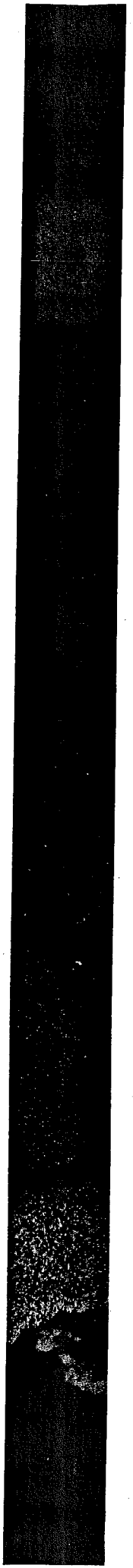
LEWIN/WHITE



psi

Professional
Service
Industries, Inc.

Professional Service Industries, Inc.

May 13, 1992

Helbing Lipp, Ltd.
7929 Westpark Drive
McLean, Virginia 22102
Attn: Mr. Tom Helbing, AIA

Re: Geotechnical Investigation
Lewinsville Center
McLean, Virginia
PSI File No. 483-25026

Gentlemen:

In compliance with your instructions, we have conducted a geotechnical investigation for the above referenced project. The results of this investigation, together with our recommendations, are to be found in the accompanying report, four (4) copies of which are being transmitted herewith.

Often, because of design and construction details which occur on a project, questions arise concerning soil conditions, and we would be pleased to continue our role as geotechnical engineers during the project implementation.

We also have great interest in providing materials testing and inspection services during the construction of this project. If you will advise us of the appropriate time to discuss these engineering services, we will be pleased to meet with you at your convenience.

Very truly yours,

PROFESSIONAL SERVICE INDUSTRIES, INC.

COMMONWEALTH OF VIRGINIA
DANA K. EDDY
#17284
PROFESSIONAL ENGINEER

Michael R. Circeo P.E.
Department Manager
Geotechnical Services

Dana K. Eddy, P.E.
District Manager

RECEIVED
MAY 18 1992
HELBING LIPP LTD

MRC/DKE/sf;

4074 Walney Road • Chantilly, VA 22021 • Phone: 703/631-7878 • Fax: 703/631-7887

GEOTECHNICAL INVESTIGATION

FOR THE PROPOSED

LEWINSVILLE CENTER

MCLEAN, VIRGINIA

PREPARED FOR

HELBING LIPP, LTD.

7929 WESTPARK DRIVE

MCLEAN, VIRGINIA 22102

BY

PROFESSIONAL SERVICE INDUSTRIES, INC.

TABLE OF CONTENTS

GEOTECHNICAL INVESTIGATION

INTRODUCTION

This report presents the results of a geotechnical investigation for the proposed Lewinsville Center conducted for Helbing Lipp, Ltd.

Authorization

Authorization to perform the geotechnical investigation was in the form of a proposal, (PSI No. 483-006) dated January 24, 1992 between Helbing Lipp, Ltd. and Professional Service Industries, Inc.

Purpose

The purpose of this investigation was to determine the various soil profile components, the engineering characteristics of the foundation materials and to provide criteria for use by the design engineers and architects in preparing the foundation and pavement design.

Scope

The scope of the geotechnical investigation included a review of geological maps of the area and a review of geologic and related literature, a reconnaissance of the immediate site, the subsurface exploration, field and laboratory testing, and an engineering analysis and evaluation of the foundation materials.

The scope of services did not include any environmental assessment for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors, colors or unusual or suspicious items or conditions are strictly for the information of the client.

General

The geotechnical investigation of the foundation conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for the foundation and pavement design. The recommendations submitted for the proposed project are based on the available soil information and the site plan furnished by Helbing Lipp, Ltd. Any revision in the plans for the proposed structures from those enumerated in this report should be brought to the attention of the Soils Engineer so that he may determine if changes in the foundation recommendations are required. If deviations from the noted subsurface conditions are encountered during construction, they should also be brought

to the attention of the Soils Engineer.

