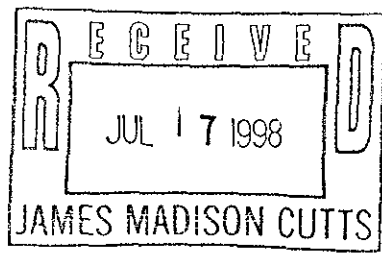


807/D-22



July 16, 1998

Mr. Craig O'Callaghan
Universal Builders Supply Inc.
5710 Columbia Park Road
Cheverly, Maryland 20785

Subject: Geotechnical Investigation
Proposed Access System
Washington Monument
Washington, DC
Project No. R98106

Dear Mr. O'Callaghan:

Woodward-Clyde is pleased to submit herein our report of a geotechnical investigation that was performed in connection with the design and erection of the proposed access system for implementing repairs to the Washington Monument in Washington, DC. This investigation was performed in accordance with our Proposal, dated June 26, 1998. This letter report presents a discussion of the geotechnical investigation, the results of the investigation, and our recommendations for supporting the access system.

Soil samples obtained during the course of the investigation will be retained in our facility for a period of three months. After that time the samples will be discarded unless other arrangements are made by your office.

INTRODUCTION

Universal Builders Supply Inc. (UBS) is part of the team selected by the U.S. Parks Service to perform restoration to the exterior of the Washington Monument. UBS's task in the project is to supply and install the access system for the restoration. The access system will consist of scaffolding, which will envelop the Monument. Woodward-Clyde (WC) was retained by UBS to perform a geotechnical investigation in connection with foundation design for the access system. The scope of work included the engagement of a registered surveyor to determine the ground surface elevation at each proposed leg location, engagement of a contractor to drill test borings, monitoring and documentation of the test borings, engineering evaluation of the boring results, and the preparation of this report.

PLEASE RETURN TO:

TECHNICAL INFORMATION CENTER
DENVER SERVICE CENTER
NATIONAL PARK SERVICE

SCANNED
8/17/01



Woodward-Clyde Federal Services • A subsidiary of Woodward-Clyde Group Inc.
200 Orchard Ridge Drive • Suite 101 • Gaithersburg, MD 20878
Phone: 301-258-9780 • Fax: 301-869-8728

Woodward-Clyde

Mr. Craig O'Callaghan
Universal Builders Supply Inc.
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Project and Site Description

The proposed access system will consist of aluminum scaffolding which will extend from the ground surface to a maximum height of approximately 555 feet. The scaffolding will taper from approximately 72 feet on a side, at the ground surface to approximately 52 feet on a side at the 500-foot level. Each side will consist of four panels of scaffolding, connected to the adjacent sides by corner trusses. The width of the scaffolding is 6 feet with the legs being located approximately 2.5 and 8.5 feet off the face of the Monument. We understand the vertical leg loads to range from 4.7 to 36.2 kips. The heavier loads are associated with the inner legs.

The ground surface surrounding the Monument is currently covered with a concrete pavement and surrounded by a ring of embedded benches. Elevations at each proposed leg location were determined by a registered surveyor. The locations and elevations are presented in Appendix A. An active utility bunker is located immediately to the west of the Monument, within the zone of the scaffolding. Floodlights are also located within close proximity to the proposed location of the scaffolding.

Based upon a review of literature, it appears that the foundation for the Monument consists of "an uncoursed rubble core underpinned and buttressed on four sides with poured-in-place hydraulic cement concrete." It appears that the top of the buttress extends approximately two feet beyond the face of the monument at a depth of approximately two feet below the ground surface and then plunges on a one to one splay to a depth of approximately 20 feet.

Regional Geology

The Washington Monument is located within the Atlantic Coastal Plain Physiographic Province which is characterized by sequences of marine and terrestrial sedimentary deposits. The western limit of the province is commonly referred to as the Fall Line, where older crystalline rocks of the Piedmont Province begin to dip beneath the relatively new sediments of the Coastal Plain. The Fall Line is located approximately two miles northwest of the site.

In general, the Coastal Plain Province consists of an eastward-thickening wedge of unconsolidated gravels, sands, silts, and clays that have been deposited upon an eroded crystalline basement rock surface that slopes downward towards the east. Many depositional environments existed during the formation of the Coastal Plain. Glacially influenced marine transgressions and regressions, periods of erosion and deposition, fluvial (riverine) processes, and structural deformations have all played a part in the evolution of the Coastal Plain. As a result of these varying processes, the presence, thickness, and lateral continuity of geologic

Woodward-Clyde

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formations are highly variable. The area around the Monument was previously filled and excavated and filled again.

