April 27, 2016

# **Geotechnical Engineering Report**

# Columbia Pike Multimodal Street Improvements Arlington, Virginia



19955 Highland Vista Drive, Suite 170 Ashburn, VA 20147 Phone 703 726 8030 • www.geoconcepts-eng.com



April 27, 2016

Mr. Mike Albright Kimley-Horn & Associates, Inc. 11400 Commerce Park Drive, Suite 400 Reston, Virginia 20191

#### Subject: Geotechnical Engineering Report, Columbia Pike Multimodal Street Improvements, Arlington, Virginia (GeoConcepts Project No. 14189)

Dear Mr. Albright:

GeoConcepts Engineering, Inc. (GeoConcepts) is pleased to present the following geotechnical engineering report prepared for Columbia Pike Multimodal Street Improvements in Arlington, 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 and recommendations contained in the report.

Sincerely,

GEOCONCEPTS ENGINEERING, INC. ) madrona ernanda

Fernanda Madrona, EIT Senior Staff Engineer fmadrona@geoconcepts-eng.com



# Table of Contents

1.0 Scope of Services	1
2.0 Site Description	1
3.0 Subsurface Conditions	1
3.1 Geology	1
3.2 Stratification	
3.3 Groundwater	3
3.4 Soil Laboratory Test Results	3
3.4.1 Classification Test Results	
3.4.2 Standard Proctor and California Bearing Ratio (CBR) Test Results	4
4.0 Engineering Analysis	
4.1 Soil Design Parameters	5
4.2 Pavements	5
4.2.1 Traffic Analyses	5
4.2.2 Pavement Design Recommendations	6
4.3 Earthwork	
4.3.1 Treatment of Unsuitable Pavement Subgrade Soils	9
5.0 General Limitations	

- Figure 1: Site Vicinity Map Figure 2: Typical Edgedrain/Underdrain Details
- Figure 3: Compacted Structural Fill Diagram
- Appendix A: Subsurface Investigation
- Appendix B: Soil Laboratory Test Results
- Appendix C: Pavement Design Calculations



# 1.0 Scope of Services

This geotechnical engineering report presents the results of the field investigation, soil laboratory testing, and engineering analysis of the geotechnical data. This report specifically addresses the following:

- Recommended soil design parameters for the proposed site retaining walls.
- An assessment of subgrade conditions for support of flexible pavements, including recommended flexible pavement sections based on an estimated design California Bearing Ratio (CBR) value from soil laboratory test results and design traffic data by others.
- Earthwork recommendations for construction of loadbearing fills, including an assessment of onsite soils to be excavated for re-use as fill.

Services not specifically identified in the contract for this project are not included in the scope of services.

# 2.0 Site Description

Arlington County is planning multimodal street improvements along a 3.5-mile stretch of Columbia Pike from the Fairfax County line on the west end to South Joyce Street on the east end. Based on plans provided to us, the proposed construction consists of demolition and reconstruction of Columbia Pike in the following segments:

- Segment A: South Orme Street to about 200 feet east of South Oak Street, Stations 57+00 to 64+00.
- Segment C: South Courthouse Road to South Quinn Street, Stations 63+50 to 73+00.
- Segment D: South Garfield Street to South Courthouse Road, Stations 89+00 to 111+50.
- Segment F: South Wakefield Street to South Oakland Street, Stations 134+50 to 167+00.
- Segments H & I: South Jefferson Street to Four Mile Run, Stations 181+50 to 205+00.

In addition, proposed plans include site retaining walls, bicycle lanes, wider sidewalks, enhanced pedestrian crossings, landscaped median areas, and tree plantings.

# 3.0 Subsurface Conditions

Subsurface conditions were investigated by drilling a total of 60 test borings along the proposed roadway improvements and 14 test borings along the proposed site retaining wall areas. Test boring logs and boring location plans are presented in Appendix A of this report.

## 3.1 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.

The existing fill soils of Stratum A are believed to be related to previous site grading. The natural soils assigned to Strata B, C, D, and E are believed to be Alluvial deposits of Quaternary age, Pleistocene age terrace deposits, Potomac Group sedimentary deposits, and residual sediments derived from early Paleozoic bedrock.



The Alluvial and Terrace Deposits are granular units dominated by gravels, sands, and silts, with lesser amounts of clay distributed heterogeneously. The Alluvial materials are gray to gray-brown, and poorly stratified, while the Terrace Deposits are more highly oxidized showing lighter colors ranging from light gray to yellow and red. The Terrace Deposits tend to be more stratified than the more recent Alluvial deposits.

The Potomac Group sediments are the oldest sedimentary deposits in the Washington, DC area, and date from the Early Cretaceous Period. These sediments 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.

The bedrock underlying the site is mapped as the Indian Run Formation of the Cambrian geologic period.

## 3.2 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 subsurface materials encountered in the test borings completed at the site have been assigned to the following strata:

Stratum A (Existing Fill)	loose to very dense or soft to very stiff, POORLY GRADED SAND (SP) with gravel, clayey SAND (SC), LEAN CLAY (CL) and FAT CLAY (CH) with various amounts of sand, moist, brown, orange-brown, and gray-brown
Stratum B (Alluvial)	medium dense to very dense or stiff to very stiff, clayey SAND (SC) with gravel, LEAN CLAY (CL) and FAT CLAY (CH) with various amounts of sand, moist to wet, brown, orange-brown, and gray
Stratum C1 (Terrace Deposits)	firm to hard, LEAN CLAY (CL) and FAT CLAY (CH), with various amounts of sand, moist, gray, brown, and orange-brown
Stratum C2 (Terrace Deposits)	very loose to very dense, POORLY GRADED SAND (SP), clayey SAND (SC), and POORLY GRADED GRAVEL (GP), moist to wet, orange-brown, red, brown and white
Stratum D1 (Potomac Group) Stratum D2	soft to very stiff, LEAN CLAY (CL) and FAT CLAY (CH) with various amounts of sand, moist, brown, orange-brown, and gray
(Potomac Group)	loose to very dense, silty SAND (SM), clayey SAND (SC), and POORLY GRADED SAND (SP), moist to wet, brown, black, orange-brown, white
Stratum E1 (Residual)	loose to very dense or stiff to very hard, silty SAND (SM), clayey SAND (SC), and sandy SILT (ML), micaceous, moist, gray, orange –brown
Stratum E2 (Intermediate Geomaterial, IGM)	very dense, silty SAND (SM), moist, 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.

## 3.3 Groundwater

Groundwater level observations were made in the field during drilling. Groundwater was encountered at six boreholes during drilling, and a summary of the water level readings rounded off to the nearest 0.5 feet depth is presented below in Table 3.3-1.

Test Boring No.	Depth to Groundwater (feet)
AB-12	28.5
CRW-1	14.0
СВ-9	8.0
FRW-1	9.0
FRW-8	5.5
IRW-4A	13.0

Table 3.3-1:	Groundwater Sun	nmarv
	Orounuwater Jur	i i i i i ai y

The groundwater observations presented herein are considered to be an indication of the groundwater levels at the dates and times indicated. Where more impervious Strata B, C1, and D1 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.

## 3.4 Soil Laboratory Test Results

Selected soil samples obtained from the field investigation were tested for grain size distribution, Atterberg limits, compaction characteristics using standard effort, California Bearing Ratio (CBR), and natural moisture contents. A summary of soil laboratory test results is presented below, and the results of natural moisture content tests are presented on the test boring logs in Appendix A.

### 3.4.1 Classification Test Results

Maximum and minimum values of percent fines passing the US Standard No. 200 sieve, liquid limits, and plasticity indices for each stratum are presented below in Table 3.4.1-1. A detailed summary of soil classification test results is presented in Table B-1 in Appendix B.

Stratum	Range of % Passing #200 Sieve	Range of Liquid Limit (LL)	Range of Plasticity Index (PI)
Stratum A (Existing Fill)	22-45	32-48	16-26
Stratum B (Alluvial)	51	36	17
Stratum C1 (Terrace Deposits)	59-87	21-51	4-30

#### Table 3.4.1-1: Classification Test Results Summary



Stratum	Range of % Passing #200 Sieve	Range of Liquid Limit (LL)	Range of Plasticity Index (PI)
Stratum C2 (Terrace Deposits)	9-44	27-30	12-16
Stratum D1 (Potomac Group)	51-94	53-71	33-44
Stratum D2 (Potomac Group)	29-32	44-74	29-54
Stratum E1 (Residual)	21	53	20

### 3.4.2 Standard Proctor and California Bearing Ratio (CBR) Test Results

A total of 14 standard proctor tests (VTM-1) and CBR tests (VTM-8) were performed on bulk samples collected from the test borings. A summary of standard proctor and CBR test results is presented below in Table 3.4.2-1. Individual sample results are presented in Appendix B.

Test Boring No.	Sample Depth (ft)	Stratum	USCS/AASHTO Symbol	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Max. Swell (%)	CBR Value* (%)
AB-12	0.0-5.0	А	SC/A-2-7	123	12	0.2	12.1
AB-15	0.0-5.0	A/C2	SC/A-2-6	127	9	0.2	13.7
CRW-2	0.0-5.0	А	SC/A-6	121	13	0.3	4.7
CB-5	0.0-5.0	C1	CL/A-7-6	124	11	2.4	2.1
CB-8	0.0-5.0	C2	SC/A-6	113	15	0.9	1.6
DB-2	0.0-5.0	C1	CH/A-7-6	127	9	5.4	2.5
DB-6	0.0-5.0	C2	SC/A-2-6	129	8	0.8	9.0
DB-10	0.0-5.0	C2	SC/A-6	124	10	0.2	16.0
FB-2	0.0-5.0	D2	SC/A-2-7	131	9	0.1	9.9
FB-9	0.0-5.0	В	CL/A-6	115	14	2.5	4.3
FB-18	0.0-5.0	C1	CL/A-4	97	25	5.1	2.3
HB-5	0.0-5.0	D2	SC/A-2-7	115	13	1.2	8.0
IB-2	0.0-5.0	D1	CH/A-7-6	112	15	3.8	4.3
IB-9	0.0-5.0	D2	SC/A-2-7	129	9	1.6	8.8

#### Table 3.4.2-1: Standard Proctor and CBR Test Results Summary

\* CBR values correspond to 0.1-inch penetration, performed on a sample compacted to 95% compaction.

# 4.0 Engineering Analysis

Recommendations regarding soil design parameters, pavements, and earthwork are presented herein.



## 4.1 Soil Design Parameters

Recommended soil design parameters to be used for this project are presented in Table 4.1-1 herein.

	Total Unit	Angle of Internal	Latera C	Coefficient		
Stratum	Weight (pcf)	Friction (degrees)	Active (Ka)	At-Rest (Ko)	Passive (Kp)	of Sliding Friction
Stratum A (Existing Fill)	125	30	0.33	0.50	3.00	0.35
Stratum B (Alluvial)	120	28	0.36	0.53	2.77	0.35
Stratum C1 (Terrace Deposits)	120	28	0.36	0.53	2.77	0.30
Stratum C2 (Terrace Deposits)	125	32	0.31	0.47	3.25	0.40
Stratum D1 (Potomac Group)	120	20	0.49	0.66	2.04	0.30
Stratum D2 (Potomac Group)	125	34	0.28	0.44	3.54	0.40
Stratum E1 (Residual)	125	30	0.33	0.50	3.00	0.35
Stratum E2 (IGM)	130	38	0.24	0.38	4.20	0.50

Table 4.1-1: Recommended Soil Design Parameters

## 4.2 Pavements

Pavement subgrades are expected to consist of existing fill, natural soils, or new compacted fill. These materials are generally considered suitable for support of the planned roadways. However, where pavement subgrades consist of unsuitable soils (soft or loose soils with a SPT blow count less than 5, soils classified as CH, MH, OH and OL in accordance with the Unified Soil Classification System (USCS), and soils with a CBR value less than 5), we recommend undercutting the unsuitable soil to a depth of at least 3 feet and backfilling with new compacted fill with a minimum CBR value of 5 in accordance with Section 303.04(b) paragraph 5 of the VDOT Road and Bridge Specifications. Recommendations regarding new compacted fill are presented in Section 4.3 of this report, and specific locations where unsuitable soils are expected along the proposed roadways are presented in Section 4.3.1 of this report.

### 4.2.1 Traffic Analyses

A pavement design was performed using the traffic data and information provided in the Columbia Pike Multimodal Street Improvements Transportation Study dated June 2012. Columbia Pike is classified as an undivided primary route. The proposed pavement will have 10 to 11 feet wide lanes in each direction. We have used the traffic data summary presented in Table 4.2.1-1 for pavement section design.

Design Decemptor	Flexible Pa Design		Rigid Pavement Design Value	
Design Parameter	Segments A, C, D, and F	Segments H and I	Segments A, C, D, and F	Segments H and I
Highway Classification	Undivided Prin	nary Route <sup>(1)</sup>	Undivided Prim	nary Route <sup>(1)</sup>
Design Years	20(	1)	<b>30</b> <sup>(1</sup>	.)
Two Way ADT (2018)	31,525 <sup>(2)</sup> 31,955 <sup>(2)</sup>		31,525(2)	31 <b>,</b> 955 <sup>(2)</sup>

Table 4.2.1-1: Design Values for Pavement Section Design



Design Denometer	Flexible Pa Design		Rigid Pavement Design Value		
Design Parameter	Segments A, C, D, and F	Segments H and I	Segments A, C, D, and F	Segments H and I	
Percent Trucks (Class 5 or Greater)	<b>5</b> <sup>(3)</sup>		<b>5</b> <sup>(3)</sup> <b>5</b> <sup>(3)</sup>		
Traffic Growth Rate (%)	0.21 <sup>(1)</sup> 0.38 <sup>(1)</sup>		0.21(1)	0.38(1)	
Number of Lanes in Design Direction	2(1)		2(1)		
Lane Distribution Factor	90 <sup>(4)</sup>		90 <sup>(</sup>	))	
Average Initial Truck Factor (ESALs/Truck)	1.05(4)		1.59	(4)	
Obtained ESALs based on the data above	5,550,524	5,718,512	12,741,724	13,241,836	

Notes:

<sup>(1)</sup> From Multimodal Street Improvements Transportation Study dated June 2012

 $\ensuremath{^{(2)}}$  Estimated from the information provided

<sup>(3)</sup> Assumed for design

<sup>(4)</sup> Values from VDOT Pavement Design Standards

#### 4.2.2 Pavement Design Recommendations

Pavement sections were designed according to the 1993 AASHTO Guide for Design of Pavement Structures taking into consideration the laboratory tests results from 14 California Bearing Ratio (CBR) tests performed under this contract. Table 4.2.2-1 below presents the average California Bearing Ratio (CBR) test results and the recommended design CBR value for each section. Design roadbed soil resilient modulus and mean effective K-value used for the pavement design are also presented in Table 4.2.2-1.

Roadway	Average CBR	2/3 of Average CBR	Design CBR used for Pavement Design <sup>(1)</sup>	Soil Resilient Modulus (psi) <sup>(2)</sup>	Mean Effective K-value (psi/inch) <sup>(3)</sup>
Segment A	12.9	8.6			
Segment C	2.8	1.9 <sup>(4)</sup>			
Segment D	9.2	6.1	3.33	5,000	257
Segment F	5.5	3.7			
Segment H/I	7.0	4.7			

#### Table 4.2.2-1: Recommended Pavement Subgrade Design Parameters

Notes:

<sup>(1)</sup> Design CBR for Pavement Design = 5\*2/3 = 3.33

<sup>(2)</sup> Soil Resilient Modulus =  $1500 \times CBR$ 

<sup>(3)</sup> Mean effective K-value (k-value) = Mr/19.4, max 500 psi/inch

<sup>(4)</sup> Undercut and replacement of soils with CBR>5 is recommended per Section 4.3.1 of this report

If fill placed at the site is generated from off-site borrow areas, the actual CBR value for the pavement subgrades may be significantly different from the value presented herein. Therefore, CBR tests should be performed on the in-place subgrade after rough grading and installation of utilities within roadways. Final pavement sections should be based on CBR tests taken on subgrade soils at the time of construction.

Additional pavement design parameters used for the flexible pavement and rigid pavement design are presented in Table 4.2.2-2 herein.



Design Parameter	Flexible Pavement Design Value	Rigid Pavement Design Value
Initial Serviceability	4.2	4.5
Terminal Serviceability	2.8	2.8
Standard Deviation	0.49	0.39
Reliability	90%	90%

#### Table 4.2.2-2: Pavement Design Parameters

Based on the estimated design CBR, resilient modulus value, and traffic loading, the following flexible and rigid pavement sections are recommended below in Table 4.2.2-3. Pavement design calculations are presented in Appendix C of this report.

Roadway	Segments A, C, D, and F	Segments H and I			
Flexible Pavement Layer	Thickness (inch	es)			
SM-9.5	2.0	2.0			
BM-25.0	8.0	8.0			
Aggregate Base Material Type I, No. 21A	12.0	12.0			
Rigid Pavement Layer	Thickness (inches)				
JPCP	10	10			
Aggregate Base Material Type I, No. 21A	6	6			
Minimum Percent Steel Reinforcement Required	0.1 (WWF placed at mid-depth	n of the concrete)			
Dowel Requirements	1-inch diameter smooth dowel along transferred length, 12-inch O.C., placed at mid-he coated rebar is recommended to	eight of concrete. Epoxy-			

#### Table 4.2.2-3: Recommended Pavement Sections

Proper drainage is imperative in the design and construction of flexible pavements. The aggregate base material, Type I, size No. 21A should be connected to a longitudinal pavement drain (UD-4) with outlets or is daylighted to provide for positive lateral drainage. Depending on the bridge profile, a transverse cross-drain (CD-2) may also be placed at the bridge approaches. Typical edgedrain/underdrain details are presented as figure 2 at the end of this report. The roadway shoulder or adjacent ground should be graded so that surface drainage runs away from the pavement and does not stand on the pavement's edge. The overall pavement design should also include suitable storm inlets and diversion structures for collecting surface runoff and to limit excessive ponding on paved surfaces.

Construction loading conditions may be more severe than post-construction conditions and typically occurs prior to placement of the total pavement sections. Construction traffic activity on partially constructed pavement sections may result in subgrade and pavement failures due to the reduced support qualities of a partial section and the relatively heavy loads associated with construction traffic. Accordingly,



consideration should be given to the construction of designated haul roads where the thickness of the granular subbase and/or asphalt base course has been increased to account for the heavier-loaded construction traffic. We suggest that placement of the asphalt surface course not occur until all the major construction has been completed for pavement areas subjected to construction traffic.

## 4.3 Earthwork

Fill may be required for site grading in pavement areas and as backfill against retaining walls. Unsuitable existing fill, soft or loose natural soils, organic material, and rubble should be stripped to approved subgrades as determined by the geotechnical engineer. Asphalt, crushed stone, and concrete depths presented on the boring logs should not be considered as stripping depths, as stripping depths may vary widely across the site. Stripping depths will probably extend to greater depths due to the presence of minor amounts of organics, roots, and other surficial materials that will require removal as a part of the stripping operations. In addition, seasonal soil moisture variations can affect stripping depths. In general, less stripping may occur during summer months when drier weather conditions can be expected. The depth of required stripping should be determined prior to construction by the excavation contractor using test pits, probes, or other means that the contractor wishes to employ, and this determination should be the responsibility of the excavation contractor. All subgrades should be proofrolled with a minimum 20 ton, loaded dump truck or suitable rubber tire construction equipment approved by the geotechnical engineer, prior to the placement of new fill.

For pavement areas, the new fill should extend at least 2 feet outside pavement edges, as illustrated by Figure 3 at the end of this report. Fill material should be placed in lifts not exceeding 8 inches loose thickness, with fill materials compacted by hand operated tampers or light compaction equipment placed in maximum 4-inch thick loose lifts. Fill should be compacted at +/- 2% of the optimum moisture content to at least 95 percent of the maximum dry density per VTM-1. The upper 6 inches of pavement subgrades should be compacted to at least 100 percent of the maximum dry density per the same standard.

Materials used for compacted fill should consist of soils classifying SC, SM, SP, SW, GC, GM, GP, or GW per ASTM D-2487, with a maximum dry density greater than 105 pcf. Materials used for backfill against walls below grade should consist of soils classifying SM, SP, SW, GM, GP, or GW, with a liquid limit and plasticity index less than 40 and 15, respectively. It is expected that portions of the soils excavated at the site will be suitable for re-use as fill based on classification. However, the Stratum A existing fill may not be suitable for re-use as new compacted fill due to deleterious man-made materials in the fill. In addition, drying of excavated soils by spreading and aerating may be necessary to obtain proper compaction. This may not be practical during the wet period of the year. Accordingly, earthwork operations should be planned for early Spring through late Fall, when drier weather conditions can be expected. Individual borrow areas, both from on-site and off-site sources, should be sampled and tested to verify classification of materials prior to their use as fill.

Fill materials should not be placed on frozen or frost-heaved soils, and/or soils that have been recently subjected to precipitation. All frozen or frost-heaved soils should be removed prior to continuation of fill operations. Borrow fill materials should not contain frozen materials at the time of placement.

Compaction equipment that is compatible with the soil type used for fill should be selected. Theoretically, any equipment type can be used as long as the required density is achieved; however, sheepsfoot roller equipment are best suited for fine-grained soils and vibratory smooth drum rollers are best suited for granular soils. Ideally, a smooth drum roller should be used for sealing the surface soils at the end of the day or prior to upcoming rain events. In addition, compaction equipment used adjacent to walls below grade should be selected so as to not impose undesirable surcharge on walls. All areas receiving fill should be graded to facilitate positive drainage of any water associated with precipitation and surface run-off.

For utility excavation backfill, we recommend that open graded stone be used to backfill the pipe trench to the spring line of the pipe. Backfill should be compacted in lifts not exceeding 6 inches loose thickness, to at least 95 percent of the maximum dry density per VTM-1. Hand operated compaction equipment should



be used until the backfill has reached a level 1 foot above the top of the pipe to prevent damaging the pipe. Also, backfill material within 2 feet of the top of the pipe should not contain rock fragments or gravel greater than 1-inch in diameter.

After completion of compacted fill operations in retaining wall or pavement areas, construction of building elements or asphalt should begin immediately, or the finished subgrade should be protected from exposure to inclement weather conditions. Exposure to precipitation and freeze/thaw cycles will cause the finished subgrade to soften and become excessively disturbed. If development plans require that finished subgrades remain exposed to weather conditions after completion of fill operations, additional fill should be placed above finished grades to protect the newly placed fill. Alternatively, a budget should be established for reworking of the upper 1 to 2 feet of previously placed compacted fill.

### 4.3.1 Treatment of Unsuitable Pavement Subgrade Soils

The majority of on-site soils are suitable as pavement subgrade materials. However, soft or loose soils with a SPT blow count less than 5, soils classified as CH, MH, OH and OL in accordance with the Unified Soil Classification System (USCS), and soils with a CBR value less than 5 are not considered suitable for direct support of the proposed roadway. Removal and replacement of these unsuitable soils are recommended to limit potential total and differential settlement of pavements and structures. Table C-1 in Appendix C presents specific locations where unsuitable soils were encountered along the project alignment. In areas where no treatment is required, subgrade soils shall be dried or wetted to attain an appropriate range of moisture content for compaction purposes, prior to placement of aggregate base course.

## 5.0 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. It is critical to the successful completion of this project that GeoConcepts be retained during construction to observe the implementation of the recommendations provided herein.

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 recommendations presented herein.

An allowance should be established for additional costs that may be required for foundation and earthwork construction as recommended in this report. Additional costs may be incurred for various reasons including wet fill materials, soft subgrade conditions, unexpected groundwater problems, rock excavation, etc.

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 engineering 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."



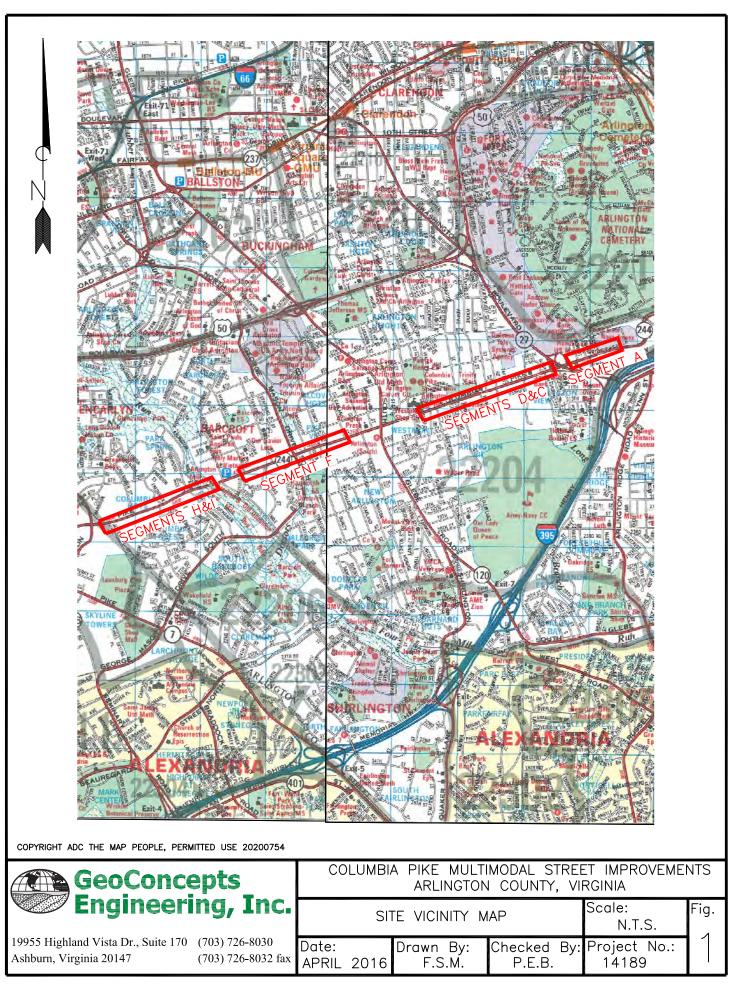
This report was prepared in accordance with generally accepted geotechnical engineering practices. No warranties, expressed or implied, are made as to the professional services included in this report.

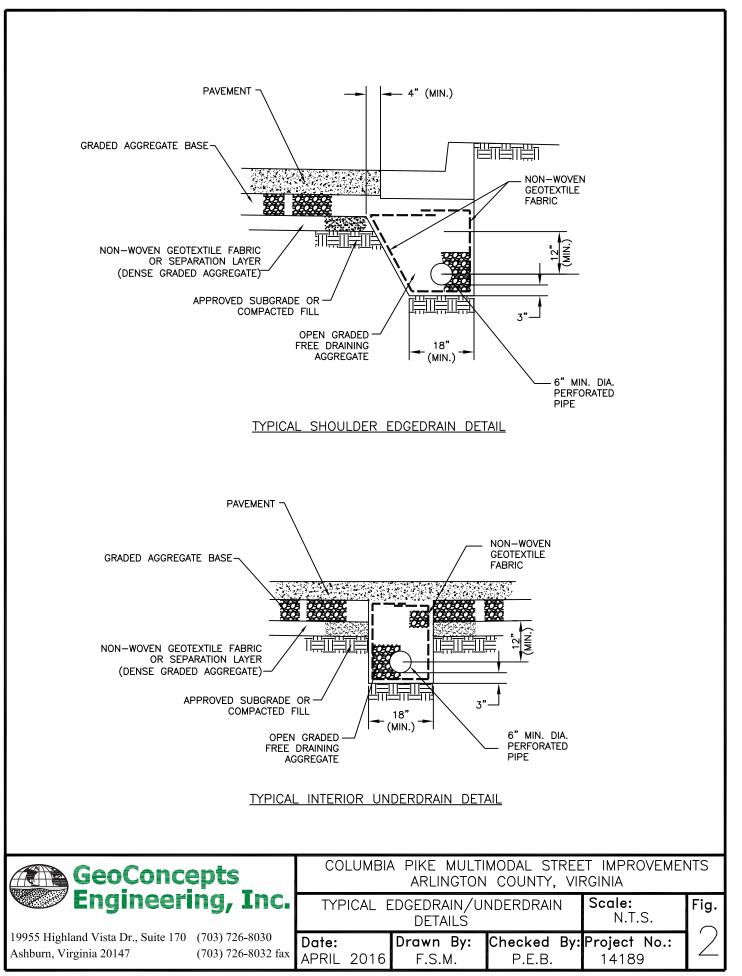
We appreciate the opportunity to be of service for this project. Please contact the undersigned if you require clarification of any aspect of this report.

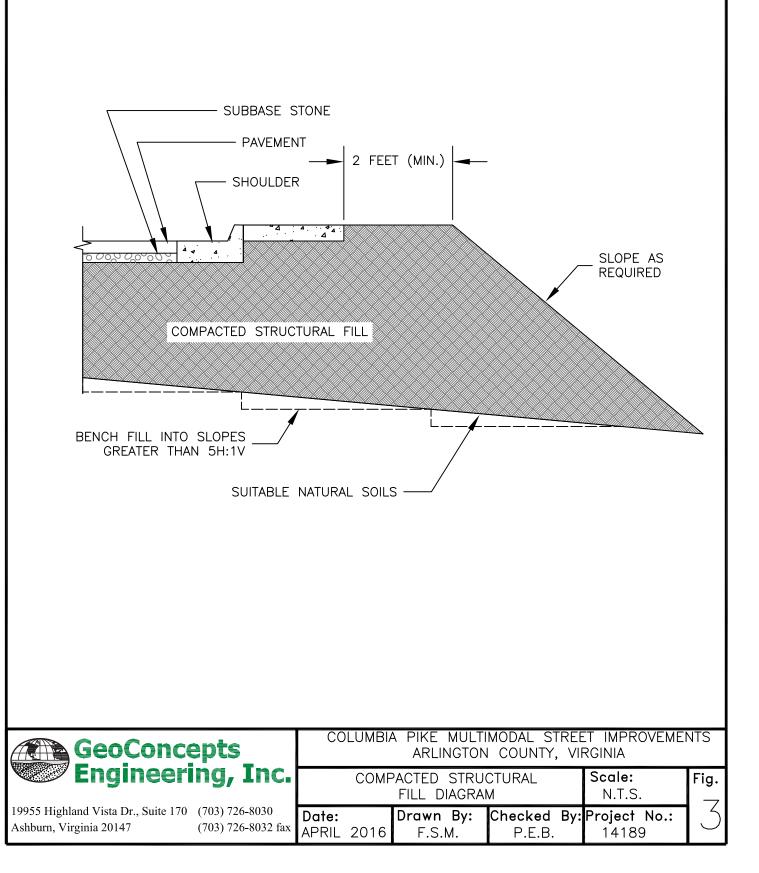
Sincerely,

GEOCONCEPTS ENGINEERING, INC. Madrona Fernanda Madrona, EIT Senior Staff Engineer UL E. BURK Lic. No. 02155 Paul E. Burkart, PE Principal ON 6444

MS/FM/SU/PEB/shm N:\PROJECTS\Active 14 Projects\14189, Columbia Pike\Final\Columbia Pike Multimodal Street Improvements Geotechnical Report.docx









## Appendix A Subsurface Investigation

Subsurface Investigation Procedures (1 page) Identification of Soil (1 page) Test Boring Notes (1 page) Hand Auger Boring Notes (1 page) Test Boring Logs (75 pages) Pavement Core Photographs (61 pages) Boring Location Plans, Figures A.1 through A.11 (11 pages)



## Subsurface Investigation Procedures

#### 1. Test Borings – Hollow Stem Augers

The borings are advanced by turning an auger with a center opening of 2-1/4 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., 1-3/8 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 inches, whichever occurs first. The sampling operation is terminated after a total of 100 hammer blows and the depth of penetration is recorded.

#### 3. Hand Auger Borings

Hand auger borings HA-2, HA-3, HA-4, and HA-19 were advanced using a 3-inch diameter auger attached to steel rods and handle extensions. The auger is manually advanced from the ground surface with excavated soil removed from the borehole with each pass of the auger.

#### 4. Test Boring Stakeout

The test boring stakeout was provided by GeoConcepts personnel using available site plans. If the risk related to using approximate boring locations is unacceptable, we recommend an as-drilled survey of boring locations and elevations be completed by a licensed surveyor.



## Identification of Soil

I. DEFINITION OF	SOIL GROUP NAMES	ASTM D-2487	Symbol	Group Name		
	Gravels	Clean Gravels	GW	WELL GRADED GRAVEL		
Coarse-Grained Soils	More than 50% of coarse	Less than 5% fines	GP	POORLY GRADED GRAVEL		
More than 50%	fraction	Gravels with Fines	GM	silty GRAVEL		
retained	retained on No. 4 sieve	More than 12% fines	GC	clayey GRAVEL		
on No. 200 sieve		Clean Sands	SW	WELL GRADED SAND		
	Sands	Less than 5% fines	SP	POORLY GRADED SAND		
	50% or more of coarse fraction passes No. 4 sieve	Sands with fines	SM	silty SAND		
	hacton passes no. + sieve	More than 12% fines	SC	clayey SAND		
		Inorganic	CL	LEAN CLAY		
	Silts and Clays Liquid Limit less than		ML	SILT		
Fine-Grained Soils	50	Organic	OL	POORLY GRADED GRAVEL silty GRAVEL clayey GRAVEL WELL GRADED SAND POORLY GRADED SAND silty SAND clayey SAND LEAN CLAY SILT ORGANIC CLAY ORGANIC SILT		
50% or more passes the No. 200 sieve	50			ORGANIC SILT		
the No. 200 sieve		Inorganic	СН	FAT CLAY		
	Silts and Clays		МН	ELASTIC SILT		
	Liquid Limit 50 or more	Organic	ОН	WELL GRADED GRAVEL POORLY GRADED GRAVEL silty GRAVEL clayey GRAVEL WELL GRADED SAND POORLY GRADED SAND silty SAND clayey SAND LEAN CLAY SILT ORGANIC CLAY ORGANIC SILT FAT CLAY ELASTIC SILT ORGANIC CLAY ORGANIC SILT		
				ORGANIC SILT		
Highly Organic Soils	Primarily organic matter, dark	in color, and organic odor	РТ	PEAT		

#### II. DEFINITION OF MINOR COMPONENT PROPORTIONS

Minor Component	Approximate Percentage of Fraction by Weight
Gravelly, Sandy (adjective)	30% or more coarse grained
Sand, Gravel	15% to 29% coarse grained
Silt, Clay	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 IGM	Boulders are considered pieces of rock larger than 12 inches, while cobbles range from 3 to 12 inches. Residual rock material with a standard penetration test (SPT) resistance of at least 60 blows per foot.
ROCK/SPOON REFUSAL ROCK FRAGMENTS	Rock material with a standard penetration test (SPT) resistance of 50 blows for 1 inch. Angular pieces of rock which have separated from original vein or strata and are present in a soil
QUARTZ	matrix. Only used in residual soils 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	$\frac{1}{2}$ 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.



## **Test Boring Notes**

- 1. Classification of soil is by visual inspection and is in accordance with ASTM D-2488.
- 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.
- 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. Intermediate Geomaterial (IGM) is defined as residual earth material with a penetration resistance between 60 blows per foot and refusal. Spoon refusal at the surface of rock, boulders, or obstructions is defined as a penetration resistance of 50 blows for 0 inches penetration. Auger refusal is taken as the depth at which further penetration of the auger is not possible without risking significant damage to the drilling equipment.



## Hand Auger Boring Notes

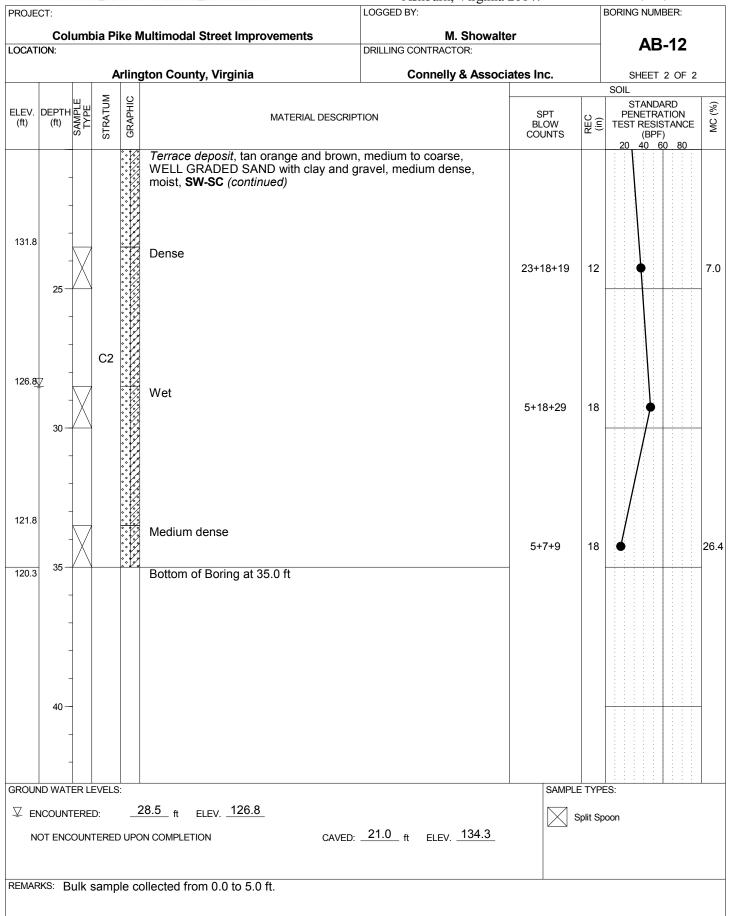
- 1. Classification of soil is by visual inspection and is in accordance with the Unified Soil Classification System. Soil classification symbols are in accordance with ASTM D-2488.
- 2. Estimated groundwater levels are indicated on the log. These are only estimates from available data and may vary with precipitation, porosity of soil, site topography, etc.
- 3. Sampling data presents Dynamic Cone Penetration (DCP) values for 1-3/4 inch intervals.
- 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, water 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 locations.
- 6. Refusal depths on the hand auger logs are the depths at which obstructions were encountered and the hand auger could no longer be advanced.

9955 Highland Vista Dr., #170	Phor
chhum Virginio 20147	Fax.

ne: (703) 726-8030 (703) 726-8032 faz

		Eng	giı	ne	eri	ng, In	C.		19 As	955 Highland V hburn, Virginia	vista D 20147	r., #170 '	0	Phone Fax: (			
PROJECT:								LOGGED BY:					BORING	NUME	BER:		
Columbia Pike Multimodal Street Improvements							S		M. Showalt	er				۸P	12		
LOCAT									DRILLING CO	ONTRACTOR:				- AB-12			
014/115								onnelly & Assoc	iates Ir			SHEET 1 OF 2					
OWNE	R/CLIEP												res drilled:				
PRO.IF			limle	y-Ho	rn and	Associates, GROUND SURF		ION (ft)	DRILLING MI		K. Kersh         3/8/16 - 3/8/1           HOD:         OFFSET NOTES:					6	
		141	00				155.3										
								SOIL									
ELEV. (ft)	DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC			MATERIA	AL DESCRIPT	TION		BL	SPT Low UNTS	REC (in)	E STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80		MC (%)	
155.3 154.9						lt = 0.38ft. ete = 0.6ft.					-					· · · ·	
154.3			*			ange, fine to	medium, c	layey SAN	ND, mediur	n dense,	3+6	;+7+9	24				
	5-										3+5	5+6+7	24	•			16.1
											4+7	′+7+7	24				14.9
											4+5	5+6+5	24	•			
	10 -		A								4+5	÷+5+6	24				_
	15 -										7+1	1+13	18				_
	· ·	-															
136.8		V	C2		WELL	e <i>deposit</i> , tar GRADED S/ <b>SW-SC</b>	n orange a AND with c	nd brown, lay and g	, medium to ravel, med	o coarse, ium dense,	14+	15+11	18				
	ND WAT				_		•				_	SAMPLE	E TYPE	ES:		_	
N		OUNTE	ERED	UPON	COMPL			CAVED:	ft	elev. <u>134.3</u>		S (	Split Sp	ioon			
REMAF	rks: E	ulk sa	ampl	e coll	ected	from 0.0 to 5	.0 ft.										