The Soils Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein, have been promulgated after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics and engineering geology. No other warranties are implied or expressed.

After the plans and specifications are more complete, it is recommended that the Soils and Foundation Engineer be provided the opportunity to review the final design and specifications, in order that the earthwork and foundation recommendations may be properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations.

This report has been prepared for the exclusive use of Helbing Lipp, Ltd. for the specific application to the proposed Lewinsville Center in accordance with generally accepted soils and foundation engineering practices.

DESCRIPTION OF SITE

Site Location

The site of the proposed structures upon which this soils exploration has been made, is situated on the east side of Great Falls Street just south of Vistas Lane in McLean, Virginia. This is shown on the Site Vicinity Map (Plate No. 1).

Site Topography and Vegetation

The project site is currently utilized as a Senior Citizen/Day Care Facility with an existing 2-story brick building and a large parking lot. The southern portion of the site is relatively flat and grassed covered with scattered tree growth. The grade slopes gradually to the west toward Great Falls Street.

Runoff is directed to existing storm drain inlets. At the time of our study, drainage appeared to be good with no standing water.

GEOLOGY

General Area Geology

According to the Geologic Map of Washington, D.C. and vicinity, the site geology consists of Wissahickon Formation of the Piedmont Physiographic Province. The bedrock in this area includes intrusive grantic rocks containing inclusions of

biotite schist, chlorite-epidote schist, quartz-mica schist and quartz fragments. The bedrock typically weathers to a saprolite or residual soil consisting of micaceous sandy silt.

FIELD EXPLORATION

Scope

The field exploration to determine the engineering characteristics of the foundation materials included a reconnaissance of the project site, making the borings, performing Standard Penetration tests and recovering split-spoon samples.

Nine (9) soil borings were drilled to a depth of twenty (20) feet in the building area and twelve (12) soil borings were drilled to depths ranging from 5 to 10 feet in the parking area. They were drilled in the locations determined by the Helbing Lipp, Ltd., and are indicated on the Boring Location Plan provided in the Appendix. The borings were staked in the field by our personnel.

The apparent groundwater level was recorded in each boring at completion and after a period of 24 hours. The drill holes were then backfilled with excavated soil and the site cleaned as required.

Drilling and Sampling Procedures

The soil borings were performed with a drilling rig equipped with a rotary head. Conventional hollow-stem augers were used to advance the holes. Representative samples were obtained employing split-spoon sampling procedures in accordance with ASTM designation D-1586 and transported to the laboratory in glass jar containers to protect against moisture loss.

Field Tests and Measurements

Penetration Tests - During the sampling procedure, Standard Penetration tests were performed at regular intervals to obtain the Standard Penetration value of the soil. The Standard Penetration value (N) is defined as the number of blows of a 140 pound hammer, falling thirty (30) inches, required to advance the split-spoon sampler one (1) foot into the soil. The sampler is lowered to the bottom of the drill hole and the number of blows recorded for each of three (3) successive increments of six (6) inches of penetration. The "N" value is obtained by adding the second and third incremental numbers. The results of the Standard Penetration test indicate the relative density and comparative consistency of the soils, and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components.

Water Level Measurements - Water level observations were made during the boring operations and are noted on the boring logs presented herewith. In relatively pervious soils, such as sandy soils, the indicated elevations are considered reliable groundwater levels. In relatively impervious soils, the accurate determination of the groundwater elevation may not be possible even after several days of observation. Seasonal variations, the temperature and recent rainfall conditions may influence the levels of the groundwater table and volumes of water will depend on the permeability of the soils.

LABORATORY TESTING PROGRAM

In addition to the field investigation, a supplemental laboratory testing program was conducted to determine additional pertinent engineering characteristics of the foundation materials necessary in analyzing the behavior of the proposed structures.