SUBSURFACE INVESTIGATION

The site subsurface conditions were explored by four test borings, as shown in the surveyor's sketch included in Figure 1. GeoServices Corporation, of Landover, Maryland drilled the borings to auger and sampler refusal on the buttress foundation of the Monument, at depths of between 5 and 6 feet. Soil samples were obtained continuously from the ground surface using the Standard Penetration Test (SPT) method. Laboratory tests were performed on soil samples taken from the test borings in order to aid in classification and evaluation of behavioral parameters of strength and consolidation. Further details of the drilling method, logs of the borings, and laboratory results are presented in Appendix B.

The concrete slab surrounding the Monument ranged from 4.5 to 5 inches thick. The fill soil encountered in the four borings beneath the slab ranged from silty sandy clay to silty clayey sand. A probable boulder was encountered during the augering of boring B-2. The soils generally classify as CL-ML to SC-SM according to the Unified Soil Classification System. Standard Penetration Test resistance (N-values) ranged from 3 to 9 blows per foot prior to encountering the foundation of the Monument. All of the borings were dry upon completion. The moisture content in the samples ranged from 3 to 18 percent.

GEOTECHNICAL EVALUATION

Settlement analyses were performed using a bearing pressure of 1,000 pounds per square foot (psf) and soil moduli values based on N-value correlations. The footings were assumed to bear 36 inches beneath the ground surface. Results of the analyses indicate that the exterior footings will undergo settlement of approximately $\frac{1}{4}$ to $\frac{1}{2}$ inch. Interior footings bearing on the existing foundation of the Monument should undergo insignificant settlement. Therefore, the total differential settlement across the width of the scaffolding is anticipated to be between $\frac{1}{4}$ and $\frac{1}{2}$ inch. If all of this amount of differential settlement were to occur as post-construction settlement, the horizontal movement at the top of the scaffolding would be on the order of 3.8 feet. However, it is anticipated that the majority of the settlement will occur during the three months of erection, and that post-construction lateral movement would be much less. It is understood that the scaffolding legs will be equipped with leveling screws to compensate for any settlement, and that the elevation of the legs will be monitored on a regular basis.

The foundations were also analyzed for bearing capacity and the potential for the footing to slide down along the one to one splay of the existing buttress foundation. Results of the

Woodward-Clyde

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analysis indicate that the foundation should be an average of 7.5 feet wide, parallel to the face of the Monument.

RECOMMENDATIONS

It is recommended that the proposed structure be supported on a shallow foundation system consisting of spread footings. Detailed recommendations pertaining to the design and construction of foundations and other related geotechnical aspects of the proposed construction are presented in the following sections.

Site Preparation

The concrete pavement will need to be removed from the areas where the footings will be constructed. It is anticipated that the footings can be excavated with vertical side walls by a small excavator. Prior to construction of the footings, the subgrade should be inspected by a geotechnical engineer or a qualified soils technician and be "proof-tested" and compacted on grade with a jumping jack compactor or walk-behind vibratory roller, in order to detect and stabilize any areas disturbed by previous construction activities. Loose or soft zones should be undercut and replaced with lean concrete or crushed stone. Any boulders encountered at the foundation level should be removed and replaced with lean concrete or crushed stone to avoid creating a hard spot directly beneath the footing.

Foundations

The structure should be founded on shallow foundations consisting of spread footing designed for a contact pressure of not greater than 1000 psf. We anticipate that footings will be designed with a trapezoidal shape. Regardless of load, the minimum footing dimension should be at least 24 inches. For frost protection, all footings should bear at least 30 inches below the existing grade. Anticipated differential settlement between the outer and inner legs is estimated at 1/4 to 1/2 inches.

During construction, all footing subgrades should be protected from disturbance, and concrete should be placed as soon as possible after excavation. Should the footing bottoms become disturbed, the disturbed material should be removed and replaced with crushed stone or lean concrete. The crushed stone should be compacted to at least 80 percent relative density.

Construction Monitoring

It is recommended that observation and monitoring be provided during the foundation construction by a geotechnical engineer or experienced soils technician who is familiar with

Woodward-Clyde

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the subsurface conditions and the foundation design criteria. These services should include the observation and documentation of foundation construction, including subgrade preparation and evaluation of foundation bearing materials.