19955 Highland Vista Dr., #170 Ashburn, Virginia 20147 Phone: (703) 726-8030 Fax: (703) 726-8032 fax



BOREHOLE/TEST PIT COLUMBIA PIKE MULTIMODAL STREET IMPROVEMENTS LOGS.GPJ GEOCONCEPTS TEMPLATE 02-12-2015.GDT 4/22/16

19955 Highland Vista Dr., #170	Pho
Ashburn, Virginia 20147	Fax:

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJE	CT:			LOGGED BY:				BORING	NUM	BER:	
	Columbia Pi	ke Multimo	odal Street Improvements	M. Showate	er					40	
LOCAT	ION:		·	DRILLING CONTRACTOR:				AB-13			
	А	rlington Co	ounty, Virginia	Connelly & Associ	Connelly & Associates Inc. SHEET 1 OF 1						
OWNE	R/CLIENT:			DRILLER:	DATES DRILLED:						
	Kimle		3	/8/16 -	3/8/1	6					
PROJE	CT NUMBER:		GROUND SURFACE ELEVATION (ft):	K. Kersh DRILLING METHOD:		OFFSET				-	
	14189		153.6	Automatic hammer 3.25"	HSA						
		O						SOIL			
ELEV. (ft)	STRATUM	GRAPHIC	MATERIAL DESCRIP	TION	BL	SPT LOW UNTS	REC (in)	PEN TEST	RESIS (BPF	TION TANCE	MC (%)
153.6		-	alt = 0.55ft.								
152.4		a	rete = 0.575ft. hed stone = 0.25ft.								
	1 IVE		rown tan and red, fine, clayey SA	ND medium dense	7.14	+13+8	18				
150.6		moist		,,	1 1 1	+13+0	10				
	$1$ $\overline{M}$	<i>Fill</i> , g	ray and orange, fine, sandy LEAN	I CLAY, stiff, moist, <b>CL</b>							
140.0					6+3	+6+4	24	1			13.7
148.6	5 A	🐹 <i>Fill</i> , b	prown and gray, medium, clayey S	AND, loose, moist, <b>SC</b>							-
					2+2	+2+2	4				
					2.2			T			
146.6		🕅 Oran	ge, medium to coarse, medium de	ense							
			g - ,		2+4	+6+8	24				
					2.1		24	T			
144.6		Terra	ce deposit, orange, medium to co	arse, clavev SAND.							
	10-X C2	medi	um dense, moist, <b>SC</b>		5171	11+16	24				
					5-7-	11+10	24				
142.6		Botto	m of Boring at 11.0 ft								
	_										
	15										-
GROU	ND WATER LEVELS					SAMPLE	TYPE	ES:			
N	OT ENCOUNTERED	DURING DRII	LLING				Split Sp	non			
				<u>7.0 ft ELEV. 146.6</u>		KN °	γni Oþ	001			
	OT ENCOUNTERED		CAVED:	IL ELEV							
REMAR	RKS: Bulk samp	le collected	d from 0.0 to 5.0 ft.			1					-+

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

19955 Hi	ghland Vista Dr., #170	H
	Virginia 20147	H

PROJE	CT:				-	LOGGED BY:				BORING	S NUM	IBER:		
	Colur	nbia P	ike M	ultimo	dal Street Improvements	M. Showat	er							
LOCAT						DRILLING CONTRACTOR:					AB	8-14		
		A	Arling	ton Co	unty, Virginia	Connelly & Assoc	iates Ir	IC.		s	HEET	1 OF 1		
OWNE	R/CLIENT:					DRILLER:		DATES	DRILL	ED:				
		Kim	ey-H	orn and	d Associates, Inc.	K. Kersh 3/8/16 - 3/8/16								
PROJE	PROJECT NUMBER: GROUND SURFACE ELEVATION (ft): DRILLING METHOD: OFFSET NOT													
	1	4189			151.8	Automatic hammer 3.25"	' HSA							
		Σ	U						1	SOIL				
ELEV.	DEPTH (ft)	TYPE STRATUM	GRAPHIC		MATERIAL DESCRIF	PTION		PT	0		TAND	ATION	MC (%)	
(11)	SAI (II)	STR	GRV					.OW UNTS	(in) BEC		(BPF	STANCE	M	
151.8				Aspha	alt = 0.55ft.					20	40 6	<u>50 80</u>		
151.3 150.7					rete = 0.575ft.		1							
	1   [	/		<i>Fill</i> , gr	ay and orange, clayey SAND, m	edium dense, moist, <b>SC</b>	1							
	-  >	$\langle  $					7+9+	11+13	24				10.5	
148.7														
	1	7 *		<i>Fill</i> , or	ange, LEAN CLAY with sand, ve	ery stiff, moist, <b>CL</b>								
	-  >	$\langle  $					5+8+	10+13	24	🄶				
146.7	5-	$\backslash$												
		Λ		Terrac	ce deposit, orange and gray, fine	, clayey SAND, medium								
		$\langle  $		uense	e, moist, <b>SC</b>		8+14	+16+21	24					
144.7		$\mathbf{N}$												
	N	Λ		Orang	e and white, medium to coarse,	with gravel, dense								
		(   C2					9+17	+14+12	24	l i g				
142.7		1								: :/				
	N	Λ		Mediu	im dense									
	10-	$\langle  $					3+8	+8+12	24	•			-	
	I 12	$\backslash$												
140.7				Bottor	n of Boring at 11.1 ft									
	15 —												-	
	-													
GROUN	ND WATER		S:					SAMPLE	TYPE	ES:				
N	OT ENCOL	INTERE	D DURI	NG DRILI	LING				plit Sp	oon				
N	OT ENCOL	INTERFI		N COMPI		<u>5.5 ft ELEV.</u> 146.3			, op					
			_ 0.0											
REMAR	RKS:							1					-	

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

19955 Highland Vista Dr., #170	]
Ashburn Virginia 20147	]

PROJE	CT:			LOGGED BY:	2011/		1	BORING	NUMBER:		
	Columbia Pi	ke Multim	odal Street Improvements	M. Showate	er						
LOCAT	ION:			DRILLING CONTRACTOR:					AB-15		
	A	rlington C	ounty, Virginia	Connelly & Assoc	iates Ir	IC.		SH	EET 1 OF	1	
OWNE	OWNER/CLIENT: DRILLER: DATES DRILL										
	Kimley-Horn and Associates, Inc. K. Kersh 3										
PROJE	CT NUMBER:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSET					
	14189		148.6	Automatic hammer 3.25"	HSA						
		0						SOIL			
ELEV. (ft)	STRATUM	GRAPHIC	MATERIAL DESCRIP	TION	BL	PT .OW JNTS	REC (in)	PENE TEST R	ANDARD ETRATION RESISTANC (BPF) 10 60 80	ы (%) МС (%)	
148.6 148.1			nalt = 0.5ft.								
147.5	1 + /		crete = 0.58ft.		_						
145.6	- A	mois	orange, coarse, clayey SAND with st, <b>SC</b>	gravel, medium dense,	6+10-	+12+14	24	•		10.1	
140.0		Terr med	<i>ace deposit</i> , orange, medium, clay ium dense, moist, <b>SC</b>	ey SAND with gravel,	1+10-	+11+12	24	•		14.2	
143.5	5	Coa	rse		8+11	+13+14	24				
	C2				6+8-	+9+11	24				
	10-				5+5+	13+15	24				
137.6	1	Botte	om of Boring at 11.0 ft								
	-										
	15										
	15										
	-										
	-										
GROUN	ND WATER LEVELS	 ::			1	SAMPLE	i Type	ES:			
	OT ENCOUNTEREE			<u>5.0</u> ft ELEV. <u>143.6</u>		X  S	plit Sp	oon			
REMAF	RKS: Bulk samp	le collecte	d from 0.0 to 5.0 ft.			1					

9955 Highland Vista Dr., #170	Ph
chhurn Virginia 20147	Fa

hone: (703) 726-8030 ax: (703) 726-8032 faz

Engineering, Inc.							19955 Highland Ashburn, Virginia	0	Phone: (703) 726-803 Fax: (703) 726-8032								
PROJE	CT:						LOGGED BY:				BORIN	ig nun	IBER:				
		lumb	oia Pi	ike N	lultimod	dal Street Improvements	M. Showa	ter				ΔF	8-16				
LOCAT	ION:						DRILLING CONTRACTOR:										
OWNE	R/CLIEN	IT:	4	Arling	ton Co	unty, Virginia	Connelly & Asso	ciates l		DRILL	SHEET 1 OF 1 RILLED:						
			Kiml	م. س	orn and	l Associates, Inc.	K. Kersh										
PROJE				cy-11	ornand	GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE			- 5/0/	10				
		14 <sup>.</sup>	189			146.2	Automatic hammer 3.25	" HSA									
	STRATUM (tt) GRAPHIC GRAPHIC										SOIL						
ELEV. (ft)	DEPTH (ft)	SAMPLI	STRATUM	GRAPHIC		MATERIAL DESCRI	PTION	В	SPT LOW JUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80		æ S				
146.2		Asphalt = 0.5ft. Concrete = 0.75ft.						_									
144.9	1					ete = 0.75tt. own, clayey SAND, loose, moist	SC	_									
		V			<i>i iii</i> , oi		., 60	1+1	0+2+5	18				10.4			
140.0								17.	1+3+3+5 18					10.4			
142.9	_	$\square$			Fill, or	ange and brown, LEAN CLAY, v	very stiff, moist, CL	-									
		181	А					3+8	+10+5	12							
	5-	Ш									$\vdash$	· · · ·					
		$\mathbb{N}$								10		· · · ·					
139.2								8+、	3+4+3	18	T						
138.9		$\left( \right)$				ins intact clay brick ce deposit, gray, fine, sandy silty	CLAY contains	/									
136.9			C1			ics, soft, moist, <b>CL-ML</b>	CLAT, contains	1+'	1+1+1	24 0				18.5			
100.9		$\left[ \right]$			Terrac	ce deposit, gray, fine to coarse, o	clayey SAND with gravel,	1									
	10-		C2		loose,	moist, SC		1+3	3+7+9	12	•						
134.9					Botton	n of Boring at 11.3 ft						· · · ·					
												· · · ·					
		$\left  \right $															
	15 -													:			
												· · · ·					
GROU	ND WAT	ERLE	EVELS	S:					SAMPL	E TYPE	ES:		1 : :				
					ING DRILL N COMPL		<u>6.5</u> ft ELEV. <u>139.7</u>			Split Sp	oon						
REMAR	RKS:								1								

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

955 Highland Vista Dr., #170	Phone:
bhurn Virginia 20147	Fax: (7

(703) 726-8030 03) 726-8032 faz

Engineeri	ng, Inc.	19955 Highland Vi Ashburn, Virginia 2	Phone: (703) 726-803 Fax: (703) 726-8032							
PROJECT:		LOGGED BY:	BORING NUMBER:							
Columbia Pike Multimoo	dal Street Improvements	L. Pugh		CRW-1						
Columbia Pike	, Arlington , VA	Connelly & Associa	ssociates, Inc. SHEET 1 OF 1							
WNER/CLIENT:		DRILLER:	DATES DRILLED:							
	Associates, Inc.	K. Kersh				5 - 2/27	/15			
ROJECT NUMBER:	GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	0	FFSET NO	TES:					
14189	NOT SURVEYED	2.25" H.S.A			SO					
(#) A SAMPLE TYPE STRATUM GRAPHIC	MATERIAL DESCRIPTION		SPT BLO\ COUN	w WITS	E TE	STAND PENETRA ST RESIS (BPF 0 40 6	ATION STANCE	MC (%)		
			9+9+ 4+9+ 14+12	10 1	2			9.2		
			5+6+			/				
15 Bottom of Bo	oring at 15.0 ft		4+7+	-4 4				_		
OUND WATER LEVELS:										
NOT ENCOUNTERED: <u>14.0</u> ft NOT ENCOUNTERED UPON COMPL	LETION CAVED: <u>8.0</u> ft			Split	Spoon					

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

19955 Highland Vista Dr., #170	Phone: (7
Ashburn Virginia 20147	Fax: (703

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJE	ECT:					LOGGED BY:				BORING NUMBER:					
10047		olun	nbia	Pike Multimo	dal Street Improvements	L. Pugh				(		W-2			
LOCAT	HON:			alumbia Dika	Arlington VA	DRILLING CONTRACTOR:	-4 1								
OWNE	R/CLI	IENT:	Ľ		e, Arlington , VA	Connelly & Associa	ates, II	DATES	DRILLE		IEEI	1 OF 1			
PROJE	ECT N	UMBE		imley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	K. Kersh DRILLING METHOD:		OFFSE		<b>:7/15 -</b> : Es:	2/27	/15			
		1	4189	)	NOT SURVEYED	2.25" H.S.A	1								
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BL	PT _OW UNTS	REC (in)	PEN TEST F	RESIS (BPF	TION TANCE	MC (%)		
		A		Asphalt = 0. Concrete = 0 <i>Fill</i> , brown, f Medium der	0.4ft. , clayey SAND, loose, moist, <b>SC</b>	/		5+5 7+7	14 14	•	+0 0		4.2		
5-	-				<i>osit</i> , brown, f-c, clayey SAND, mo	edium dense, moist, <b>SC</b>	6+!	9+16	1						
10-		C2		Orange - bro	own		5+	5+8	18						
15-				With gravel Bottom of B	oring at 15.0 ft		9+9	9+16	10		· · · · · · · · · · · · · · · · · · ·		-		
20 -	-												_		
25-	_										· · · · · · · · · · · · · · · · · · ·		-		
	_														
N	IOT EI	NCOU	NTER	ED DURING DRIL ED DURING DRIL ED UPON COMPI nple from 0' to	LETION CAVED: <u>3.5</u> ft			SAMPLI	E TYPE						

9955 Highland Vista Dr., #170	Phon
shburn Virginia 20147	Fax:

ne: (703) 726-8030 (703) 726-8032 faz

Engineering, Inc.					ng, Inc.	19955 Highland Vista Dr., #170 Ashburn, Virginia 20147					Phone: (703) 726-803 Fax: (703) 726-8032							
PROJI						LOGGED BY:						JMBER						
			nbia	Pike Multimo	dal Street Improvements		L. Pugh						СВ-3					
.OCA	TION:					DRILLING CONTRACTOR:												
OWNE	R/CL	IENT:	C	olumbia Pike	, Arlington , VA	Connelly & Assoc DRILLER:	DRILL	SHEET 1 OF 1										
			ĸ	imlev-Horn &	Associates, Inc.	K. Kersh			5 - 2/3	27/15								
ROJI	ECT N	IUMBE			GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE			0 21							
	_	1	4189	)	NOT SURVEYED	2.25" H.S.A												
EPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		S	PT .OW	REC (in)	SO TE	STAN	IDARD RATIO SISTAN		MC (%)				
( )	'S	STI	В				COUNTS				(B	PF) 60 8		≥				
			P A	Asphalt = 0. Concrete = 0			~											
	-			Terrace dep	osit, brown, f, sandy silty CLAY	with gravel, stiff, moist,	7+	7+4	10	•			· · ·	14.				
	+	C1		CL-ML Brown and g	irav		2+	4+6	12		· · · ·		· · ·					
	+									]	· · · ·		· · ·					
5-	$\mathbb{X}$			Terrace dep <b>SC</b>	<i>osit</i> , light brown, f, clayey SANE	D, medium dense, moist,	4+	7+10	5		R		· · · · · · · · · · · · · · · · · · ·	11.				
		C2											· · · · · · · · · · · · · · · · · · ·					
	$\mathbb{X}$			Orange - bro	own, f-c, with gravel, dense		14+	17+17	10		٢		· · ·					
10-	ſ			Bottom of Bo	oring at 10.0 ft								· · ·					
	]																	
	-																	
	-																	
15-	1												<u>.</u>					
	]																	
	-										· · · ·		· · ·					
	-																	
20 -	-												<u> </u>					
	1										· · · ·		· · ·					
	]																	
	-																	
25-	-																	
	-												· · ·					
											· · · ·		· · ·					
	1										· · · ·							
ROI		/ATER		1.5				SAMPL										
					2.2			*	Split Sp	oon								
1	NULE	NCOU	INTER	ED UPON COMPL	LETION CAVED: <u>0.0</u> ft													
EMA	RKS:																	

19955 Highland Vista Dr., #170	Pho
Ashburn Virginia 20147	Fax

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJE	CT:					LOGGED BY:	1	BORING NUMBER:					
		olur	nbia	Pike Multimo	dal Street Improvements	L. Pugh				CI	B-4		
LOCAT	ION:		_			DRILLING CONTRACTOR:							
OWNE	R/CLI	ENT:	C	olumbia Pike	, Arlington , VA	Connelly & Associa	ates, li	DATES	DRILLI		1 OF 1		
			K	mlay Horn 9	Associates, Inc.	C. Wolfe				25/15 - 2/25	:/A E		
PROJE	CT N	UMBE		miey-nom a	GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSET			0/15		
		1	4189		NOT SURVEYED	2.25" H.S.A							
				·		2.20 11.0.74				SOIL			
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BL	SPT LOW UNTS	REC (in)	STAND PENETR TEST RESI (BPF 20 40	ATION STANCE <sup>=</sup> )	MC (%)	
			PL	Asphalt = 0.		/	-						
	$\mathbb{N}$	C1		Concrete = (	osit, brown, LEAN CLAY with gra	avel, verv stiff, moist, CL	15+	-12+8	6			18.7	
-	$\square$	_	00	•	osit, white, f-c, POORLY GRADI	· · · · · ·		41+34	12				
5-		C2	0000				12+	17+22	2	<b>•</b>		4.8	
-		62	0000										
10-	X			moist, SC	<i>osit</i> , orange - brown, f-c, clayey oring at 10.0 ft	SAND, medium dense,	3+	6+5	18			_	
-	-												
15	-												
- 20	-											_	
-	-												
25-	-												
				1.6.						=0.			
	OT EI	NCOU	NTER	ED DURING DRIL	LING LETION CAVED: <u>5.8</u> ft			SAMPLE	= TYPE Split Sp				
REMAR	RKS:												

9955 Highland Vista Dr., #170	Ph
Achhurn Virginia 20147	Fat

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJE	JECT:					LOGGED BY:				BORING NUMBER:							
	C	olun	nbia	Pike Multimo	dal Street Improvements	L. Pugh					CB-5						
LOCAT	FION:					DRILLING CONTRACTOR:					CE	5-5					
			С	olumbia Pike	, Arlington , VA	Connelly & Associa	ites, li	nc.			HEET	1 OF	1				
OWNE	R/CL	ENT:				DRILLER:		DATES	DRILLI	ED:							
PROJE				mley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	C. Wolfe DRILLING METHOD:		OFFSE		2 <mark>5/15 -</mark>	2/25	/15					
PROJE								OFFSE	INUT	<u>=</u> 0.							
			4189		NOT SURVEYED	2.25" H.S.A				SOIL							
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BL	PT OW UNTS	REC (in)	S PEI TEST	(BPF	TION TANCE )	MC (%)				
				Asphalt = 0.						20	40 6	0 80					
	$\bigtriangledown$				0.5ft. <i>osit</i> , light brown, f-m, sandy LEA	NI CLAX stiff moist CL	11-	+5+7	18				9.7				
		01		-	rown, very stiff	IN CLAT, SUII, MOISI, CL				Ţ							
	$\square$	C1					6+	·8+9	18	•							
5-				Terrace dep	<i>osit</i> , black, f-c, clayey SAND, mo	bist, <b>SC</b>	5+	6+7	3	<b>I</b>	· · · · · · · · · · · · · · · · · · ·		-				
		C2															
10-	$\mathbb{X}$	C1		moist, CL	<i>osit</i> , orange - brown, f, LEAN CL	AY with sand, firm,	3+	3+4	16				23.3				
10-				Bottom of B	oring at 10.0 ft												
	-																
15-	-												_				
	-										· · ·						
	-																
	-																
	-																
20-	-												_				
.	-																
	-																
	-																
	-																
25-	-										<u> </u>		_				
	-																
	-																
	-																
	-																
GROU	⊥ ND W	ATER	LEVE	LS:				SAMPL	 E TYPE	ES:							
N		NCOLI		ED DURING DRIL	LING												
					5.0			M °	Split Sp	oon							
	IOLE	NCOL	NIER	ED UPON COMP	LETION CAVED: <u>0.0</u> ft												
REMA	RKS:	Bull	san	nple from 0' to	o 5'			I									

19955 Highland Vista Dr., #170	Pho
Ashburn Virginia 20147	Fax

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJECT:				LOGGED BY:	τ/		IG NUMBER:	
		Pike Multimo	dal Street Improvements	L. Pugh			CB-6	
LOCATION:				DRILLING CONTRACTOR:				
OWNER/CL		Columbia Pike	, Arlington , VA	Connelly & Associates DRILLER:	, <b>Inc.</b> DATES DRIL		SHEET 1 OF 1	
OWNER/CL								
PROJECT N		imley-Horn &	Associates, Inc.	C. Wolfe DRILLING METHOD:	OFFSET NO		- 2/25/15	
						TEO.		
	14189	)	NOT SURVEYED	2.25" H.S.A		S	DIL	
DEPTH (ft) SAMPLE	STRATUM GRAPHIC		MATERIAL DESCRIPTION	N	SPT BLOW COUNTS	REC (in)	STANDARI PENETRATIO TEST RESISTA (BPF) 20 40 60	I
	A . A	Asphalt = 0.			-			
		Concrete = (	).5ft. <i>osit</i> , brown, f-m, clayey SAND w	/	14+11+7	14		
		moist, SC		in gravel, medium dense,			T	
					4+8+14	18		
5	C2				4+5+8	3		
			oring at 10.0 ft		4+8+11	2		
GROUND W	ATER LEVE	ELS:			SAMPLE TYP	PES:		
NOT E		red During Drili	5.0		Split S	spoon		
REMARKS:								

19955 Highland Vista Dr., #170	Phone
Ashburn Virginia 20147	Fax: (

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJE	CT:				-	LOGGED BY:	.0117	1	BORING		·	
LOCAT		olun	nbia I	Pike Multimo	dal Street Improvements	L. Pugh				C	B-7	
LUCAI	ION:		~						_			
OWNE	R/CLI	ENT:	С	olumbia Pike	, Arlington , VA	Connelly & Associa	DATES			HEET	1 0	F 1
			V:	unlas i Llaura Q	Associates Inc					2/2/	-/4 -	
PROJE	CT N	UMBE		miey-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	C. Wolfe DRILLING METHOD:	OFFSE		2 <b>5/15</b> · ES:	• 2/2:	0/15	
			4189		NOT SURVEYED	2.25" H.S.A						
					I		I	1	SOIL			
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		SPT BLOW COUNTS	REC (in)	PE TEST	(BPI	ATION STAN	
			P. D.	Asphalt = 0.						40		
-	$\mathbf{X}$				).5ft. <i>osit</i> , brown, f-c, clayey SAND wit	h gravel, medium dense,	11+8+14	10	•	· · ·		
-	$\square$			moist, SC			8+15+8	12				5.
5-	$\square$	C2										
-	X						5+6+7	6	¢			
-												
-	$\mathbf{X}$	C1		<i>Terrace dep</i> moist, <b>CL</b>	osit, orange - brown, f, LEAN CL	AY with sand, stiff,	5+4+5	12		· · ·		22
10					oring at 10.0 ft							
-												
-												
_												
15-												
15												
										:::		
-												
- 20												
20												
_												
25												
-												
										: :		
GROU	ND W	ATER	LEVEI	LS:			SAMPL	E TYPE	ES:			
N		NCOU	NTERE	ED DURING DRIL	LING			Split Sp	oon			
N	OT EI	NCOU	NTER	ED UPON COMPL	ETION CAVED: <u>5.0</u> ft							
REMAF	113:											

19955 Highland Vista Dr., #170	Phone
Ashburn Virginia 20147	Fax: (

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJE	CT:					LOGGED BY:	2011/		1	BORING	NUMBER:	
		olun	nbia	Pike Multimo	dal Street Improvements	L. Pugh					CB-8	
LOCAT	'ION:					DRILLING CONTRACTOR:					0-00	
014	<b>D</b> /011		C	olumbia Pike	, Arlington , VA	Connelly & Assoc					EET 1 O	F 1
OWNE	R/CLI	ENI:				DRILLER:		DATES				
				imley-Horn &		T. Chew		05505			2/24/15	
PROJE	CIN				GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE	INOT	=5:		
		1	4189		NOT SURVEYED	2.25" H.S.A				001		
	щ	ΜŊ	₽							SOIL	ANDARD	
DEPTH (ft)	AMP TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BLO	PT OW	(in) (in)	PENE TEST F	ETRATION RESISTAN	ACE (%)
	0	Ś	U				COU	JNTS	Ľ	20 4	(BPF) <u>0 60 8</u>	
			P b	- Asphalt = 0.8 - Concrete = 0		/	4					
	$\mathbb{N}$	C2			<i>osit</i> , brown, f, clayey SAND, ver	v loose, moist, <b>SC</b>	3+2	2+2	18			16.6
.	$\mathbb{H}$			-	osit, brown, f, LEAN CLAY with		-					
	М	C1		<b></b>	,,,, <u></u>	, ,,	2+{	5+3	18			21.2
5-	$\left\{ \right\}$			Terrace den	osit, dark orange - brown, f-c, cla	avev SAND with gravel	-	_				
				medium den	se, moist, <b>SC</b>	ayoy of and wan gravel,	11+	7+9	18	•		13.7
		C2										
		02										
	X						13+1	4+15	18	l è		
10-	ſ		1.1	Bottom of Bo	oring at 10.0 ft		1					
· ·												
· ·	1											
· ·												
15-												
	1											
	1											
	1											
20-	1											
-												
25-												
	-											
	$\left  \right $											
	$\left  \right $											
	$\left  \right $											
GROU	ND W	ATER	LEVE	LS:			-	SAMPL	E TYPE	S:		
				ED DURING DRILI								
									Split Sp	oon		
N	IOT E	NCOU	NTER	ED UPON COMPL	ETION CAVED: <u>5.1</u> ft							
REMA	RKS:	Bulk	san	nple from 0' to	5'							
		San	. Jun		-							

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

19955 H	ighland V	ïsta Dr.,	#170
	Vincinio		

Phone: (703) 726-8030 Fax: (703) 726-8032 fay

PROJI	ECT:				31		LOGGED BY:	a 20147			BORING NUN		0052
1.004			nbia	Pike Multimo	dal Street Imp	provements	L. Pugl	h			C	B-9	
LOCA	HON:					<i></i>	DRILLING CONTRACTOR:						
OWNE	ER/CL	ENT:	<u> </u>	Solumbia Pike	, Arlington , \	/Α	Connelly & Asso	ciates, li	DATES	DRILLI		1 OF 1	
PROJI				imley-Horn &	Associates, I	<b>nc.</b> ACE ELEVATION (ft):	C. Wolfe		OFFSE	2/2	25/15 - 2/25	5/15	
FROJ			⊷. 4189			SURVEYED	2.25" H.S.A		OFFSE	INOT	E <b>3</b> .		
				·							SOIL		
DEPTH (ft)	SAMPLE	STRATUM	GRAPHIC		MA	FERIAL DESCRIPTION		BL	SPT LOW UNTS	REC (in)	STAND PENETR TEST RESI (BPI 20 40	ATION STANCE <sup>=</sup> )	MC (%)
				Asphalt = 0.				~					
	K			dense, mois	osit, brown, f-		ith gravel, medium		13+10 1+22	18			
					,			071	11722	10			
5-		C2		Light brown moist, <b>GP</b>	f-c, POORLY	GRADED GRAVE	EL with sand, very dense,	22+3	30+24	6			
¥								39+:	34+38	18			5.8
10-	-		·~ ( \	Bottom of B	oring at 10.0 t	ť							
15-	_												
	-												
20 -	_												_
	-												
25-	-												_
	-												
0	]								<b>.</b>				
GROL ⊻ E		ATER		LS: <u>8.0</u> ft					SAMPLI	e type Split Sp			
1	NOT E	NCOU	NTER	ED UPON COMP	LETION CAVE	D: <u>5.2</u> ft							
REMA	RKS:												

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

19955 Highland Vista Dr., #170	Ph
Ashburn Virginia 20147	Fa

PROJE	ECT:		-			LOGGED BY:	2011/				· · · · · · · · · · · · · · · · · · ·	
		olun	nbia	Pike Multimoo	dal Street Improvements	L. Pugh						
LOCAT	FION:					DRILLING CONTRACTOR:				D	B-1	
			C	olumbia Pike	, Arlington , VA	Connelly & Associa	ates, lı				1 OF 1	
OWNE	R/CLI	ENT:				DRILLER:		DATES	DRILLI	ED:		
				imley-Horn &	Associates, Inc.	T. Chew				23/15 - 2/23	8/15	
PROJE	ECT N	UMBE	R:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE	T NOTI	ES:		
		1	4189	)	NOT SURVEYED	2.25" H.S.A						
	ш	Σ	U							SOIL		
DEPTH (ft)	AMPL TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BL	PT .OW	(in)	STAND PENETR TEST RESI	STANCE	MC (%)
	Ś	ST	Ū				CO	UNTS	<u> </u>	(BPI 20 40	=)	2
			P 4	Asphalt = 0.2								
	1X			Concrete = (	).6ft. <i>osit</i> , orange - brown, f, LEAN CL	AX with cond and	3+	4+6	18	•		12.1
	$\exists$	C1		gravel, stiff,	moist, <b>CL</b>	_A f with Sanu, and						
	1X	U1		Very stiff			8+1	1+13	18	∃ ∳∃ ∃ ∃		
	$\square$											
5-	$\mathbb{N}$			Terrace dep	osit, orange brown and red, f-c,	clayey SAND with gravel,	12+	14+15	18			1
	$\square$			medium den	se, moist, SC							
	1	C2										
				Dense								
	1X			Dense			13+	15+17	18	•		
10-				Bottom of Bo	oring at 10.0 ft		1					1
· ·	-											
15-	-											-
· ·												
· ·												
	-											
· ·	-											
20 -	+											
	-											
	-											
	+											
	+											
25-	+											
	+											
	$\left  \right $											
	$\left  \right $											
	$\left  \right $											
GROU	ND W	ATER		LS:				SAMPL		 ES:		
				ED DURING DRILI				ء 🏹 ا	Split Sp	oon		
N	IOT E	NCOU	NTER	ED UPON COMPL	ETION CAVED: <u>5.1</u> ft							
DENT												
REMA	RKS:											

9955 Highland Vista Dr., #170	Pho
abburn Virginia 20147	Fax

one: (703) 726-8030 x: (703) 726-8032 faz

	Ì	E	ng	ineeri	ng, Inc.	19955 Highland V Ashburn, Virginia	ista D 20147	r., #17 7	0				726-80 6-8032			
PROJE	CT:					LOGGED BY:	1	BORING NUMBER:								
LOCAT			nbia	Pike Multimo	dal Street Improvements	L. Pugh		DB-2								
LUCAI	ION.		~	olumbio Diko	Arlington VA		ly & Associates, Inc.									
OWNE	R/CLI	IENT:	U		, Arlington , VA	DRILLER:	ales, I	DATES	DRILLI	SHEET 1 OF 1						
			Ki	mley-Horn &	Associates, Inc.	T. Chew			2/2	23/15 -	2/23	/15				
PROJE	ECT N	UMBE	R:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE	T NOTE	ES:						
		1	4189		NOT SURVEYED	2.25" H.S.A	1			0.011						
DEPTH (ft)	SAMPLE TYPE	STRATUM	MATERIAL DESCRIPTI			I	BI	SPT LOW UNTS	REC (in)		TAND/ NETRA RESIS (BPF	ATION STANC	MC (%)			
				Asphalt = 0.4	0.4ft.					20 40 60 80			;			
-				Concrete = 0 Terrace dep		T CLAY with gravel,	5+	-7+6	18	•			17.5			
_		C1		Very stiff			8+1	0+15	18				21.7			
5-	X			Without grav	rel		18+	16+13	18							
- - 10		C2		moist, SC	<i>osit</i> , orange - brown, f, clayey s	SAND, medium dense,	8+	10+8	18	∮						
-	_			Bottom of Bo	oring at 10.0 ft											
15-	-										· · ·		· · · · · · · · · · · · · · · · · · ·			
-	-															
20																
25-	-												<u>.</u>			
-	-															
				<u>  ç.</u>				SAMPL								
N	OT EI	NCOU	NTER	ed during drili Ed upon compl	47				Split Sp							
REMAR	RKS:	Bull	k san	nple from 0' to	5'											

19955 Highland Vista Dr., #170	Phor
Ashburn Virginia 20147	Fax.

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

		Eng	Jineen	ng, me.	Ashburn, Virginia 2014	7	Fax	x: (703)	726-	803			
PROJEC	ROJECT:				LOGGED BY:		BORING NUMBER:						
	С	olumbia	a Pike Multimo	dal Street Improvements	L. Pugh		DB-3						
LOCATI	ON:				DRILLING CONTRACTOR:	JR: DB-							
			Columbia Pike	e, Arlington , VA	Connelly & Associates,	Inc.		SHEET 1	1 OF 1				
OWNEF	R/CLII				DRILLER:	DATES DRIL		-					
			(imlev-Horn &	Associates, Inc.	T. Chew	2/23/15 - 2/23/15							
PROJEC		JMBER:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NO							
		1418	9	NOT SURVEYED	2.25" H.S.A								
				NOT GORVETED	2.23 11.0.4		S	OIL					
DEPTH (ft)	SAMPLE TYPE	STRATUM GRAPHIC		MATERIAL DESCRIPTION		SPT BLOW COUNTS	REC (in)	PENE TEST R	(BPF)	ON ANCE			
	X	C2	Concrete =	0.6ft. <i>bosit</i> , brown, f-c, clayey SAND with	n gravel, dense, moist, <b>SC</b>	15+15+32 33+14+9	18		0 60	80			
5	X	C1	Terrace dep	<i>bosit</i> , orange - brown, f, LEAN CL/	AY with sand, firm, moist, <b>CL</b>	3+4+4	3	•					
-	X	C2		oosit, white, f, clayey SAND, medii oring at 10.0 ft	um dense, <b>SC</b>	4+4+7	18						
ROUN	D W.	ATER LEV	ELS:			SAMPLE TYP	ES:						
			RED DURING DRIL RED UPON COMP	5.0		Split S	poon						
REMAR	KS:					1							

9955 Highland Vista Dr., #170	Р
Ashburn Virginia 20147	– F

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJE	CT:					LOGGED BY:	2011/		1	BORING NUM	<i>.</i>	
			nbia	Pike Multimo	dal Street Improvements	L. Pugh				DE	3-4	
LOCAT	TION:					DRILLING CONTRACTOR:					J- <del>-</del>	
			С	olumbia Pike	, Arlington , VA	Connelly & Associa	ates, Ir			SHEET	1 OF 1	
OWNE	R/CLI	IENT:				DRILLER:		DATES	BRILLI	ED:		
			Ki	mley-Horn &	Associates, Inc.	T. Chew			2/1	9/15 - 2/19/	/15	
PROJE	ECT N	UMBE	R:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE	T NOT	ES:		
		1	4189	)	NOT SURVEYED	2.25" H.S.A						
		5				1			_	SOIL		
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BL	PT .OW JNTS	(in) (in)	STANDA PENETRA TEST RESIS (BPF	TION TANCE	MC (%)
	-			Asphalt = 0.	9ft					20 40 6	0 80	
	$ \downarrow $		$\otimes$	Crushed sto								
	K		$\bigotimes$		rown, clayey GRAVEL with sand	, loose, moist, <b>GC</b>	8+	5+5	12	<b>9</b>		13.4
	$\square$	А					5+	4+3	18			
	$\square$							4.0		T		
5-				Torrooc da	osit, orange - brown, LEAN CLA	V miananaun aaft						-
	ΙX			moist, <b>CL</b>	usit, orange - brown, LEAN CLA	T, MICACEOUS, SOIL,	5+	2+1	6 (			
	$\square$	C1		,								
	$\square$	00		Terrace dep	osit, orange - brown, clayey SAN	ID with gravel, medium			10	$\boldsymbol{\Lambda}$		
10 -	$\square$	C2		dense, mois	t, <b>SC</b>		3+:	5+12	18			
				Bottom of B	oring at 10.0 ft							
-												
-												
-												
15 -												1
	1											
	1											
	1											
	-											
20 -	-											-
	-											
-	-											
-												
	-											
25 -												4
GROU	ND W	ATER	LEVE	LS:				SAMPL	E TYPE	ES:		
Ν	OT EI	NCOU	NTERI	ED DURING DRIL	LING				Split Sp	oon		
N	IOT F	NCOL	NTER	ED UPON COMPI	_ETION CAVED:ft							
~												
REMA	RKS:							1				

19955 Highland Vista Dr., #170	Pho
Ashburn, Virginia 20147	Fax

PROJE	ECT:					LOGGED BY:			E	BORING N	IUMBER:	
	С	olun	nbia	Pike Multimoo	dal Street Improvements	L. Pugh						
LOCAT	FION:					DRILLING CONTRACTOR:					DB-5	
			C	olumbia Pike	, Arlington , VA	Connelly & Associa	ates, Inc			SHE	ET 1 OF 1	
OWNE	R/CLI	ENT:			-	DRILLER:		DATES	DRILLE	ED:		
			κ	imley-Horn &	Associates, Inc.	T. Chew			2/1	9/15 - 2	/19/15	
PROJE	ECT N	UMBE		-	GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	C	OFFSET				
		1	4189	)	NOT SURVEYED	2.25" H.S.A						
		5	0							SOIL		_
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		SP <sup>-</sup> BLO COUN	T W NTS	REC (in)	PENE TEST RI (I	NDARD TRATION ESISTANCE BPF) ) 60 80	MC (%)
				Asphalt = 0.8						20 40		
	$\mathbb{N}$		$\otimes$	Crushed sto			7+18-	+15	18			
	$\mathbb{H}$			moist, SP	rown, f-c, POORLY GRADED SA	AND with gravel, dense,						
	А			Very dense			23+35	5+48	18			
5-	~	А					50/	3	3		>>	4.0
												1
							26+27	<b>'</b> +33	18			
10-	$\left\{ \cdot \right\}$			Bottom of Bo	oring at 10.0 ft							-
	-				<b>3 1 1 1</b>							
	-											
15-												
20 -												
25-												-
	-											
	-											
	-											
	$\left  \right $											
GROU	ND W	ATFR		LS:				SAMPLE		S:		
				ED DURING DRILI				X s	plit Sp	oon		
N	IOT E	NCOL	NTEF	RED UPON COMPL	ETION CAVED: <u>5.2</u> ft							
REMA	RKS:											

9955 Highland Vista Dr., #170	Pho
chhurn Virginia 20147	Fax

one: (703) 726-8030 :: (703) 726-8032 faz

W.	Ì	E	ng	ineeri	ng, Inc.	19955 Highland V Ashburn, Virginia	/ista D 20147	r., #17 7	70	Pho Fax	one: (* :: (703	703) 7 3) 726	26-80 -8032			
PROJ	ECT:					LOGGED BY:				BORING NUMBER:						
LOCA			nbia	Pike Multimo	dal Street Improvements	L. Pugh DRILLING CONTRACTOR:					DB-6					
LUCA	non.		~	alumbia Dilu												
OWNE	R/CL	IENT:	C	olumbia Pike	, Arlington , VA	Connelly & Assoc	3 DRILL		SHEET	1 OF	1					
			Ki	mlev-Horn &	Associates, Inc.	T. Chew			2/1	9/15	- 2/19	/15				
PROJ	ECT N	IUMBE			GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE	T NOT		-	-				
		1	4189	1	NOT SURVEYED	2.25" H.S.A	_									
	<u> </u>									SOIL	STAND	ARD				
DEPTH (ft)	SAMPI TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		B	SPT LOW UNTS	(in) (in)	DEVETOATION			MC (%)			
			P. 4.	Asphalt = $0.1$		/				20	<u>+0 (</u>					
	$]\times$			Concrete = 0	0.5ft. osit, orange - brown, f, clayey S	SAND with gravel, verv	3-	+1+2	2	•			11.0			
	ł	C2		loose, moist Brown, loose	, SC				12							
	$\vdash$			BIOWII, 10056	5			+2+2	12							
5-	$\bigtriangledown$				osit, orange - brown, f, LEAN C	CLAY with sand, stiff,		+4+5	18							
	14			moist, <b>CL</b>			31	7470	10	T						
	]	C1														
	$\downarrow$			Gray, withou	it sand		5	+6+6	18							
10-	$\vdash$			Bottom of B	oring at 10.0 ft		- 5	-0+0	10							
	-			Dottom of D												
	1															
	1															
15-	]															
	-															
	-															
	-															
00	1															
20 -	]															
	-															
	-															
	-															
25-	1															
	]															
	1										· · · ·					
	-										· · · ·					
GROL	 IND W	ATER		LS:				SAMPL	_E TYPI	ES:						
N		NCOU	NTER	ED DURING DRILI	LING				Split Sp	005						
				ED UPON COMPL	4.0				эрш эр							
		D: //														
REMA	KKS:	Bull	k san	nple from 0' to	00											
1																

19955 Highland Vista Dr., #170	Phone:
Ashburn Virginia 20147	Fax: (7

PROJECT:			LOGGED BY:		1	BORING NUMBER:	
	ia Pike Multimo	dal Street Improvements	L. Pugh			DB-7	
LOCATION:			DRILLING CONTRACTOR:			00-1	
OWNER/CLIENT:	Columbia Pike	, Arlington , VA	Connelly & Associa			SHEET 1 OF 1	
OWNER/CLIENT:				DA			
PROJECT NUMBER:		Associates, Inc. GROUND SURFACE ELEVATION (ft):	R. Wilcher DRILLING METHOD:		2/1 FSET NOTE	2/15 - 2/12/15	
					I SET NOT	_0.	
14	189	NOT SURVEYED	2.25" H.S.A			SOIL	
STRATUM	GKAPHIC	MATERIAL DESCRIPTION		SPT BLOW COUNT	/ ∭_⊑	STANDARD	MC (%)
5 C2	medium den		SAND with gravel,	7+8+4 6+7+8			_
	Loose Terrace dep	osit, gray, LEAN CLAY, micaced	bus, firm, moist, <b>CL</b>	3+4+3			
		oring at 10.0 ft		2+3+4	4 18		33.5
	ERED DURING DRIL			SA	MPLE TYPE		
NOT ENCOUNT REMARKS:	ERED UPON COMPL	LETION CAVED: <u>5.7</u> ft					

955 Highland Vista Dr., #170	Phone
hburn Virginia 20147	Fax: (7

: (703) 726-8030 703) 726-8032 faz

Ż	J	E	ng	ineeri	ng, Inc.	19955 Highland Vi Ashburn, Virginia	ista D 20147	r., #17	0	Ph Faz	one: ( k: (70	703) 3) 726	726-80 5-8032
PROJE	CT:					LOGGED BY:				BORI	NG NUI	MBER:	
			nbia	Pike Multimo	dal Street Improvements	L. Pugh					П	B-8	
LOCAT	fion:					DRILLING CONTRACTOR:					U	D-0	
OWNE	R/CL	IENT:	C	olumbia Pike	, Arlington , VA	Connelly & Associa	ates, I	<b>nc.</b> DATES	DRILL		SHEET	1 OF	1
			к	imlev-Horn &	Associates, Inc.	R. Wilcher			2/1	2/15	5 - 2/1:	2/15	
PROJE	ECT N	NUMBE			GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE				-	
		1	4189	)	NOT SURVEYED	2.25" H.S.A							
EPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BI		REC (in)	SOII P TES	STANE ENETR ST RES	ATION	MC (%)
		S	0	-√Asphalt = 0.3	3ft			UNTS		1	(BP ) 40	F) <u>60 80</u>	;
-	X	2		Concrete = (		nedium dense, moist, <b>SC</b>		-8+8	18	•			
5-		C2		1 11, 10000				-4+6	18				
-		s					34	-4+4	4				
	$\overline{\mathbf{X}}$	C1		Terrace dep	osit, gray, LEAN CLAY, micace	ous, stiff, moist, <b>CL</b>	5+	-6+8	18				33.4
10-				Bottom of Bo	oring at 10.0 ft								
	-												
-	-												
15-													
	-												
	-												
20-													·
-	-												
-	-												
-	1												
25											· · · ·		
-													
	-												
-													
		ATER						SAMPL	E TYPI	ES:			
				ED DURING DRIL					Split Sp	oon			
N	IOT E	ENCOL	INTEF	ED UPON COMPL	LETION CAVED: <u>5.0</u> ft								
REMAR	RKS:												
REMAF	RKS:	_	_							_			_

19955 Highland Vista Dr., #170	Ph
Ashburn Virginia 20147	Faz

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJE	CT:					LOGGED BY:			1	BORING N	IUMBER:	
			nbia	Pike Multimo	dal Street Improvements	L. Pugh					DB-9	
LOCAT	FION:					DRILLING CONTRACTOR:						
			C	Columbia Pike	, Arlington , VA	Connelly & Associa	ates, lı				ET 1 OF	1
OWNE	R/CLI	ENI:				DRILLER:		DATES	DRILLI	=D:		
				imley-Horn &	Associates, Inc.	R. Wilcher		05505		2/15 - 2	/12/15	
PROJE		UMBE	:R:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE	INOT	=S:		
		1	4189	Ð	NOT SURVEYED	2.25" H.S.A	1					
	щ	Σ	<u>∪</u>							SOIL	NDARD	
DEPTH (ft)	SAMPL	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BL	SPT LOW UNTS	REC (in)	PENE TEST RI (	TRATION ESISTANCE BPF) 0 60 80	MC (%)
			P A	Asphalt = 0.								
	$\square$	C2	1				5-	7+8	18			11.3
		02		<i>⊺errace dep</i> ∖moist, <b>SC</b>	osit, orange - brown, f, clayey S	AND, MECIUM CENSE,	1 07	1+0	10	Ţ		11.3
	X	C1			<i>osit</i> , orange - brown, f, LEAN Cl	AY with sand, very stiff,	4+(	6+10	18			18.7
5-	X	C2		<i>Terrace dep</i> moist, <b>SC</b>	<i>osit</i> , orange - brown, f, clayey S,	AND, medium dense,	12+	12+13	18			15.6
10-		C1		moist, CL	<i>osit</i> , orange - brown, f-m, LEAN oring at 10.0 ft	CLAY with sand, firm,	13-	+3+2	18	┥		29.4
15 - 20 - 25 -												
GROU	ND W	ATER	LEVE	ELS:				SAMPL	E TYPE	S:		
	IOT E			ed During Dril Red Upon Compi	LING LETION CAVED: <u>5.4</u> ft				Split Sp	oon		