The laboratory testing program included supplementary visual classification on all samples in accordance with the Unified Soil Classification System and water content determinations on selected samples. In addition, representative samples were subject to Atterberg Limits Determination (ASTM D-4318) and Sieve Analysis (ASTM D-422) for classification purposes.

All phases of the laboratory testing program were conducted in general accordance with applicable ASTM Specifications and the results of these tests are to be found on the accompanying boring logs located in the Appendix.

SUBSURFACE CONDITIONS

General

The types of foundation materials encountered have been visually classified and are described in detail on the boring logs. The results of the field penetration tests, water level observations and other laboratory tests are presented on the boring logs in graphical and numerical form. The soil profile corresponds relatively well to the surface profile of the area. Representative samples of the soils were placed in sample jars and are now stored in the laboratory for further analysis if desired. Unless notified to the contrary, all samples will be disposed of after three (3) months.

The stratification of the soils, as shown on the boring logs, represents the soil conditions in the actual boring locations, and other variations may occur between the borings. Lines of demarcation represent the approximate boundary between the soil types, but the transition may be gradual.

from three (3) to six (6) feet. Fill was not encountered in the remaining borings. It is believed that the southwest portion of the site was a natural drainage way which was subsequently filled to create the ball field. The material is medium dense with a N-value of 10 bpf indicating that the fill was placed in a controlled manner.

Stratum 5 - Alluvial (Organic) Deposits

A stratum of dark gray to black silty CLAY (CL) with some wood and organic debris was encountered directly beneath the fill (Stratum 4). This stratum was approximately two (2) to five (5) feet in thickness. The soils are very moist to wet and extremely compressible with a N-value of 5 bpf.

Groundwater Observations

Groundwater was encountered in the soil borings at approximately three and one-half (3-1/2) to five and one-half (5-1/2) feet below the existing ground surface after a 24 hour period. Water volumes entering the drill holes were estimated to be light to moderate.

Past experience with this type of soil indicates that a perched watertable could develop with time due to variation in environmental conditions, recent rainfall, drought and other factors not evident at the time measurements were made and reported herein.

FOUNDATION DISCUSSION AND RECOMMENDATIONS

Project Description

Based upon the information provided, it is understood that the proposed project will include construction of one (1) and two (2) story masonry, slab-on-grade structures. In addition, a partial below grade basement is proposed.

This information has been provided by Mr. Jeff Whitaker of Helbing Lipp, Ltd. Design loads are assumed to be relatively light; however, the actual loading conditions were not known at this time. Once the design details have been finalized, PSI should be notified to determine if further analysis is required.

Spread Footings

Considering the soil conditions on this site, the proposed building loads and the proposed below grade construction, it appears that conventional spread and continuous wall footings will be suitable foundation system. Settlements should be within tolerable limits if the following foundation design and construction details are observed.

Exterior footings should be placed on the residual soils and/or structural fill at a minimum depth of thirty (30) inches below the proposed grades for frost protection. Interior footings can be founded at a nominal depth below the proposed concrete slab-on-grade. Footings bearing on the residual soils and/or structural fill should be designed for an allowable soil pressure of 2,500 psf. Minimum footing widths of eighteen (18) and twenty-four (24) inches should be adopted for continuous wall footings and isolated column footings, respectively.

Based on the recommended allowable soil bearing pressure and the anticipated building loads, we estimate total settlement should not exceed one (1) inch and differential settlement on the order of three-quarter (3/4) inches. The Structural Engineer should be consulted to determine if these settlements can be tolerated for the proposed structure.

The exposed subgrade should be kept as close to the natural moisture content as possible. Excessive wetting or drying of these soils should be avoided. It is recommended that concrete be placed in the footings the same day the excavations are made.