It is understood that the scaffolding legs will be equipped with leveling screws and that the elevation of the legs will be monitored on a regular basis. We recommend that the elevations of the legs be monitored on a weekly basis as the scaffolding is erected. Adjustment to the outer screw jacks may be needed to compensate for the differential settlement. Less frequent monitoring may be needed as settlement rates decrease.

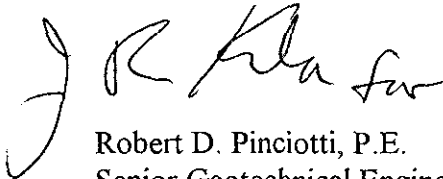
LIMITATIONS

This report has been prepared to assist UBS and the structural engineer in the foundation design. The work has been carried out in accordance with reasonable and accepted engineering practices. No warranty or guarantee, either written or implied, is applicable to this work. The recommendations presented in this report are based upon the assumption that the subsurface conditions do not deviate appreciably from those disclosed by the subsurface exploration, and that competent monitoring and testing will be conducted during construction. Any changes in the proposed design of the facilities or variations in the existing site conditions from those assumed in this report must be brought to the attention of Woodward-Clyde so that we have the opportunity to review the changes, and if necessary, modify the recommendations to suit the new conditions.

Soil samples obtained during the course of the investigation will be retained in our facility for a period of three months. After that time the samples will be discarded unless other arrangements are made by your office.

We sincerely appreciate the opportunity to be of service to you on this project. Please do not hesitate to contact us if you should have any question concerning this preliminary report.

Very truly yours,



Robert D. Pinciotti, P.E.
Senior Geotechnical Engineer

RDP:als

Attachments

Woodward-Clyde Federal Services

**Appendix A
Surveying Data**

A. MORTON THOMAS AND ASSOCIATES, INC.

ENGINEERS • SURVEYORS • PLANNERS • LANDSCAPE ARCHITECTS
 12750 TWINBROOK PARKWAY – SUITE 200 – ROCKVILLE, MARYLAND 20852
 TELEPHONE: (301) 881-2545 FAX: (301) 881-0814