55 Highland Vista Dr., #170	Phone: (703
hurn Virginia 20147	Fax: (703) 7

MECT:       LOGGED BY:         Columbia Pike Multimodal Street Improvements       L. Pugh         Matterial       DRILLING CONTRACTOR:         Columbia Pike, Arlington , VA       Connelly & Associate:         NERVCLIENT:       DRILLER:         Kimley-Horn & Associates, Inc.       T. Chew         DECT NUMBER:       GROUND SURFACE ELEVATION (ft):       DRILLING METHOD:         14189       NOT SURVEYED       2.25" H.S.A         TH       Material Description       Asphalt = 0.3ft.         Concrete = 0.7ft.       Terrace deposit, orange - brown, LEAN CLAY, firm, moist, CL         Terrace deposit, orange - brown, clayey SAND, medium dense, moist, SC       Terrace deposit, orange - brown, clayey SAND, medium dense, moist, SC	OFFSE OFFSE BLOW COUNTS 5+3+3	S DRILL 2/ ET NOT	SHE LED: 18/15 - 2 ES: SOIL SOIL STA PENE TEST R		1
Columbia Pike, Arlington , VA     DRILLING CONTRACTOR:       Columbia Pike, Arlington , VA     Connelly & Associate       NER/CLIENT:     DRILLER:       Kimley-Horn & Associates, Inc.     T. Chew       DJECT NUMBER:     GROUND SURFACE ELEVATION (ft):     DRILLING METHOD:       14189     NOT SURVEYED     2.25" H.S.A       TH     Material Description       Asphalt = 0.3ft.     Concrete = 0.7ft.       Concrete = 0.7ft.     Terrace deposit, orange - brown, LEAN CLAY, firm, moist, CL       Terrace deposit, orange - brown, clayey SAND, medium dense, moist, SC	OFFSE OFFSE BLOW COUNTS 5+3+3	<b>2/1</b>	SHE LED: 18/15 - 2 ES: SOIL SOIL STA PENE TEST R	ET 1 OF 1	1
Kimley-Horn & Associates, Inc.     DRILLER:       Kimley-Horn & Associates, Inc.     T. Chew       DJECT NUMBER:     GROUND SURFACE ELEVATION (ft):     DRILLING METHOD:       14189     NOT SURVEYED     2.25" H.S.A       TH     Material Description     Asphalt = 0.3ft.       Concrete = 0.7ft.     Concrete = 0.7ft.       Terrace deposit, orange - brown, LEAN CLAY, firm, moist, CL       Terrace deposit, orange - brown, clayey SAND, medium dense, moist, SC	OFFSE OFFSE BLOW COUNTS 5+3+3	<b>2/1</b>	ED: <b>18/15 - 2</b> ES: SOIL SOIL STA PENE TEST R	/18/15	1
Kimley-Horn & Associates, Inc.     DRILLER:       Kimley-Horn & Associates, Inc.     T. Chew       DJECT NUMBER:     GROUND SURFACE ELEVATION (ft):     DRILLING METHOD:       14189     NOT SURVEYED     2.25" H.S.A       TH     Material Description     Asphalt = 0.3ft.       Concrete = 0.7ft.     Concrete = 0.7ft.       Terrace deposit, orange - brown, LEAN CLAY, firm, moist, CL       Terrace deposit, orange - brown, clayey SAND, medium dense, moist, SC	OFFSE OFFSE BLOW COUNTS 5+3+3	<b>2/1</b>	ED: <b>18/15 - 2</b> ES: SOIL SOIL STA PENE TEST R	/18/15	
DIECT NUMBER:     GROUND SURFACE ELEVATION (ft):     DRILLING METHOD:       14189     NOT SURVEYED     2.25" H.S.A       TH     Material description     Material description	SPT BLOW COUNTS 5+3+3		SOIL SOIL STA PENE TEST R		
DIECT NUMBER:     GROUND SURFACE ELEVATION (ft):     DRILLING METHOD:       14189     NOT SURVEYED     2.25" H.S.A       TH     Material description     Material description       TH     Material description     Concrete = 0.3ft.       Concrete = 0.7ft.     Terrace deposit, orange - brown, LEAN CLAY, firm, moist, CL       Terrace deposit, orange - brown, clayey SAND, medium dense, moist, SC	SPT BLOW COUNTS 5+3+3		SOIL STA PENE TEST R		
TH HAR       Material description         Asphalt = 0.3ft.         Concrete = 0.7ft.         Terrace deposit, orange - brown, LEAN CLAY, firm, moist, CL         Terrace deposit, orange - brown, clayey SAND, medium dense, moist, SC	BLOW COUNTS 5+3+3	REC (in)	STA PENE TEST R		
Asphalt = 0.3ft. Concrete = 0.7ft. <i>Terrace deposit</i> , orange - brown, LEAN CLAY, firm, moist, <b>CL</b> <i>Terrace deposit</i> , orange - brown, clayey SAND, medium dense, moist, <b>SC</b>	BLOW COUNTS 5+3+3	REC (in)	STA PENE TEST R		
Asphalt = 0.3ft. Concrete = 0.7ft. <i>Terrace deposit</i> , orange - brown, LEAN CLAY, firm, moist, <b>CL</b> <i>Terrace deposit</i> , orange - brown, clayey SAND, medium dense, moist, <b>SC</b>	BLOW COUNTS 5+3+3	(in)	PENE TEST R		
Concrete = 0.7ft. <i>Terrace deposit</i> , orange - brown, LEAN CLAY, firm, moist, <b>CL</b> <i>Terrace deposit</i> , orange - brown, clayey SAND, medium dense, moist, <b>SC</b>				NDARD TRATION ESISTANCE BPF)	MC (%)
C1 Concrete = 0.7ft. Terrace deposit, orange - brown, LEAN CLAY, firm, moist, CL Terrace deposit, orange - brown, clayey SAND, medium dense, moist, SC			20 4	0 60 80	+
<i>Terrace deposit</i> , orange - brown, clayey SAND, medium dense, moist, <b>SC</b>		18			
5 moist, SC	4.0.7				
	4+6+7	18	<b>\</b>		16.1
	7+9+12	18			
	8+9+12	18			
Bottom of Boring at 10.0 ft	0+9+12				_
5-					-
5-					_
DUND WATER LEVELS:	SAMPL	LE TYP	ES:		
NOT ENCOUNTERED DURING DRILLING		Split Sp	ooon		
NOT ENCOUNTERED UPON COMPLETION CAVED:ft		2011 OF			
MARKS: Bulk sample from 0' to 5'					

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

19955 Highland Vista Dr., #170	Phone: (
Ashburn Virginia 20147	Fax: (70)

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJE	CT:					LOGGED BY:	2017/			BORING NUM	<u></u>	
		olun	nbia	Pike Multimo	dal Street Improvements	L. Pugh				DB	_11	
LOCAT	FION:		_			DRILLING CONTRACTOR:						
OWNE	R/CLI	ENT:	C	olumbia Pike	, Arlington , VA	Connelly & Associa	ates, li	<b>nc.</b> DATES	DRILLI	SHEET ED:	1 OF 1	
			ĸ	imlev-Horn &	Associates, Inc.	R. Wilcher				1/15 - 2/11/	15	
PROJE	ECT N	UMBE			GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE			10	
		1	4189		NOT SURVEYED	2.25" H.S.A						
	ш	Σ	U			•				SOIL		
DEPTH (ft)	SAMPLE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BL	SPT LOW UNTS	REC (in)	STANDA PENETRA TEST RESIS (BPF) 20 40 6	TION TANCE	MC (%)
			P G	Asphalt = 0.						20 40 0		
				Concrete = ( Terrace dep	0.6ft. <i>osit</i> , brown, f-m, LEAN CLAY wit	h sand, hard, moist, <b>CL</b>	13+:	27+12	18	∮		13.3
	$\square$	C1		Firm			11	+4+3	0	<b>Ý</b>		
5-				Terrace dep	osit, brown, f, clayey SAND, med	dium dense, moist, <b>SC</b>	6+	-8+7	18			
		C2										
					own, f-c, dense		19+	16+15	18	•		
10-				Bottom of B	oring at 10.0 ft							1
	_											
15-	-											
20	-											
20-	-											
	$\left  \right $											
25-												
	-											
	$\left  \right $											
GROU	ND W	ATER	LEVE	LS:				SAMPL	 E TYPE	======================================		
N	OT EN	NCON	NTER	ED DURING DRIL	LING LETION CAVED: <u>5.0</u> ft				Split Sp			
REMA	RKS:											

19955 Highland Vista Dr., #170	Pho
Ashburn, Virginia 20147	Fay

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJE	ECT:					LOGGED BY:		BORIN	IG NUMBER:
			nbia	Pike Multimoo	dal Street Improvements	L. Pugh			
LOCAT	FION:					DRILLING CONTRACTOR:			FRW-1
			C	Columbia Pike	, Arlington , VA	Connelly & Associate			SHEET 1 OF 1
OWNE	R/CL	IENT:				DRILLER:	DATES DRILL	_ED:	
PROJE	ECT N	UMBE		imley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	T. Chew DRILLING METHOD:	OFFSET NOT		- 2/4/15
		1	4189	9	NOT SURVEYED	2.25" H.S.A			
		Μ	U					S	
DEPTH (ft)	SAMPLI TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	N	SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80
				Asphalt = 0.					
	$\downarrow$		000	Concrete = (		h aroual dance maint SC			
	$\mathbb{X}$			-	oup, brown, f-c, clayey SAND wit	n gravel, dense, moist, SC	13+18+14	13	7
	$\mathbb{N}$			Medium den	se, without gravel		7+6+8	14	7
	$\square$						71010	14	
_									
5-	$\mathbb{N}$			Loose					1
	+						14+5+5	8	T
	F								
		D2							
	-								
<u>Z</u>									
	X						6+4+3	2	•
10-	$\uparrow$								
7									
7	-								
	_								
				Potomac are	oup, gray, FAT CLAY, stiff, moist	СН			
	17	D1		r otornao gre		., 011	6+5+4	18	
15-	$\square$			Dettern of D					
				Bollom of Bo	oring at 15.0 ft				
	1								
	-								
	1								
	-								
GROU	ND W	ATER	LEVE	ELS:			SAMPLE TYP	ES:	· · · · · · · · · · · · · · · · · · ·
ΣE	NCOL	JNTEF	RED:				Split S	poon	
				<sub>DN:</sub> <u>12.0</u> ft	CAVED: <u>13.0</u> ft			poon	
<u> </u>		JUNI		un. <u></u> tt	CAVED: <u>10.0</u> Π				
REMA	RKS:								
i -									

BOREHOLE/TEST PIT SEG. F LOGS.GPJ GEOCONCEPTS TEMPLATE 02-12-2015.GDT 4/22/16

19955 Highland Vista Dr., #170	Pho
Ashburn Virginia 20147	Fax

PROJECT	:				LOGGED BY:		BORI	NG NUMBER:
		mbia	Pike Multimo	dal Street Improvements	L. Pugh			
LOCATION	N:				DRILLING CONTRACTOR:			FRW-2
			olumbia Pike	, Arlington , VA	Connelly & Associates			SHEET 1 OF 1
OWNER/C	LIENT				DRILLER:	DATES DRIL	LED:	
		K	imley-Horn &	Associates, Inc.	T. Chew		2/4/15	- 2/4/15
PROJECT	NUME	ER:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NO	TES:	
		14189	)	NOT SURVEYED	2.25" H.S.A			
	5	0		•			S	OIL
DEPTH (ft)	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	Ν	SPT BLOW COUNTS	(in) (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80
			Asphalt = 0.	7ft.				
-			Concrete = (	0.6ft.				
			Potomac gro	<i>oup</i> , brown, f-c, clayey SAND wit	th gravel, dense, moist, <b>SC</b>	12+20+17	16	7
	7		Medium den	Ise		16+12+7	14	
5			Gray, micac	eous, loose		5+5+4	11	•
10	D2	2	Very loose			3+2+2	10	•
			medium den	<i>pup</i> , orange - brown, f-c, POORL ise, moist, <b>SP-SC</b>	Y GRADED SAND with clay,	5+6+10	18	
15			Bottom of Bo	oring at 15.0 ft				
GROUND	WATE		LS:			SAMPLE TYP		
NOT	ENCO	UNTER	ed during drili Ed upon compl	0.0				
REMARKS	8:					I		

19955 Highland Vista Dr., #170	Pho
Ashburn, Virginia 20147	Fax

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJECT:				LOGGED BY:		BORIN	IG NUMBER:
C	Columbia	Pike Multimoo	dal Street Improvements	L. Pugh			
LOCATION:	:			DRILLING CONTRACTOR:			FRW-3
	c	olumbia Pike	, Arlington , VA	Connelly & Associa	tes, Inc.		SHEET 1 OF 1
OWNER/CL			-	DRILLER:	DATES DRIL	LED:	
	к	imley-Horn &	Associates, Inc.	T. Chew		2/4/15	- 2/4/15
PROJECT N		•	GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NO		
	14189		NOT SURVEYED	2.25" H.S.A			
						S	DIL
DEPTH (ft) SAMPLE	STRATUM GRAPHIC		MATERIAL DESCRIPTION	Ν	SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80
		Asphalt = 0.					
	A 4 A	Concrete = (					
		Potomac gro Medium den	oup, brown, f-c, clayey SAND wit	th gravel, dense, moist, <b>SC</b>	15+21+18	18	<b>/</b>
$    \rangle$			55, IIUISL		15+10+5	18	
5-	D2						
					20+16+10	15	
	D1	Potomac gro	bup, brown, f-c, sandy FAT CLA	Y with gravel, soft, moist, <b>CH</b>	1+2+2	14	
		Firm, moist			3+4+4	3	•
		Bottom of Bo	oring at 15.0 ft				
GROUND W	VATER LEVE	LS:			SAMPLE TYP	PES:	
NOT E	ENCOUNTER	ed During Drili Ed Upon Compl	7 5		Split S		
REMARKS:							

19955 Highland Vista Dr., #170	Р
Ashburn Virginia 20147	F

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJ	ECT:					LOGGED BY:		BORI	NG NUMBER:
	C	olun	nbia	Pike Multimoo	dal Street Improvements	L. Pugh			
LOCA	TION:					DRILLING CONTRACTOR:			FRW-4
			C	olumbia Pike	, Arlington , VA	Connelly & Associates	, Inc.		SHEET 1 OF 1
OWNE	ER/CL	IENT:				DRILLER:	DATES DRIL	LED:	
				imley-Horn &	Associates, Inc.	T. Chew			- 2/4/15
PROJI	ECT N	IUMBE	R:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NO	TES:	
	_	1	4189	)	NOT SURVEYED	2.25" H.S.A			
	щ	Σ	ౖ					S	OIL STANDARD
DEPTH (ft)	SAMPL	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	Ν	SPT BLOW COUNTS	REC (in)	
				Asphalt = 0.					
				Concrete = (					
				Potomac gro	oup, brown, f-c, clayey SAND, loo	ose, moist, <b>SC</b>	12+4+3	6	•
		D2					5+4+4	5	•
5-				Potomac gro gravel, stiff,	oup, orange brown and gray, f, sa moist, <b>CL</b>	andy LEAN CLAY with	4+4+5	6	•
				Potomac gro	<i>up</i> , light brown, LEAN CLAY, m	icaceous, very stiff, moist, <b>CL</b>	4+7+9	18	
10 -		D1					4+7+9	10	
	-			Gray			8+10+14	18	
15-					pring at 15.0 ft				
GROL	IND W	ATER	LEVE	ils:			SAMPLE TYP	PES:	
				ed During Drili Red Upon Compl	7.0		Split S	Spoon	
REMA	RKS:								

19955 Highland Vista Dr., #170	Ph
Ashburn, Virginia 20147	Faz

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJE	ECT:					LOGGED BY:		BORI	IG NUMBER:
	С	olun	nbia l	Pike Multimoo	dal Street Improvements	L. Pugh			
LOCAT					-	DRILLING CONTRACTOR:			FRW-5
			С	olumbia Pike	, Arlington , VA	Connelly & Assoc	iates, Inc.		SHEET 1 OF 1
OWNE	R/CLI	ENT:				DRILLER:	DATES DRII		
			Ki	mlev-Horn &	Associates, Inc.	T. Chew		2/5/15	- 2/5/15
PROJE	ECT N	UMBE			GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NC		
		1	4189		NOT SURVEYED	2.25" H.S.A			
								S	OIL
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTIO	N	SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80
				Asphalt = 0.7					
	-			Concrete = (					
				Potomac gro	oup, brown, f-c, clayey SAND, m	iedium dense, moist, <b>SC</b>	4+8+9	13	7
	7V			LOOSE			10+4+5	14	
	-		$\langle \rangle$						
5-				With gravel,	medium dense		6+10+10	16	•
		D2							
10-							8+5+7	12	•
		D1		Potomac gro	oup, gray, LEAN CLAY, very stif	f, moist, <b>CL</b>	7+8+14	18	
15-	$\square$								
	-			Bottom of Bo	oring at 15.0 ft				
GROU	ND W	ATER	LEVE	LS:			SAMPLE TY	PES:	
				ed during drili Ed upon compl	0.0		Split :	Spoon	
REMA	RKS:						1		

19955 Highland Vista Dr., #170	Pho
Ashburn, Virginia 20147	Fax

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJE	CT:					LOGGED BY:			1	BORING	NUMBE	R:
	С	olun	nbia	Pike Multimoo	dal Street Improvements	L. Pugh						•
LOCAT						DRILLING CONTRACTOR:					FRW	-6
			С	olumbia Pike	, Arlington , VA	Connelly & Assoc	iates. lı	IC.		S	HEET 1	OF 1
OWNE	R/CLI	ENT:			,	DRILLER:		DATES				
			Ki	mlev-Horn &	Associates, Inc.	T. Chew			2	/5/15 -	2/5/15	
PROJE	ECT N	UMBE			GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE			2/0/10	
		1	4189		NOT SURVEYED	2.25" H.S.A						
			4103		NOT SORVETED	2.23 11.3.A				SOIL		
	Щщ	STRATUM	HC					DT		S		) (%
DEPTH (ft)	TYF	[RA	GRAPHIC		MATERIAL DESCRIPTION		BL	PT .OW	(in) (in)	TEST	RESISTA (BPF)	D DN NCE W
	S	S	G				CO	JNTS	ľ		(BPF) 40 60	
				Asphalt = 1f								
				Concrete = $($	D.5ft. pup, brown, f-c, clayey SAND wit	th aravel medium dense	-					
	X			moist, SC		an gravel, mealann aense,	11-	+8+7	4	•		17.8
	Ш											
	V	D2					10	+9+5	5			14.(
							10	-9-0	5			14.0
5-				Determent			_					
	V			Potomac gro	oup, gray, FAT CLAY, stiff, mois	t, <b>CH</b>	4+	6+7	18			37.2
								0.7				01.1
		D1										
	-											
				Potomac gro	oup, orange - brown, f-m, clayey	SAND, medium dense,	-					
	1X			moist, SC			5+	7+12	18	•		22.0
10-	$\left\{ \right\}$											
	-	D2										
	$\Lambda$			Potomac gro	<i>pup</i> , light gray, f-c, POORLY GR ise, moist, <b>SP-SC</b>	ADED SAND with clay,						
				medium den	ise, moist, <b>SP-SC</b>		/+	7+10	18			13.0
15-			1.12	Bottom of Bo	oring at 15.0 ft		-					
	-											
	-											
GROU	ND W	ATER	LEVE	LS:				SAMPL	E TYPE	ES:		
N		NCOU	NTER	ED DURING DRILI	LING				Split Sp	oon		
		NCOU		ED UPON COMPL	ETION CAVED: 8.0 ft				э <b>н</b> ор			
					LETICIN CAVEDIL							
REMA	RKS:							I				

BOREHOLE/TEST PIT SEG. F LOGS.GPJ GEOCONCEPTS TEMPLATE 02-12-2015.GDT 4/22/16

19955 Highland Vista Dr., #170	-
Achhurn Virginia 20147	

PROJE	CT:					LOGGED BY:			IG NUMBER:
10047		olum	bia l	Pike Multimo	dal Street Improvements	L. Pugh			FRW-7
LOCAT	ION:		-			DRILLING CONTRACTOR:			
OWNE	R/CLI		С	olumbia Pike	, Arlington , VA	Connelly & Associa	ates, Inc. DATES DRIL		SHEET 1 OF 1
OWNE									
PROJE				mley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	T. Chew DRILLING METHOD:	OFFSET NO		- 2/5/15
FROJE							OFFSETNO	123.	
		14	<b>1189</b>		NOT SURVEYED	2.25" H.S.A			<u></u>
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTIO	Ν	SPT BLOW COUNTS	(in)	OIL STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80
				Asphalt = 0.					
-		D1		Concrete = ( <i>Potomac gro</i> Very stiff, mo	oup, light brown, FAT CLAY, mic	caceous, stiff, moist, <b>CH</b>	7+5+4 4+7+10	14 18	•
5-				Potomac gro moist, <b>SC</b>	<i>oup</i> , orange - brown, f-m, clayey	SAND, medium dense,	7+9+12	17	•
- - 10		D2		Potomac gro medium den	oup, light gray, f-c, POORLY GR se, moist, <b>SP-SC</b>	ADED SAND with clay,	10+7+8	18	
- - - 15				Bottom of Bo	oring at 15.0 ft		8+10+11	14	
GROUI				_S: Ed during drill	LING		SAMPLE TY		
N		NCOUI	NTER	ED UPON COMPL	ETION CAVED: 7.5 ft				

19955 Highland Vista Dr., #170	Ph
Ashburn, Virginia 20147	Fa

PROJ	ECT:					LOGGED BY:		BORIN	IG NUMBER:
	C	olun	nbia	Pike Multimo	dal Street Improvements	L. Pugh			
LOCATION:				DRILLING CONTRACTOR:		FRW-8			
	Columbia Pike, Arlington , VA Connelly & Associates, Inc.					SHEET 1 OF 1			
OWNE	ER/CL	IENT:				DRILLER:	DATES DRI	LED:	
				mley-Horn &	Associates, Inc.	T. Chew			- 2/5/15
PROJ	ECT N	IUMBE	R:		GROUND SURFACE ELEVATION (ft)	: DRILLING METHOD:	OFFSET NC	TES:	
		1	4189		NOT SURVEYED	2.25" H.S.A			
DEPTI (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIP	TION	SPT BLOW COUNTS	(in)	OIL STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80
				Asphalt = 0					
				Concrete = Potomac gr White	0.6ft. oup, brown, f-c, clayey SAND	, medium dense, moist, <b>SC</b>	8+14+6	4	7
5-				white			5+5+7	18	•
¥		D2					4+5+6	18	
10-	-						4+7+8	18	
15-		D1		stiff, moist,	oup, gray and orange brown, f CL Boring at 15.0 ft	f-c, sandy LEAN CLAY, very	5+9+11	18	•
	-				oning at 10.0 It				
GROL	JND W	ATER	LEVE	_S:			SAMPLE TY	PES:	
		JNTEF		<u>5.5</u> fi Ed upon comp	t PLETION CAVED: <u>7.4</u> ft		Split :	Spoon	
REMA	RKS:						1		

GeoCor Engine	cepts ering, Inc.	19955 Highland Vista D Ashburn, Virginia 2014'	br., #170 7	Phone: (703) 726-80 Fax: (703) 726-8032	
PROJECT:		LOGGED BY:		BORING NUMBER:	
Columbia Pike Mu	timodal Street Improvements	L. Pugh			
LOCATION:		DRILLING CONTRACTOR:	FB-1		
Columbia	Pike, Arlington , VA	Connelly & Associates, I	nc.	SHEET 1 OF 1	
OWNER/CLIENT:		DRILLER:	DATES DRIL	LED:	
Kimley-Ho	rn & Associates, Inc.	R. Wilcher		2/10/15 - 2/10/15	
PROJECT NUMBER: GROUND SURFACE ELEVATION (ft):		DRILLING METHOD: OFFSET NOTES:			

#### NOT SURVEYED 2.25" H.S.A GRAPHIC SPT MATERIAL DESCRIPTION Asphalt = 1ft.

5 - 2/10/15

#### 14189 SOIL STRATUM STANDARD PENETRATION TEST RESISTANCE DEPTH (ft) SAMPLE (in) BLOW (BPF) 40 60 80 Crushed stone = 0.1ft. Potomac group, brown, f-m, sandy FAT CLAY, firm, moist, CH D1 6 6+4+3 Potomac group, brown, f-c, clayey SAND with gravel, medium dense, moist, SC 8 5+9+12 5 Loose, without gravel D2 12 5+2+3 D1 Potomac group, dark gray, FAT CLAY, micaceous, firm, moist, CH 3+4+4 18 10 Bottom of Boring at 10.0 ft 15 GROUND WATER LEVELS: SAMPLE TYPES: NOT ENCOUNTERED DURING DRILLING Split Spoon NOT ENCOUNTERED UPON COMPLETION CAVED: 5.5 ft REMARKS:

9955 Highland Vista Dr., #170	Pho
abburn Virginia 20147	Fax

one: (703) 726-8030 x: (703) 726-8032 faz

V	Ì	E	ng	ineeri	ng, Inc.	19955 Highland Ashburn, Virgini	Vista D a 2014	9r., #17 7	0	Phone: (70) Fax: (70)		
PROJE	CT:					LOGGED BY:	<u>u 2011</u>	, 		BORING NUM	<i>´</i>	
Columbia Pike Multimodal Street Improvements						L. Pugh					3-2	
LOCA	FION:					DRILLING CONTRACTOR:					J-E	
OWNE	R/CL	IENT:	0	Columbia Pike	e, Arlington , VA	Connelly & Assoc	ciates, I	DATES	DRILL		1 OF 1	
			ĸ	imlev-Horn &	Associates, Inc.	T. Chew				/4/15 - 2/4/	15	
PROJE	ECT N	IUMBE		initey-norm a	GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE			15	
		1	4189	)	NOT SURVEYED	2.25" H.S.A						
	ш	M	U					·		SOIL		
DEPTH (ft)	SAMPL TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		В	SPT LOW DUNTS	REC (in)	STAND PENETR TEST RESI (BPF 20 40	ATION STANCE <sup>=</sup> )	MC (%)
				Asphalt = 0.								
	-		A A A	Concrete =								
	$\mathbb{X}$			SC	<i>oup</i> , brown, f-c, clayey SAND w	-	12+	18+15	17	•		6.2
				Potomac gro dense, mois	<i>oup</i> , dark gray, f-m, silty SAND, st, <b>SM</b>	micaceous, medium	6-	+7+9	8	•		
5-		D2		<i>Potomac gro</i> moist, <b>SC</b>	<i>oup</i> , brown, f-c, clayey SAND w	ith gravel, medium dense,	9-	+8+7	9	•		
	-											
	$\mathbb{N}$	D1		Potomac gro	<i>oup</i> , gray, FAT CLAY, firm, moi	st, CH	2-	+3+3	14			
10-				Bottom of B	oring at 10.0 ft		_					-
	-											
15-												
	-											
	-											
GROU	ND W	ATER	LEVE	ELS:			1	SAMPL	ETYPE	ES:	<u>ı.::</u>	1
				ED DURING DRIL	6.0				Split Sp	boon		
REMA	RKS:	Bulł	< sar	nple collected	l from 0.0' to 5.0'			1				

BOREHOLE/TEST PIT SEG. F LOGS.GPJ GEOCONCEPTS TEMPLATE 02-12-2015.GDT 4/22/16

19955 Highland Vista Dr., #170	Phone:
Ashburn Virginia 20147	Fax: (7

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

		-	ing	meen	ng, mc.	Ashburn, Virginia	20147				,	3) 726	-8032
PROJECT:			LOGGED BY:				BORIN	g nui	MBER:				
Columbia Pike Multimodal Street Improvements				Pike Multimo	L. Pugh				FB-3				
LOCATION:						DRILLING CONTRACTOR:							
			C	olumbia Pike	e, Arlington , VA	Connelly & Associa	ates, Ir				SHEE	Г 1 OF 1	
OWNE	R/CLI	IENT:				DRILLER:		DATES	DRILLI	ED:			
				mley-Horn &	Associates, Inc.	R. Wilcher			2	9/15	- 2/9	/15	
PROJI	ECT N	IUMBE	R:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE	T NOTI	ES:			
		1	4189		NOT SURVEYED	2.25" H.S.A							
		Z	0							SOIL			
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BL	PT .OW JNTS	(in) (in)	PE TEST	NETF RES (BP		MC (%)
	+			Asphalt = 0.	7ft.					20	40	60 80	
			772	∖Crushed sto									
		D2		Potomac gr	<i>oup</i> , brown and black, f-c, clayey nse, moist, <b>SC</b>	SAND with gravel,	10-	+9+7	18	1			
				Potomac gr	oup, gray, FAT CLAY, micaceou	s, stiff, moist, <b>CH</b>	5+	5+7	18	•			37.5
	$\square$	D1											
5-				<i>Potomac gr</i> moist, <b>SC</b>	<i>oup</i> , orange - brown, clayey SAN	ID, medium dense,	8+	8+4	4	•	· · · · ·		
	-	D2											
	-												
		D1		Potomac gr	oup, gray, FAT CLAY with sand,	firm, moist, <b>CH</b>	3+	4+4	6	J			
10-				Bottom of B	oring at 10.0 ft								
	_												
	-												
	-												
15-	-												-
	-												
	_												
GROL	IND W	ATER	LEVE	LS:				SAMPL	.E TYPE	S:			
Ν	IOT EI	NCOU	NTER	ED DURING DRIL					Split Sp	oon			
1	NOT E	NCOL	INTER	ED UPON COMP	LETION CAVED: <u>5.5</u> ft								
REMA	DICC												
	1113.												

19955 Highland Vista Dr., #170	Pho
Ashburn Virginia 20147	Fax

PROJECT:					LOGGED BY:	.,	BORIN	IG NUMBER:
		nbia	Pike Multimoo	dal Street Improvements	L. Pugh			
LOCATION:	:				DRILLING CONTRACTOR:			FB-4
Columbia Pike, Arlington , VA Connelly &								SHEET 1 OF 1
OWNER/CL	IENT:				DRILLER:	DATES DRILI	_ED:	
			imley-Horn &	Associates, Inc.	T. Chew			- 2/5/15
PROJECT N				GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NOT	ES:	
	1	4189		NOT SURVEYED	2.25" H.S.A			0.11
Щ.,	Ν	₽					S	OIL STANDARD
DEPTH (ft) (ft)	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	N	SPT BLOW COUNTS	(in) (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80
			Asphalt = 0.	8ft.				20 40 80 80
-			Concrete = (	D.6ft.		-		
			Potomac gro	<i>pup</i> , brown, f-c, clayey SAND wit	h gravel, loose, moist, <b>SC</b>	12+5+4	4	•
			Very loose			4+2+2	4	
						1.2.2	.	
5	D2		Without grav	/el		3+2+3	8	
	4					0.2.0		
_								
			<i>Potomac gro</i> moist, <b>SP</b>	oup, brown, f-c, POORLY GRAD	ED SAND with gravel, dense,	16+18+19	10	<b>)</b>
10		<u></u>	Bottom of Bo	oring at 10.0 ft		-		
-								
15								
-								
GROUND W	VATER	LEVE	ils:			SAMPLE TYP	ES:	
NOT E	NCOU	NTER	ED DURING DRILI	LING		Split S	poon	
NOT E	ENCOU	NTEF	RED UPON COMPL	ETION CAVED: 6.0 ft				
REMARKS:								

GeoConcepts Engineering, Inc.	19955 Highland Vista Dr., #170 Ashburn, Virginia 20147
PROJECT:	LOGGED BY:
Columbia Pike Multimodal Street Improvements	L. Pugh
LOCATION:	DRILLING CONTRACTOR:

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJE	ECT:					LOGGED BY:		BORIN	NG NUMBER:
Columbia Pike Multimodal Street Improvements				Pike Multimo	dal Street Improvements	L. Pugh			
LOCA					•	DRILLING CONTRACTOR:	FB-5		
			С	olumbia Pike	, Arlington , VA	Connelly & Associate	s. Inc.	SHEET 1 OF 1	
OWNE	R/CL	ENT:			, ·	DRILLER:	DATES DRIL		
			Ki	mlev-Horn &	Associates, Inc.	R. Wilcher		2/9/15	- 2/9/15
PROJE	ECT N	UMBE		initey-norm &	GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NO		- 2/3/13
			4400		NOT SURVEYED	2.25" LL C. A			
			4189		NOT SURVETED	2.25" H.S.A		S	OIL
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC	Acchait = 0	MATERIAL DESCRIPTIO	Ν	SPT BLOW COUNTS	(in)	STANDARD
				Asphalt = 0.	911.				
	$\overline{\mathbf{N}}$			Crushed sto			Π		
	$ \lambda $			Potomac gro	oup, orange - brown, f-c, sandy F	-AT CLAY, stiff, moist, CH	2+4+5	18	<b>●</b>
	$\vdash$			Brown, with	gravel				
					-		2+5+7	12	
5-	$\overline{\mathbb{V}}$	D1		Firm			2+3+5	10	
	- - -						21010		
	1		$\square$				_		
	+			Potomac gro	oup, gray, FAT CLAY, micaceou	s, stiff, moist, <b>CH</b>	4+4+6	18	
10-	$\square$								
15-	-			Bottom of Bo	oring at 10.0 ft				
GROU	ND W	ATER	LEVE	LS:			SAMPLE TY	PES:	
				ed During Drili Ed Upon Compl	4.2		Split S	Spoon	
REMA	RKS:						I		

19955 Highland Vista Dr., #17	0 ]
Ashburn Virginia 20147	]

PROJECT	:				LOGGED BY:			IG NUMBER:
	Colun	nbia	Pike Multimoo	dal Street Improvements	L. Pugh	L. Pugh		
LOCATIO					DRILLING CONTRACTOR: FB-6			
Columbia Pike, Arlington , VA Connelly & Associate								SHEET 1 OF 1
OWNER/C	CLIENT:				DRILLER:	DATES DRIL	LED:	
		Ki	mley-Horn &	Associates, Inc.	T. Chew		2/5/15	- 2/5/15
PROJECT	NUMBE	R:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NO	TES:	
	1	4189	)	NOT SURVEYED	2.25" H.S.A			
	Σ	0					S	OIL
DEPTH (ft) (ft)	TYPE STRATUM	GRAPHIC		MATERIAL DESCRIPTIO	Ν	SPT BLOW COUNTS	(in) (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80
			Asphalt = 0.6					
		P 4 4	Concrete = (					
			Potomac gro	oup, light brown, f-m, clayey SAN	ND, medium dense, moist, <b>SC</b>	5+8+6	18	•
						4+5+7	18	•
5								
	D2					9+10+8	6	•
	7					4+6+9	18	
10	<u> </u>		Bottom of Bo	oring at 10.0 ft				
-								
15								
-								
GROUND	WATER	LEVE	LS:			SAMPLE TY	PES:	
			ed during drili Ed upon compl	LING LETION CAVED: <u>5.8</u> ft		Split S	Spoon	
REMARKS	5:							

19955 Highland Vista Dr., #170	Pho
Ashburn, Virginia 20147	Fay

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJE	ECT:					LOGGED BY:		BORIN	IG NUMBER:
	С	olun	nbia	Pike Multimo	dal Street Improvements	L. Pugh			ED 7
LOCATION: DRILLING CONTRACTOR:					DRILLING CONTRACTOR:			FB-7	
Columbia Pike, Arlington , VA Connelly & Associate					SHEET 1 OF 1				
OWNE	R/CLI	IENT:				DRILLER:	DATES DRIL	LED:	
			K	imley-Horn &	Associates, Inc.	R. Wilcher			- 2/9/15
PROJE	ECT N	UMBE	R:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NOT	TES:	
		1	4189	)	NOT SURVEYED	2.25" H.S.A			
	ш	Σ	U					S	
DEPTH (ft)	SAMPL TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTIO	Ν	SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80
				Asphalt = 0.	7ft.				20 40 80 80
	-		P 4 4	Concrete =					
	$\mathbb{N}$			<i>Potomac gro</i> moist, <b>CH</b>	<i>oup</i> , orange - brown, f, FAT CLA	Y with sand, micaceous, stiff,	4+5+7	18	•
				With gravel			F . 7 . 7	10	
							5+7+7	18	
_		D1							
5-	$\mathbb{N}$			Orange brow	wn and gray, without gravel				
							20+4+6	18	$\mathbb{R}$
	$\mathbb{N}$	D2		<i>Potomac gro</i> moist, <b>SC</b>	oup, orange - brown, f-c, clayey \$	SAND with gravel, dense,	24+30+14	12	<b>\</b>
10-				Bottom of B	oring at 10.0 ft				
	-								
	-								
	-								
45									
15-	]								
	-								
	+								
GROU	ND W	ATER	LEVE	LS:			SAMPLE TYP	PES:	
N		NCOU	NTER	ED DURING DRIL	LING		Split S	poon	
N	IOT F	NCOL	NTER	ED UPON COMPI	LETION CAVED: <u>5.0</u> ft				
REMA	RKS:								

9955 Highland Vista Dr., #170	Pho
abburn Virginia 20147	Fax.

ne: (703) 726-8030 : (703) 726-8032 faz

	0	E	ng	ineeri	ng, Inc.		19955 Highland V Ashburn, Virginia	/ista D 20147	r., #17	0	Pho Fax:	ne: (′ (703	703) 7 3) 726	26-8 -803
PROJEC			-			LOGGED		. 2011/			BORIN	· ·	·	
	Columbia Pike Multimodal Street Improvements L. Pugh					FB-8								
OCATIO	ON:		_			DRILLING CONTRACTOR:								
WNER	R/CLIE	ENT:	С	olumbia Pike	e, Arlington , VA	DRILLER:	Connelly & Assoc	iates, li	<b>nC.</b> DATES	DRILL		HEET	Г 1 OF 1	
			Ki	mley-Horn &	Associates, Inc.		R. Wilcher			2/1	0/15	- 2/10	/15	
ROJEC	CT NU	JMBE			GROUND SURFACE ELEVATION	(ft): DRILLING	METHOD:		OFFSE	T NOT	ES:		0/10	
		1	4189		NOT SURVEYED		2.25" H.S.A				00"			
EPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIP	TION		BL	SPT LOW UNTS	REC (in)	PE TEST	RESI: BPF)	ATION STANCE	MC (%)
-	X							_	9+10 2+14	12 18	•			22
5		В							10+13	18	•			
10 -				Bottom of Bo	oring at 10.0 ft				10+10	12				
15 — - - -														
ROUNI	D WA	ATER	LEVEI	_S:					SAMPL	 E TYPE	ES:			
				ed during drili Ed upon compl	F 2				× 1	Split Sp	oon			

955 Highland Vista Dr., #170	Phon
abburn Virginio 20147	Fax:

ne: (703) 726-8030 (703) 726-8032 faz

W.	Ì	E	ng	ineeri	ng, Inc.	19955 Highland V Ashburn, Virginia	/ista Dr., #170 20147	Pho Fax	one: (703) 726-8 x: (703) 726-803			
PROJECT: LOC Columbia Pike Multimodal Street Improvements						LOGGED BY:						
				Pike Multimo	dal Street Improvements	L. Pugh		<b>FB-9</b>				
LOCA	TION:	FION: DRILLING CONTRACTOR:					10-9					
	ER/CLI		C	olumbia Pike	e, Arlington , VA	Connelly & Associates, Inc.         SH           DRILLER:         DATES DRILLED:			SHEET 1 OF 1			
			K	inalas i la ma 9	Associates las				2/0/4 5			
PROJ	ECT N	IUMBE		Imley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	R. Wilcher DRILLING METHOD:	OFFSET NC		- 2/9/15			
		1	4189	)	NOT SURVEYED	2.25" H.S.A						
								S	OIL			
EPT (ft)	E SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTI	ION	SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80			
				Asphalt = 0.								
	-		P 4 9	Concrete =		CLAV stiff maint CL						
					nge - brown, f-c, sandy LEAN (	CLAT, SUII, MOISI, <b>CL</b>	11+4+6	8	₹			
		×		Very stiff			4+14+13	18				
5		В		Wet			4+5+9	6	•			
10		7			wn and gray		7+9+14	18				
15				Bottom of B	oring at 10.0 ft							
ROI	JND W	ATER	LEVE	ïLS:			SAMPLE TY	PES:				
	NOT E	NCOU	INTER	ed During Dril	PLETION CAVED: <u>6.2</u> ft		Split :	Spoon				
					LETION CAVED: <u>6.2</u> ft							

19955 Highland Vista Dr., #170	Phone: (70
Ashburn Virginia 20147	Fax: (703)

Phone: (703) 726-8030 Fax: (703) 726-8032 fay

					5/	Ashburn, Virginia	a 2014.	/		Тал. (/(		-0052
PROJE	ECT:					LOGGED BY:				BORING NU	MBER:	
Columbia Pike Multimodal Street Improvements				L. Pugh				FB-10				
LOCAT	TION:					DRILLING CONTRACTOR:			5-10			
			С	olumbia Pike	, Arlington , VA	Connelly & Assoc				T 1 OF 1		
OWNE	R/CLI	ENT:				DRILLER:		DATES	DRILL	ED:		
			Ki	imley-Horn &	Associates, Inc.	R. Wilcher			2	/9/15 - 2/9	/15	
PROJE	ECT N	UMBE	R:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE	T NOT	ES:		
		1	4189		NOT SURVEYED	2.25" H.S.A						
					1					SOIL		
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		B	SPT LOW UNTS	REC (in)	(D)	RATION SISTANCE PF)	MC (%)
	+			_Asphalt = 0.	4ft.					20 40	60 80	
			P A A A	Concrete = (	0.6ft.							
	$\mathbb{N}$			dense, mois	nge - brown, f-m, clayey SAND v .t, <b>SC</b>	with gravel, medium	5-	+7+4	18	•		
				F-c			4-	+4+7	18			
5-												
5-		В		Brown, very	dense		43+	37+23	18			
	-											
				Alluvial, grav	y, FAT CLAY, soft, moist, <b>CH</b>		_					
10-							1+	+1+1	2 0			36.7
				Bottom of B	oring at 10.0 ft							
	-											
	_											
	-											
15-												
	-											
	-											
	1											
GROU				18.				SAMPL		====		
GRUU		AIEK	LEVE	LJ.					∟ i rPt	_3.		
				ed during dril Ed upon compl	5 5				Split Sp	oon		
DEMA												
REMA	KKS:											

19955 Highland Vista Dr., #170	Phone:
Ashburn Virginia 20147	Fax: (7

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJECT:		LOGGED BY:		BORIN	IG NUMBER:				
	ke Multimodal Street Improvements	L. Pugh		FB-11					
LOCATION:					10-11				
Col OWNER/CLIENT:	umbia Pike, Arlington , VA	Connelly & Associat	DATES DRILLED:						
	ley-Horn & Associates, Inc.	Z. Macomber			- 2/3/15				
PROJECT NUMBER:	GROUND SURFACE ELEVATION (ft):		OFFSET NOT		- 2/3/15				
14189	NOT SURVEYED	2.25" H.S.A							
				SC	DIL				
(t) (t) (t) (t) (t) (t) (t) (t) (t) (t)	MATERIAL DESCRIPT	ΓΙΟΝ	SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF)				
	Asphalt = 0.3ft.		7		<u>20 40 60 80</u>				
	Concrete = 0.6ft.								
	Potomac group, orange brown and gray, f- gravel, very stiff, moist, <b>CH</b>	-m, sandy FAT CLAY with	3+9+10	17	•				
			3+9+10	6	•				
5	Potomac group, orange - brown, f-c, claye lense, moist, <b>SC</b>	ey SAND with gravel, medium	17+9+10	13	•				
D2									
	Potomac group, gray, LEAN CLAY, very s	tiff, moist, <b>CL</b>	10+12+12	5					
	Bottom of Boring at 10.0 ft								
GROUND WATER LEVELS			SAMPLE TYP	ES:					
NOT ENCOUNTERED	DURING DRILLING UPON COMPLETION CAVED: <u>5.0</u> ft		Split S	poon					
REMARKS:									

19955 Highland Vista Dr., #170	Phone: (7
Ashburn Virginia 20147	Fax: (703)

Phone: (703) 726-8030 Fax: (703) 726-8032 fay

		_				Ashburn, Virginia	a 20147					15) 720	-0052			
PROJE	PROJECT:				LOGGED BY:				BORING NUMBER:							
	С	olun	nbia	Pike Multimo	dal Street Improvements	L. Pugh										
LOCAT					•	DRILLING CONTRACTOR:				FB-12						
			ſ	olumbia Piko	, Arlington , VA	Connelly & Associates, Inc.										
OWNE	R/CLII	ENT:				DRILLER:	iates, ii	DATES DRILLED:								
			14		A					2/3/15 - 2/3/15						
PROJE				imley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	Z. Macomber DRILLING METHOD:		OFFSE			5 - 2/3	/15				
	.0110									_0.						
		1	4189		NOT SURVEYED	2.25" H.S.A										
	ш	Σ	U							SOI						
DEPTH (ft)	SAMPL TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION SPT BLOW COUNTS				(in) (in)							
				_Asphalt = 0.	4ft.					20	0 40	60 80				
_			0 4 4 9	Concrete = (	0.6ft.											
	$\mathbb{N}$			Potomac gro	Potomac group, light brown, FAT CLAY, stiff, moist, CH											
	M	D1					4+	7+7	18	7			34.9			
				Potomac gro	oup, light brown, clayey SAND, n	nedium dense, moist, SC	-									
-	1XI			C C			7+9	9+12	18							
-	$\square$															
5-																
_	IXI						11+1	2+15	18		∳ : :					
	Д	D2														
-																
-	1															
-	М															
	X						6+1	0+10	18		•					
10-	$ \left\{ \right\} $		///	Bottom of B	oring at 10.0 ft		_						-			
-	-															
-	1															
-																
15													-			
-																
-	1															
-																
GROU	ND W	ATER	LEVE	LS:				SAMPLI	i E type	ES:						
	ULEN	ICOU	NIER	ED DURING DRIL				ء 🔟	Split Sp	oon						
N	OT EN	NCOU	NTER	ED UPON COMPI	LETION CAVED: <u>5.5</u> ft											
REMAF	RKS:															

19955 Highland Vista Dr., #170	Phon
Ashburn Virginia 20147	Fax:

Phone: (703) 726-8030 Fax: (703) 726-8032 fax

PROJE	CT:					LOGGED BY:		BORIN	IG NUMBER:			
		olun	nbia	Pike Multimo	dal Street Improvements	L. Pugh			FB-13			
LOCAT	ION:					DRILLING CONTRACTOR:			10-13			
			C	olumbia Pike	, Arlington , VA	Connelly & Associat						
OWNER	R/CLIE	ENT:				DRILLER:	DATES DRIL	LED:				
				imley-Horn &	Associates, Inc.	Z. Macomber			- 2/3/15			
PROJE	CT NU	JMBE	R:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NO	TES:				
		1	4189	)	NOT SURVEYED	2.25" H.S.A						
	ш	Σ	υ					S	OIL STANDARD			
DEPTH (ft)	SAMPL TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTIO	Ν	SPT BLOW COUNTS	(in) (in)				
				_Asphalt = 0.4					20 40 00 80			
-				Concrete = (		andium daman maint <b>00</b>	_					
_	X	D2		-	oup, brown, f-m, clayey SAND, n		5+12+8	7	•			
-	$\mathbb{X}$			Potomac gro micaceous,	oup, orange brown and gray, f, F very stiff, moist, <b>CH</b>	AT CLAY with sand,	6+12+18	18				
5												
_	X	D1		Gray			7+12+17	18	•			
_												
10-	Å			Bottom of B	oring at 10.0 ft		8+11+11	18				
_					0							
-												
-												
15 —												
-												
-												
GROUN		ATER	LEVE	LS:			SAMPLE TY	PES:				
NC	DT EN	ICOUI	NTER	ED DURING DRILI	LING		Split S	Shoen				
					_ETION CAVED: <u>6.5</u> ft			ομοσιι				
		NCOO										
REMAR	RKS:						1					

19955 Highland Vista Dr., #170	Pho
Achhurn Virginia 20147	Fax.

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

Engineering, Inc.				meen	Ashburn, Virginia 20147				Fax: (703) 726-8032				
PROJECT:					LOGGED BY:				BORING NUMBER:				
Columbia Pike Multimodal Street Improvements						L. Pugh				FB-14			
LOCAT	FION:					DRILLING CONTRACTOR:				10-14			
			C	olumbia Pike	e, Arlington , VA	Connelly & Associates, Inc.					SHEET	1 OF	1
OWNE	R/CL	IENT:				DRILLER:	DATES DRILLED:						
				imley-Horn &	Associates, Inc.	Z. Macomber				/3/15	- 2/3/	/15	
PROJE	ECT N	NUMBE	R:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSET	r not	ES:			
		1	4189		NOT SURVEYED	2.25" H.S.A							
		Σ	U						1	SOIL			
DEPTH (ft)	SAMPLE				MATERIAL DESCRIPTION		BL	PT .OW JNTS	U E STANDARD PENETRATIO TEST RESISTAN (BPF)			ATION ISTANCE F)	ж   У
	+			Asphalt = 0.	5ft.					20	40	<u>60 80</u>	
			Concrete =				8+7	13					
		2					9+1	1+15	18				
5-		D2		<i>Potomac gro</i> clay, with gr	<i>oup</i> , orange - brown, f-c, POORL avel, dense, moist, <b>SP-SC</b>	Y GRADED SAND with	12+2	16+18	16		•		
		D1		<i>Potomac gro</i> moist, <b>CH</b>	<i>oup</i> , orange brown - gray, FAT C	CLAY, micaceous, firm,		4+4	11				38.9
10-	_			Bottom of B	oring at 10.0 ft								
	_												
GROU	ND W	VATER	LEVE	LS:				SAMPLE	E TYP	ES:	<u>· · ·</u>		
				ed During Dril	6.0			<b>X</b> s	Split Sp	ooon			
<u></u>													
REMA	RKS:												

9955 Highland Vista Dr., #170	Ph
Achhurn Virginia 20147	– Fa

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJE	ECT:					LOGGED BY:			IG NUMBER:		
LOCAT		olum	ibia l	Pike Multimoo	dal Street Improvements	L. Pugh	FB-15				
LUCAI	HON.		~	olumbio Diko	Arlington VA						
OWNE	R/CLI	ENT:	۔ د		, Arlington , VA	Connelly & Associates	DATES DRIL		SHEET 1 OF 1		
PROJE	CT N			mley-Horn &	Associates, Inc.	Z. Macomber	0FFSET NO		- 1/28/15		
	_011		4189	1	NOT SURVEYED	2.25" H.S.A	OFFSET NOTES.				
	щ	M	C					S	DIL STANDARD		
DEPTH (ft)	SAMPL	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	I	SPT BLOW COUNTS	(in) (in)	PENETRATION TEST RESISTANCE (BPF)		
			5 N.	Asphalt = 0.4					20 40 60 80		
-			A 4 4	Concrete = (	0.6ft. <i>osit</i> , orange - brown, f-c, POORL	Y GRADED SAND with clay	-				
	$\mathbb{A}$			with gravel, I	loose, moist, <b>SP-SC</b>	T GRADED SAND WITT day,	5+5+5	14	•		
				Micaceous			7+4+5	15	•		
-											
5	X	C2		Medium den	se		6+9+6	13	•		
-											
	-										
	$\overline{\mathbf{N}}$						4+9+15	18	•		
10-				Bottom of Bo	oring at 10.0 ft		_				
-											
-											
-											
-											
15-											
-											
-	-										
-	$\left  \right $										
GROU							SAMPLE TY				
					LING _ETION CAVED: <u>6.5</u> ft		Split S	Spoon			
	UTE	NCOU	NIER	ED UPON COMPL	LETION GAVED: tt						
REMA	RKS:										

GeoConcepts Engineering, Inc.
Engineering, Inc.

19955 Highland Vista Dr., #170	Phone:
Ashburn Virginia 20147	Fax: (7

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJEC	T:				LOGGED BY:	2011/			BORING	<u>`</u>	IBER:	
		lumbia	Pike Multimo	dal Street Improvements	L. Pugh					FB	<b>-16</b>	
LOCATIO	DN:				DRILLING CONTRACTOR:							
OWNER			Columbia Pike	, Arlington , VA	Connelly & Associa	ates, Ir	DATES			HEET	1 OF 1	
							DAILO					
PROJEC			imley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	Z. Macomber DRILLING METHOD:		OFFSET		2 <b>8/15 -</b> ES <sup>:</sup>	1/28	5/15	
			_				OTTOET	NOT	LO.			
		1418	9	NOT SURVEYED	2.25" H.S.A				SOIL			
ц		ĕ Ş							S	TAND	ARD	(%
DEPTH (ft)	INFO	STRATUM GRAPHIC		MATERIAL DESCRIPTION		BL	PT OW JNTS	(in)	PENETRATION TEST RESISTANCE (BPF) 20 40 60 80		MC (%)	
		P 4							20			
				0.3ft. <i>osit</i> , orange - brown, f-m, POOF		6-	4+6	15				
			clay, micace	eous, loose, moist, <b>SP-SC</b>	REF GRADED SAIND WILL		410					
			With gravel,	/ith gravel, medium dense								7.6
	$\square$						6+10	14	I			1.0
5-		2										-
	XL					5+	7+6	18	•			
-												
	_											
- `	$\langle  $					9+1	1+12	16				
10-												
			Bottom of Bo	oring at 10.0 ft								
-												
-												
15-												1
-												
-												
]												
GROUNE	TAW C	ER LEVE	ELS:				SAMPLE	 E TYPE	ES:			
			RED DURING DRIL									
							K s	Split Sp	oon			
NO	T ENC	COUNTER	RED UPON COMPL	LETION CAVED: <u>5.0</u> ft								
REMARK	(S:											

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

BOREHOLE/TEST PIT SEG. F LOGS.GPJ GEOCONCEPTS TEMPLATE 02-12-2015.GDT 4/22/16

19955 Highland Vista Dr., #170	Phone: (7
Ashburn Virginia 20147	Fax: (703)

Phone: (703) 726-8030 Fax: (703) 726-8032 fay

					Ashburn, Virginia 2014/			$\frac{1}{2}$				
PROJECT					LOGGED BY:		BORING NUMBER:					
LOCATIO		mbia	Pike Multimo	dal Street Improvements	L. Pugh DRILLING CONTRACTOR:			FB-17				
	N.											
OWNER/0			Columbia Pike	e, Arlington , VA	Connelly & Associa	tes, Inc.	DATES DRILLED:					
OWNER												
PROJECT			imley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	Z. Macomber	1/2 OFFSET NOT		- 1/29/15				
			-			GITGETNOT	LO.					
		14189	9	NOT SURVEYED	2.25" H.S.A		50	DIL				
DEPTH (ft)	STRATUM	GRAPHIC		MATERIAL DESCRIPTIO	Ν	SPT BLOW COUNTS	REC (in)	STANDA PENETRA TEST RESIS (BPF) 20 40 60	TION TANCE			
		P 4 4	Asphalt = 0.									
			Concrete = <i>Terrace dep</i> dense, mois Dense	oosit, orange - brown, f-c, clayey	SAND with gravel, very	6+35+31	15					
5			Very dense			10+16+15	18					
						10+45+50/6	10		~			
10			Bottom of B	oring at 10.0 ft		50/6	5		>>●			
-												
15 — - -												
GROUND WATER LEVELS: NOT ENCOUNTERED DURING DRILLING							SAMPLE TYPES:					
			RED UPON COMP	LETION CAVED: <u>6.0</u> ft								

955 Highland Vista Dr., #170	Phone:
shburn Virginia 20147	Fax: (70

N.	Engineering, Inc.					199 Ast	19955 Highland Vista Dr., #170 Ashburn, Virginia 20147					Phone: (703) 726-803 Fax: (703) 726-8032 f				
PROJI	ECT:					LOGGED BY:						BORING NUMBER:				
			nbia	Pike Multimo	dal Street Improvements		L. Pugh					FB-18				
LOCA	TION:						DRILLING CONTRACTOR:				r-D-10					
OWNE			C	Columbia Pike	e, Arlington , VA	DRILLER:	Connelly & Associates, Inc. DRILLER: DATES DRI					SHEET 1 OF 1				
OVVINE					• • • •				DATES							
PROJI	ECT N	IUMBE		imley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):		. Macomber THOD:		OFFSET	1/29/15 - 1/29/15 NOTES:						
	-	1	4189	)	NOT SURVEYED		2.25" H.S.A									
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	N		BL CO	SPT ₋OW UNTS	REC (in)	PEN TEST	RESIS (BPF	ATION STANCE	MC (%)		
			- N	Asphalt = 0.				_				<u>+0 C</u>				
			d N d N	Concrete = Terrace dep	υ.οπ. posit, gray, LEAN CLAY, stiff, n	noist, <b>CL</b>		3+	-3+8	18				18.6		
				Hard				10+	17+18	18						
5-		C1		Very stiff				10+	14+16	18						
				Hard												
10-					oring at 10.0 ft			12+	16+15	18				-		
	_															
	-															
15-	-															
	_															
GROL		ATER		ELS:					SAMPLE		ES:					
				ed During Dril	7.0					Split Sp						
REMA	RKS:															

19955 Highland Vista Dr., #170	Phone: (7
Ashburn Virginia 20147	Fax: (703)

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJE						LOGGED BY:		NG NUMBER:	
LOCAT		olum	bia	Pike Multimo	dal Street Improvements	L. Pugh DRILLING CONTRACTOR:		HA-19	
200711			C	olumbia Piko	, Arlington , VA	Connelly & Associate	es Inc	SHEET 1 OF	1
OWNE	R/CLI	ENT:	U			DRILLER:	DATES DRILLED:	SHELT TO	<u> </u>
			Ki	mley-Horn &	Associates, Inc.	L. Pugh		5 - 2/10/15	
PROJE	CT N	UMBE	२:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NOTES:		
		1	4189		NOT SURVEYED	Hand Augers		1	
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC			ESCRIPTION		DCP BLOW COUNTS	Geoprobe Pen. (in)
				Asphalt = 0.	9ft.				
-		D2		↓ Dense	oup, orange - brown, f-c, clayey	SAND with gravel, dense, moist	f, SC	19+35/ 6+10+7 22+35/	
5	-								
10	-								
15 - - -	-								
GROU	ND W	ATER	LEVE	LS:			SAMPLE TYPES:		
				ed during dril	LING LETION CAVED: <u>2.0</u> ft		Dynamic Cone Penetrometer		
REMAR	RKS:						I		

19955 Highland Vista Dr., #170	Pho
Achhum Virginia 20147	Fax.

	ny	meen	ng, mc.	Ashburn, Virginia 2	0147		: (703) 726-80			
PROJECT:				LOGGED BY:		BORING NUMBER:				
	mbia	Pike Multimo	dal Street Improvements	L. Pugh		HB-1				
OCATION:				DRILLING CONTRACTOR:	10-1					
		olumbia Pike	e, Arlington , VA	Connelly & Associat	es, Inc.	:	SHEET 1 OF 1			
WNER/CLIENT:				DRILLER:	DATES DRILI	ED:				
	Ki	imley-Horn &	Associates, Inc.	Z. Macomber	1/	13/15	- 1/13/15			
ROJECT NUMB			GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NOT	TES:				
	14189		NOT SURVEYED	2.25" H.S.A		S	DIL			
type stratum	GRAPHIC		MATERIAL DESCRIPTION	I	SPT BLOW COUNTS	STANDARD PENETRATION TEST RESISTANG (BPF)				
_		Asphalt = 0.	5ft.				20 40 60 80			
		Crushed sto Alluvial, ora moist, <b>SC</b>		th gravel, medium dense,	22+20+10	7	•			
В		Dense			10+19+19	0	X			
5		Micaceous,	very dense		20+36+36	15				
		Auger Refus								
5										
	RLFVF	LS:				PES <sup>.</sup>				
NOT ENCOU	JNTER	ED DURING DRIL	2.0		Split S					
EMARKS:										

19955 Highland Vista Dr., #170	Ph
Achhurn Virginia 20147	Fa

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJECT	Г:				LOGGED BY:	0147		IG NUMBER:
		nbia	Pike Multimo	dal Street Improvements	L. Pugh			HB-2
LOCATIO	N:				DRILLING CONTRACTOR:		ND-2	
		C	Columbia Pike	e, Arlington , VA	Connelly & Associat	es, Inc. DATES DRILI		SHEET 1 OF 1
OWNER/0	CLIENT:							
PROJECT			imley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	Z. Macomber DRILLING METHOD:	OFFSET NOT		- 1/22/15
					2.25" H.S.A		. 20.	
		4189	,	NOT SURVEYED	2.23 N.S.A		S	DIL
DEPTH (ft) S	TYPE STRATUM	GRAPHIC		MATERIAL DESCRIPTION	Ν	SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF)
			Asphalt = 0.	5ft.				20 40 60 80
		P. 4	Concrete =	0.5ft.				
			moist, <b>SC</b>	nge - brown, f-c, clayey SAND w	ith gravel, medium dense,	13+5+8	6	•
			Dense			14+19+23	12	
5	В		Brown, mica	aceous, medium dense		19+12+9	15	
10	D2		moist, <b>SM</b>	oup, light brown, f-m, silty SAND oring at 10.0 ft	, micaceous, very dense,	 16+26+31	18	
GROUND			:1 S:			SAMPLE TYF		
NOT	ENCOU	NTER	ed During Dril Red Upon Compi	6.0		SAMPLE TYP		
REMARK	S:							

19955 Highland Vista Dr., #170	Ph
Achhurn Virginia 20147	Fa

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJE	ECT:				-	LOGGED BY:	17/		NG NUM	<u>´</u>	0.0021		
LOCAT		olun	nbia	Pike Multimo	dal Street Improvements	L. Pugh		-	HE	3-3			
			с	olumbia Pike	, Arlington , VA	Connelly & Associate	s. Inc.	SHEET 1 OF 1					
OWNE	R/CLI	ENT:			, <b></b>	DRILLER:	DATES DRIL		0				
			Ki	mley-Horn &	Associates, Inc.	Z. Macomber	1	/22/15	- 1/22	/15			
PROJE	ECT N	UMBE	R:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NO	TES:					
		1	4189	)	NOT SURVEYED	2.25" H.S.A							
	щ	Σ	<u></u>					S		TANDA			
DEPTH (ft)	SAMPL	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	Ν	SPT BLOW COUNTS	(in) (in)	PEN TEST	IETRA RESIS (BPF)	TION TANCE		
				Asphalt = 0.	4ft.		~		20	40 6	<u>0 80</u>		
				Concrete =			-						
	$\mathbb{N}$			moist, <b>SC</b>	nge - brown, f-c, clayey SAND w	ith gravel, medium dense,	7+6+9	4	•				
		В		Light brown,	without gravel		6+6+8	12					
5-				Potomac gro moist, <b>SP-S</b>	o <i>up</i> , white, f-c, POORLY GRADE C	ED SAND with clay, loose,	4+3+5	18	•				
		D2											
				Potomac gro dense, mois	<i>bup</i> , orange - brown, f-m, clayey t, <b>SC</b>	SAND with gravel, medium	7+7+9	10					
10-	-			Bottom of B	oring at 10.0 ft								
15 - -	-												
GROU	ND W	ATER	LEVE	LS:			SAMPLE TY	PES:					
				ED DURING DRIL ED UPON COMPI	LING LETION CAVED: 7.0 ft		Split S	Spoon					
REMA	RKS:												

955 Highland Vista Dr., #170	Phone
aburn Virginia 20147	Fax: (

C.	Engineering, Inc.					19955 Highland V Ashburn, Virginia	0	Pho Fax	one: ( : (70	703) 3) 72	726-80 26-8032					
PROJI					-	LOGGED BY:					BORING NUMBER:					
			nbia	Pike Multimo	dal Street Improvements	L. Pugh		HB-4								
LOCA	TION:					DRILLING CONTRACTOR:	DRILLING CONTRACTOR:					ПD-4				
OWNE			C	Columbia Pike	, Arlington , VA	Connelly & Assoc	Connelly & Associates, Inc.						SHEET 1 OF 1			
OVVINL			k		Accesiates Inc						A 140	N/4 E				
PROJI	ECT N	IUMBE		Imley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	Z. Macomber DRILLING METHOD:		OFFSE			- 1/19	9/15				
		1	4189	9	NOT SURVEYED	2.25" H.S.A										
		Συ						1		SOIL						
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	Ν	BL	SPT LOW UNTS	REC (in)	PE TES	T RESI (BP	ATION STAN				
			PAA	Asphalt = 0.4 Concrete = 0			-									
	+		× 4	<b>_</b>	סוסת. 1. היומים, orange - brown, f-c, claye	y SAND with gravel, loose,	-									
	+	D2		moist, <b>SC</b>			4+	-3+3	9	٩			12.2			
		E1		<i>Residual</i> , gr	ay, f-m, silty SAND, micaceou	s, dense, moist, <b>SM</b>	8+1	1+25	4				9.7			
5-				Weathered I	rock, gray, silty SAND, micace	ous, very dense, moist, <b>SM</b>	5	0/6	4				>>@22.3			
	_															
	_	E2														
10-				Dottom of D	oring at 9.8 ft		25+3	4+50/4	16				>>●11.2			
10				Bottom of Bo	oning at 9.0 it											
	_															
	-															
15-																
	-															
	-															
	_															
GROL		ATER		ELS:				SAMPL	E TYPI	ES:						
				RED DURING DRILL	6 5				Split Sp	oon						
REMA	RKS:															

955 Highland Vista Dr., #170	Phor
shburn Virginia 20147	Fax.

ne: (703) 726-8030 (703) 726-8032 faz

Engineering, Inc.					1995 Ash	19955 Highland Vista Dr., #170 Ashburn, Virginia 20147				Phone: (703) 726-803 Fax: (703) 726-8032 f					
PROJ						LOGGED BY:						BORING NUMBER:			
		olun	nbia	Pike Multimo	dal Street Improvements		L. Pugh				HB-5				
LOCA	FION:						DRILLING CONTRACTOR:								
OWNE	R/CLI	ENT:	C	olumbia Pike	e, Arlington , VA	DRILLER:	nelly & Associa	ates, li	<b>IC.</b> DATES	DRILL	SHEET 1 OF 1				
			ĸ	imlev-Horn &	Associates, Inc.							1/28/15 - 1/28/15			
PROJ	ECT N	UMBE			GROUND SURFACE ELEVATION (ft):				OFFSE			20/10			
		1	4189	)	NOT SURVEYED	2	.25" H.S.A								
					·					SOIL					
DEPTH (ft)	SAMPL	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	DN		BL	SPT LOW UNTS	REC (in)	PENET TEST RE (B	IDARD RATION SISTANCE PF) <u>60 80</u>	MC (%)		
			P 6.	Asphalt = 0.											
				Concrete = 0 Potomac gro	0.6ft. oup, white and orange brown,	f-c, clayey SAN	), medium								
	X			dense, mois	st, SC			5+	7+12	12	•				
	$\mathbb{H}$			Contains gra	avel, dense										
								15+	13+18	16	•		17.3		
5-	+			Medium den	ise								-		
	X	D2						6+1	1+11	18					
	$\square$														
	$\mathbb{N}$				oup, yellow and white, f-c, PO avel, very dense, moist, <b>SP-S</b>		SAND with	16+:	20+45	18					
10-	$\square$				· · · · · · ·								_		
				Bollom of B	oring at 10.0 ft										
	]														
	-														
	-														
15-	1														
	-														
	-														
	1														
GROU	 ND W	'ATER	LEVE	LS:					SAMPL	 E TYPE	ES:				
Ν	IOT EI	NCOU	NTER	ED DURING DRIL	LING					Split Sp					
				ED UPON COMPI	5.5					-piit Op					
	_														
		יייים			1 from 0.0' to 5.0'										
	1113.	Duil	sar	nple collected	l from 0.0' to 5.0'										

9955 Highland Vista Dr., #170	Р
Achhurn Virginia 20147	– F

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJECT:				5/	LOGGED BY:	)14/				0 0052	
		nbia	Pike Multimo	dal Street Improvements	L. Pugh		HB-6				
LOCATION:	:				DRILLING CONTRACTOR:						
		С	olumbia Pike	, Arlington , VA	Connelly & Associate						
OWNER/CL	IENI:				DRILLER:	DATES DRIL					
PROJECT N			mley-Horn &	Associates, Inc.	Z. Macomber DRILLING METHOD:	1/28/15 - 1/28/15 OFFSET NOTES:					
TROJECTI							120.				
	1	4189		NOT SURVEYED	2.25" H.S.A		S	JIL			
DEPTH (ft) SAMPLE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	Ν	SPT BLOW COUNTS	(in)	S <sup>T</sup> PEN TEST	TANDA NETRA RESIS (BPF) 40 6	TION TANCE	
			Asphalt = 0.			_			40 0	0 00	
			Concrete = (	).5ft. <i>oup</i> , white, f-c, clayey SAND, cor	atains gravel modium donso	-					
-	*		moist, <b>SC</b>		italiis gravel, medium dense,	6+9+12	14	1			
+			Without grav	/el		7+14+14	6		)		
5											
	D2					9+11+11	18	Ó			
-											
-	7		Contains gra	avel		6+11+13	18				
			Bottom of Bo	oring at 10.0 ft							
15 —											
-											
-											
	NCOU	NTER	ls: Ed during drili Ed upon compl	6.0		SAMPLE TY					
REMARKS:											

9955 Highland Vista Dr., #170	Р
Achhum Vincinia 20147	- F

PROJE	CT:					LOGGED BY:	0147		IG NUMBER			
	С	olum	ıbia l	Pike Multimo	dal Street Improvements	L. Pugh		HB-7				
LOCAT	'ION:					DRILLING CONTRACTOR:						
OWNE	R/CLI	ENT:	С	olumbia Pike	e, Arlington , VA	Connelly & Associat	DATES DRILLED:					
			Ki	mlov Horn 8	Associates, Inc.	Z. Macomber			1/29/15			
PROJE	CT N	UMBE		mey-nom a	GROUND SURFACE ELEVATION (ft):	1/28/15 - 1/28/15 OFFSET NOTES:						
		1	4189		NOT SURVEYED	2.25" H.S.A						
		Σ	U		1			S	OIL			
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	1	SPT BLOW COUNTS	(in)		ATION ISTANCE F)		
				Asphalt = 0.				-	20 40	60 80		
-				Concrete =	0.5ft. oup, orange - brown, f-c, clayey S							
-	X			moist, <b>SC</b>	<i>bup</i> , orange - brown, i-c, clayey c	7+4+5	8	•				
-	$\mathbb{N}$	D2					5+3+5	2				
-	$\square$											
5				_								
	$\mathbb{N}$			Potomac gro gravel, stiff,	<i>oup</i> , orange brown and gray, f, sa moist, <b>CL</b>	andy LEAN CLAY, contains	5+7+6	10				
-	$ \Delta $											
-		D1										
-		ы										
_	$\overline{\mathbf{n}}$			Firm								
	X						2+3+3	4	•			
10-				Bottom of B	oring at 10.0 ft							
-												
-												
-												
-	-											
15												
-												
-	-											
-	1											
GROUN	ND W.	ATER	 LEVEI	LS:			SAMPLE TY	PES:				
N			NTERF	ED DURING DRIL	LING		Split S	Shoon				
				ED UPON COMPI	6.0			νροσιι				
REMAF	KS:											

19955 Highland Vista Dr., #170	Pho
Ashburn Virginia 20147	Fax

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJE	ECT:					LOGGED BY:	a 20117			BORING NUMBER:			
		olun	nbia	Pike Multimoo	dal Street Improvements	L. Pugh	1			IRW-1			
LOCAT	FION:					DRILLING CONTRACTOR:				11.1.4.41			
OWNE			С	olumbia Pike	, Arlington , VA	Connelly & Assoc	& Associates, Inc. SHEET 1 OF 1 DATES DRILLED:						
OWINE	R/GLI							DATES					
PROJE	CT N			mley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	Z. Macomber DRILLING METHOD:		OFFSE		13/15 - 1/13/15			
								0110L		20.			
			4189		NOT SURVEYED	2.25" H.S.A				SOIL			
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BL	PT OW JNTS	REC (in)	STANDARD	MC (%)		
		A		Topsoil = 0.2 <i>Fill</i> , brown, f	2ft. -c, sandy FAT CLAY with grave	el, soft, moist, <b>CH</b>	1+	1+1	12 (	$\mathbb{R}^{\mathbb{R}}$	20.9		
		D2		Potomac gro sand, dense	<i>oup</i> , orange - brown, f, POORL` , moist, <b>GP</b>	Y GRADED GRAVEL with	10+1	17+15	1		2.0		
5-				<i>Residual</i> , ora moist, <b>SM</b>	ange - brown, f-m, silty SAND,	micaceous, very stiff,	12+7	1+10	10		18.7		
10-		E1		Dark gray, v	ery hard		20+2	29+42	18		13.6		
15 -				Very stiff			19+1	16+14	18		20.6		
	-				oring at 15.0 ft								
GROU	ND W	ATER	LEVE	LS:				SAMPLI	E TYPE	ES:			
	IOT E			ed during drili Ed upon compl	LING LETION CAVED: <u>10.5</u> ft			5	Split Sp	ioon			

19955 Highland Vista Dr., #170	Phone: (70)
Ashburn Virginia 20147	Fax: (703)

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJE	CT:				-	LOGGED BY:		NG NUMBER:			
LOCAT		olum	bia	Pike Multimoo	dal Street Improvements	L. Pugh		HA-2			
			c	Columbia Pike	, Arlington , VA	GeoConcepts Engineer	ring. Inc.	SHEET 1 OF 1			
OWNER	R/CLI	ENT:			, <b></b>	DRILLER:	DATES DRILLED:	0			
PROJE				imley-Horn &	Associates, Inc.	L. Pugh	1/15/15 OFFSET NOTES:	5 - 1/15/15			
PROJE				<b>`</b>	NOT SURVEYED		OFFSET NOTES.				
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL D	ESCRIPTION		DCP BLOW COUNTS			
		A		<i>Fill</i> , brown, f	3ft. , POORLY GRADED GRAVEL, Refusal at 0.5 ft	medium dense, moist, <b>GP</b>		3+12+15	5		
- 10 — - - -											
15	1D W	ATER	LEVE	:LS:			SAMPLE TYPES:				
				ed During Drili Red Upon Compl	0.5		Dynamic Cone Penetrometer	·			
REMAR	KS:										

19955 Highland Vista Dr., #170	Phone: (703
Ashburn Virginia 20147	Fax: (703) 7

Phone: (703) 726-8030 Fax: (703) 726-8032 fax

PROJE						LOGGED BY:		NG NUMBER:	
LOCAT		olun	nbia	Pike Multimo	dal Street Improvements	L. Pugh DRILLING CONTRACTOR:		HA-3	
OWNE	D/CLI		C	Columbia Pike	e, Arlington , VA	GeoConcepts Engineering,	DATES DRILLED:	SHEET 1 OF	1
OWNE	:R/CLI	ENT.	K	imley-Horn &	Associates, Inc.	L. Pugh		- 1/15/15	
PROJE	ECT N				GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NOTES:		
		1	4189	)	NOT SURVEYED	Hand Auger		SOIL	
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL D	ESCRIPTION		DCP BLOW COUNTS	Geoprobe Pen. (in)
				Concrete = 0 <i>Fill</i> , brown, f	0.3ft. -c, clayey SAND, loose, moist, <b>S</b>	SC	/	2+3+3	5
				<i>Fill</i> , brown, f	-c, sandy LEAN CLAY with grave	el, very stiff, moist, <b>CL</b>		2+4+15	5
		A	$\bigotimes$					9+9+9	5
-		D2		Potomac are	oup, orange - brown, f-c, clavey (	SAND with gravel, very dense, mois	t. SC	19 <del>+</del> 35/	2
	IOT EN	NCOU	NTER	ELS: ED DURING DRIL RED UPON COMPI	4.5		SAMPLE TYPES: Dynamic Cone Penetrometer		
REMA	RKS:								

19955 Highland Vista Dr., #170	Phone: (70
Ashburn Virginia 20147	Fax: (703)

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJE					-	LOGGED BY:		RING NUMBER:	
LOCAT			nbia	Pike Multimo	dal Street Improvements	L. Pugh DRILLING CONTRACTOR:		HA-4	
			ſ	olumbia Piko	e, Arlington , VA	GeoConcepts Enginee	aring Inc	SHEET 1 OF	1
OWNE	R/CLI	IENT:				DRILLER:	DATES DRILLED:		-
			κ	mley-Horn &	Associates, Inc.	L. Pugh	1/15/1	15 - 1/15/15	
PROJE	CT N	IUMBE			GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NOTES:		
		1	4189		NOT SURVEYED	Hand Auger			
	щ	Σ	Ş					SOIL	_
DEPTH (ft)	SAMPI TYPE	STRATUM	GRAPHIC		MATERIAL	DESCRIPTION		DCP BLOW COUNTS	Geoprobe Pen. (in)
					0.3ft.			6+12+18	5
-	-	A		<i>⊢III</i> , brown, f	-c, clayey SAND with gravel, r	neaium dense, moist, <b>SC</b>			
-			$\bigotimes$					6+14+14	5
				Hand Auger	Refusal at 2.5 ft			-	
-									
-									
5									
-									
-									
-									
-									
10-									
_									
-									
-									
-									
15 —									
-									
-									
-									
_									
GROUN	ND W	/ATER	LEVE	LS:			SAMPLE TYPES:		_
N	OT EI	NCOU	NTER	ED DURING DRIL	LING		Dynamic Cone		
					LETION CAVED: 2.5 ft		Penetrome	er	
	. L								
REMAF	RKS:								

19955 Highland Vista Dr., #170	Ph
Ashburn, Virginia 20147	Fa

PROJE	ECT:					LOGGED BY:		BORIN	IG NUMBER:
		olum	bia	Pike Multimoo	dal Street Improvements	L. Pugh			IRW-4A
LOCA	FION:					DRILLING CONTRACTOR:			
			C	Columbia Pike	, Arlington , VA	Connelly & Associat			SHEET 1 OF 1
OWNE	R/CLI	ENT:				DRILLER:	DATES DRILL	ED:	
				imley-Horn &	Associates, Inc. GROUND SURFACE ELEVATION (ft):	Z. Macomber DRILLING METHOD:			- 1/20/15
PROJE							OFFSET NOT	E9.	
		1	4189	)	NOT SURVEYED	2.25" H.S.A		SI	DIL
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTIO	Ν	SPT BLOW COUNTS	REC (in)	STANDARD
			P A	Asphalt = 0.4 Concrete = 0					
				Potomac gro moist, <b>SC</b>	<i>oup</i> , orange - brown, f-c, clayey \$	SAND with gravel, loose,	6+5+4	13	•
				medium den	se, without gravel		3+6+13	18	
5-				Potomac gro gravel, very	<i>pup</i> , light brown, f-c, POORLY G dense, moist, <b>SP-SC</b>	RADED SAND with clay and	13+35+50/6	18	
10 -		D2		Potomac gro moist, <b>SC</b>	<i>oup</i> , light brown, f-c, clayey SAN	D with gravel, medium dense,	18+12+12	18	•
<b>⊈</b> 15-				Wet Bottom of Bo	oring at 15.0 ft		7+10+14	18	•
GROU	ND W	ATER	LEVE	ELS:			SAMPLE TYP	ES:	
		JNTER COMP		<u>13.0</u> ft DN: <u>13.0</u> ft			Split Sp	poon	
				ICOUNTERED	CAVED: <u>8.0</u> ft				
REMA	RKS.								

BOREHOLE/TEST PIT SEG. H&I LOGS.GPJ GEOCONCEPTS TEMPLATE 02-12-2015.GDT 4/22/16 THE STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES. THE TRANSITION MAY BE GRADUAL.

19955 Highland Vista Dr., #170	Pho
Ashburn Virginia 20147	Fax

Phone: (703) 726-8030 Fax: (703) 726-8032 fa:

PROJE	ECT:					LOGGED BY:	,	BORIN	IG NUMBER:			
		olun	nbia	Pike Multimoo	dal Street Improvements	L. Pugh			IB-1			
LOCAT	FION:					DRILLING CONTRACTOR:			ID-I			
			C	olumbia Pike	, Arlington , VA	Connelly & Associate						
OWNE	R/CLI	ENT:				DRILLER:	DATES DRIL	LED:				
				imley-Horn &	Associates, Inc.	Z. Macomber			- 1/21/15			
PROJE	CIN				GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NO	IES:				
		1	4189	)	NOT SURVEYED	2.25" H.S.A		50	DIL			
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	N	SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80			
			D. 14	Asphalt = 0. Concrete = 0	5ft.		_					
					יסונ. - brown, f-c, clayey SAND with g	ravel, loose, moist, SC	-					
				-		,,,	5+5+5	15				
		А		Very dense			4+6+50/6	14				
				Crushed asp	bhalt							
5-				Potomac gro moist, <b>SC</b>	oup, light brown, f-c, clayey SAN	D with gravel, medium dense,	11+10+13	18	•			
	$\left  \right $											
		D2										
	$\mathbb{N}$						8+10+14	18	•			
10-				Bottom of Bo	oring at 10.0 ft							
· ·												
15-	+											
GROU	ND W.	ATER	LEVE	LS:			SAMPLE TYP	PES:				
				ED DURING DRILI			Split S	poon				
N	IOT EI	NCOU	NTER	ED UPON COMPL	LETION CAVED: <u>5.0</u> ft							
REMA	RKS:											

955 Highland Vista Dr., #170	Phon
hhum Virginio 20147	Fax.

ne: (703) 726-8030 (703) 726-8032 faz

	D	E	ng	ineeri	ng, Inc.	19955 Highland V Ashburn, Virginia	Vista D a 20147	r., #17	0'0				726-80 26-8032	
PROJ	ECT:		_		-	LOGGED BY:		BORING NUMBER:						
		olur	nbia	Pike Multimo	dal Street Improvements	L. Pugh				IB-2				
LOCA	TION:					DRILLING CONTRACTOR:				ID-2				
OWN	ER/CLIE	-NT·	C	olumbia Pike	e, Arlington , VA	Connelly & Assoc	ciates, I	DATES			SHEET	1 OF	= 1	
			K	imlay Harn 9	Accordance Inc	Z. Macomber					4/20	V4 E		
PROJ	Kimley-Horn & Associates, Inc.         Z. Macomber           ROJECT NUMBER:         GROUND SURFACE ELEVATION (ft):         DRILLING METHOD:									2 <b>0/15</b> ES:	- 1/20	//15		
		1	4189	)	NOT SURVEYED	2.25" H.S.A								
	ш	Σ	U							SOIL				
DEPTI (ft)	E SAMPL TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BI	SPT LOW UNTS	REC (in)	) (E) STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80				
			P A	Asphalt = 0. Concrete = 0										
					ouon. oup, brown, f-c, sandy FAT CLA	AY, with gravel, stiff, moist,	5+	+7+8	16	•				
				Orange - bro	own, very stiff		8+1	12+14	18				24.7	
5-		D1		Without grav	vel		54	+7+8	18	•				
10-	-	D2			oup, light brown, f-c, POORLY ( ise, moist, <b>SP-SC</b>	GRADED SAND with clay,	9+1	1+14	18					
45				very stiff, mo		wn, f, sandy LEAN CLAY,	9+	9+18	18					
15-	-			Bottom of B	oring at 15.0 ft									
GROL	JND W	ATER	LEVE	LS:				SAMPL	.E TYPI	ES:	<u> </u>	1 : :		
				ed During Dril Ied Upon Compi	9.5				Split Sp	oon				
REMA	RKS:	Bull	k san	nple collected	from 0.0' to 5.0'			1						

19955 Highland Vista Dr., #170	Phone
Ashburn Virginia 20147	Fax: (

	ng	meen	ing, mc.	Ashburn, Virginia 2	20147		: (703)			
ROJECT:				LOGGED BY:		BORING NUMBER:				
	mbia	Pike Multimoo	dal Street Improvements	L. Pugh		IB-3				
CATION:				DRILLING CONTRACTOR:		10-5				
	C	olumbia Pike	, Arlington , VA	Connelly & Associa	tes, Inc.	SHEET 1 OF 1				
VNER/CLIENT:				DRILLER:	DATES DRIL	LED:				
	κ	imley-Horn &	Associates, Inc.	Z. Macomber	1/	20/15	- 1/20/1	5		
ROJECT NUMBI	ER:		GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NOT	TES:				
	14189		NOT SURVEYED	2.25" H.S.A						
Σ	U					S				
(H H H H H H H H H H H H H H H H H H H	GRAPHIC		MATERIAL DESCRIPTION	N	SPT BLOW COUNTS	STANDARD PENETRATION TEST RESISTANC (BPF) 20 40 60 80				
		Asphalt = 1f	t.				<u> </u>			
		Fill, orange - SC	brown, f-c, clayey SAND with g	ravel, medium dense, moist,	12+7+7	3	•	$\downarrow$		
- A					12+50/6	10				
-		Crushed asp	bhalt					/		
5		Potomac are	oup, dark gray, f-c, clayey SAND	with gravel medium dense				/		
		moist, <b>SC</b>	ap, dan gray, i o, dayey or no	with gravel, mediam dense,	14+12+10	10				
D2										
<b>.</b>					16+37+28	18		•		
		Bottom of Bo	oring at 10.0 ft							
-										
-										
5-										
-										
-										
1										
-										
OUND WATER	RLEVE	LS:			SAMPLE TYP	PES:				
NOT ENCOL	JNTER	ED DURING DRILI	LING		Split S	poon				
NOT ENCOL	JNTER	ED UPON COMPL	ETION CAVED: <u>5.0</u> ft							

19955 Highland Vista Dr., #170	Ph
Ashburn Virginia 20147	Fa

Phone: (703) 726-8030 Fax: (703) 726-8032 faz

PROJE	ECT:					LOGGED BY:	1 20147	·	E	BORING NUM	<u></u>	0052
1.004			nbia	Pike Multimo	dal Street Improvements	L. Pugh				IB	8-4	
LOCA	HON:					DRILLING CONTRACTOR:						
OWNE	R/CL	ENT:	C	olumbia Pike	e, Arlington , VA	Connelly & Assoc	lates, I	<b>nc.</b> DATES	DRILLE		1 OF 1	
			ĸ	imlev-Horn &	Associates, Inc.	Z. Macomber			1/2	20/15 - 1/20	/15	
PROJE	ECT N	UMBE			GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:		OFFSE			/10	
		1	4189	)	NOT SURVEYED	2.25" H.S.A						
		Σ	U			1				SOIL		
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION		BL	SPT LOW UNTS	REC (in)	STAND/ PENETRA TEST RESIS (BPF 20 40 6	ATION STANCE	MC (%)
	1			Asphalt = 1f	ft.					20 40 0		
				moist, SC	- brown, f-c, clayey SAND with g own, f-c, POORLY GRADED GR		_	-6+9	4			13.2
5-		A		Crushed as	phalt		18-	+50/5	6			
5	-	D2		Potomac gro dense, mois	<i>oup</i> , white, f-c, POORLY GRADE st, <b>SP</b>	ED SAND with gravel,	22+	17+15	11			3.7
10-				medium der	oup, orange - brown, f-c, clayey s nse, moist, <b>SC</b> oring at 10.0 ft	SAND with gravel,	14-	+6+7	14	•		_
	-											
15-	-											
GROU	 ND W	'ATER	LEVE	LS:				SAMPL	 E TYPE	ES:		
				ed During Dril Ied Upon Compi	5.0				Split Sp	oon		
REMA	RKS:											

955 Highland Vista Dr., #170	Phone
hburn Virginia 20147	Fax: (

e: (703) 726-8030 (703) 726-8032 faz

N.	Ì	En	gineeri	ing, Inc.	19955 Highland Vista Ashburn, Virginia 201	Dr., #170 47		one: (703) 726-803 : (703) 726-8032 1
PROJE	ECT:				LOGGED BY:	.,	BORIN	IG NUMBER:
LOCA		olumbi	a Pike Multimo	odal Street Improvements	L. Pugh		-	IB-5
			Columbia Dik	Arlington VA		Inc		
OWNE	R/CLI	ENT:	Columbia Pike	e, Arlington , VA	Connelly & Associates DRILLER:	DATES DRIL		SHEET 1 OF 1
			Kimlev-Horn &	Associates, Inc.	Z. Macomber	1	/15/15	- 1/15/15
PROJE	ECT N	JMBER:	<b>,</b>	GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NO		
		141	89	NOT SURVEYED	2.25" H.S.A		SC	DIL
DEPTH (ft)	SAMPLE TYPE	STRATUM		MATERIAL DESCRIPTIO	Ν	SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF)
	-		Asphalt = 0	.7ft.				20 40 60 80
			Crushed sto		SAND with gravel, dense,	23+20+25	18	<b>,</b>
		D2	Loose			5+6+4	0	Í
5-			Residual, g	ray, f-m, sandy SILT, micaceous,	, stiff, moist, <b>ML</b>	7+6+6	15	
	-	E1	Basidual a	range - brown, f-c, silty SAND, m	inggo un dance maist CM	_		
			Residual, O	Tange - brown, i-c, silly SAND, in	icaceous, dense, moist, <b>Sivi</b>	9+15+17	18	
10-	-		Bottom of B	Boring at 10.0 ft				
GROU	ND W	ATER LE	VELS:			SAMPLE TYP	PES:	
			ERED DURING DRII ERED UPON COMF	5 5		Split S	poon	
REMA	RKS:							

19955 Highland Vista Dr., #170	Р
Ashburn Virginia 20147	F

PROJE	CT:					LOGGED BY:	0117	BORIN	IG NUMBER:
	С	olun	nbia	Pike Multimoo	dal Street Improvements	L. Pugh			
LOCAT					•	DRILLING CONTRACTOR:			IB-6
			C	olumbia Pike	, Arlington , VA	Connelly & Associat	es, Inc.		SHEET 1 OF 1
OWNE	R/CLI	ENT:				DRILLER:	DATES DRILI		
			ĸ	imlev-Horn &	Associates, Inc.	Z. Macomber	1/	15/15	- 1/15/15
PROJE	ECT N	JMBE			GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NOT		
		1	4189		NOT SURVEYED	2.25" H.S.A			
			-103	•		2.20 H.O.A		S	OIL
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTION	N	SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80
				Asphalt = 0.6					
				Crushed sto					
	$\mathbb{N}$	A		moist, <b>SP</b>	-c, POORLY GRADED SAND w	-	22+7+22	2	•
		D2		Potomac gro dense, mois	b <i>up</i> , orange - brown, f-c, clayey \$ t, <b>SC</b>	SAND with gravel, medium	35+12+16	15	
5-				Residual, ora	ange - brown, f-m, sandy SILT, r	nicaceous, stiff, moist, <b>ML</b>	5+6+7	18	•
10-		E1		Very stiff			6+10+12	18	•
· · · · · · · · · · · · · · · · · · ·				Gray			9+14+20	18	
15-	_			Bottom of Bo	oring at 15.0 ft				
GROU	ND W	ATER	LEVE	LS:			SAMPLE TYF	ES:	
N		ICOU	NTER	ED DURING DRILI	LING		Split S	noon	
					LETION CAVED: <u>11.0</u> ft			ροση	
REMA	RKS:								

GeoConcepts Engineering, Inc.	19955 Highland Vista Dr., #170 Ashburn, Virginia 20147
PROJECT:	LOGGED BY:
Columbia Pike Multimodal Street Improvements	L. Pugh
LOCATION:	DRILLING CONTRACTOR:

PROJECT:		LOGGED BY:		BORING NUMBER:	
Columbia Pike Multimoo	dal Street Improvements	L. Pugh		IB-7	
Columbia Pike	, Arlington , VA	Connelly & Associat	es Inc	SHEET 1 OI	F 1
OWNER/CLIENT:		DRILLER:	DATES DRILI		
Kimley-Horn &	Associates, Inc.	Z. Macomber	1/	19/15 - 1/19/15	
PROJECT NUMBER:	GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NO		
14189	NOT SURVEYED	2.25" H.S.A			
		2.20 11.0.7		SOIL	
STRATUM GRAPHIC GRAPHIC	MATERIAL DESCRIPTION	Ν	SPT BLOW COUNTS	U (E) U	ATION STANCE F)
Asphalt = 0.	9ft.				
dense, mois	<i>oup</i> , orange - brown, f-c, clayey s t, <b>SC</b>		7+17+12	10	
Residual, gra	ay, f-m, silty SAND, micaceous,	medium dense, moist, <b>SM</b>	5+6+9	14	
5			2+10+15	18	
E2 SM	<i>rock</i> , gray, f-m, silty SAND, mica	iceous, very dense, moist,	15+25+45	18	
GROUND WATER LEVELS:			SAMPLE TYP	ES:	
NOT ENCOUNTERED DURING DRILI NOT ENCOUNTERED UPON COMPL	7.0		Split S	poon	

19955 Highland Vista I	Dr., #170 Pł
Ashburn Virginia 2014	

PROJE	CT:					LOGGED BY:	117	BORIN	NG NUMBER:	
	С	olum	ıbia	Pike Multimo	dal Street Improvements	L. Pugh				
LOCAT						DRILLING CONTRACTOR:			IB-8	
			C	olumbia Pike	, Arlington , VA	Connelly & Associate			SHEET 1 OF	1
OWNE	R/CLI	ENT:				DRILLER:	DATES DRIL	LED:		
				imley-Horn &	Associates, Inc.	Z. Macomber			- 1/15/15	
PROJE	CIN				GROUND SURFACE ELEVATION (ft):	DRILLING METHOD:	OFFSET NO	ITES:		
		1	4189		NOT SURVEYED	2.25" H.S.A			<u></u>	
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPTIO	N	SPT BLOW COUNTS	(in)	OIL STANDA PENETRA TEST RESIS (BPF) 20 40 6	TION
				Asphalt = 0.	8ft.					
			777	Crushed sto			7			
	Å			dense, mois		SAND with gravel, medium	10+6+7	12		
				Dark gray, n	nicaceous		4+4+7	10	•	
5-		D2		Potomac gro moist, <b>GP</b>	oup, orange - brown, c, POORL	Y GRADED GRAVEL, loose,	4+4+6	1	•	
			000	-	<i>oup</i> , brown, f-c, clayey SAND, m	nicaceous, firm, moist, <b>SC</b>	3+3+4	0	•	
10 -	-			Bottom of Bo	oring at 10.0 ft					
15-	-									
0761		A T					0.000			
	OT EN	NCOU	NTER	ed During Drill	LING LETION CAVED: <u>6.5</u> ft		SAMPLE TY			
REMA	RKS:									

955 Highland Vista Dr., #170	Phone
bhurn Virginio 20147	Fax <sup>•</sup> (

W.	J	E	ng	ineeri	ng, Inc.		19955 Highland V Ashburn, Virginia	/ista D	r., #17	0	Phone: Fax: (70	(703) 7 )3) 726-	26-80 -8032	
PROJECT:					LOGGED BY:					BORING NUMBER:				
	Columbia Pike Multimodal Street Improvements						L. Pugh				I	R_Q		
LOCA	TION:					DRILLING	G CONTRACTOR:				- <b>IB-9</b> SHEET 1 OF 1			
OWNE	R/CL		C	olumbia Pike	e, Arlington , VA	DRILLER	Connelly & Assoc	iates, I	n <b>c.</b> Dates					
OWNE			K	mlay Llava 9	Accesiates Inc	DIVILLEN						2/4 5		
PROJE	ECT N	UMBE		inliey-norn a	Associates, Inc. GROUND SURFACE ELEVATION (ft):	: DRILLING	Z. Macomber G METHOD:		OFFSE		<b>13/15 - 1/1</b> ES:	3/15		
		1	4189	)	NOT SURVEYED		2.25" H.S.A							
		Σ	0		1	1			1		SOIL			
DEPTH (ft)	SAMPLE	STRATUM	GRAPHIC		MATERIAL DESCRIPTIO	DN		BL	SPT LOW UNTS	(in) (in)	STAN PENETI TEST RES (BF 20 40	RATION SISTANCE PF)	MC (%)	
				Asphalt = 0.	8ft.						20 40			
					<i>oup</i> , orange - brown, f-c, claye ise, moist, <b>SC</b>	ey SAND wit	h gravel,	4+	-7+6	15	•		7.6	
		D2						4+	6+13	0				
5-				Dense				15+	12+21	3				
		E1		Residual, da	ark gray, f-m, clayey SAND, lo	oose, moist,	SC	5+	-4+3	4				
10-	_			Bottom of B	oring at 10.0 ft									
15-	-													
GROU				18.					SAMPL		FS.			
N	OT EI	NCOU	NTER	ED DURING DRIL ED UPON COMPI	4.0					Split Sp				
REMA	RKS:	Bulk	san	nple collected	from 0.0' to 5.0'									

955 Highland Vista Dr., #170	Phone: (7
hburn Virginia 20147	Fax: (703

703) 726-8030 8) 726-8032 faz

Ś	J	E	ng	ineeri	ng, Inc.		19955 Highland Vi Ashburn, Virginia	sta Dr., #170 20147				726-80			
PROJECT:							LOGGED BY:				BORING NUMBER:				
			nbia	Pike Multimo	dal Street Improvements		L. Pugh				IB-10				
LOCA	LOCATION:						CONTRACTOR:				- 10				
OWNE	Columbia Pike, Arlington , VA					DRILLER	Connelly & Associa	ates, Inc. DATES DRIL	_	SHEET	Г 1 OF	- 1			
			K	mlay Llama 9	Associates Inc	DIVILLEIN				4 /4	E / A E				
PROJI	ECT N	UMBE		miey-norn a	Associates, Inc.	: DRILLING	Z. Macomber	OFFSET NO	/ <b>15/15</b> TES:	- 1/1;	5/15				
		1	4189	)	NOT SURVEYED		2.25" H.S.A								
						I			S	OIL					
DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC		MATERIAL DESCRIPT	TION		SPT BLOW COUNTS	(in) (in)	PE TES1	(BPF	ATION STANCE			
	-			Asphalt = 0.						20	40 6				
	+	,		Crushed sto	one = 0.3ft. <i>oup</i> , orange - brown, f-c, claye		caceous dense								
		*		moist, SC		ey Sand, III	caceous, dense,	15+20+12	1		•				
				Brown, med	num dense			16+6+7	18						
5-		D2		With gravel											
	-							7+8+6	1						
	_														
	-	E1		<i>Residual</i> , br	rown, f-m, clayey SAND, mica	ceous, loose	e, moist, <b>SC</b>	1+2+4	3						
10-	+			Bottom of B	oring at 10.0 ft										
	-														
	-														
	-														
15-											· · · ·				
10															
	1														
	-														
	-														
GROU		/ATER	LEVE	LS:				SAMPLE TY	PES:		<u> </u>				
				ED DURING DRIL	0.5			Split S	Spoon						
REMA	RKS:														





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
AB-12	11.5	4.5	7.0





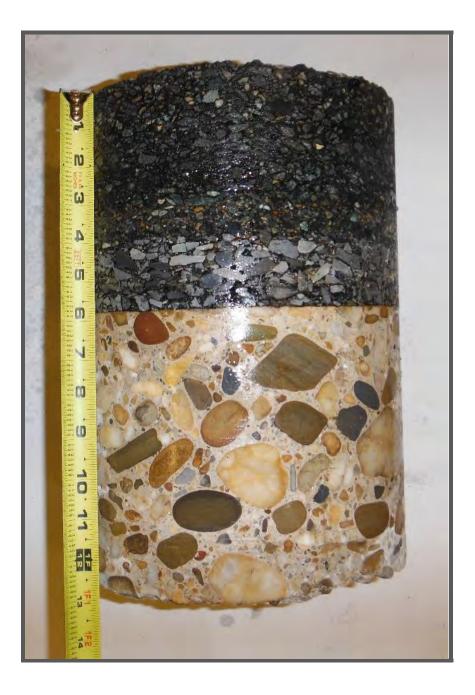
Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
AB-13	13.5	6.5	7.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
AB-14	13.5	6.5	7.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
AB-15	13.0	6.0	7.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
AB-16	15.0	6.0	9.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
CB-9	15.5	6.0	9.5





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
CB-8	13.0	6.25	6.75





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
CB-7	12.75	6.5	6.25





Core #	Total Thickness (inch)	Asphalt Thickness (inch)	Concrete Thickness (inch)
CB-6	13.0	7.0	6.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
CB-5	13.25	6.75	6.5





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
CB-4	13.5	6.5	7.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
CB-3	14.5	7.5	7.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
CRW-2	14.0	7.5	6.5





Core #	Total Thickness (inch)	Asphalt Thickness (inch)	Estimated Concrete Thickness (inch)
CRW-1	12.0	6.0	6.0*

\* Estimated thickness, no recovery





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
DB-11	8.5	2.75	5.75





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
DB-10	12.0	3.5	8.5





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
DB-9	13.0	2.5	10.5





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
DB-8	8.5	3.25	5.25





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
DB-7	10.0	3.75	6.25





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
DB-6	9.75	3.5	6.25





Core #	Total Asphalt Thickness (inch)	Subbase Material Type
DB-5	8.0	Crushed stone





Core #	Total Asphalt Thickness (inch)	Subbase Material Type
DB-4	9.0	Crushed stone





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
DB-3	7.75	2.25	5.5





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
DB-2	10.5	4.5	6.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
DB-1	9.75	3.0	6.75





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FRW-1	13.5	8.0	5.5





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FRW-2	15.5	8.5	7.0





Core #	Total Thickness (inch)	Asphalt Thickness (inch)	Concrete Thickness (inch)
FRW-3	15.5	8.5	7.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FRW-4	15.5	8.5	7.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FRW-5	15.5	8.5	7.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FRW-6	13.0	7.0	6.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FRW-7	12.5	5.75	6.75





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FRW-8	15.0	8.0	7.0





Core #	Total Asphalt Thickness (inch)	Subbase Material Type
FB-1	11.5	Crushed Stone





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-2	16.0	9.0	7.0





Core #	Total Asphalt Thickness (inch)	Subbase Material Type	
FB-3	8.5	Crushed Stone	





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-4	16.0	9.0	7.0





Core #	Total Asphalt Thickness (inch)	Subbase Material Type	
FB-5	10.5	Crushed stone	





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-6	15.5	7.75	7.75





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-7	14.5	8.0	6.5





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-8	14.0	7.5	6.5





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-9	13.5	6.75	6.75





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-10	12.5	5.25	7.25





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-11	10.75	3.75	7.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-12	11.0	4.25	6.75





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-13	11.75	4.5	7.25





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-14	13.5	6.5	7.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-15	12.0	5.25	6.75





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-16	8.5	2.25	6.25





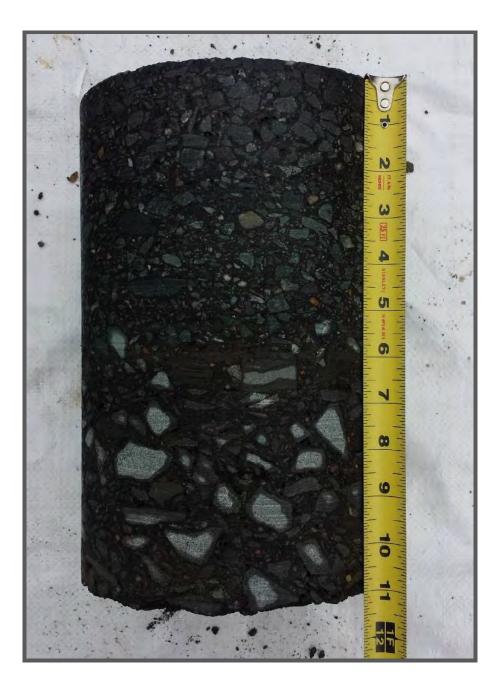
Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-17	12.5	5.75	6.75





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
FB-18	13.5	6.5	7.0





Core #	Total Asphalt Thickness (inch)	Subbase Material Type
FB-19	11.0	Crushed stone





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
HB-7	13.0	6.25	6.75





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
HB-6	13.0	6.75	6.25





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
HB-3	12.5	5.0	7.5





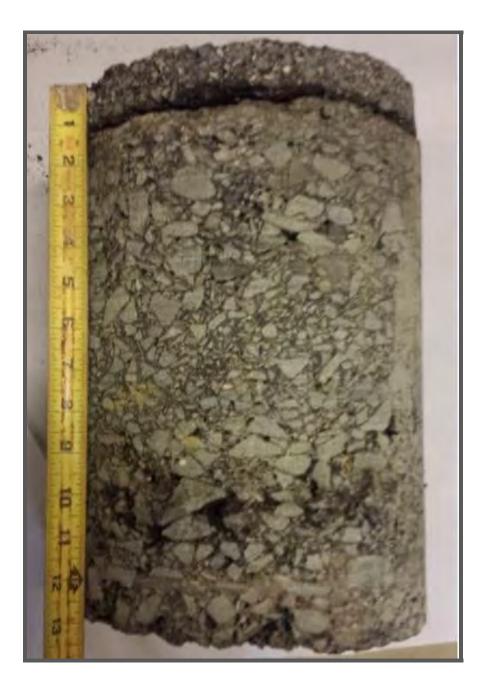
Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
HB-2	13.0	6.0	7.0





Core #	Total	Asphalt	Concrete
	Thickness	Thickness	Thickness
	(inch)	(inch)	(inch)
IB-1	12.5	6.0	6.5





Core #	Total Asphalt Thickness (inch)	Subbase Material Type
IB-2	13.0	Crushed Stone





Core #	Total Asphalt Thickness (inch)	Subbase Material Type
IB-10	8.5	Crushed Stone



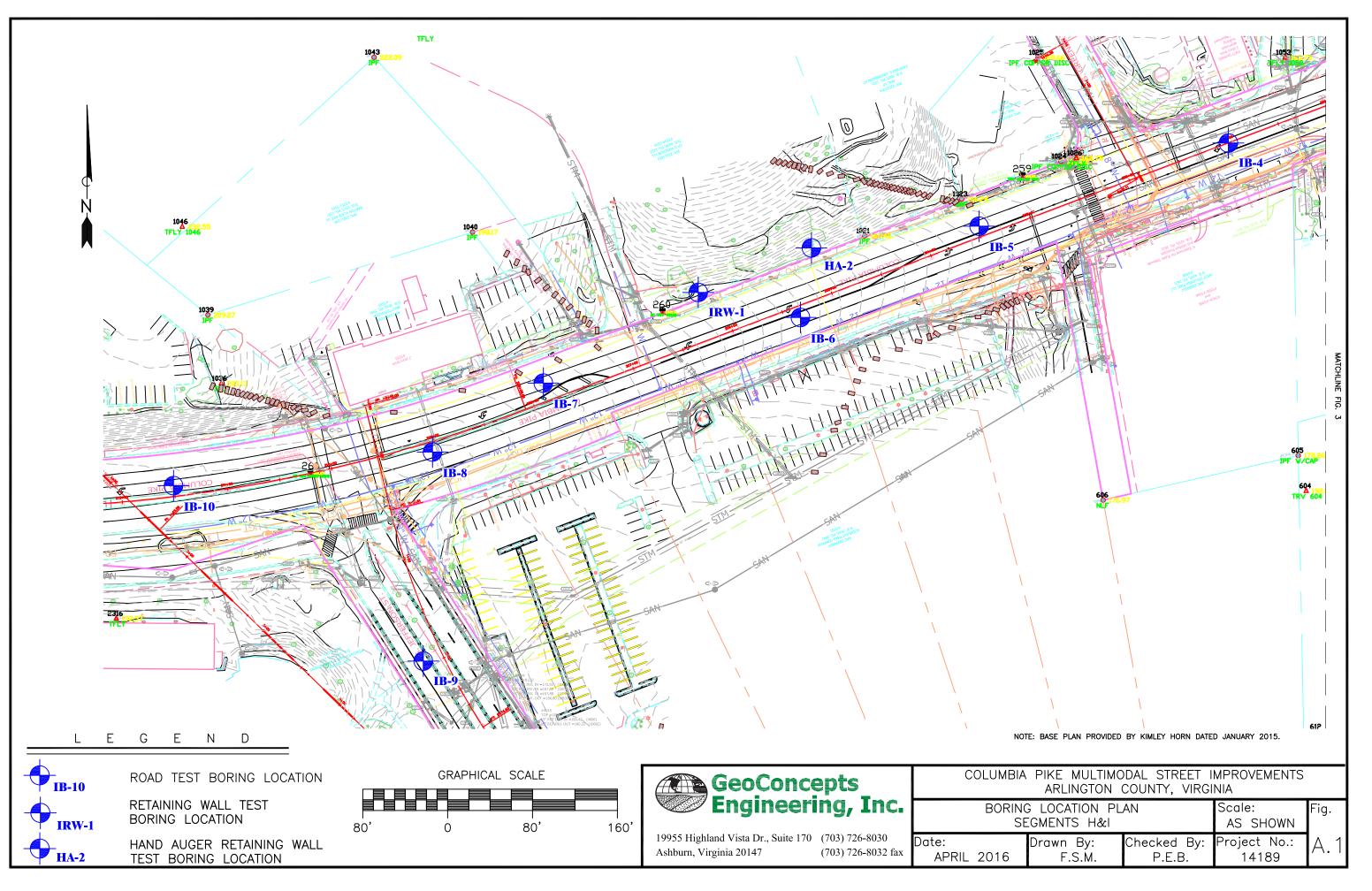


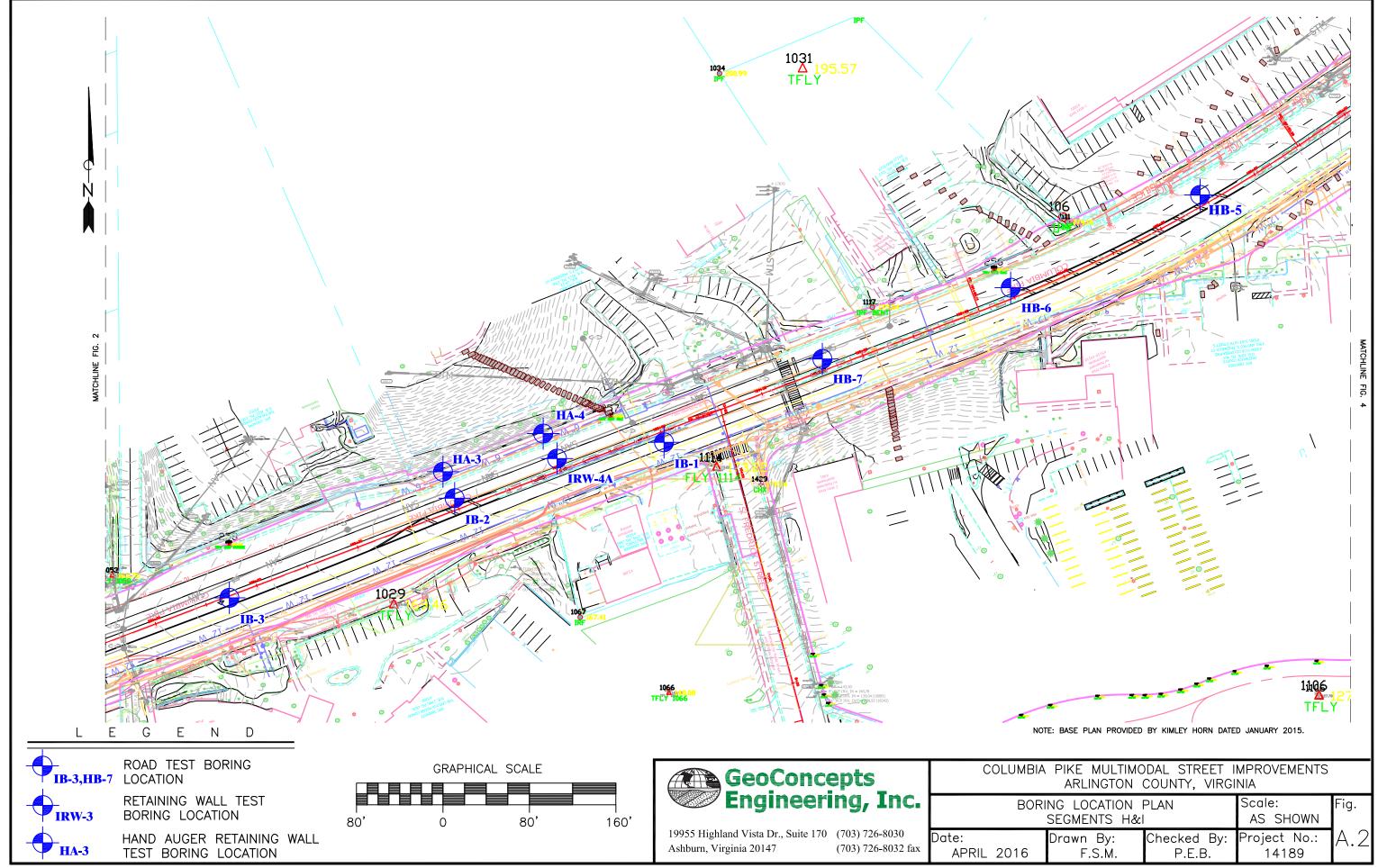
Core #	Total Asphalt Thickness (inch)	Subbase Material Type
IB-9	8.0	Crushed Stone

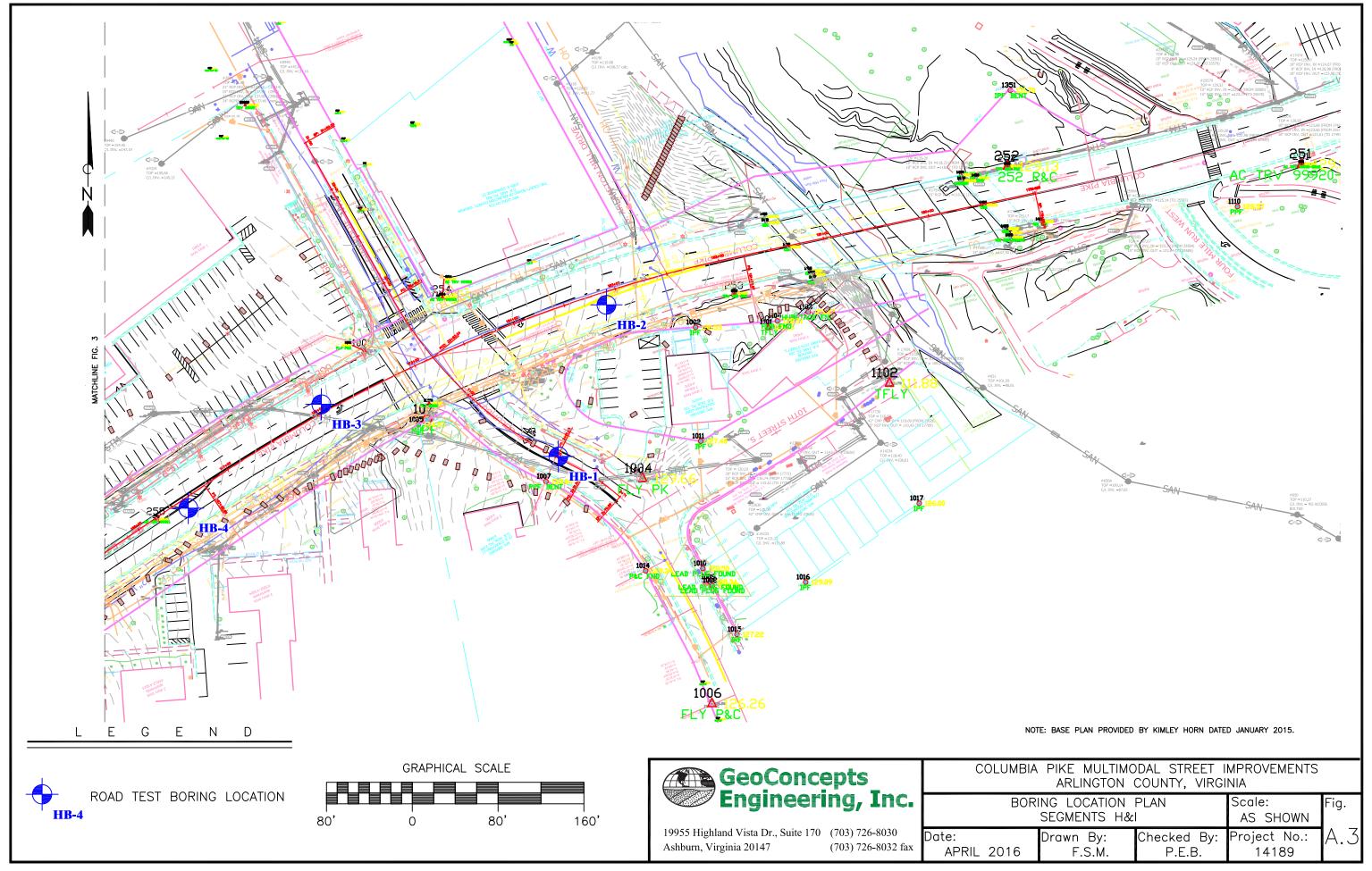


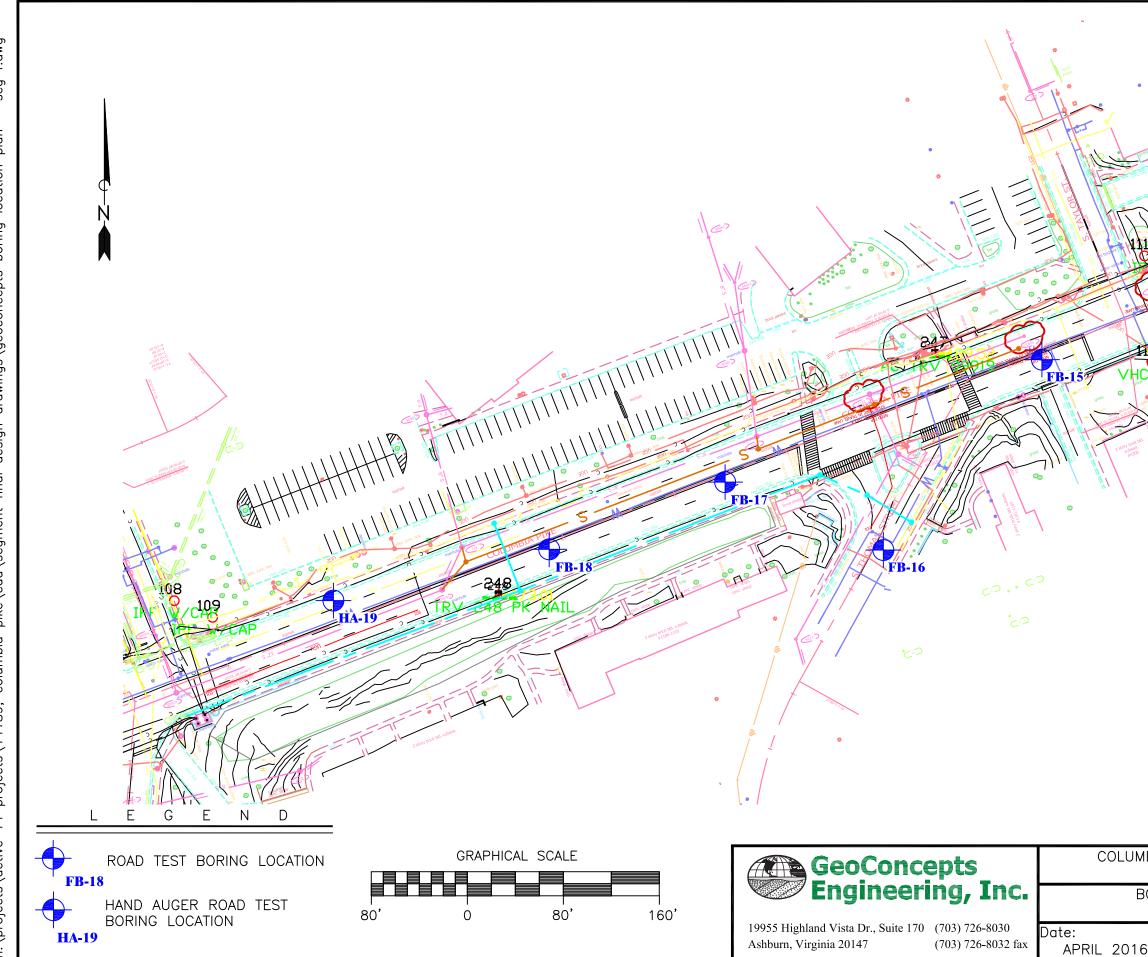


Core #	Total Asphalt Thickness (inch)	Subbase Material Type
IB-8	8.5	Crushed Stone

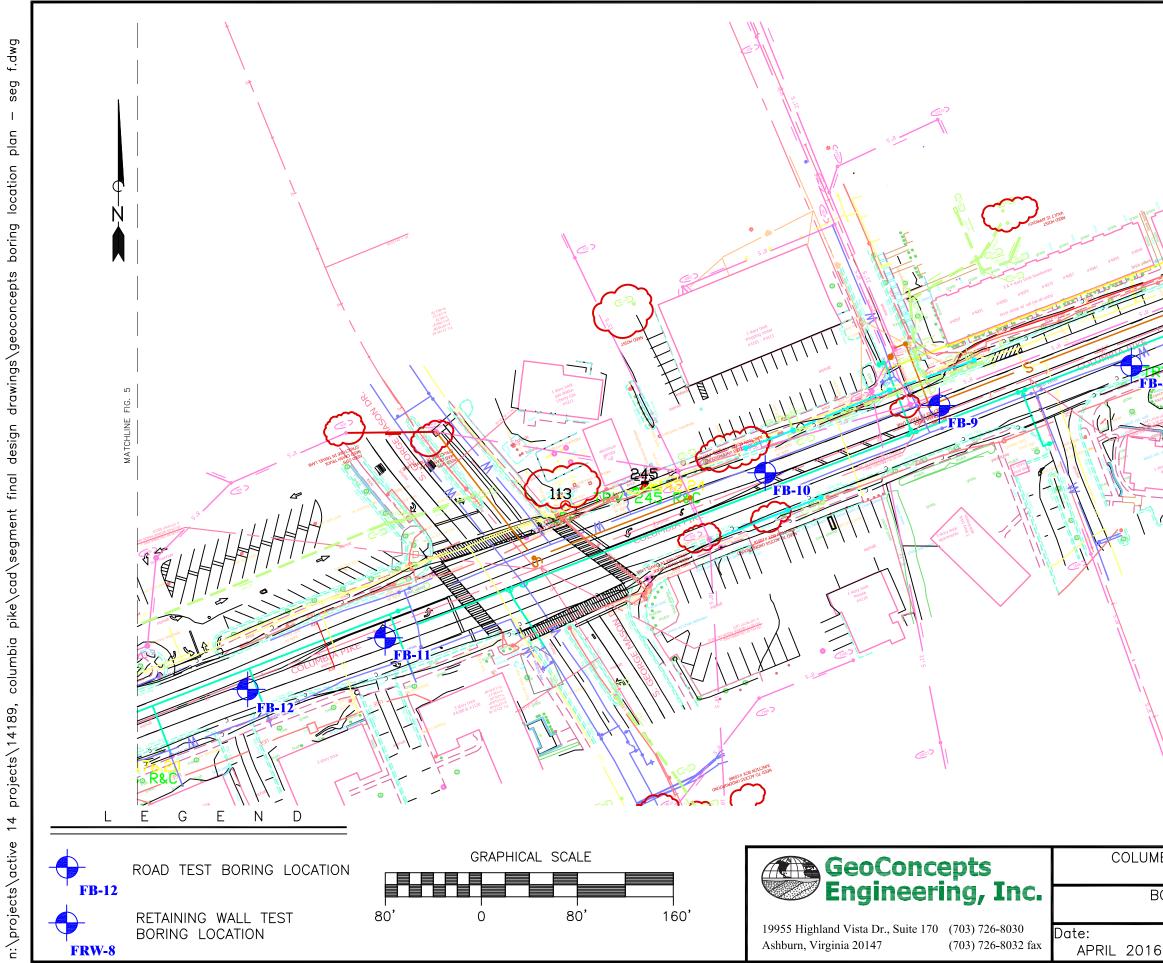




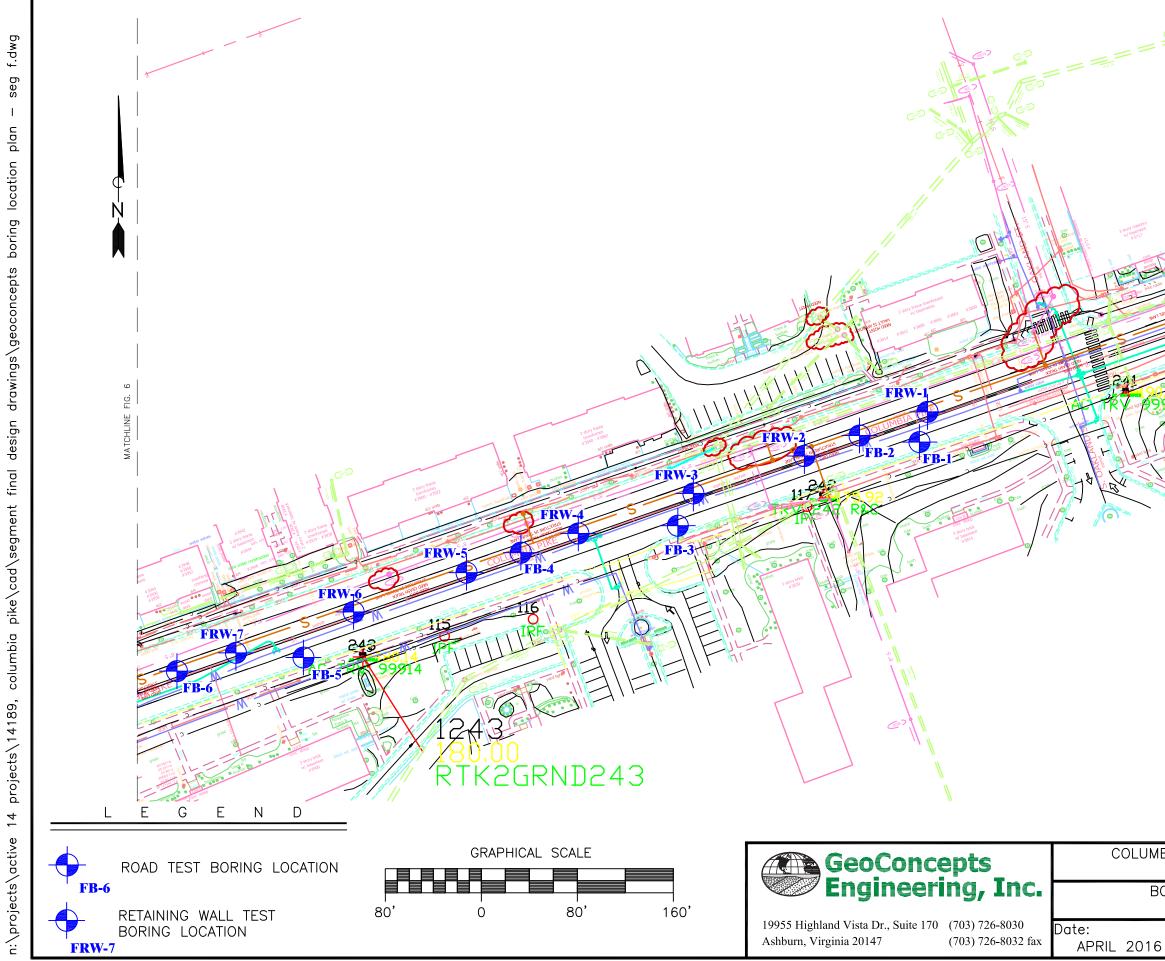




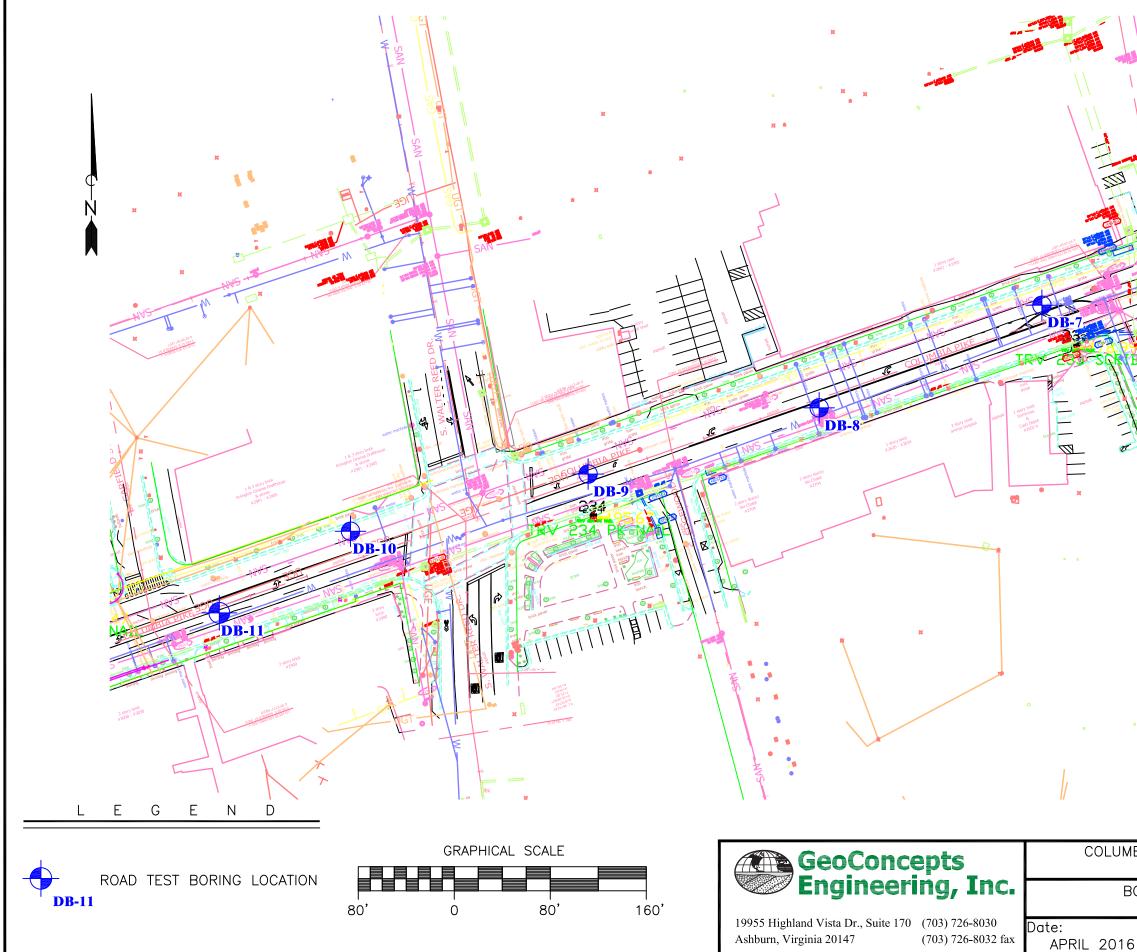
ABIA       PIKE       MULTIMODAL       STREET       IMPROVEMENTS         ARLINGTON       COUNTY,       VIRGINIA         BORING       LOCATION       PLAN       Scale:       Fig.         SEGMENT       F       AS       SHOWN       A.4         Drawn       By:       Checked       By:       Project       No.:       A.4         6       F.S.M.       P.E.B.       14189       A.4	NDE: ENSE PLAN PROVIDED BY KIMLEY-HORN DATA	ED JANUARY 2015.	MATCHLINE FIG. 6
BORING LOCATION PLAN SEGMENT F AS SHOWN Drawn By: Checked By: Project No.: A.4			
Drawn By: Checked By: Project No.: A.4	BORING LOCATION PLAN	Scale:	Fig.
	Drawn By: Checked By:	Project No.:	A.4



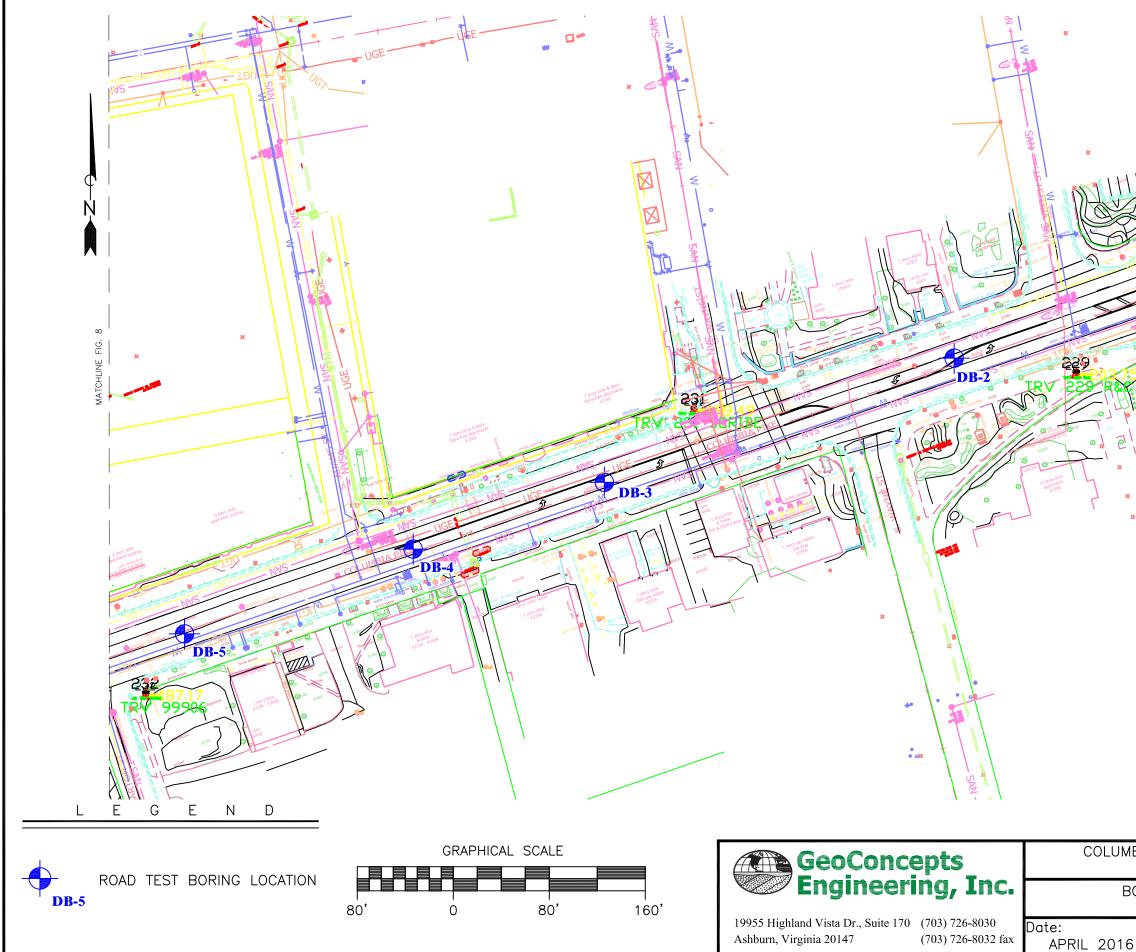
NOTE: BASE PLAN PROVIDED BY KIMLEY-HORN DATED JANUARY 2015. THE MULTIMODAL STREET IMPROVEMENTS ARLINGTON COUNTY, VIRGINIA BORING LOCATION PLAN SEGMENT F Drawn By: Checked By: Project No.: F.S.M. P.E.B. Project No.: 14189		
ARLINGTON COUNTY, VIRGINIA BORING LOCATION PLAN SEGMENT F Drawn By: Checked By: Project No.: A.5		RND244
ARLINGTON COUNTY, VIRGINIA BORING LOCATION PLAN SEGMENT F Drawn By: Checked By: Project No.: A.5		
SEGMENT F AS SHOWN Drawn By: Checked By: Project No.: A.5	ARLINGTON COUNTY, VIRGIN	NIA
Drawn By: Checked By: Project No.: A.5 F.S.M. P.E.B. 14189	SEGMENT F	
	Drawn By: Checked By: 6 F.S.M. P.E.B.	Project No.: A.5 14189