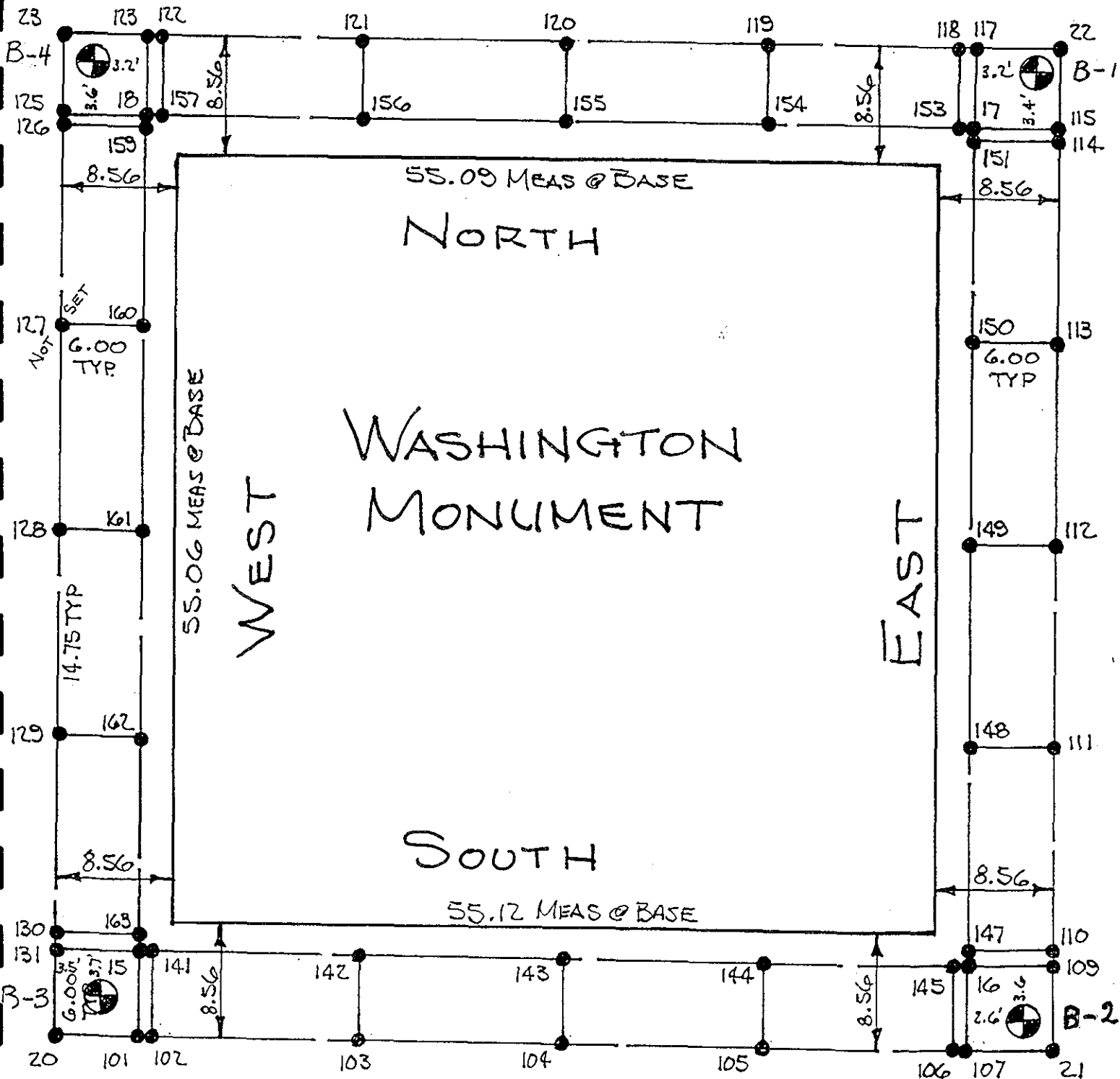
RESEARCH
SURVEY DEF, AS
COMP. DEF
DESIGN
DRW/CADD DEF
CHECK HRE

SCALE: 1" = 10'

DATE: 6-30-98

FILE NO: 98-076

FIGURE 1



SKETCH OF SCAFFOLD STAKE-OUT
 WASHINGTON MONUMENT
 JUNE 30, 1998
 SCALE: 1" = 10'

JUNE 30, 1998

AMT JOB NO.98-076

A. MORTON THOMAS and ASSOCIATES, INC
12750 TWINBROOK PARKWAY
ROCKVILLE, MARYLAND 20852

=====

ELEVATIONS OF SCAFFOLD FEET POINTS SET ON JUNE 30, 1998 AROUND THE
WASHINGTON MONUMENT

ELEVATIONS ARE BASED ON AN ASSUMED ELEVATION OF 500 FT
BENCH MARK IS A STEEL BAR APPROXMENTLY 1 INCH ABOVE THE SIDEWALK ALONG THE
EAST WALL OF THE MONUMENT 4'+- SOUTH OF THE ENTRANCE.

=====

POINT NO.	ELEVATION	POINT NO.	ELEVATION
15	499.92	16	499.70
17	499.71	18	499.95
20	499.22	21	499.06
22	499.00	23	499.20
101	NOT SET	102	NOT SET
103	499.82	104	499.79
105	499.75	106	499.41
107	499.40	109	499.39
110	499.41	111	499.65
112	499.55	113	499.64
114	499.42	115	499.39
117	499.41	118	499.44
119	499.72	120	499.80
121	499.85	122	499.68
123	499.66	125	499.65
126	499.63	127	NOT SET
128	499.97	129	499.96
130	ELEV NOT TAKEN	131	ELEV NOT TAKEN
141	499.95	142	500.02
143	499.97	144	499.94
145	499.72	147	499.73
148	499.85	149	499.79
150	499.81	151	499.74
153	499.73	154	499.89
155	499.97	156	500.02
157	499.99	159	499.98
160	500.16	161	500.09
162	500.11	163	499.95
TEST HOLE B-1	499.41	TEST HOLE B-2	499.44
TEST HOLE B-3	499.65	TEST HOLE B-4	499.65
FLOOR ELEV AT CENTER ENTRANCE TO MONUMENT AT FACE OF WALL= 499.89			

APPENDIX B

SUBSURFACE EXPLORATION

The subsurface exploration consisted of four borings, the locations of which are shown on the sketch in Appendix A. The borings were drilled by GeoServices Corp. of Landover, Maryland, under the technical supervision of Woodward-Clyde. Layout was performed by A. Morton Thomas of Rockville, Maryland. The surveying data are presented in Appendix A.