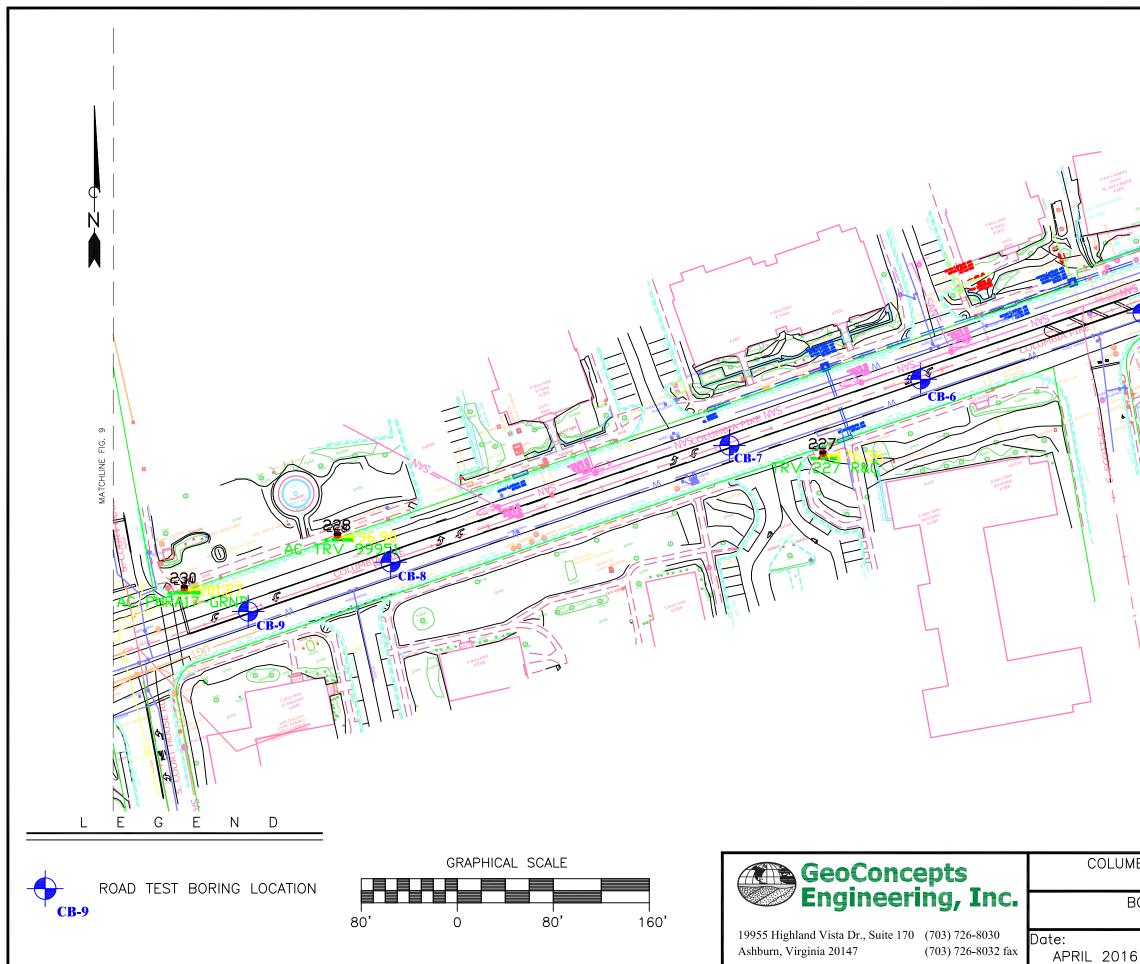
(Jiel)				
//				
The second secon	P C Q P A			LI F
				ahak -
91.			1 any market #37(70)	
NOT	E: BASE PLAN PROVIDED	BY KIMLEY-HORN DATE	D JANUARY 2015.	
BIA	PIKE MULTIMO			
ORI	ARLINGTON C	COUNTY, VIRGIN PLAN	IIA Scale:	Fig.
	SEGMENT F Drawn By:	Checked By:	AS SHOWN Project No :	A.6
5	F.S.M.	P.E.B.	14189	A.0



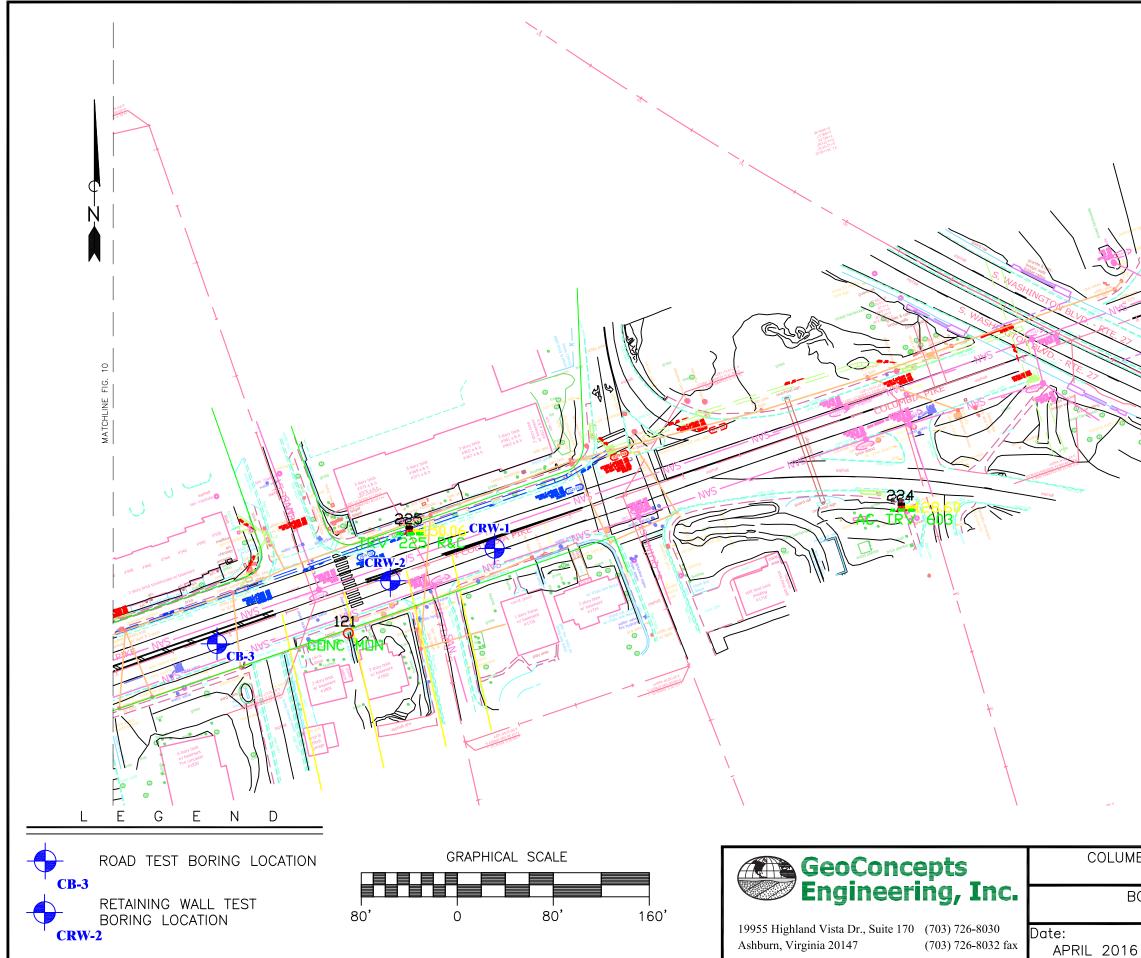
NOTE: BASE PLAN PROVIDED BY KIMLEY-HORN DATED JANUARY 2015. IBIA PIKE MULTIMODAL STREET IMPROVEMENTS ARLINGTON COUNTY, VIRGINIA BORING LOCATION PLAN SEGMENT D Drawn By: Checked By: Project No.: F.S.M. Checked By: Project No.: 14189			
ARLINGTON COUNTY, VIRGINIA BORING LOCATION PLAN SEGMENT D Drawn By: Checked By: Project No.: A.7	NIKS THE AND A MARK	) JANUARY 2015.	
BORING LOCATION PLAN SEGMENT D Drawn By: Checked By: Project No.: A.7			
SEGMENT D AS SHOWN Drawn By: Checked By: Project No.: A.7			Fig.
Drawn By: Checked By: Project No.: A./ 5 F.S.M. P.E.B. 14189	SEGMENT D	AS SHOWN	, '9.
	Drawn By: Checked By: 6 F.S.M. P.E.B.		A. /



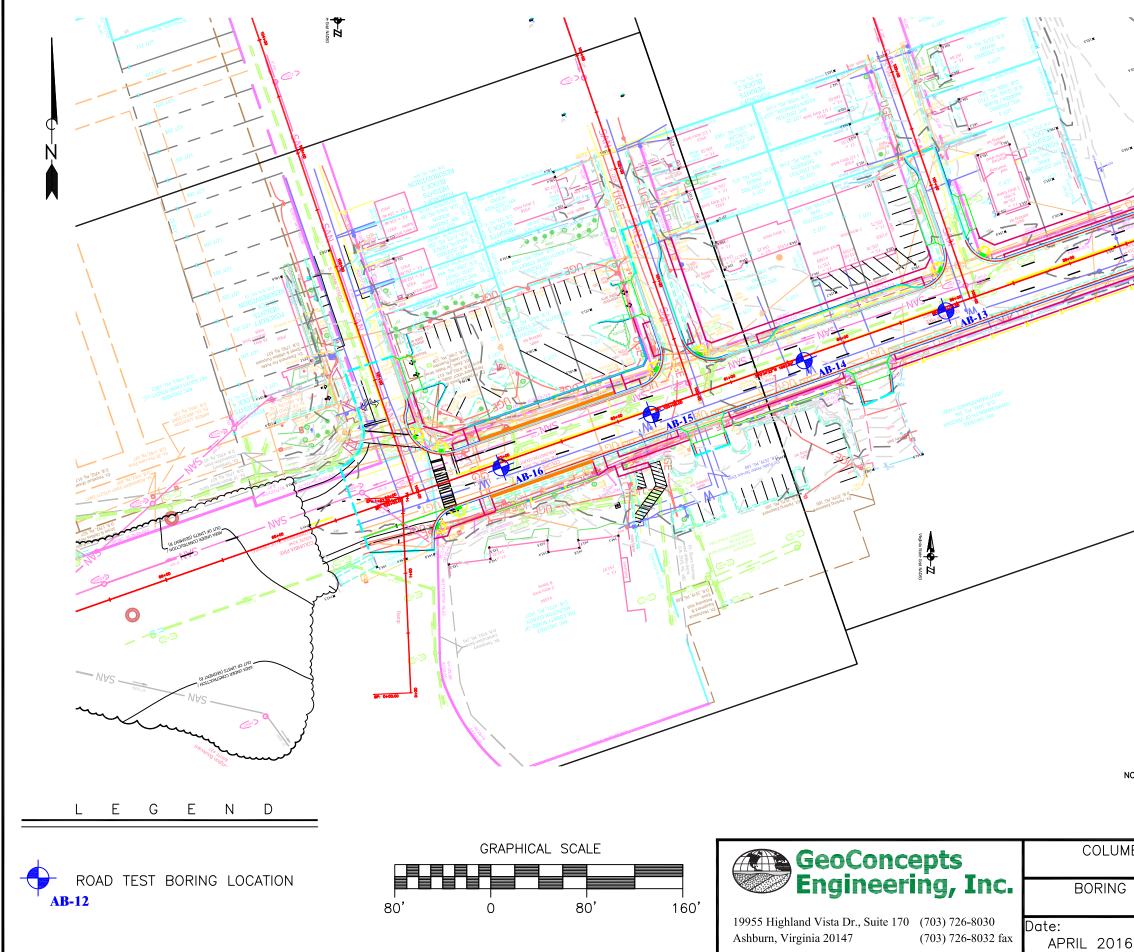
THE SET PLAN PROVIDED BY KINLEY-HORN DATE	TOPUNE FG. 10
IBIA PIKE MULTIMODAL STREET I ARLINGTON COUNTY, VIRGIN	
BORING LOCATION PLAN	Scale: Fig.
SEGMENT D	AS SHOWN
Drawn By: Checked By: 6 F.S.M. P.E.B.	Project No.: A.8 14189
· · · · · · · · · · · · · · · · · · ·	11105



NDTE: BASE PLAN PROVIDED BY KIMLEY-HORN DAT	ED JANUARY 2015.	MATCHUNE FIG. 11
IBIA PIKE MULTIMODAL STREET ARLINGTON COUNTY, VIRIGI		
ORING LOCATION PLAN	Scale: Fi	g.
SEGMENT C Drawn By: Checked By:	AS SHOWN Project No.:	٨.9
6 F.S.M. P.E.B.	14189	



WTE: EXE PLAN PROVIDED BY KIMLEY-HORN DATE	
ABIA PIKE MULTIMODAL STREET I ARLINGTON COUNTY, VIRIGIN	
BORING LOCATION PLAN	Scale: Fig.
SEGMENT C	AS SHOWN
Drawn By: Checked By: 6 F.S.M. P.E.B.	Project No.: A.10 14189



×		1877 J	
*iers			
and the second s			
***** · · · · · · · · · · · · · · · · ·			
555CM			
9551*	solw cratter		
ark		***	
	-		
01-301-301-301-301-301-301-301-301-301-3		A A A A A A A A A A A A A A A A A A A	
State Stat	X SIN X	-	
NB-12-	X 100		
	×		
L Port	$\lambda = \lambda$		
1000 Ly Instruction	and a second		
çar <b>t</b>			
-			
NOTE: BASE PLAN PROVIDED B	Y KIMLEY-HORN DATED I	EBRUARY, 2016.	
IBIA PIKE MULTIMO		MPROVEMENTS	
ARLINGT	ON, VIRGINIA		
LOCATION PLAN	SEGMENT A	Scale:	Fig.
	Checked By:	AS SHOWN Project No.:	A.11
Drawn By: 6	P.E.B.	14189	
	-	-	d



### Appendix B Soil Laboratory Test Results

Table B-1: Summary of Soil Laboratory Test Results (1 page) Liquid Limit and Grain Size Analysis Test Data (44 pages) Moisture Density Relationship Test Data (14 pages) CBR Test Data (14 pages)

					Sieve Results         A           Description of Soil Specimen         Percent         Percent           Retained         Passing         LL           # 4 Sieve         # 200 Sieve		Att	erberg Li	mits	Natural	
Test Boring No.	Depth	Sample	Stratum	Description of Soil Specimen				PL	Ы	Moisture Content (%)	Remarks
AB-12	0.0-5.0	Bulk	А	clayey SAND (SC)	5.5	31.8	50	24	26	16.1	CBR=12.1%
AB-12	5.0-7.0	Split- Spoon	А	clayey SAND (SC)	1.5	26.4	48	24	24	14.9	
AB-12	23.0-25.0	Split- Spoon	C2	WELL GRADED SAND with clay and gravel (SW-SC)	43.5	9.6	30	18	12	7.0	
AB-13	3.0-5.0	Split- Spoon	C1	sandy LEAN CLAY (CL)	1.3	64.8	24	17	7	13.7	
AB-15	0.0-5.0	Bulk	A/C2	clayey SAND (SC)	11.7	30.8	37	17	20	10.1	CBR=13.7%
AB-16	7.3-9.3	Split- Spoon	C1	Sandy Silty CLAY (CL-ML)	8.6	58.7	22	18	4	18.5	
CRW-2	0.0-5.0	Bulk	А	clayey SAND (SC)	9.9	44.9	34	15	19	14.2	CBR=4.7%
CB-3	1.0-2.5	Split- Spoon	C1	sandy silty CLAY with gravel (CL-ML)	16.6	64.0	21	15	6	14.4	
CB-5	0.0-5.0	Bulk	C1	sandy LEAN CLAY (CL)	14.3	59.1	41	18	23	9.7	CBR=2.1%
CB-8	0.0-5.0	Bulk	C2	clayey SAND (SC)	5.3	42.1	30	15	15	16.6	CBR=1.6%
DB-2	0.0-5.0	Bulk	C1	sandy FAT CLAY with gravel (CH)	18.2	61.2	51	21	30	17.5	CBR=2.5%
DB-4	5.0-6.5	Split- Spoon	А	clayey GRAVEL with sand (GC)	43.3	22.2	32	16	16	13.4	
DB-6	0.0-5.0	Bulk	C2	clayey SAND with gravel (SC)	15.1	32.1	31	15	16	11.0	CBR=9.0%
DB-10	0.0-5.0	Bulk	C2	clayey SAND (SC)	2.1	44.4	27	14	13	16.1	CBR=16.0%
FRW-6	5.0-6.5	Split- Spoon	D1	FAT CLAY (CH)	0.0	93.6	71	27	44	37.2	
FB-2	0.0-5.0	Bulk	D2	clayey SAND with gravel (SC)	16.4	26.8	72	26	46	6.2	CBR=9.9%
FB-9	0.0-5.0	Bulk	В	sandy LEAN CLAY (CL)	8.8	51.1	36	19	17	14.5	CBR=4.3%
FB-18	0.0-5.0	Bulk	C1	LEAN CLAY (CL)	0.1	86.7	25	17	8	18.6	CBR=2.3%
HB-5	0.0-5.0	Bulk	D2	clayey SAND (SC)	5.0	29.0	74	20	54	17.3	CBR=8.0%
IRW-1	5.0-6.5	Split- Spoon	E1	silty SAND (SM)	0	21.3	53	33	20	18.7	
IB-2	0.0-5.0	Bulk	D1	sandy FAT CLAY (CH)	1.8	51	53	20	33	24.7	CBR=4.3%
IB-9	0.0-5.0	Bulk	D2	clayey SAND with gravel (SC)	26.2	31.7	44	15	29	7.6	CBR=8.8%

#### Table B-1: Summary of Soil Laboratory Test Results

Notes:

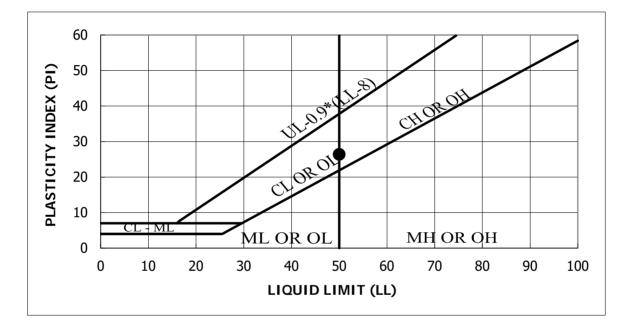
 Soil tests are in accordance with applicable ASTM standards.
 Soil classification symbols are in accordance with Unified Soil Classification System.
 Key to abbreviations: LL= Liquid Limit; PL= Plastic Limit; PI= Plasticity Index; NP= Nonplastic; N/T= Not Tested
 CBR values correspond to 0.1 inch penetration resistance of soil sample compacted to 95% of maximum dry density



# GeoConcepts Engineering, Inc.

19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318							
Project No. 14189 Project Name Columbia Pike Multimodal St. Improvements							
Test Boring No. AB-12 Depth (Feet) 0.0'-5.0'							
Lab Order No. 3754-2 Date 3/17/2016							

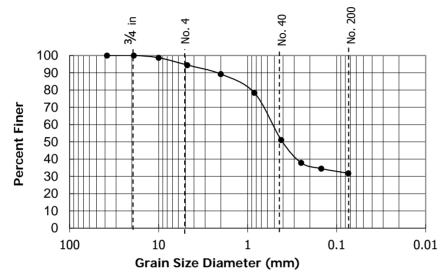


Material Description	LL	PL	PI	% Passing		USCS	w (%)
Material Description		1 6		#4	#200	0303	W (78)
CLAYEY SAND	50	24	26	94.5	31.8	SC	16.1
Color		Brown		AASHTO CI	assification	A-2-7	

Reviewed by Lindsay Bartz



GRAIN SIZE ANALYSIS - ASTM D422					
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements		
Test Boring No.	AB-12	Depth (Feet)	0.0'-5.0'		
Lab Order No.	3754-2	Date	3/17/2016		



SIEVE	% Passing
1 1⁄2 "	100
3/4"	100
3/8"	99
#4	94
#10	89
#20	78
#40	51
#60	38
#100	35
#200	32
Pan	

USCS Group Symbol	SC
USCS Group Name	CLAYEY SAND
Cu	
Cc	
LL	50
PI	26
Gravel	5.5
Sand	62.7
Fines	31.8
AASHTO Classification	A-2-7
Color	Brown

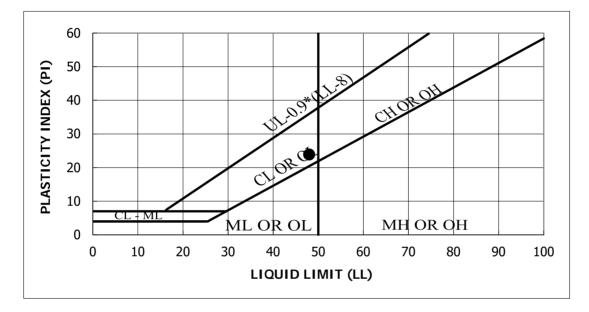
Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

Lindsay Bartz



LIQUID AND PLASTIC LIMIT - ASTM D4318						
Project No.	14189	Project Name	Columbia Pike Multimodal Street Improvements			
Test Boring No.	AB-12	Depth (Feet)	5.0-7.0			
Lab Order No. 3754-1 Date 3/22/2016						

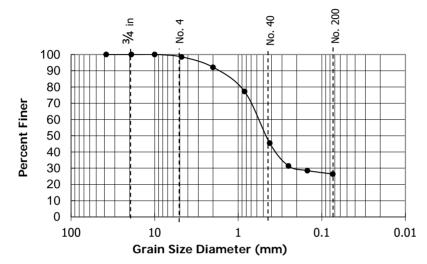


Material Description		PL	PI	% Passing		USCS	w (%)
Material Description	LL	r L	#4		#200		
CLAYEY SAND	48	24	24	98.5	26.4	SC	14.9
Color	Red	ddish Brown		AASHTO CI	assification	A-2-7	

Reviewed by Lindsay Barts



	GRAIN SIZE ANALYSIS - ASTM D422						
Project No.	Project No. 14189 Project Name Columbia Pike Multimodal Street Improvements						
Test Boring No.	AB-12	Depth (Feet)	5.0-7.0				
Lab Order No.	3754-1	Date	3/22/2016				



SIEVE	% Passing
1 1⁄2 "	100
3/4"	100
3/8"	100
#4	99
#10	92
#20	77
#40	45
#60	31
#100	29
#200	26
Pan	

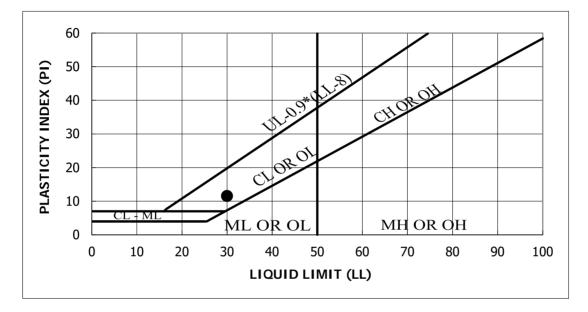
USCS Group Symbol	SC
USCS Group Name	CLAYEY SAND
Cu	
Cc	
LL	48
PI	24
Gravel	1.5
Sand	72.1
Fines	26.4
AASHTO Classification	A-2-7
Color	Reddish Brown
Test Method: ASTM D 422	

Soil Classification by ASTM D2487 and AASHTO M 145

Lundsay Bartz



LIQUID AND PLASTIC LIMIT - ASTM D4318						
Project No.	14189	Project Name	Columbia Pike Multimodal Street Improvements			
Test Boring No.	AB-12	Depth (Feet)	23.0-25.0			
Lab Order No. 3754-3 Date 3/22/2016						

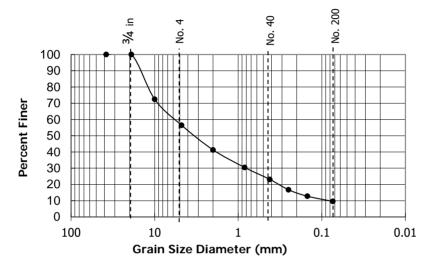


Material Description		PL	PI	% Passing		USCS	w (%)
Material Description	LL	r L	<b>F 1</b>	#4	#200	0303	W (78)
WELL GRADED SAND with	30	18	12	56.5	9.6	SW-SC	7.0
clay and gravel	50	10	12	50.5	9.0	300-30	7.0
Color		Brown		AASHTO CI	assification		A-2-6

Reviewed by Lindsay Bartz



	GRAIN SIZE ANALYSIS - ASTM D422						
Project No.	ect No. 14189 Project Name Columbia Pike Multimodal Street Improvements						
Test Boring No.	AB-12	Depth (Feet)	23.0-25.0				
Lab Order No.	3754-3	Date	3/22/2016				



SIEVE	% Passing
1 1⁄2 "	100
3/4"	100
3/8"	72
#4	56
#10	41
#20	30
#40	23
#60	17
#100	13
#200	10
Pan	

USCS Group Symbol	SW-SC
USCS Group Name	WELL GRADED SAND with clay and gravel
Cu	70.5
Cc	1.3
LL	30
PI	12
Gravel	43.5
Sand	46.9
Fines	9.6
AASHTO Classification	A-2-6
Color	Brown
Tect Method: ASTM D 422	

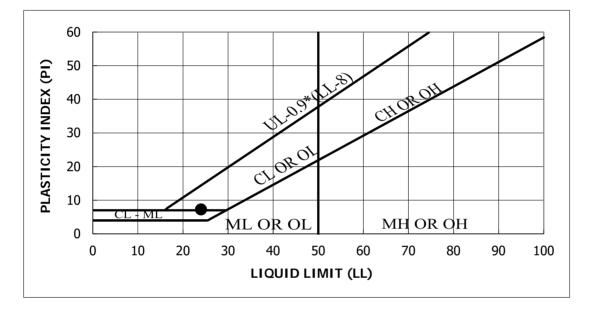
Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

Lindsay Bartz



LIQUID AND PLASTIC LIMIT - ASTM D4318					
Project No.	14189	Project Name	Columbia Pike Multimodal Street Improvements		
Test Boring No.	AB-13	Depth (Feet)	3.0-5.0		
Lab Order No.	3754-5	Date	3/22/2016		

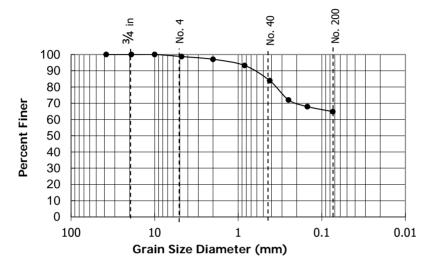


Material Description	LL PL	PI	% Passing		USCS	w (%)	
Material Description	LL	r L	FI	#4	#200	0303	W (78)
sandy Lean Clay	24	17	7	98.7	64.8	CL	13.7
Color	D	ark Brown		AASHTO C	assification		A-4

Reviewed by Lindsay Barts



GRAIN SIZE ANALYSIS - ASTM D422					
Project No.	14189	Project Name	Columbia Pike Multimodal Street Improvements		
Test Boring No.	AB-13	Depth (Feet)	3.0-5.0		
Lab Order No. 3754-5 Date 3/22/2016					



SIEVE	% Passing
1 1⁄2 "	100
3/4"	100
3/8"	100
#4	99
#10	97
#20	93
#40	84
#60	72
#100	68
#200	65
Pan	

USCS Group Symbol	CL
USCS Group Name	sandy Lean Clay
Cu	
Cc	
LL	24
PI	7
Gravel	1.3
Sand	33.9
Fines	64.8
AASHTO Classification	A-4
Color	Dark Brown
Tect Method: ASTM D 422	

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

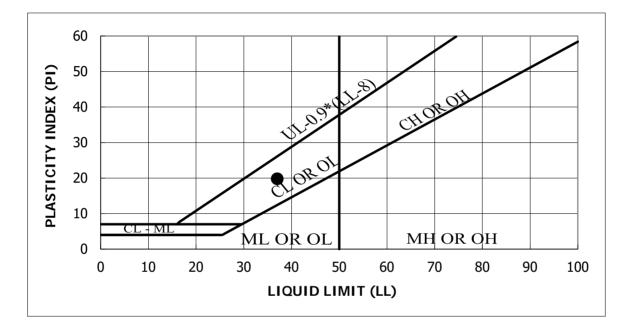
Lindsay Bartz



# GeoConcepts Engineering, Inc.

19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318					
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements		
Test Boring No.	AB-15	Depth (Feet)	0.0'-5.0'		
Lab Order No. 3754-7 Date 3/17/2016					

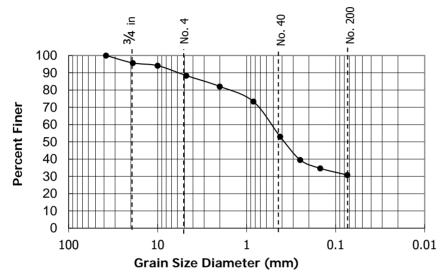


Material Description				PL	Ы	% Passing		USCS	w (%)
Material Description	LL	F L	FI	#4	#200	0303	VV (78)		
CLAYEY SAND	37	17	20	88.3	30.8	SC	10.1		
Color		Brown		AASHTO CI	assification		A-2-6		

Reviewed by Lindsay Barty



GRAIN SIZE ANALYSIS - ASTM D422				
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements	
Test Boring No.	AB-15	Depth (Feet)	0.0'-5.0'	
Lab Order No.	3754-7	Date	3/17/2016	



SIEVE	% Passing
1 1⁄2 "	100
3/4"	96
3/8"	94
#4	88
#10	82
#20	73
#40	53
#60	40
#100	35
#200	31
Pan	

USCS Group Symbol	SC
USCS Group Name	CLAYEY SAND
Cu	
Cc	
LL	37
PI	20
Gravel	11.7
Sand	57.6
Fines	30.8
AASHTO Classification	A-2-6
Color	Brown

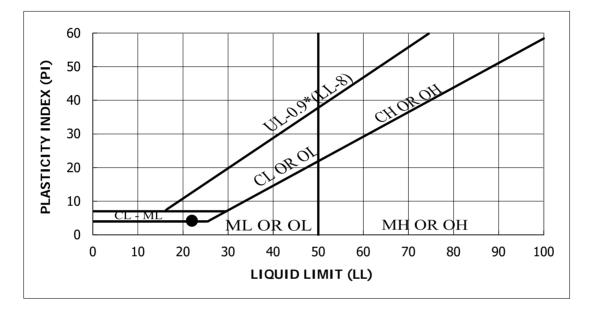
Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

Lindsay Bartz



LIQUID AND PLASTIC LIMIT - ASTM D4318						
Project No. 14189 Project Name Columbia Pike Multimodal Street Improvement						
Test Boring No.	AB-16	Depth (Feet)	7.3-9.3			
Lab Order No.         3754-10         Date         3/22/2016						



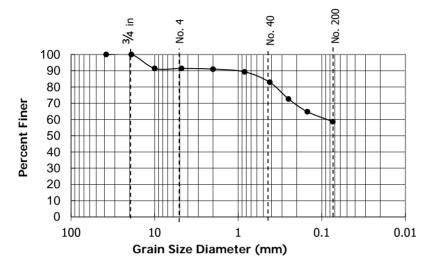
Material Description	LL PL	PI	% Passing		USCS	w (%)	
Material Description	LL	F L	FI	#4	#200	0303	W (76)
sandy silty Clay	22	18	4	91.4	58.7	CL-ML	18.5
Color		Gray	AASHTO C		ASHTO Classification		A-4

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by Lindsay Bartz



	GRAIN SIZE ANALYSIS - ASTM D422							
Project No. 14189 Project Name Columbia Pike Multimodal Street Improvements								
Test Boring No.	AB-16	Depth (Feet)	7.3-9.3					
Lab Order No.	3754-10	Date	3/22/2016					



SIEVE	% Passing
1 1⁄2 "	100
3/4"	100
3/8"	91
#4	91
#10	91
#20	89
#40	83
#60	73
#100	65
#200	59
Pan	

sandy silty Clay  
22
4
8.6
32.8
58.7
A-4
Gray

Test Method: ASTM D 422

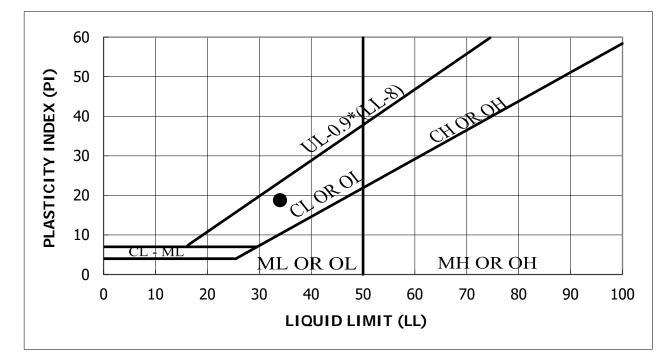
Soil Classification by ASTM D2487 and AASHTO M 145

Indsay Bartz



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318						
Project No. 14189 Project Name Columbia Pike Multimodal St. Improvements						
Test Boring No.	CRW-2	Depth (Feet)	0.0'-5.0'			
Lab Order No.	3486-13	Date	3/5/2015			



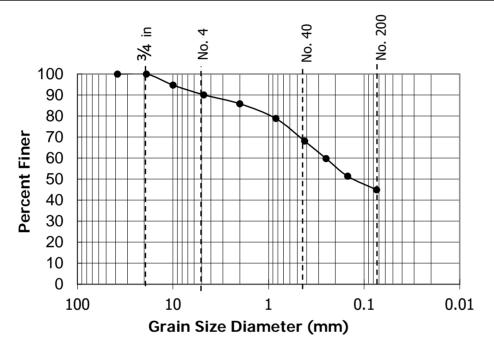
Material Description	LL	PL	PI	% Passing		USCS	w (%)
Material Description	LL	F L	FI	#4	#200	0303	vv (70)
CLAYEY SAND	34	15	19	90.1	44.9	SC	14.2
Color		Brown		AASHTO C	assification	A-6	

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Chil myty Reviewed by \_



GRAIN SIZE ANALYSIS - ASTM D422						
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements			
Test Boring No.	CRW-2	Depth (Feet)	0.0'-5.0'			
Lab Order No.	3486-13	Date	3/5/2015			



SIEVE	% Passing
1 1⁄2 "	100
3/4"	100
3/8"	95
#4	90
#10	86
#20	79
#40	68
#60	60
#100	51
#200	45
Pan	

SC	
CLAYEY SAND	
34	
19	
9.9	
45.2	
44.9	
A-6	
Brown	
	CLAYEY SAND  34 19 9.9 45.2 44.9 A-6

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

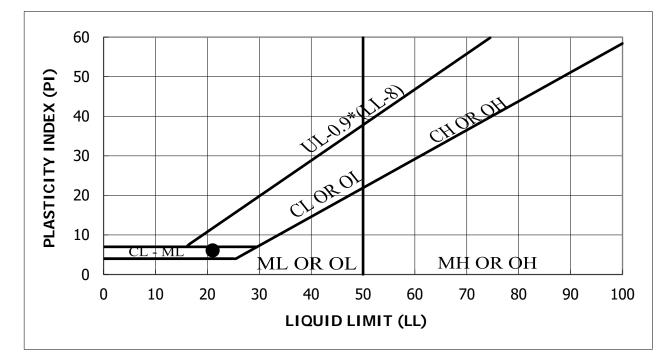
Tested by:\_\_\_\_\_

hic mysty



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318						
Project No. 14189 Project Name Columbia Pike Multimodal St. Improvements						
Test Boring No.	CB-3	Depth (Feet)	1.0'-2.5'			
Lab Order No.	3486-1	Date	3/13/2015			



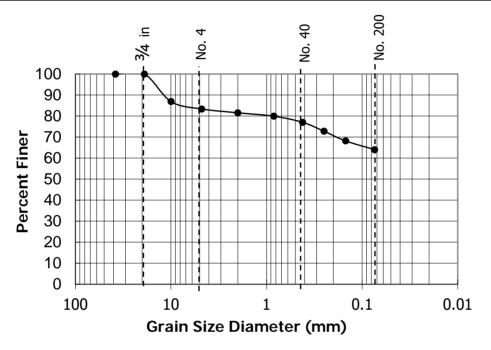
Material Description	LL	PL	PI	% Pa	ssing	USCS	w (%)
Waterial Description	LL	r L	FI	#4	#200	0303	W (78)
sandy silty Clay with gravel	21	15	6	83.4	64.0	CL-ML	14.4
Color	D	ark Gray		AASHTO C	assification	A-4	

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

"hil my Reviewed by



GRAIN SIZE ANALYSIS - ASTM D422				
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements	
Test Boring No.	CB-3	Depth (Feet)	1.0'-2.5'	
Lab Order No.	3486-1	Date	3/13/2015	



SIEVE	% Passing
1 1/2 "	100
3/4"	100
3/8"	87
#4	83
#10	82
#20	80
#40	77
#60	73
#100	68
#200	64
Pan	

USCS Group Symbol	CL-ML
USCS Group Name	sandy silty Clay with gravel
Cu	
Cc	
LL	21
PI	6
Gravel	16.6
Sand	19.3
Fines	64.0
AASHTO Classification	A-4
Color	Dark Gray

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

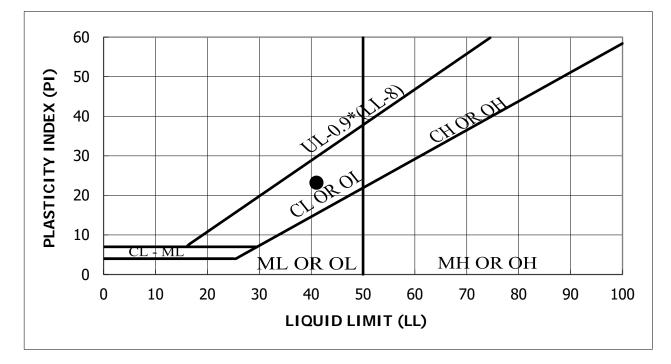
Reviewed by:

"hic mysty



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

	LIQUID A	ND PLASTIC LIMIT -	ASTM D4318
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements
Test Boring No.	CB-5	Depth (Feet)	0.0'-5.0'
Lab Order No.	3486-12	Date	3/5/2015



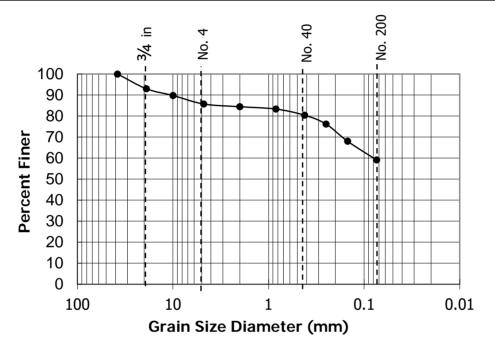
Material Description	LL	PL	PI	% Passing		USCS	w (%)
Material Description	LL	ΓL	F I	#4	#200	0303	W (78)
sandy Lean Clay	41	18	23	85.7	59.1	CL	9.7
Color Light Grayish Brown			AASHTO C	assification		A-7-6	

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Chil mysty Reviewed by



GRAIN SIZE ANALYSIS - ASTM D422				
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements	
Test Boring No.	CB-5	Depth (Feet)	0.0'-5.0'	
Lab Order No.	3486-12	Date	3/5/2015	



SIEVE	% Passing
1 1⁄2 "	100
3/4"	93
3/8"	90
#4	86
#10	84
#20	83
#40	80
#60	76
#100	68
#200	59
Pan	

USCS Group Symbol	CL	
USCS Group Name	sandy Lean Clay	
Cu		
Cc		
LL	41	
PI	23	
Gravel	14.3	
Sand	26.6	
Fines	59.1	
AASHTO Classification	A-7-6	
Color	Light Grayish Brown	

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

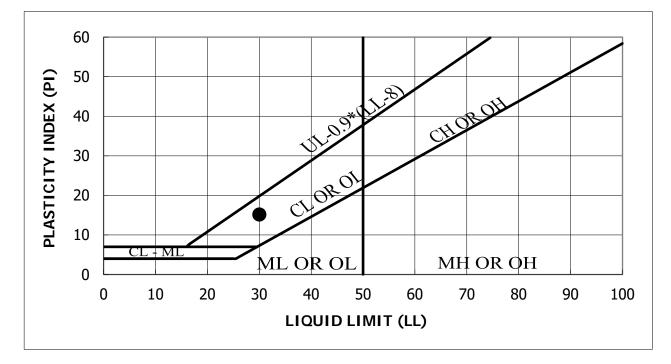
Reviewed by:

hic myty



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

	LIQUID A	ND PLASTIC LIMIT -	ASTM D4318
Project No.	14189	Project Name	Columbia Pike Street Improvements
Test Boring No.	CB-8	Depth (Feet)	0.0'-5.0'
Lab Order No.	3483-2	Date	3/5/2014



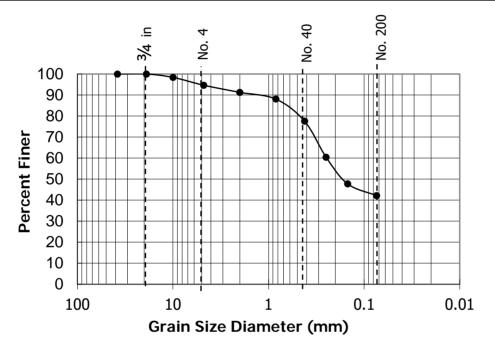
Material Description	LL	PL	Ы	% Passing		USCS	w (%)
Material Description	LL	F L	FI	#4	#200	0303	W (70)
CLAYEY SAND	30	15	15	94.7	42.1	SC	16.6
Color	Dark B	rownish Gray		AASHTO C	assification		A-6

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Chi ( Mapty) Reviewed by



GRAIN SIZE ANALYSIS - ASTM D422				
Project No.	14189	Project Name	Columbia Pike Street Improvements	
Test Boring No.	CB-8	Depth (Feet)	0.0'-5.0'	
Lab Order No.	3483-2	Date	3/5/2014	



SIEVE	% Passing
1 1⁄2 "	100
3/4"	100
3/8"	98
#4	95
#10	91
#20	88
#40	78
#60	60
#100	48
#200	42
Pan	

USCS Group Symbol	SC			
USCS Group Name	CLAYEY SAND			
Cu				
Сс				
LL	30			
PI	15			
Gravel	5.3			
Sand	52.5			
Fines	42.1			
AASHTO Classification	A-6			
Color	Dark Brownish Gray			

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

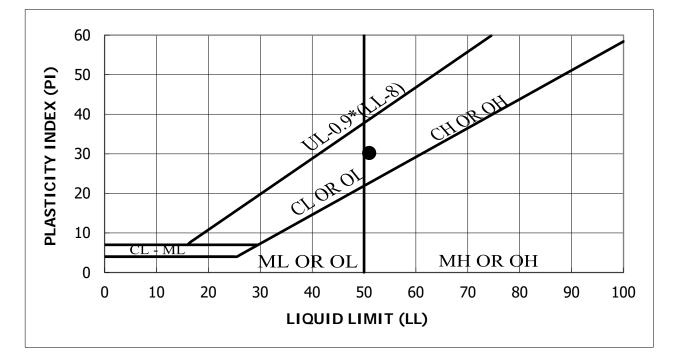
Tested by:\_\_\_\_\_

hi ( mysty



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318						
Project No. 14189 Project Name Columbia Pike Street Improvements						
Test Boring No.	DB-2	Depth (Feet)	0.0'-5.0'			
Lab Order No.	3483-1	Date	3/5/2014			



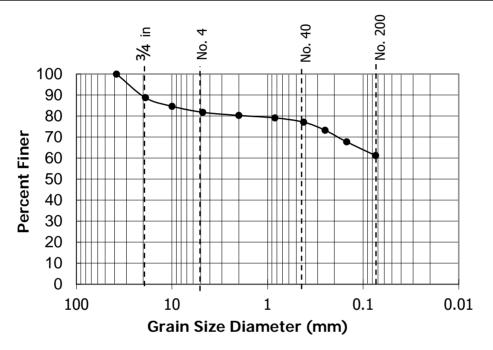
Material Description	LL	PL PI		% Passing		USCS	w (%)
Material Description		r L	F I	#4	#200	0303	W (78)
sandy Fat Clay with gravel	51	21	30	81.8	61.2	СН	17.5
Color	Ora	inge Brown		AASHTO Classification			A-7-6

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by \_\_\_\_\_



GRAIN SIZE ANALYSIS - ASTM D422					
Project No.	ect No. 14189 Project Name Columbia Pike Street Improvements				
Test Boring No.	st Boring No. DB-2 Depth (Feet)		0.0'-5.0'		
Lab Order No.	3483-1	Date	3/5/2014		



SIEVE	% Passing
1 1⁄2 "	100
3/4"	89
3/8"	85
#4	82
#10	80
#20	79
#40	77
#60	73
#100	68
#200	61
Pan	