The test borings were drilled using a skid rig. All borings were advanced using hollow-stem augers. Samples were obtained for identification and classification by means of a 2-inch O.D. split barrel sampler driven 18 inches by a 140-pound hammer freely falling 30 (the Standard Penetration Test, ASTM D 1586). The number of hammer blows required to drive the sampler during the interval from 6 to 18 inches, or fraction thereof, is reported on the test boring logs as the "Sampling Resistance," and is also known as the "N-value."

A "Key to Soil Symbols and Terms" used in this report is presented in this appendix. Logs of the test borings conducted during this investigation are included thereafter.

Physical property tests were performed in the laboratory on selected representative soil samples to aid in classification and for correlation with engineering behavior of the soils. These tests included natural water content (ASTM D 2216), liquid and plastic limits (ASTM D 4318), and grain-size distribution (ASTM D 422). The numerical test results are presented in the appropriate boring logs. Grain-size distribution curves are presented on the pages following the boring logs.

Major Divisions		Group symbols	Typical names	Laboratory classification criteria		Particle Size		Material			
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	GW	Well-graded gravels, gravel-sand mixture, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent..... GW, GP, SW, SP More than 5 percent..... GM, GC, SM, SC 5 to 12 percent..... Borderline cases requiring dual symbols**	$Cu = \frac{D_{60}}{D_{10}}$ greater than 4; $Cc = \frac{(D_{30})^2}{D_{10}D_{60}}$ between 1 and 3	mm <0.005 0.005 to 0.074 0.074 to 0.42 0.42 to 2.00 2.42 to 4.76	#200 to #40 #40 to #10 #10 to #4	Clay Silt Sand Fine Sand Med Coarse			
		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW						
	GM* u	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or PI less than 4		Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols						
			GC							Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line with PI greater than 7
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines					$Cu = \frac{D_{60}}{D_{10}}$ greater than 6; $Cc = \frac{(D_{30})^2}{D_{10}D_{60}}$ between 1 and 3	Limits plotting in hatched zone with PI between 4 and 7 are borderline cases requiring use of dual symbols
			SP		Poorly graded sands, gravelly sands, little or no fines					Not meeting all gradation requirements for SW	
SM* u		Silty sands, sand-silt mixtures	Atterberg limits below "A" line or PI less than 4								
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line with PI greater than 7						
Fine-grained soils (More than half of material is smaller than No. 200 sieve)	Silt and clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rockflour, silty or clayey fine sands or clayey silts with slight plasticity		mm 4.76 to 19.1 19.1 to 76.2 76.2 to 304.8 304.8 to 914.4	15 50/2 P/250 P _z 65 20 VS	Sample Recovered Sample Not Recovered	Laboratory Test Performed			
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays								
		OL	Organic silts and organic silty clays of low plasticity								
	Silt and clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts								
		CH	Inorganic clays of high plasticity, fat clays								
		OH	Organic clays of medium to high plasticity, organic silts								
	Highly organic soils	PT	Peat and other highly organic soils								

KEY TO SOIL SYMBOLS AND TERMS

Terms used in this report for describing soils according to their texture or grain size distribution are in accordance with the Unified Soil Classification System, as described in Technical Memorandum No. 3-358, Waterways Experiment Station, March 1953.

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (major portion retained on No. 200 sieve): Includes (1) clean gravels and (2) silty or clayey gravels and sands. Condition is rated according to relative density.

Descriptive Term	Relative Density (1)
Very Loose	0 to 15%
Loose	15 to 40%
Medium dense	40 to 70%
Dense	70 to 85%
Very dense	85 to 100%

FINE GRAINED SOILS (major portion passing No. 200 sieve): Includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings or by unconfined compression tests.

Descriptive Term	Unconfined Compression Strength, tf
Very soft	less than 0.25
Soft	0.25 to 0.50
Firm	0.50 to 1.00
Stiff	1.00 to 2.00
Very stiff	2.00 to 4.00
Hard	4.00 and higher

TEST AND SAMPLE IDENTIFICATION

- 15 - The number of blows (15) of a 140-pound hammer falling 30 inches used to drive a 2" O.D. split-barrel sampler for the last 12 inches of penetration.
- 50/2 - Number of blows (5) used to drive the split-barrel a certain number of inches (2).
- P - Thin-wall tube sample.
- P/250 - Thin-wall tube pushed hydraulically, using a certain pressure (250 psi) to push the last 6 inches.
- C - Denison or Pitcher-Type - core-barrel sample. Piton sample.
- A - Auger sample.
- BX - Rock cored with BX core barrel, which obtains a 1-5/8" diam. core.
- NX - Rock cored with NX core barrel, which obtains a 2-1/8" diam. core.
- 65% - Percentage (65) of rock core recovered.
- 20% - Rock Quality Designation (RQD) (2)
- VS - Vane Shear Test.
- C - Consolidation and specific gravity tests.
- D - Maximum and minimum density.
- DS - Direct Shear Test.
- G - Specific gravity test.
- K - Permeability test.
- M - Mechanical (sieve or hydrometer) analysis.
- T - Triaxial compression test.
- U - Unconfined compression test.
- W - Unit weight and natural moisture content.
- X - Special tests performed - see Laboratory test results.

* Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when LL is 28 or less and the PI is 6 or less; the suffix u used when LL is greater than 28
 ** Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

(1) ASTM 2049-69

$$(2) RQD = \frac{\sum \text{Core Segments} > 4 \text{ Inches}}{\text{Core Interval}} \times 100$$

Where segmentation is not caused by drilling effects.

Project: Washington Monument
 Project Location: Washington, D.C.
 Project Number: R98106

Log of Boring B-1

Sheet 1 of 1

Date(s) Drilled	6/30/98 - 6/30/98	Logged By	MA Younis	Checked By	RD Pinciotti
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	3"	Total Depth Drilled (feet)	5.6
Drill Rig Type	Skid Rig CME-45	Drilling Contractor	GEOSERVICES CORP.	Sampler Type(s)	SPT
Groundwater Level and Date Measured	Dry 6/30/98	Hammer Data	140 lbs	Approximate Surface Elevation	499.4
Comments				Borehole Backfill	Yes

Elevation feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Water Content, %	% Passing #200 Sieve	REMARKS/ OTHER TESTS	
		Type	Number	Percent Recovery						Blow Count (Blows / ft)
- 0						Gray, plain CONCRETE (sidewalk slab);(5")				
		S-1	22	8		Medium stiff, moist, brown, sandy silty CLAY, trace gravel (CL-ML); (fill)	3			
		S-2	56	4				17		
		S-3	56	5				17	54	LL= 23, PI=6
- 495		S-4	100	100/7.5"						
	- 5					Gray, plain weathered CONCRETE (existing foundation)	18			
- 490										
- 10										

Project: Washington Monument
 Project Location: Washington, D.C.
 Project Number: R98106

Log of Boring B-2

Sheet 1 of 1

Date(s) Drilled	6/30/98 - 6/30/98	Logged By	MA Younis	Checked By	RD Pinciotti
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	3"	Total Depth Drilled (feet)	5.8
Drill Rig Type	Skid Rig CME-45	Drilling Contractor	GEO SERVICES CORP.	Sampler Type(s)	SPT
Groundwater Level and Date Measured	Dry 6/30/98	Hammer Data	140 lbs	Approximate Surface Elevation	499.4
Comments				Borehole Backfill	Yes

Elevation feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Water Content, %	% Passing #200 Sieve	REMARKS/ OTHER TESTS
		Type	Number	Percent Recovery					
0	0					Gray, plain CONCRETE (sidewalk slab);(5")			
		S-1	22	7		Medium dense, moist, brown, clayey silty f SAND, trace gravel (SM-SC); (fill) Boulder encountered between 1' and 3'			
		S-2	17	9					
		S-3	56	6					
495	5	S-4	100	100/4"		Gray, plain weathered CONCRETE (existing foundation)			
490									
-10									



Project: Washington Monument
 Project Location: Washington, D.C.
 Project Number: R98106

Log of Boring B-3

Sheet 1 of 1

Date(s) Drilled	6/30/98 - 6/30/98	Logged By	MA Younis	Checked By	RD Pinciotti
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	3"	Total Depth Drilled (feet)	5.8
Drill Rig Type	Skid Rig CME-45	Drilling Contractor	GEOSERVICES CORP.	Sampler Type(s)	SPT
Groundwater Level and Date Measured	Dry 6/30/98	Hammer Data	140 IBS	Approximate Surface Elevation	499.7
Comments				Borehole Backfill	Yes

Elevation feet	Depth, feet	SAMPLES				Graphic Log	MATERIAL DESCRIPTION	Water Content, %	% Passing #200 Sieve	REMARKS/ OTHER TESTS
		Type	Number	Percent Recovery	Blow Count (Blows / ft)					
- 0						Gray, plain CONCRETE (sidewalk slab); (5")				
		S-1		0	8		9			
		S-2		22	5		6			
		S-3		56	4		18			
- 495	- 5	S-4		100	100/5"		18			
						Gray, plain weathered CONCRETE (existing foundation)				
- 490	- 10									

Project: Washington Monument
 Project Location: Washington, D.C.
 Project Number: R98106

Log of Boring B-4

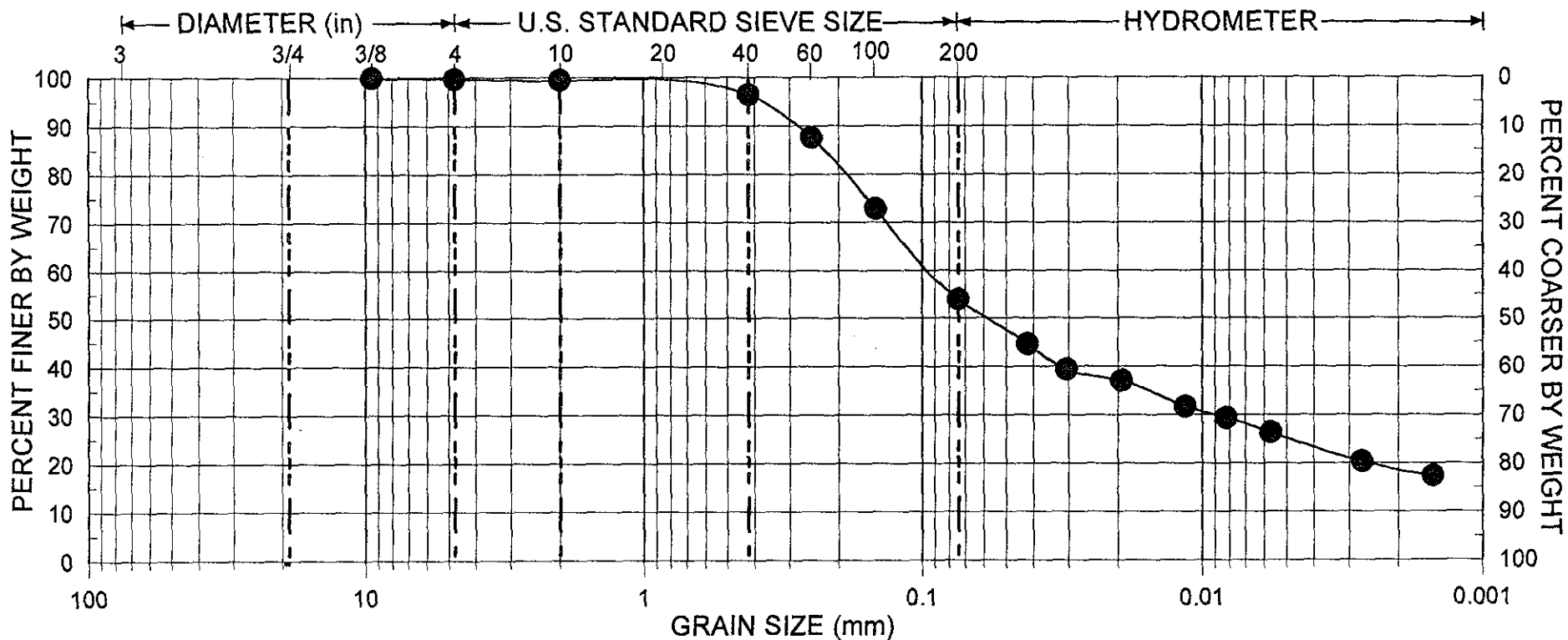
Sheet 1 of 1

Date(s) Drilled	6/30/98 - 6/30/98	Logged By	MA Younis	Checked By	RD Pinciotti
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	3"	Total Depth Drilled (feet)	5.4
Drill Rig Type	Skid Rig CME-45	Drilling Contractor	GESERVICES CORP.	Sampler Type(s)	SPT
Groundwater Level and Date Measured	Dry 6/30/98	Hammer Data	140 LBS	Approximate Surface Elevation	499.7
Comments				Borehole Backfill	Yes

Elevation feet	Depth, feet	SAMPLES				Graphic Log	MATERIAL DESCRIPTION	Water Content, %	% Passing #200 Sieve	REMARKS/ OTHER TESTS
		Type	Number	Percent Recovery	Blow Count (Blows / ft)					
0						Gray, plain CONCRETE (sidewalk slab);(4.5")				
		S-1		6	5		Medium dense, moist, brown, clayey silty f SAND, trace gravel (SM-SC); (fill)			
		S-2		33	4					
		S-3		22	3					
-495		S-4		100	100/5"		Gray, plain weathered CONCRETE (existing foundation)		47	
-490										
-10										