USCS Group Symbol	СН			
USCS Group Name	sandy Fat Clay with gravel			
Cu				
Cc				
LL	51			
PI	30			
Gravel	18.2			
Sand	20.6			
Fines	61.2			
AASHTO Classification	A-7-6			
Color	Orange Brown			

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

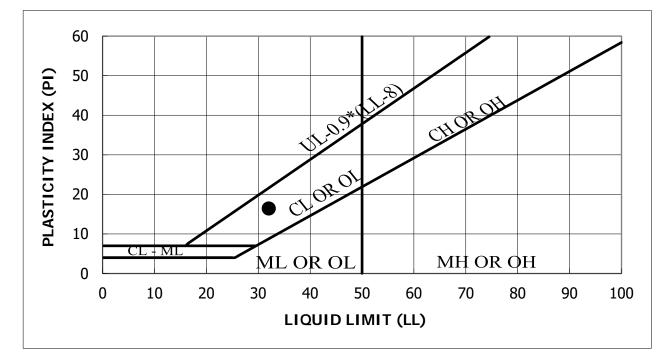
Tested by:\_\_\_\_\_

hi ( mysty



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318						
Project No. 14189 Project Name Columbia Pike Multimodal						
Test Boring No.	DB-4	Depth (Feet)	5.0'-6.5'			
Lab Order No.	3484-3	Date	3/3/2015			



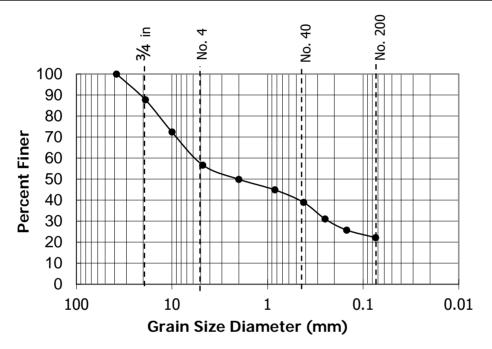
Material Description	LL	11	LL PL	Ы	% Passing		USCS	w (%)
Material Description	LL	FL	FI	#4	#200	0303	W (78)	
CLAYEY GRAVEL with sand	32	16	16	56.7	22.2	GC	13.4	
Color	Dark Gray		AASHTO Classification			A-2-6		

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by \_\_\_\_\_



GRAIN SIZE ANALYSIS - ASTM D422					
Project No. 14189 Project Name Columbia Pike Multimodal					
Test Boring No.	DB-4	Depth (Feet)	5.0'-6.5'		
Lab Order No.	3484-3	Date	3/3/2015		



SIEVE	% Passing
1 1⁄2 "	100
3/4"	88
3/8"	72
#4	57
#10	50
#20	45
#40	39
#60	31
#100	26
#200	22
Pan	

USCS Group Symbol	GC			
USCS Group Name	CLAYEY GRAVEL with sand			
Cu				
Cc				
LL	32			
PI	16			
Gravel	43.3			
Sand	34.5			
Fines	22.2			
AASHTO Classification	A-2-6			
Color	Dark Gray			

Test Method: ASTM D 422

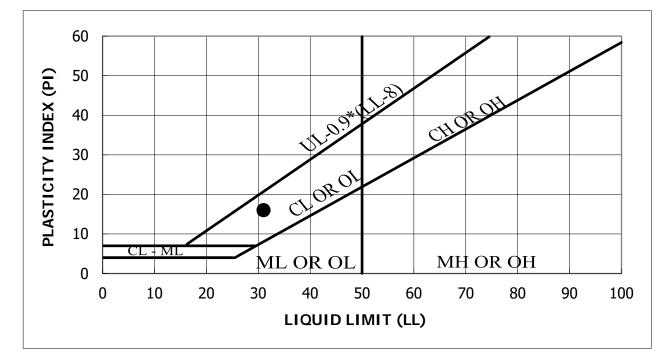
Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by: She Harris



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318						
Project No. 14189 Project Name Columbia Pike Multimodal						
Test Boring No.	DB-6	Depth (Feet)	0.0'-5.0'			
Lab Order No.	3481-2	Date	3/3/2015			



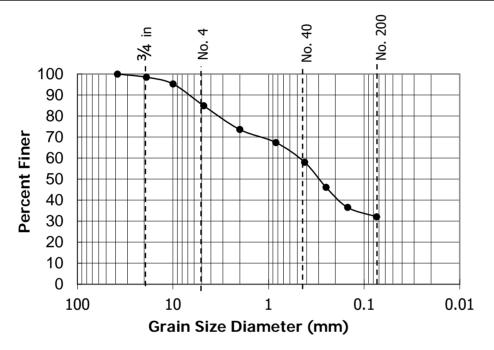
Material Description	LL PL		PI	% Passing		USCS	w (%)
Material Description		ΓL	F I	#4	#200	0303	W (78)
CLAYEY SAND with gravel	31	15	16	84.9	32.1	SC	11.0
Color	Dark Gray		AASHTO Classification			A-2-6	

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by \_\_\_\_\_ Harris



GRAIN SIZE ANALYSIS - ASTM D422						
Project No.	14189	Project Name	Columbia Pike Multimodal			
Test Boring No.	DB-6	Depth (Feet)	0.0'-5.0'			
Lab Order No.	3481-2	Date	3/3/2015			



SIEVE	% Passing
1 1⁄2 "	100
3/4"	98
3/8"	95
#4	85
#10	74
#20	67
#40	58
#60	46
#100	37
#200	32
Pan	

USCS Group Symbol	SC	
USCS Group Name	CLAYEY SAND with gravel	
Cu		
Сс		
LL	31	
PI	16	
Gravel	15.1	
Sand	52.8	
Fines	32.1	
AASHTO Classification	A-2-6	
Color	Dark Gray	

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

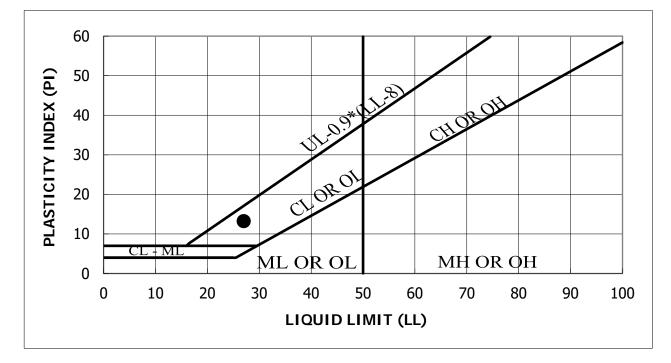
Reviewed by:

Jh Harris



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318						
Project No.	14189	Project Name	Columbia Pike Multimodal			
Test Boring No.	DB-10	Depth (Feet)	0.0'-5.0'			
Lab Order No.	3481-1	Date	3/3/2015			



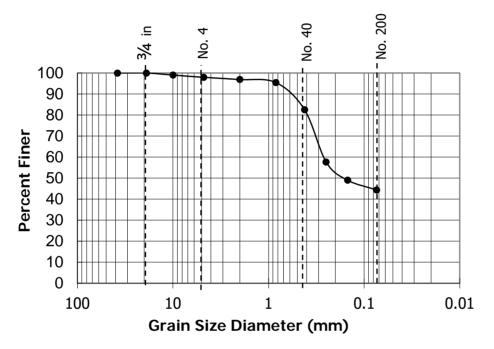
Material Description	terial Description LL P		PI	% Passing		USCS	w (%)
Material Description		ΓL	F I	#4	#200	0303	W (78)
CLAYEY SAND	27	14	13	97.9	44.4	SC	16.1
Color	Brownish Gray			AASHTO C	AASHTO Classification		A-6

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by \_\_\_\_\_ Harris



GRAIN SIZE ANALYSIS - ASTM D422						
Project No.	14189	Project Name	Columbia Pike Multimodal			
Test Boring No.	DB-10	Depth (Feet)	0.0'-5.0'			
Lab Order No.	3481-1	Date	3/3/2015			



SIEVE	% Passing
1 1/2 "	100
3/4"	100
3/8"	99
#4	98
#10	97
#20	95
#40	83
#60	58
#100	49
#200	44
Pan	

USCS Group Symbol	SC
USCS Group Name	CLAYEY SAND
Cu	
Cc	
LL	27
PI	13
Gravel	2.1
Sand	53.6
Fines	44.4
AASHTO Classification	A-6
Color	Brownish Gray

Test Method: ASTM D 422

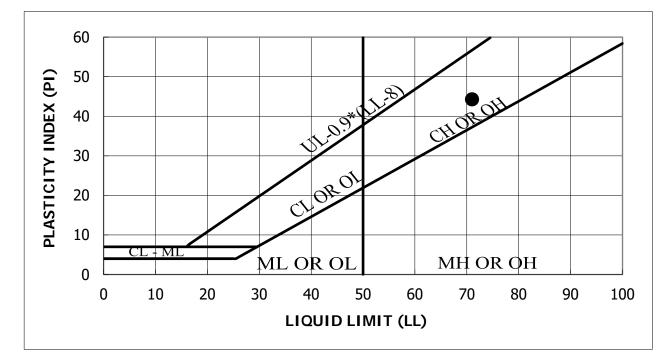
Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by: Shar Harris



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318						
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements			
Test Boring No.	FRW-6	Depth (Feet)	5.0'-6.5'			
Lab Order No.	3480-8	Date	3/6/2015			



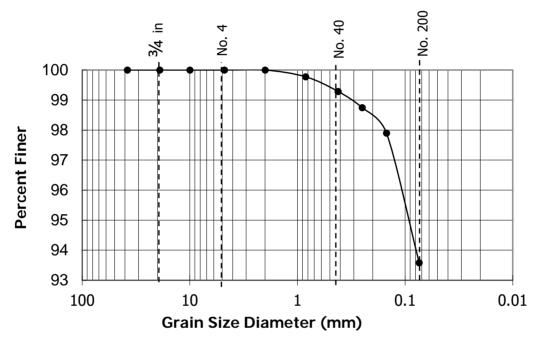
Material Description	LL	PL			РІ	% Passing		USCS	w (%)
Material Description	LL	r L	F I	#4	#200	0303	W (78)		
Fat Clay	71	27	44	100.0	93.6	СН	37.2		
Color		Gray		AASHTO C	lassification		A-7-6		

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Chil my Reviewed by \_



GRAIN SIZE ANALYSIS - ASTM D422						
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements			
Test Boring No.	FRW-6	Depth (Feet)	5.0'-6.5'			
Lab Order No.	3480-8	Date	3/6/2015			



SIEVE	% Passing
1 1/2 "	100
3/4"	100
3/8"	100
#4	100
#10	100
#20	100
#40	99
#60	99
#100	98
#200	94
Pan	

USCS Group Symbol	СН
USCS Group Name	Fat Clay
Cu	
Cc	
LL	71
PI	44
Gravel	0.0
Sand	6.4
Fines	93.6
AASHTO Classification	A-7-6
Color	Gray

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

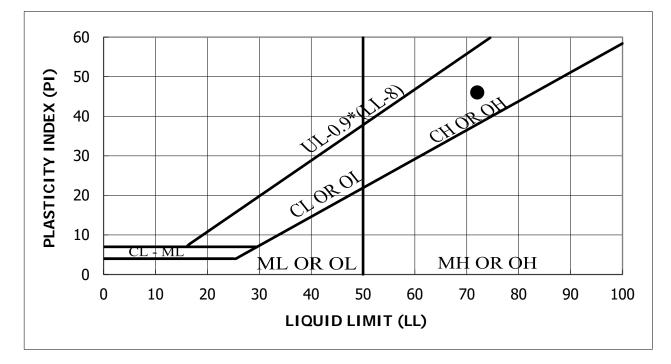
Tested by:\_\_\_\_\_

hic mity



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318							
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements				
Test Boring No.	FB-2	Depth (Feet)	0.0'-5.0'				
Lab Order No.							



Material Description			LL			LL PL	Ы	% Passing		USCS	w (%)
Material Description	LL	F L	FI	#4	#200	0303	W (78)				
CLAYEY SAND with gravel	72	26	46	83.6	26.8	SC	6.2				
Color	D	ark Gray		AASHTO C	assification		A-2-7				

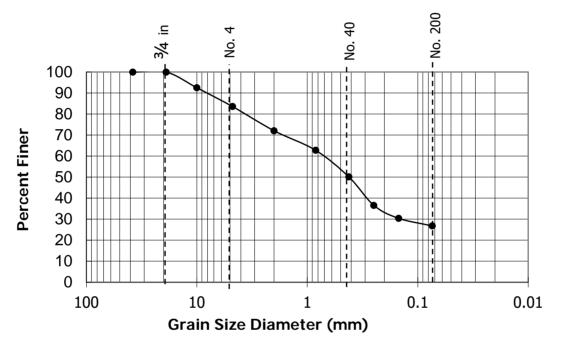
Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Chil mpty Reviewed by



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

GRAIN SIZE ANALYSIS - ASTM D422				
Project No. 14189 Project Name Columbia Pike Multimodal St. Improvements				
Test Boring No.	FB-2	Depth (Feet)	0.0'-5.0'	
Lab Order No.         3480-14         Date         3/6/2015				



SIEVE	% Passing
1 1⁄2 "	100
3/4"	100
3/8"	93
#4	84
#10	72
#20	63
#40	50
#60	37
#100	30
#200	27
Pan	

USCS Group Symbol	SC
USCS Group Name	CLAYEY SAND with gravel
Cu	
Сс	
LL	72
PI	46
Gravel	16.4
Sand	56.8
Fines	26.8
AASHTO Classification	A-2-7
Color	Dark Gray

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

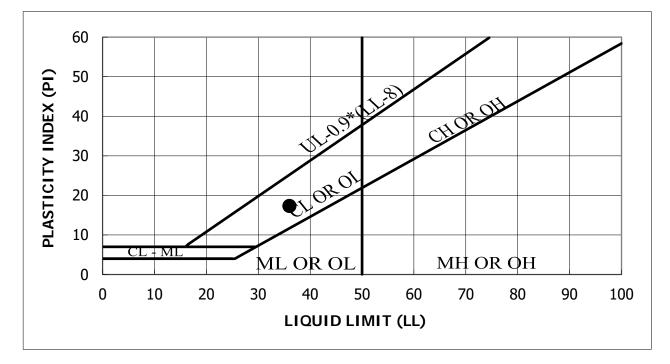
Tested by:\_\_\_\_\_

hi C. maply



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318						
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements			
Test Boring No.	FB-9	Depth (Feet)	0.0'-5.0'			
Lab Order No.         3480-13         Date         3/6/2015						



Material Description	LL	PL PI		LL DI PI % Passing	USCS	w (%)	
Material Description	LL	F L	FI	#4	#200	0303	W (70)
sandy Lean Clay	36	19	17	91.2	51.1	CL	14.5
Color	Brov	vnish Gray		AASHTO C	assification		A-6

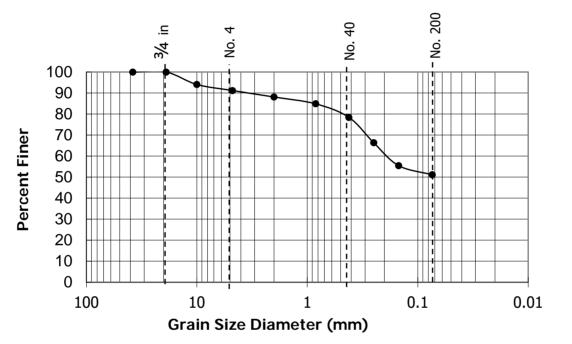
Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Chi ( mysty Reviewed by



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

GRAIN SIZE ANALYSIS - ASTM D422				
Project No. 14189 Project Name Columbia Pike Multimodal St. Improvements				
Test Boring No.	FB-9	Depth (Feet)	0.0'-5.0'	
Lab Order No.         3480-13         Date         3/6/2015				



SIEVE	% Passing
1 1/2 "	100
3/4"	100
3/8"	94
#4	91
#10	88
#20	85
#40	78
#60	66
#100	55
#200	51
Pan	

USCS Group Symbol	CL
USCS Group Name	sandy Lean Clay
Cu	
Cc	
LL	36
PI	17
Gravel	8.8
Sand	40.1
Fines	51.1
AASHTO Classification	A-6
Color	Brownish Gray

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

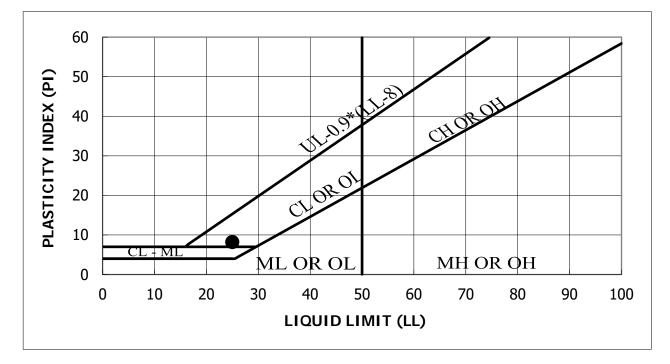
Tested by:\_

hi ( miply



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318							
Project No.	Project No. 14189 Project Name Columbia Pike Multimodal St. Improvements						
Test Boring No. FB-18 Depth (Feet) 0.0'-5.0'							
Lab Order No.	Lab Order No.         3480-12         Date         3/6/2015						



Material Description	LL	PL	PI	% Pa	ssing	USCS	w (%)
Material Description	LL	F L	FI	#4	#200	0303 1	W (78)
Lean Clay	25	17	8	99.9	86.7	CL	18.6
Color		Gray		AASHTO C	assification	A-4	

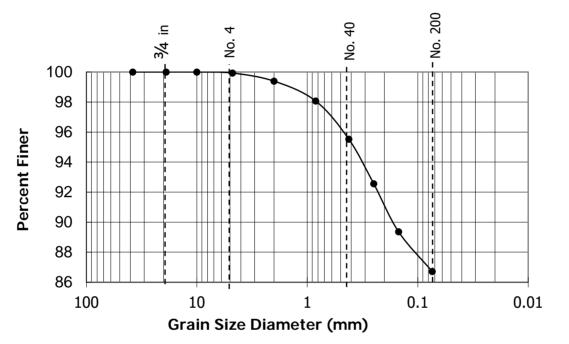
Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Chil my Reviewed by



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

GRAIN SIZE ANALYSIS - ASTM D422							
Project No. 14189 Project Name Columbia Pike Multimodal St. Improvements							
Test Boring No.	Test Boring No. FB-18 Depth (Feet) 0.0'-5.0'						
Lab Order No.         3480-12         Date         3/6/2015							



SIEVE	% Passing
1 1⁄2 "	100
3/4"	100
3/8"	100
#4	100
#10	99
#20	98
#40	96
#60	93
#100	89
#200	87
Pan	

USCS Group Symbol	CL
USCS Group Name	Lean Clay
Cu	
Cc	
LL	25
PI	8
Gravel	0.1
Sand	13.2
Fines	86.7
AASHTO Classification	A-4
Color	Gray

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

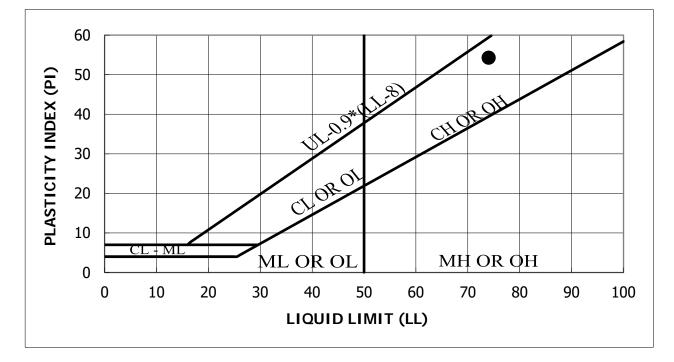
Tested by:

Chi ( mity



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318						
Project No. 14189 Project Name Columbia Pike - Segment H/I						
Test Boring No. HB-5 Depth (Feet) 0.0'-5.0'						
Lab Order No.         3468         Date         2/5/2015						



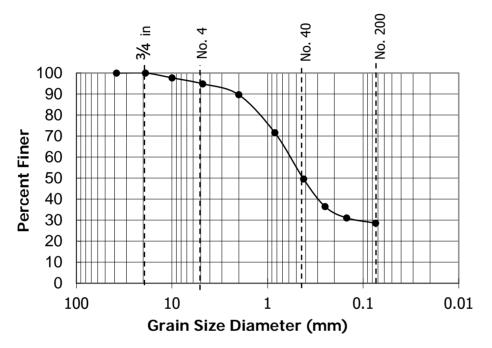
Material Description	LL	PL	PI	% Pa	ssing	USCS	w (%)
Material Description		ΓL	F I	#4	#200		W (78)
CLAYEY SAND	74	20	54	94.9	28.6	SC	17.3
Color		Gray		AASHTO C	assification	A-2-7	

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by \_\_\_\_\_\_



GRAIN SIZE ANALYSIS - ASTM D422							
Project No.	14189	Project Name	Columbia Pike - Segment H/I				
Test Boring No.	HB-5	Depth (Feet)	0.0'-5.0'				
Lab Order No.	3468	Date	2/5/2015				



SIEVE	% Passing
1 1⁄2 "	100
3/4"	100
3/8"	98
#4	95
#10	90
#20	72
#40	50
#60	36
#100	31
#200	29
Pan	

SC	
CLAYEY SAND	
74	
54	
5.1	
66.3	
28.6	
A-2-7	
Gray	
	CLAYEY SAND  74 54 5.1 66.3 28.6 A-2-7

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

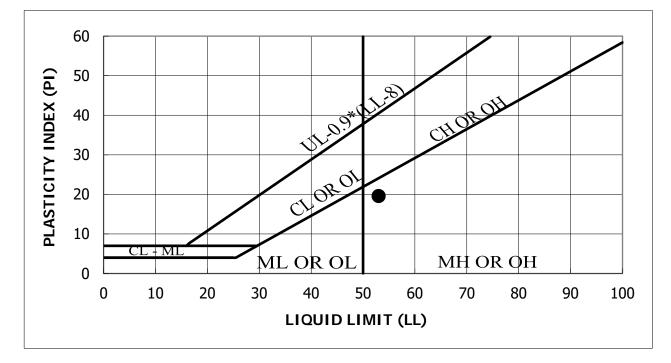
Tested by:

Reviewed by: Sharno



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318							
Project No. 14189 Project Name Columbia Pike Multimodal							
Test Boring No. IRW-1 Depth (Feet) 5.0-6.5							
Lab Order No.							



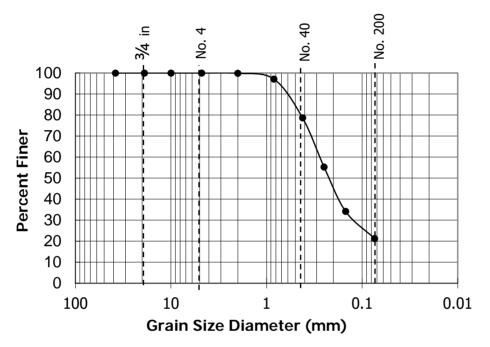
Material Description	LL	PL	PI	% Pa	ssing	USCS	w (%)
Material Description		r L	F I	#4	#200	0303	W (78)
SILTY SAND	53	33	20	100.0	21.3	SM	18.7
Color	Brov	wnish Gray		AASHTO C	assification	A-2-7	

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by \_\_\_\_\_\_



	GRAIN SIZE ANALYSIS - ASTM D422					
Project No.	14189	Project Name	Columbia Pike Multimodal			
Test Boring No.	IRW-1	Depth (Feet)	5.0-6.5			
Lab Order No.	3462-7	Date	2/2/2015			



SIEVE	% Passing
1 1⁄2 "	100
3/4"	100
3/8"	100
#4	100
#10	100
#20	97
#40	79
#60	55
#100	34
#200	21
Pan	

USCS Group Symbol	SM	
USCS Group Name	SILTY SAND	
Cu		
Cc		
LL	53	
PI	20	
Gravel	0.0	
Sand	78.7	
Fines	21.3	
AASHTO Classification	A-2-7	
Color	Brownish Gray	

Test Method: ASTM D 422

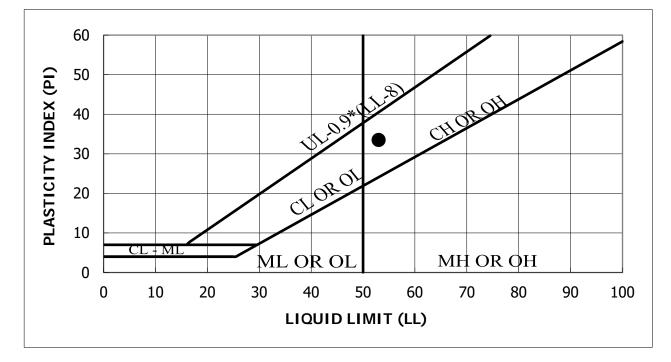
Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by: Jh Harris



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318							
Project No.	14189	Project Name	Columbia Pike Multimodal				
Test Boring No.	IB-2	Depth (Feet)	0.0-5.0				
Lab Order No.	3462-13	Date	2/2/2015				



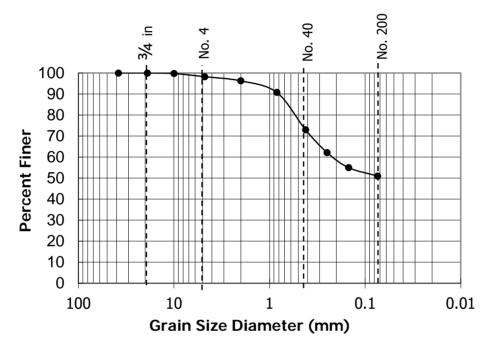
Material Description	LL	PL	PI	% Passing		USCS	w (%)
Material Description		F L	FI	#4	#200	0303	vv (70)
sandy Fat Clay	53	20	33	98.2	51.0	СН	24.7
Color	Brov	vnish Gray		AASHTO C	lassification		A-7-6

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by \_\_\_\_\_\_ Show Harris



	GRAIN SIZE ANALYSIS - ASTM D422					
Project No.	14189	Project Name	Columbia Pike Multimodal			
Test Boring No.	IB-2	Depth (Feet)	0.0-5.0			
Lab Order No.	3462-13	Date	2/2/2015			



SIEVE	% Passing
1 1/2 "	100
3/4"	100
3/8"	100
#4	98
#10	96
#20	91
#40	73
#60	62
#100	55
#200	51
Pan	

USCS Group Symbol	СН	
USCS Group Name	sandy Fat Clay	
Cu		
Cc		
LL	53	
PI	33	
Gravel	1.8	
Sand	47.3	
Fines	51.0	
AASHTO Classification	A-7-6	
Color	Brownish Gray	

Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

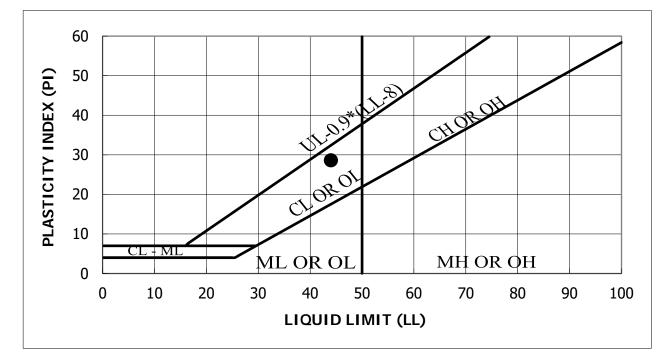
Tested by:

Reviewed by: <u>Jh</u> Havno



19955 Highland Vista Dr., Suite 170 Ashburn, Virginia 20147 (703) 726-8030 www.geoconcepts-eng.com

LIQUID AND PLASTIC LIMIT - ASTM D4318							
Project No.	14189	Project Name	Columbia Pike Multimodal				
Test Boring No.	IB-9	Depth (Feet)	3462-12				
Lab Order No.	3462-12	Date	2/2/2015				



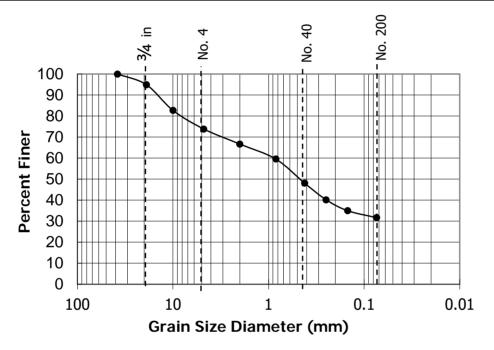
Material Description	LL	PL	Ы	% Passing		USCS	w (%)
Material Description	LL	ΓL	FI	#4	#200	0303	W (70)
CLAYEY SAND with gravel	44	15	29	73.8	31.7	SC	7.6
Color		Gray		AASHTO C	assification		A-2-7

Test Method: ASTM D 4318 Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by \_\_\_\_\_\_



	GRAIN SIZE ANALYSIS - ASTM D422					
Project No.	14189	Project Name	Columbia Pike Multimodal			
Test Boring No.	IB-9	Depth (Feet)	3462-12			
Lab Order No.	3462-12	Date	2/2/2015			



SIEVE	% Passing
1 1⁄2 "	100
3/4"	95
3/8"	83
#4	74
#10	67
#20	60
#40	48
#60	40
#100	35
#200	32
Pan	

SC	
CLAYEY SAND with gravel	
44	
29	
26.2	
42.2	
31.7	
A-2-7	
Gray	
	CLAYEY SAND with gravel  44 29 26.2 42.2 31.7 A-2-7

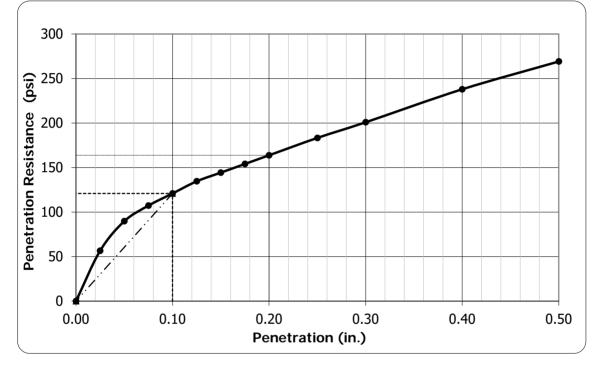
Test Method: ASTM D 422

Soil Classification by ASTM D2487 and AASHTO M 145

Reviewed by: She Havis



CALIFORNIA BEARING RATIO (CBR) TEST - ASTM- D1833			
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improven
Test Boring No.	AB-12	Depth (Feet)	0.0'-5.0'
Lab Order No.	3754-2	Date	3/17/2016



Molded	
Dry Density (pcf)	122.6
Moisture (%)	11.9
Percent of Max. Density (%)	99.7

Soaked	
Dry Density (pcf)	122.4
Moisture (%)	14.7
Percentage of Max. Density (%)	99.5

CBR	(%)
0.1 in.	12.1
0.2 in.	10.9

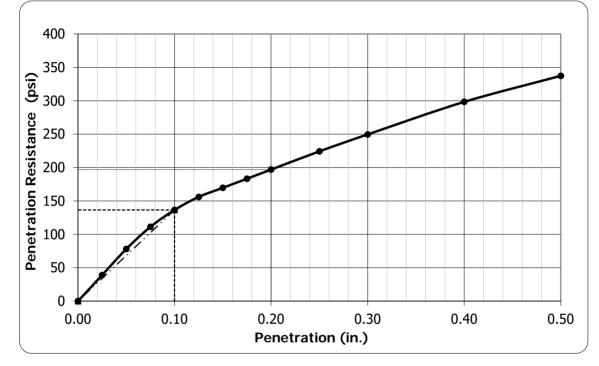
Linearity Correction	0.000
Surcharge (Ibs)	10
Max Swell (%)	0.2

Material Description	CLAYEY SAND
USCS	SC
Max Density	123
Optimum Moisture (%)	12
LL	50
PI	26
Color	Brown

Lindsay Bartz



CALIFORNIA BEARING RATIO (CBR) TEST - ASTM- D1833			
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improven
Test Boring No.	AB-15	Depth (Feet)	0.0'-5.0'
Lab Order No.	3754-7	Date	3/17/2016



Molded	
Dry Density (pcf)	127.3
Moisture (%)	9.0
Percent of Max. Density (%)	100.3

Soaked	
Dry Density (pcf)	127.1
Moisture (%)	12.6
Percentage of Max. Density (%)	100.1

CBR	(%)
0.1 in.	13.7
0.2 in.	13.1

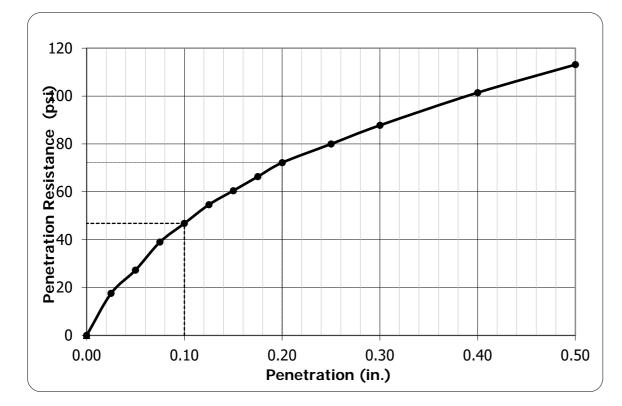
Linearity Correction	0.000
Surcharge (Ibs)	10
Max Swell (%)	0.2

Material Description	CLAYEY SAND
USCS	SC
Max Density	127
Optimum Moisture (%)	9
LL	37
PI	20
Color	Brown

Lindsay Bartz



CALIFORNIA BEARING RATIO (CBR) TEST - VTM-008			
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements
Test Boring No.	CRW-2	Depth (Feet)	0.0'-5.0'
Lab Order No.	3486-13	Date	3/5/2015



Molded	
Dry Density (pcf)	120.1
Moisture (%)	12.7
Percent of Max. Density (%)	99.3

Soaked	
Dry Density (pcf)	119.8
Moisture (%)	14.9
Percentage of Max. Density (%)	99.0

CBR	(%)
0.1 in.	4.7
0.2 in.	4.8

Tested by:

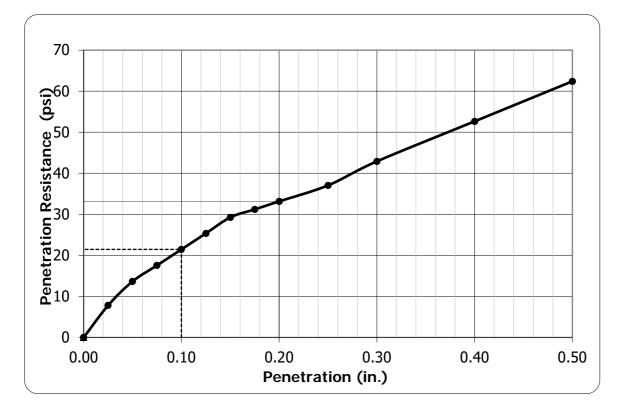
Linearity Correction	0.000	
Surcharge (lbs)	10	
Max Swell (%)	0.3	

Material Description	CLAYEY SAND
USCS	SC
Max Density	121
Optimum Moisture (%)	13
LL	34
PI	19
Color	Brown

She Harris



CALIFORNIA BEARING RATIO (CBR) TEST - VTM-008			
Project No.	ject No. 14189 Project Name Columbia Pike Multimodal St. Improvements		Columbia Pike Multimodal St. Improvements
Test Boring No.	CB-5	Depth (Feet)	0.0'-5.0'
Lab Order No.	3486-12	Date	3/5/2015



Molded	
Dry Density (pcf)	122.8
Moisture (%)	11.4
Percent of Max. Density (%)	99.0

Soaked	
Dry Density (pcf)	119.9
Moisture (%)	17.9
Percentage of Max. Density (%)	96.7

CBR (%)	
0.1 in.	2.1
0.2 in.	2.2

Tested by:

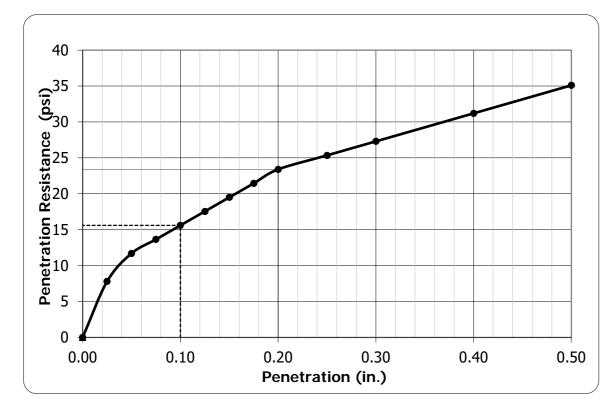
Linearity Correction	0.000
Surcharge (lbs)	10
Max Swell (%)	2.4

Material Description	sandy Lean Clay
USCS	CL
Max Density	124
Optimum Moisture (%)	11
LL	41
PI	23
Color	Light Grayish Brown

She Harris



CALIFORNIA BEARING RATIO (CBR) TEST - VTM-008			
Project No.	14189	Project Name	Columbia Pike Street Improvements
Test Boring No.	CB-8	Depth (Feet)	0.0'-5.0'
Lab Order No.	3483-2	Date	3/5/2014



Molded	
Dry Density (pcf)	112.7
Moisture (%)	15.1
Percent of Max. Density (%)	99.7

Soaked	
Dry Density (pcf)	111.7
Moisture (%)	16.8
Percentage of Max. Density (%)	98.8

CBR (	%)
0.1 in.	1.6
0.2 in.	1.6

Tested by:

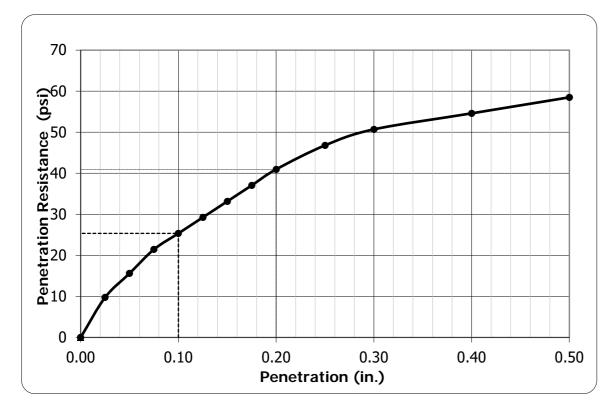
Linearity Correction	0.000
Surcharge (lbs)	10
Max Swell (%)	0.9

Material Description	CLAYEY SAND
USCS	SC
Max Density	113
Optimum Moisture (%)	15
LL	30
PI	15
Color	Dark Brownish Gray

Sh- Harris



CALIFORNIA BEARING RATIO (CBR) TEST - VTM-008			
Project No.	14189	Project Name	Columbia Pike Street Improvements
Test Boring No.	DB-2	Depth (Feet)	0.0'-5.0'
Lab Order No.	3483-1	Date	3/5/2014



Molded	
Dry Density (pcf)	126.8
Moisture (%)	9.1
Percent of Max. Density (%)	99.8

Soaked	
Dry Density (pcf)	120.3
Moisture (%)	24.2
Percentage of Max. Density (%)	94.7

CBR (	(%)
0.1 in.	2.5
0.2 in.	2.7

Tested by:

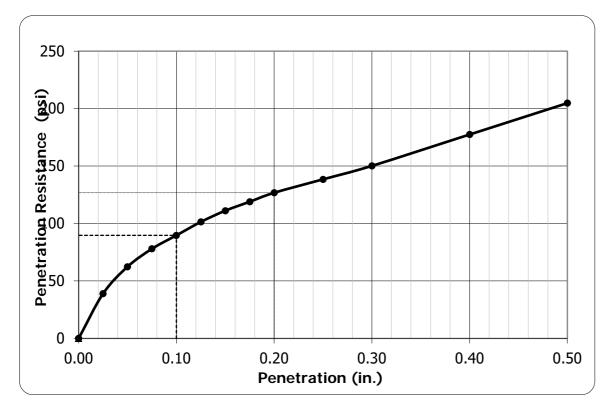
Linearity Correction	0.000
Surcharge (lbs)	10
Max Swell (%)	5.4

Material Description	sandy Fat Clay with gravel
USCS	СН
Max Density	127
Optimum Moisture (%)	9
LL	51
PI	30
Color	Orange Brown

She Harris



CALIFORNIA BEARING RATIO (CBR) TEST - VTM-008			
Project No.	14189	Project Name	Columbia Pike Multimodal
Test Boring No.	DB-6	Depth (Feet)	0.0'-5.0'
Lab Order No.	3481-2	Date	3/3/2015



Molded		
Dry Density (pcf)	129.3	
Moisture (%)	8.0	
Percent of Max. Density (%)	100.2	

Soaked		
Dry Density (pcf)	128.2	
Moisture (%)	12.8	
Percentage of Max. Density (%)	99.4	

CBR	(%)
0.1 in.	9.0
0.2 in.	8.5

Tested by:

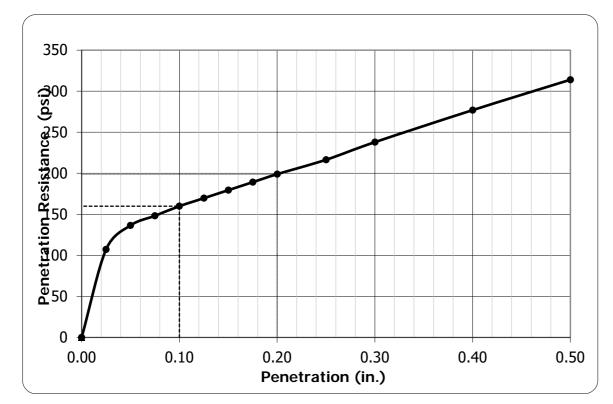
Linearity Correction	0.000
Surcharge (lbs)	10
Max Swell (%)	0.8

Material Description	CLAYEY SAND with gravel
USCS	SC
Max Density	129
Optimum Moisture (%)	8
LL	31
PI	16
Color	Dark Gray

She Havis



CALIFORNIA BEARING RATIO (CBR) TEST - VTM-008			
Project No.	14189	Project Name	Columbia Pike Multimodal
Test Boring No.	DB-10	Depth (Feet)	0.0'-5.0'
Lab Order No.	3481-1	Date	3/3/2015



Molded		
Dry Density (pcf)	123.2	
Moisture (%)	10.0	
Percent of Max. Density (%)	99.3	

Soaked		
Dry Density (pcf)	122.9	
Moisture (%)	12.7	
Percentage of Max. Density (%)	99.1	

CBR (%)	
0.1 in.	16.0
0.2 in.	13.3

Tested by:

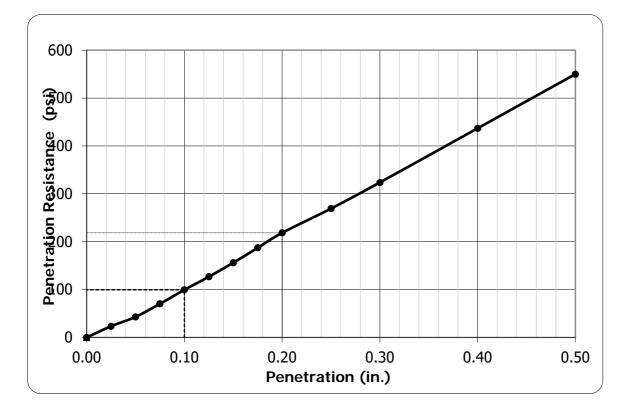
Linearity Correction	0.000
Surcharge (lbs)	10
Max Swell (%)	0.2

Material Description	CLAYEY SAND
USCS	SC
Max Density	124
Optimum Moisture (%)	10
LL	27
PI	13
Color	Brownish Gray

Sh Havis



CALIFORNIA BEARING RATIO (CBR) TEST - VTM-008			
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements
Test Boring No.	FB-2	Depth (Feet)	0.0'-5.0'
Lab Order No.	3480-14	Date	3/6/2015



Molded		
Dry Density (pcf)	130.6	
Moisture (%)	9.4	
Percent of Max. Density (%)	99.7	

Soaked		
Dry Density (pcf)	130.5	
Moisture (%)	10.3	
Percentage of Max. Density (%)	99.6	

CBR (S	%)
0.1 in.	9.9
0.2 in.	14.6

Tested by:

Linearity Correction	0.000
Surcharge (lbs)	10
Max Swell (%)	0.1

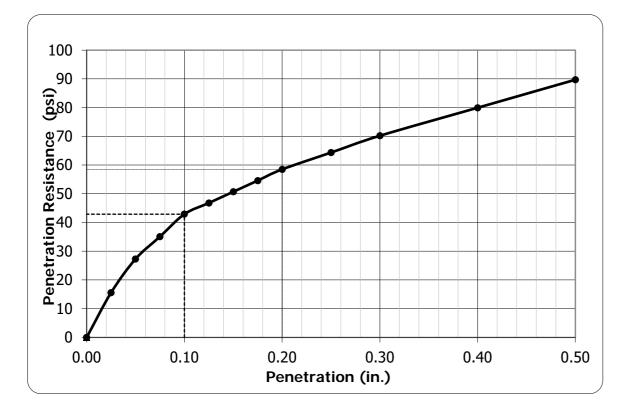
Material Description	CLAYEY SAND with gravel
USCS	SC
Max Density	131
Optimum Moisture (%)	9
LL	72
PI	46
Color	Dark Gray

Reviewed by:

She Harris



CALIFORNIA BEARING RATIO (CBR) TEST - VTM-008			
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements
Test Boring No.	FB-9	Depth (Feet)	0.0'-5.0'
Lab Order No.	3480-13	Date	3/6/2015



Molded		
Dry Density (pcf)	115.1	
Moisture (%)	14.3	
Percent of Max. Density (%)	100.1	

Soaked		
Dry Density (pcf)	112.3	
Moisture (%)	21.1	
Percentage of Max. Density (%)	97.6	

CBR (%)	
0.1 in.	4.3
0.2 in.	3.9

Tested by:

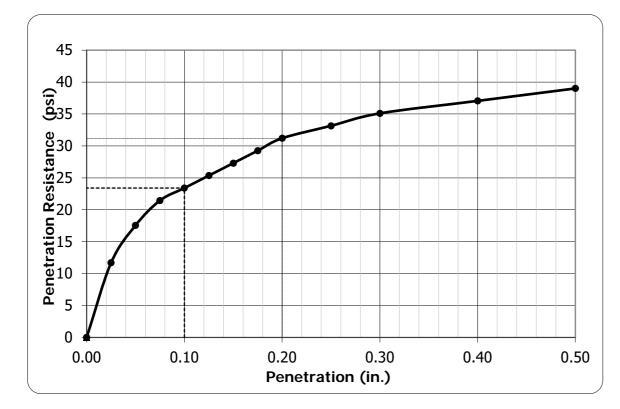
Linearity Correction	0.000
Surcharge (lbs)	10
Max Swell (%)	2.5

Material Description	sandy Lean Clay
USCS	CL
Max Density	115
Optimum Moisture (%)	14
LL	36
PI	17
Color	Brownish Gray

She Harris



CALIFORNIA BEARING RATIO (CBR) TEST - VTM-008			
Project No. 14189 Project Name Columbia Pike Multimodal St. Improvements			
Test Boring No.	FB-18	Depth (Feet)	0.0'-5.0'
Lab Order No.	3480-12	Date	3/6/2015



Molded	
Dry Density (pcf)	97.2
Moisture (%)	25.0
Percent of Max. Density (%)	100.2

Soaked	
Dry Density (pcf)	92.5
Moisture (%)	59.4
Percentage of Max. Density (%)	95.4

CBR (	%)
0.1 in.	2.3
0.2 in.	2.1

Tested by:

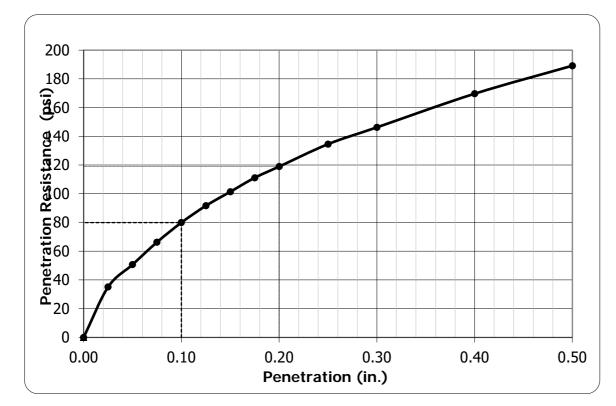
Linearity Correction	0.000	
Surcharge (lbs)	10	
Max Swell (%)	5.1	

Material Description	Lean Clay
USCS	CL
Max Density	97
Optimum Moisture (%)	25
LL	25
PI	8
Color	Gray

She Harris



CALIFORNIA BEARING RATIO (CBR) TEST - VTM-008			
Project No.	14189	Project Name	Columbia Pike - Segment H/I
Test Boring No.	HB-5	Depth (Feet)	0.0'-5.0'
Lab Order No.	3468	Date	2/5/2015



Molded	
Dry Density (pcf)	115.6
Moisture (%)	12.7
Percent of Max. Density (%)	100.5

Soaked	
Dry Density (pcf)	114.3
Moisture (%)	16.9
Percentage of Max. Density (%)	99.4

CBR	(%)
0.1 in.	8.0
0.2 in.	7.9

Tested by:

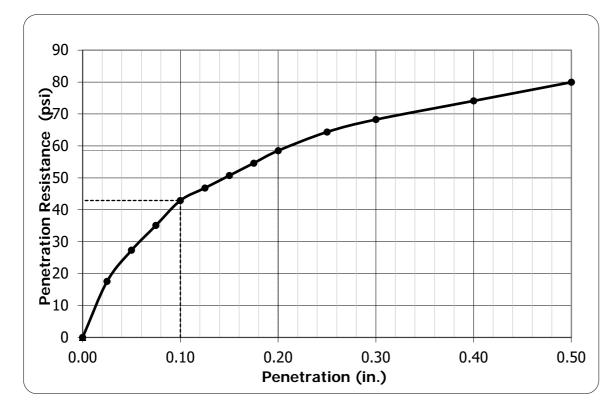
Linearity Correction	0.000
Surcharge (lbs)	10
Max Swell (%)	1.2

Material Description	CLAYEY SAND
USCS	SC
Max Density	115
Optimum Moisture (%)	13
LL	74
PI	54
Color	Gray

Sh- Harris



CALIFORNIA BEARING RATIO (CBR) TEST - VTM-008			
Project No.	14189	Project Name	Columbia Pike Multimodal
Test Boring No.	IB-2	Depth (Feet)	0.0-5.0
Lab Order No.	3462-13	Date	2/2/2015



Molded	
Dry Density (pcf)	111.9
Moisture (%)	15.4
Percent of Max. Density (%)	99.9

Soaked	
Dry Density (pcf)	107.7
Moisture (%)	22.5
Percentage of Max. Density (%)	96.2

CBR	(%)
0.1 in.	4.3
0.2 in.	3.9

Tested by:

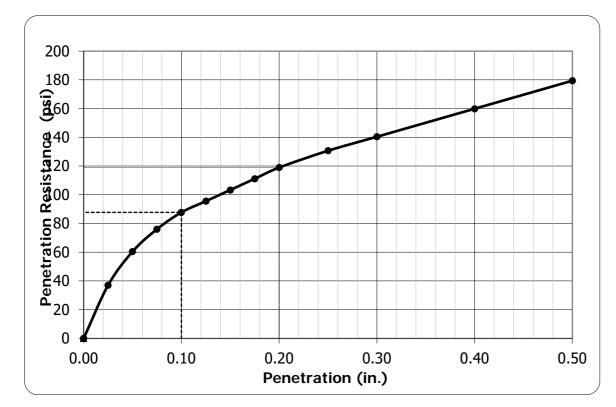
Linearity Correction	0.000
Surcharge (lbs)	10
Max Swell (%)	3.8

Material Description	sandy Fat Clay
USCS	СН
Max Density	112
Optimum Moisture (%)	15
LL	53
PI	33
Color	Brownish Gray

She Harris



CALIFORNIA BEARING RATIO (CBR) TEST - VTM-008			
Project No.	14189	Project Name	Columbia Pike Multimodal
Test Boring No.	IB-9	Depth (Feet)	3462-12
Lab Order No.	3462-12	Date	2/2/2015



Molded		
Dry Density (pcf)	128.8	
Moisture (%)	9.2	
Percent of Max. Density (%)	99.9	

Soaked		
Dry Density (pcf)	126.8	
Moisture (%)	13.9	
Percentage of Max. Density (%)	98.3	

CBR	(%)
0.1 in.	8.8
0.2 in.	7.9

Tested by:

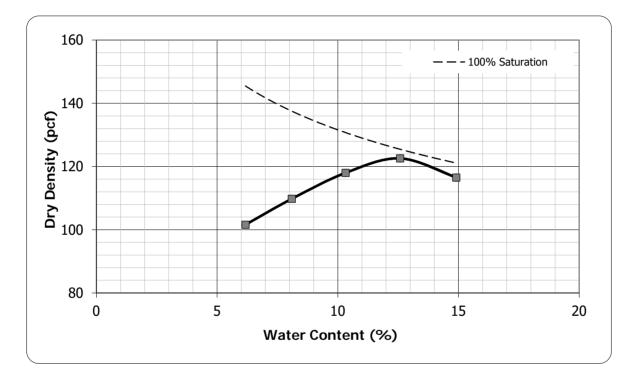
Linearity Correction	0.000
Surcharge (lbs)	10
Max Swell (%)	1.6

Material Description	CLAYEY SAND with gravel
USCS	SC
Max Density	129
Optimum Moisture (%)	9
LL	44
PI	29
Color	Gray

She Harris



	MOISTURE DENSITY RELATIONSHIP - VTM-001								
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements						
Test Boring No.	AB-12	Depth (Feet)	0.0'-5.0'						
Lab Order No.	3754-2	Date	3/17/2016						

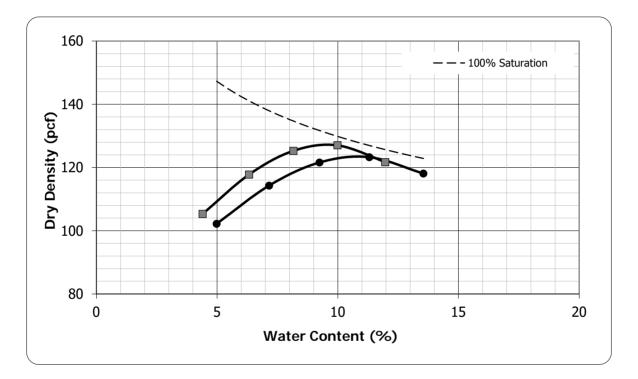


TEST RESULTS	Before Correc.		Afte	er Correc.				
Maximum Dry Density (pcf)	123				Color			
Optimum Moisture Content (%)	12				Brown			
Material	Classific	ation	Nat. Moist. (%)	Sp. G. (Assumed)	LL	ΡI	% > # 4	% < #200
CLAYEY SAND	USCS SC	AASHTO A-2-7	16.1	2.7	50	26	5.5	31.8

Reviewed by Lindsay Bartz



	MOISTURE DENSITY RELATIONSHIP - VTM-001									
Project No.	14189	Project Name	Columbia Pike Multimodal St. Improvements							
Test Boring No.	AB-15	Depth (Feet)	0.0'-5.0'							
Lab Order No.	3754-7	Date	3/17/2016							

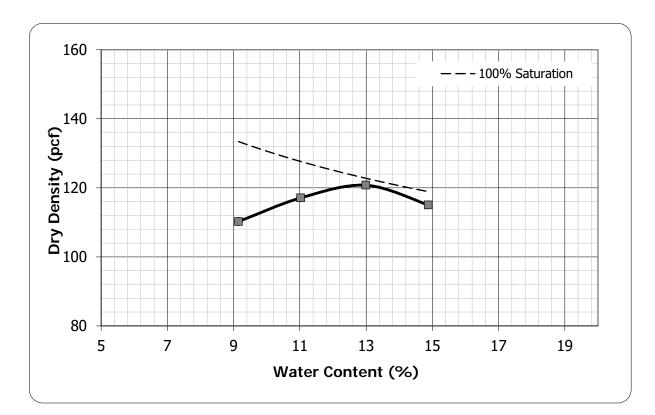


TEST RESULTS	Before Correc.		Afte	After Correc.				
Maximum Dry Density (pcf)	124		127		Color			
Optimum Moisture Content (%)	11		9 Brown					
Material	Classific	ation	Nat. Moist. (%) (Assumed)		LL	ΡI	% > # 4	% < #200
CLAYEY SAND	USCS SC	AASHTO A-2-6	10.1	2.65	37	20	11.7	30.8

Reviewed by Lindsay Bartz



MOISTURE DENSITY RELATIONSHIP - VTM-001								
Project No. 14189 Project Name Columbia Pike Multimodal St. Improvement								
Test Boring No.	CRW-2	Depth (Feet)	0.0'-5.0'					
Lab Order No.         3486-13         Date         3/5/2015								

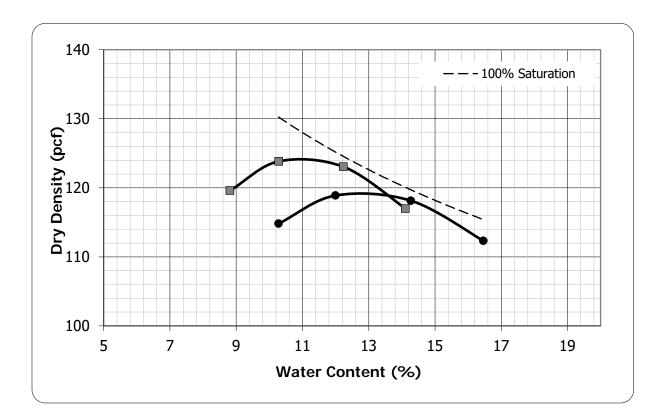


TEST RESULTS	Before Correc.		After Correc.							
Maximum Dry Density (pcf)	1	121				Color				
Optimum Moisture Content (%)		13				Brown				
Material	Classi	fication	Nat. Moist. (%)	Sp. G. (Assumed)	LL	ΡI	% > #4	% < #200		
	USCS	AASHTO	14.2	2.65	24	10	0.0	44.0		
CLAYEY SAND	SC	A-6	14.2	2.65	34	19	9.9	44.9		

Reviewed by Chil My



MOISTURE DENSITY RELATIONSHIP - VTM-001								
Project No. 14189 Project Name Columbia Pike Multimodal St. Improveme								
Test Boring No.	CB-5	Depth (Feet)	0.0'-5.0'					
Lab Order No.	3486-12	Date	3/5/2015					

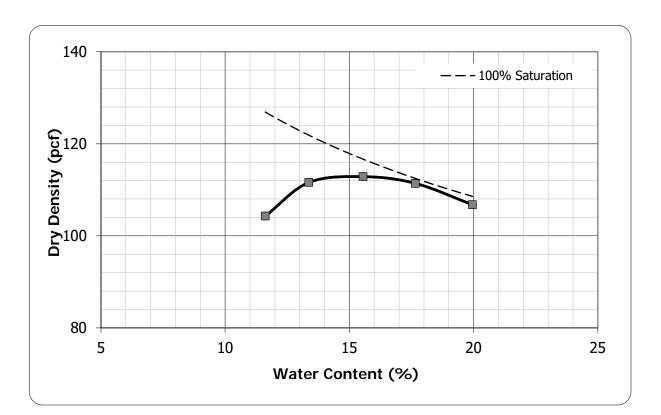


TEST RESULTS	Before	e Correc.	Afte	er Correc.				
Maximum Dry Density (pcf)	119 124			Color				
Optimum Moisture Content (%)		13		11	Light Grayish Brown			า
Material	Classi	fication	Nat. Moist. (%)	Sp. G. (Assumed)	LL	PI	% > #4	% < #200
andy Lean Clay	USCS	AASHTO	0.7	2.65	41	22	14.2	FO 1
sandy Lean Clay	CL	A-7-6	9.7	2.65	41	23	14.3	59.1

Reviewed by Chic My



MOISTURE DENSITY RELATIONSHIP - VTM-001								
Project No. 14189 Project Name Columbia Pike Street Improvements								
Test Boring No.	CB-8	Depth (Feet)	0.0'-5.0'					
Lab Order No.	3483-2	Date	3/5/2014					



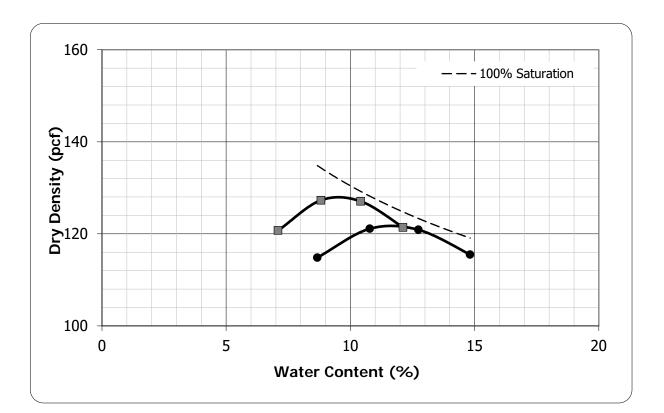
TEST RESULTS	Before	e Correc.	After Correc.						
Maximum Dry Density (pcf)	1	113				Color			
Optimum Moisture Content (%)		15			C	Dark Brownish Gray			
Material	Classi	fication	Nat. Moist. (%)	Sp. G. (Assumed)	LL	Ы	% > # 4	% < #200	
CLAYEY SAND	USCS SC	AASHTO A-6	16.6	2.65	30	15	5.3	42.1	

Tested by \_\_\_\_\_

Chi ( Myty



MOISTURE DENSITY RELATIONSHIP - VTM-001							
Project No. 14189 Project Name Columbia Pike Street Improvements							
Test Boring No.	DB-2	Depth (Feet)	0.0'-5.0'				
Lab Order No.	3483-1	Date	3/5/2014				



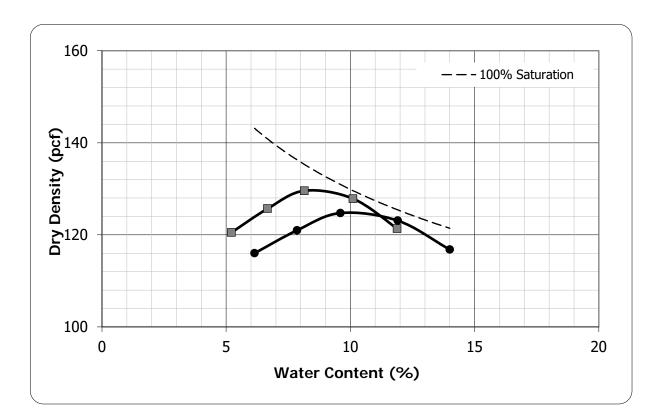
TEST RESULTS	Before	e Correc.	Afte	er Correc.				
Maximum Dry Density (pcf)	121		127		Color			
Optimum Moisture Content (%)		12	9			Orange Brown		
Material	Classi	fication	Nat. Moist. (%)	Sp. G. (Assumed)	LL	Ы	% > # 4	% < #200
sandy Fat Clay with gravel	USCS CH	AASHTO A-7-6	17.5	2.65	51	30	18.2	61.2

Tested by \_\_\_\_\_

Chil myty



	MOISTURE DENSITY RELATIONSHIP - VTM-001								
Project No. 14189 Project Name Columbia Pike Multimodal									
Test Boring No.	DB-6	Depth (Feet)	0.0'-5.0'						
Lab Order No.	3481-2	Date	3/3/2015						

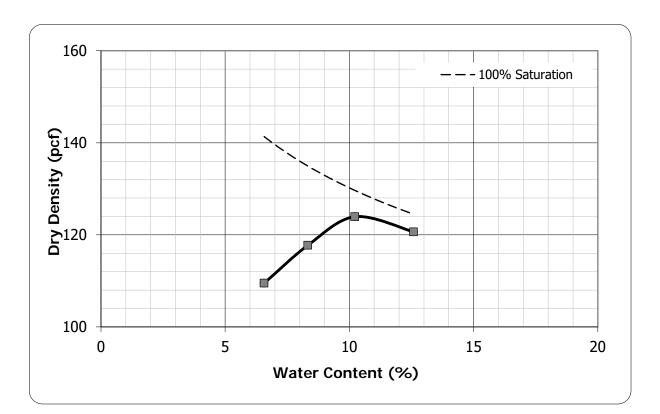


TEST RESULTS	Before	Before Correc.		After Correc.						
Maximum Dry Density (pcf)	-	125		129		Color				
Optimum Moisture Content (%)		10		8		Dark Gray				
Material	Classi	fication	Nat. Moist. (%)	Sp. G. (Assumed)	Ц	Ы	% > # 4	% < #200		
CLAYEY SAND with gravel	USCS SC	AASHTO A-2-6	11.0	2.65	31	16	15.1	32.1		

Reviewed by She Harris



	MOISTURE DENSITY RELATIONSHIP - VTM-001								
Project No. 14189 Project Name Columbia Pike Multimodal									
Test Boring No.	DB-10	Depth (Feet)	0.0'-5.0'						
Lab Order No.	3481-1	Date	3/3/2015						

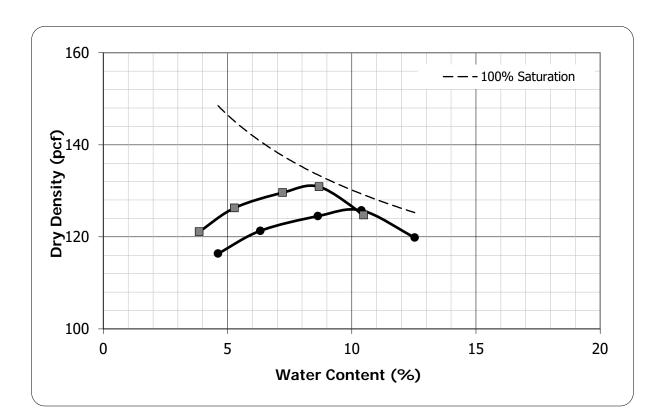


Before	Before Correc.		After Correc.					
1	124				Color			
	10				Brownish Gray			
Classi	fication	Nat. Moist. (%)	Sp. G. (Assumed)	LL	Ы	% > # 4	% < #200	
USCS	AASHTO	16.1	2.65	27	13	2.1	44.4	
	Classi	124 10 Classification USCS AASHTO	124 10 Nat. Moist. (%) USCS AASHTO 16.1	124        10        Nat. Moist. (%)       USCS     AASHTO       16.1     2.65	124      Image: style="text-align: center;">Image: style="text-align: style="text-align: style="text-align: center;">Image: style="text-align: style: style="text-align: sty	124      Brown       10      Brown       Classification     Nat. (%)     Sp. G. (Assumed)     LL       USCS     AASHTO     16.1     2.65     27     13	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	

Reviewed by She Harris



MOISTURE DENSITY RELATIONSHIP - VTM-001								
Project No. 14189 Project Name Columbia Pike Multimodal St. Improvemen								
Test Boring No.	FB-2	Depth (Feet)	0.0'-5.0'					
Lab Order No.	3480-14	Date	3/6/2015					



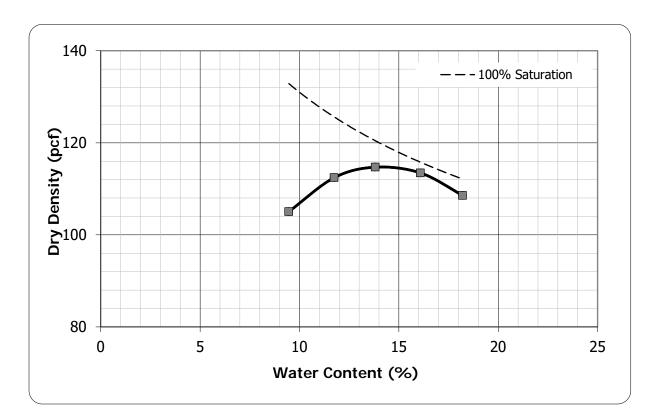
TEST RESULTS	Before	Before Correc.		After Correc.					
Maximum Dry Density (pcf)	1	126		131		Color			
Optimum Moisture Content (%)		10		9		Dark Gray			
Material	Classi	fication	Nat. Moist. (%)	Sp. G. (Assumed)	LL	ΡI	% > #4	% < #200	
CLAYEY SAND with gravel	USCS SC	AASHTO A-2-7	6.2	2.65	72	46	16.4	26.8	

Tested by \_\_\_\_\_

Chil my



MOISTURE DENSITY RELATIONSHIP - VTM-001								
Project No. 14189 Project Name Columbia Pike Multimodal St. Improveme								
Test Boring No.	FB-9	Depth (Feet)	0.0'-5.0'					
Lab Order No.	3480-13	Date	3/6/2015					



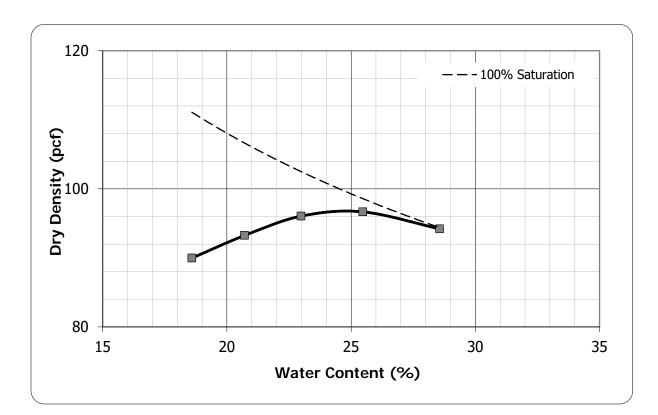
TEST RESULTS	Before Correc.		After Correc.						
Maximum Dry Density (pcf)	1	115				Color			
Optimum Moisture Content (%)		14				Brownish Gray			
Material	Classi	fication	Nat. Moist. (%)	Sp. G. (Assumed)	LL	ΡI	% > #4	% < #200	
US(		AASHTO	14 E	2.65	26	17	0 0	E1 1	
sandy Lean Clay	CL	A-6	14.5	2.65	36	17	8.8	51.1	

Tested by \_\_\_\_\_

Chi ( myty



	MOISTURE DENSITY RELATIONSHIP - VTM-001								
Project No. 14189 Project Name Columbia Pike Multimodal St. Improvement									
Test Boring No.	FB-18	Depth (Feet)	0.0'-5.0'						
Lab Order No.	3480-12	Date	3/6/2015						



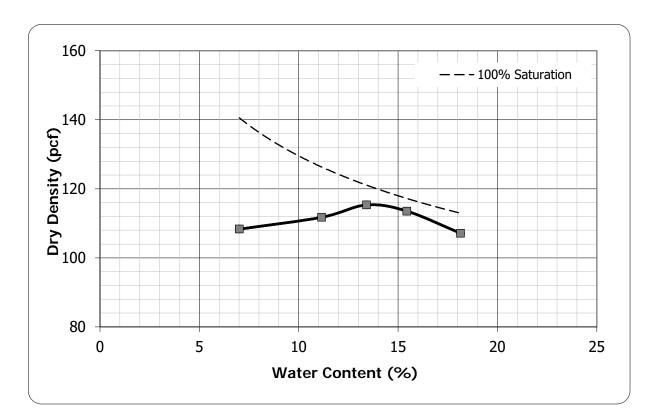
TEST RESULTS	Before	Before Correc.		After Correc.					
Maximum Dry Density (pcf)		97				Color			
Optimum Moisture Content (%)		25				Gray			
Material	Classi	fication	Nat. Moist. (%)	Sp. G. (Assumed)	LL	PI	% > #4	% < #200	
Lean Clay	USCS	AASHTO	10.6	2.65	25	0	0.1	06.7	
Lean Clay	CL	A-4	18.6	2.65	25	8	0.1	86.7	

Tested by \_\_\_\_\_

Chi ( myty



	MOISTURE DENSITY RELATIONSHIP - VTM-001								
Project No. 14189 Project Name Columbia Pike - Segment H/I									
Test Boring No.	HB-5	Depth (Feet)	0.0'-5.0'						
Lab Order No.	3468	Date	2/5/2015						

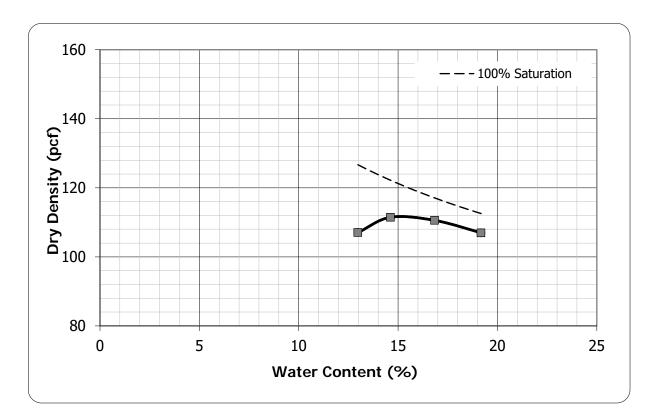


TEST RESULTS	Before	Before Correc.		After Correc.						
Maximum Dry Density (pcf)	1	115				Color				
Optimum Moisture Content (%)		13				Gray				
Material	Classi	fication	Nat. Moist. (%)	Sp. G. (Assumed)	LL	Ы	% > # 4	% < #200		
CLAYEY SAND	USCS SC	AASHTO A-2-7	17.3	2.65	74	54	5.1	28.6		

Reviewed by She Harris



MOISTURE DENSITY RELATIONSHIP - VTM-001							
Project No.	Project No. 14189 Project Name Columbia Pike Multimodal						
Test Boring No.	IB-2	Depth (Feet)	0.0-5.0				
Lab Order No.         3462-13         Date         2/2/2015							

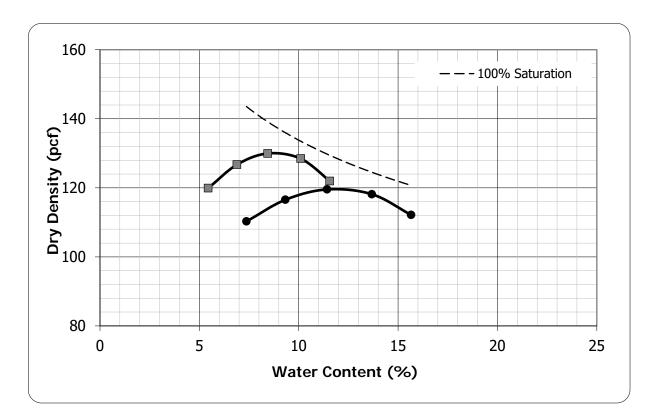


TEST RESULTS	Before Correc.		After Correc.					
Maximum Dry Density (pcf)	112				Color			
Optimum Moisture Content (%)	15				Brownish Gray			
Material	Classi	fication	Nat. Moist. (%)	Sp. G. (Assumed)	Ц	PI	% > # 4	% < #200
sandy Fat Clay	USCS CH	AASHTO A-7-6	24.7	2.75	53	33	1.8	51.0

Reviewed by She Harris



MOISTURE DENSITY RELATIONSHIP - VTM-001							
Project No.	Project No. 14189 Project Name Columbia Pike Multimodal						
Test Boring No.	IB-9	Depth (Feet)	3462-12				
Lab Order No.         3462-12         Date         2/2/2015							



TEST RESULTS	Before Correc.		After Correc.					
Maximum Dry Density (pcf)	119		129		Color			
Optimum Moisture Content (%)	12		9		Gray			
Material	Classi	fication	Nat. Moist. (%)	Sp. G. (Assumed)	LL	ΡI	% > # 4	% < #200
CLAYEY SAND with gravel	USCS SC	AASHTO A-2-7	7.6	2.75	44	29	26.2	31.7

Reviewed by Jh Harrio



# Appendix C Pavement Design Calculations

Flexible Pavement Design Calculations (2 pages)

Rigid Pavement Design Calculations (4 pages)

Table C-1: Unsuitable Soil Summary and Recommendations (3 pages)

# DARWin Pavement Design and Analysis System

### A Proprietary AASHTOWare Computer Software Product Microsoft

## Flexible Structural Design Module

Columbia Pike Segments A, C, D, and F

#### **Flexible Structural Design**

18-kip ESALs Over Initial Performance Period	5,550,524
Initial Serviceability	4.2
Terminal Serviceability	2.8
Reliability Level	90 %
Overall Standard Deviation	0.49
Roadbed Soil Resilient Modulus	5,000 psi
Stage Construction	1
Calculated Design Structural Number	5.61 in

### **Simple ESAL Calculation**

Performance Period (years)	20
Two-Way Traffic (ADT)	31,525
Number of Lanes in Design Direction	2
Percent of All Trucks in Design Lane	90 %
Percent Trucks in Design Direction	50 %
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater	5 %
Average Initial Truck Factor (ESALs/truck)	1.05
Annual Truck Factor Growth Rate	0 %
Annual Truck Volume Growth Rate	0.21 %
Growth	Compound
Total Calculated Cumulative ESALs	5,550,524

**Specified Layer Design** 

		Struct	Drain			
		Coef.	Coef.	Thickness	Width	Calculated
<u>Layer</u>	Material Description	<u>(Ai)</u>	<u>(Mi)</u>	<u>(Di)(in)</u>	<u>(ft)</u>	<u>SN (in)</u>
1	SM-9.5	0.44	1	2	11	0.88
2	BM-25.0	0.44	1	8	11	3.52
3	Graded Aggregate Base 21A	0.12	1	12	11	1.44
Total	-	-	-	22.00	-	5.84

# DARWin Pavement Design and Analysis System

### A Proprietary AASHTOWare Computer Software Product Microsoft

### Flexible Structural Design Module

Columbia Pike Segments H&I

#### **Flexible Structural Design**

18-kip ESALs Over Initial Performance Period	5,718,512
Initial Serviceability	4.2
Terminal Serviceability	2.8
Reliability Level	90 %
Overall Standard Deviation	0.49
Roadbed Soil Resilient Modulus	5,000 psi
Stage Construction	1
Calculated Design Structural Number	5.64 in

### **Simple ESAL Calculation**

Performance Period (years)	20
Two-Way Traffic (ADT)	31,955
Number of Lanes in Design Direction	2
Percent of All Trucks in Design Lane	90 %
Percent Trucks in Design Direction	50 %
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater	5 %
Average Initial Truck Factor (ESALs/truck)	1.05
Annual Truck Factor Growth Rate	0 %
Annual Truck Volume Growth Rate	0.38 %
Growth	Compound
Total Calculated Cumulative ESALs	5,718,512

### **Specified Layer Design**

		Struct	Drain			
		Coef.	Coef.	Thickness	Width	Calculated
<u>Layer</u>	Material Description	<u>(Ai)</u>	<u>(Mi)</u>	<u>(Di)(in)</u>	<u>(ft)</u>	<u>SN (in)</u>
1	SM-9.5	0.44	1	2	11	0.88
2	BM-25.0	0.44	1	8	11	3.52
3	Graded Aggregate Base 21A	0.12	1	12	11	1.44
Total	-	-	-	22.00	-	5.84

\*Note: This value is not represented by the inputs or an error occurred in calculation.

# DARWin Pavement Design and Analysis System

# A Proprietary AASHTOWare Computer Software Product

## Rigid Structural Design Module

Columbia Pike Segments A, C, D, and F

### **Rigid Structural Design**

Pavement Type	JPCP
18-kip ESALs Over Initial Performance Period	12,741,724
Initial Serviceability	4.5
Terminal Serviceability	2.8
28-day Mean PCC Modulus of Rupture	650 psi
28-day Mean Elastic Modulus of Slab	5,000,000 psi
Mean Effective k-value	257 psi/in
Reliability Level	90 %
Overall Standard Deviation	0.39
Load Transfer Coefficient, J	2.7
Overall Drainage Coefficient, Cd	1
Calculated Design Thickness	9.81 in

#### **Simple ESAL Calculation**

Performance Period (years)	30
Two-Way Traffic (ADT)	31,525
Number of Lanes in Design Direction	2
Percent of All Trucks in Design Lane	90 %
Percent Trucks in Design Direction	50 %
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater	5 %
Average Initial Truck Factor (ESALs/truck)	1.59
Annual Truck Factor Growth Rate	0 %
Annual Truck Volume Growth Rate	0.21 %
Growth	Compound
Total Calculated Cumulative ESALs	12,741,724

Layer Information

Joint Spacing	16 ft
Dowel Material	Steel
Dowel Diameter	1 in
Dowel Length	18 in
Dowel Space	12 in
Dowel Coating	Epoxi
-	1

Layer	Material Description
1	JPCP

Thickness (in) 9.8098206 One Dir Width (<u>ft)</u> -

Ţ		Thickness	One Dir Width
<u>Layer</u>	Material Description	<u>(in)</u>	<u>(ft)</u>
2	Crushed Aggregate	6	-
3	-	-	-
Total	-	15.81	-

# DARWin Pavement Design and Analysis System

## A Proprietary AASHTOWare Computer Software Product

## Rigid Structural Design Module

Columbia Pike Segments H&I

### **Rigid Structural Design**

Pavement Type	JPCP
18-kip ESALs Over Initial Performance Period	13,241,836
Initial Serviceability	4.5
Terminal Serviceability	2.8
28-day Mean PCC Modulus of Rupture	650 psi
28-day Mean Elastic Modulus of Slab	5,000,000 psi
Mean Effective k-value	257 psi/in
Reliability Level	90 %
Overall Standard Deviation	0.39
Load Transfer Coefficient, J	2.7
Overall Drainage Coefficient, Cd	1
Calculated Design Thickness	9.87 in

#### **Effective Modulus of Subgrade Reaction**

Period	Description		Roadbed Soil Resilient <u>Modulus (psi)</u>	Base Elastic Modulus <u>(psi)</u>
Base Type Base Thickness Depth to Bedrock Projected Slab Thickness Loss of Support Category		- - in - ft - in		
Effective Modulus of Subgrade Re	action	- psi/in*		

\*Note: This value is not represented by the inputs or an error occurred in calculation.

## Simple ESAL Calculation

Performance Period (years)	30
Two-Way Traffic (ADT)	31,955
Number of Lanes in Design Direction	2
Percent of All Trucks in Design Lane	90 %
Percent Trucks in Design Direction	50 %
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater	5 %
Average Initial Truck Factor (ESALs/truck)	1.59
Annual Truck Factor Growth Rate	0 %
Annual Truck Volume Growth Rate	0.38 %
Growth	Compound

# **Layer Information**

Joint Spacing Dowel Material	16 ft Steel
Dowel Diameter	1 in
Dowel Length	18 in
Dowel Space	12 in
Dowel Coating	Epoxi

		Thickness	One Dir Width
<u>Layer</u>	Material Description	<u>(in)</u>	<u>(ft)</u>
1	JPCP	9.8707114	-
2	Crushed Aggregate	6	-
3	-	-	-
Total	-	15.87	-

	Statio			Unsuitable Soil (ft)				
Location	From	То	Representative Boring No.	CH/MH OH/OL	Soft or Loose Soil	CBR <5	Recommended Treatment below Pavement Subgrade	
	57+00	58+00	AB-12				No Treatment Required	
	58+00	59+75	AB-13			3.0-5.0	No Treatment Required	
Segment A	59+75	61+00	AB-14			3.0-5.0	No Treatment Required	
	61+00	62+50	AB-15				No Treatment Required	
	62+50	64+00	AB-16			3.0-7.5	No Treatment Required	
	73+00	74+00	CRW-1				No Treatment Required	
	74+00	75+25	CRW-2			0.0-5.0	В	
	75+25	77+00	CB-3			0.0-5.0	В	
	77+00	78+00	CB-4			0.0-2.5	В	
Segment C	78+00	81+00	CB-5			0.0-5.0 8.5-10.0	В	
	81+00	83+00	CB-6				No Treatment Required	
	83+00	85+50	CB-7			8.5-10.0	No Treatment Required	
	85+50	87+50	CB-8		0.0-2.5	2.5-5.0	А	
	87+50	89+00	CB-9				No Treatment Required	
	89+00	91+50	DB-1			0.0-5.0	В	
	91+50	94+25	DB-2	0.0-8.5		0.0-8.5	В	
	94+25	96+50	DB-3			5.0-8.5	No Treatment Required	
	96+50	98+50	DB-4		5.0-8.5	5.0-8.5	No Treatment Required	
	98+50	100+50	DB-5				No Treatment Required	
Segment D	100+50	102+75	DB-6		0.8-5.0	5.0-10.0	A	
	102+75	105+00	DB-7			8.5-10.0	No Treatment Required	
	105+00	107+00	DB-8			8.5-10.0	No Treatment Required	
	107+00	109+00	DB-9			2.5-5.0 8.5-10.0	No Treatment Required	
	109+00	110+50	DB-10			0.0-2.5	В	
	110+50	112+00	DB-11			0.0-5.0	В	

Table C-1: Unsuitable Soil Summary and Recommendations

	Statio			-	uitable Soil (		_
Location	From	То	Representative Boring No.	CH/MH OH/OL	Soft or Loose Soil	CBR <5	Recommended Treatment below Pavement Subgrade
	136+00	136+50	FRW-1	13.5-15.0		13.5-15.0	No Treatment Required
	136+50	136+75	FB-1	0.0-2.5 8.5-10.0		0.0-2.5 8.5-10.0	В
	136+75	137+25	FB-2	13.5-15.0		13.5-15.0	No Treatment Required
	137+25	138+00	FRW-2		8.5-13.5		No Treatment Required
	138+00	138+50	FRW-3	8.5-15.0	8.5-10.0	8.5-10.0	No Treatment Required
	138+50	139+00	FB-3	2.5-5.0 8.5-10.0		2.5-5.0 8.5-10.0	No Treatment Required
	139+00	139+75	FRW-4			5.0-15.0	No Treatment Required
	139+75	140+25	FB-4		3.0-4.5		No Treatment Required
	140+25	141+00	FRW-5			13.5-15.0	No Treatment Required
	141+00	141+75	FRW-6	5.0-8.5		5.0-8.5	No Treatment Required
	141+75	142+25	FB-5	0.0-10.0		0.0-10.0	В
	142+25	142+75	FRW-7	0.0-5.0		0.0-5.0	В
Segment F	142+75	143+25	FB-6				No Treatment Required
Segment F	143+25	144+25	FRW-8			13.5-15.0	No Treatment Required
	144+25	146+00	FB-7	0.0-8.5		0.0-8.5	В
	146+00	147+75	FB-8	0.0-3.5		0.0-3.5	В
	147+75	149+25	FB-9				No Treatment Required
	149+25	151+75	FB-10	8.5-10.0	8.5-10.0	8.5-10.0	No Treatment Required
	151+75	154+00	FB-11	0.0-5.0 8.5-10.0		0.0-5.0 8.5-10.0	В
	154+00	155+50	FB-12	0.0-2.5		0.0-2.5	В
	155+50	157+00	FB-13	2.5-10.0		2.5-10.0	No Treatment Required
	157+00	159+00	FB-14	8.5-10.0		8.5-10.0	No Treatment Required
	159+00	159+75	FB-15				No Treatment Required
	159+75	163+25	FB-17				No Treatment Required
	163+25	165+00	FB-18			0.0-10.0	В
	165+00	167+00	HA-19				No Treatment Required

Table C-1: Unsuitable Soil Summary and Recommendations

	Station No.			Unsuitable Soil (ft)		Recommended	
Location	From	То	Representative Boring No.	CH/MH OH/OL	Soft or Loose Soil	CBR <5	Treatment below Pavement Subgrade
	182+00	183+00	HB-2				No Treatment Required
	183+00	186+75	HB-3				No Treatment Required
Cognort H	186+75	188+50	HB-4				No Treatment Required
Segment H	188+50	190+50	HB-5				No Treatment Required
	190+50	192+50	HB-6				No Treatment Required
	192+50	194+00	HB-7	-		5.0-10.0	No Treatment Required
	198+00	195+50	IB-1				No Treatment Required
	195+50	196+00	IRW-4A				No Treatment Required
	196+00	169+50	HA-4				No Treatment Required
	169+50	197+00	IB-2	0.0-8.5		0.0-8.5	В
	197+00	198+25	HA-3			1.5-4.0	В
	198+25	200+20	IB-3				No Treatment Required
Comment I	200+20	202+25	IB-4				No Treatment Required
Segment I	202+25	204+25	IB-5				No Treatment Required
	204+25	205+25	HA-2				No Treatment Required
	205+25	206+00	IB-6				No Treatment Required
	206+00	207+00	IRW-1	0.0-2.5	0.0-2.5	0.0-2.5	В
	207+00	208+50	IB-7				No Treatment Required
	208+50	209+00	IB-8				No Treatment Required
	209+00	212+00	IB-10				No Treatment Required
S Thomas St.	0+00	3+00	FB-16				No Treatment Required
S Columbus St.	0+00	3+00	HB-1				No Treatment Required
S Jefferson St.	0+00	3+00	IB-9				No Treatment Required

Table C-1: Unsuitable Soil Summary and Recommendations

**RECOMENDED TREATMENTS:** 

A. Excavate unsuitable materials (soft or loose soils) to a minimum depth of 3 feet below subgrade and allow to dry, prior to re-use as new compacted fill. B. Excavate unsuitable materials (CBR<5, CH/MH/OH/OL) to a minimum depth of 3 feet below subgrade and replace with new compacted fill with a minimum CBR value of 5.