PROJECT: Washington Monument
PROJECT NO: R98106

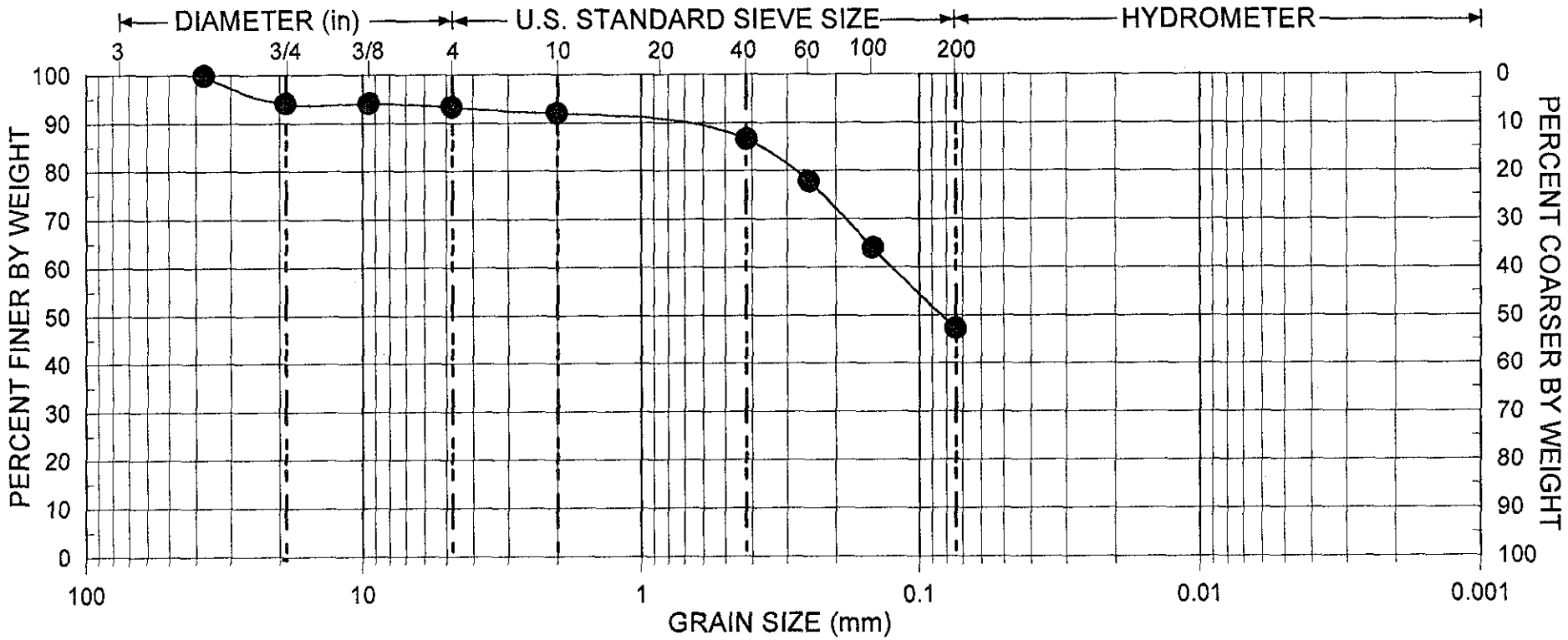
GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



KEY	BORING NUMBER	SAMPLE NUMBER	DEPTH (FT)	MC (%)	LL	PL	FI	SOIL DESCRIPTION	GRADATION ANALYSIS	
									TESTED BY:	DATE:
●	B-1	S-3	3.5-5.0	17.8	23	17	6	Brown sandy CLAYEY SILT, trace gravel (CL-ML) [A-4]	JMK	7-4-98
									CHECKED BY: SK	SHEET: 1 of 2

PROJECT: Washington Monument
PROJECT NO: R98106

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



KEY	BORING NUMBER	SAMPLE NUMBER	DEPTH (FT)	MC (%)	LL	PL	PI	SOIL DESCRIPTION	GRADATION ANALYSIS	
									TESTED BY:	DATE:
●	B-4	S-3	3.5-5.0	---	---	---	---	Brown "clayey silty" SAND, trace gravel	JMK CHECKED BY: SK	7-4-98 SHEET: 2 of 2