Floor Slab

Prior to the placing of concrete floors on this site, or before any floor supporting fill is placed, loose or obviously compressive materials must be removed. The subgrade should then be proof-rolled until the grade offers a relatively unyielding surface or until the specified degree of compaction has been achieved. Areas of excessive yielding should be excavated and backfilled with clean, compacted soil.

A four (4) inch minimum granular layer (VDOT No. 57 Stone) should be provided below the floor slab to prevent capillary rise and to function as a leveling course. An impervious membrane with a six (6) mil thickness should be provided as a vapor barrier beneath the slab with a six (6) inch overlap of membranes to prevent seepage of groundwater and moisture through the ground slab.

Retaining Wall Design

Based on the types of subsurface materials encountered by the borings, the proposed retaining walls should be designed to resist the lateral earth pressures developed from the backfill and any surcharge loads. The following equivalent fluid pressures should be utilized for design of the retaining walls:

Active Pressure = 40 H psf
At Rest Pressure = 60 H psf
H = Height of the Fill

These values for lateral earth pressures assume that no hydrostatic pressure exist behind the wall and granular soils are used for backfill. The wall should also account for any surcharge loads within a 1h:1v slope from the base of the wall.

Soil used for backfill behind the retaining walls should consist of granular, non-plastic SM or better, according to the Unified Soil Classification System. The backfill must be placed in loose lifts no greater than eight (8) inches in thickness and compacted to ninety-five (95) percent of ASTM D-698. Light compaction equipment (i.e. tampers) should be used within five (5) feet of the below grade walls to prevent damage to the retaining walls.

The upper twelve (12) inches should consist of a low plastic, non-expansive clayey or silty material or paved to minimize the amount of surface water infiltration behind the wall. The ground surface should also be kept properly sloped at a five (5) percent grade away from the building to prevent ponding behind the walls.

Foundation Drains

Foundation drains are required in areas where below grade walls are proposed to relieve hydrostatic pressures. The foundation drainage system should consist of perforated PVC pipe or drainage tile, a minimum of four (4) inches in diameter, surrounded by VDOT No. 57 stone (or equivalent size), and wrapped in filter fabric to prevent fine grained material from clogging the gravel. At least two (2) inches of gravel should be placed under the pipe. Exterior foundation drains should extend at least twelve (12) inches beyond the edge of the footing at a level below the ground floor slab. Foundation drains should discharge into a sump pit. A typical sketch of the foundation drain is provided in the appendix (Plate No. 24).

CONSTRUCTION CONSIDERATIONS

Site Preparation

The organic topsoils, tree stumps and soft soils undergo high volume change when subjected to loads. This is detrimental to the behavior of floor slabs, structural fill and shallow foundations placed on them. Therefore, it is recommended that all organic topsoils, tree stumps and obviously compressible soils should be stripped from these areas in their entirety five (5) feet outside the building perimeter and wasted or stockpiled for landscape purposes.

Any existing pavements and underground utilities should also be removed prior to placement of new foundations. Any excavations that are advanced below the proposed foundation

levels should be backfilled with lean concrete (2,000 psi) or structural fill up to the proposed bottom of footing levels.

Groundwater Control

Based on observations made at the time of the study, difficulty resulting from groundwater conditions during excavation and construction is anticipated. Groundwater was encountered at relatively shallow depths across the site. A gravity drainage system, sump pump, or other conventional minor dewatering procedure should be sufficient if groundwater is encountered during excavation of the basement and utilities trenches.

Excavations

Excavations can be accomplished with conventional construction equipment. It is recommended that the excavation side slopes should be graded back with a minimum 1h:1v slope. The slopes should also be protected with waterproof sheeting (6 mil poly). Materials removed from the excavation should not be stockpiled immediately adjacent to the excavation, inasmuch as this load may cause a sudden collapse of the embankment.

It is anticipated that groundwater will be encountered above the proposed basement excavation. Removal of overburden and groundwater infiltration will ultimately result in breakdown of the soils strength. For this reason, consideration should be given to the incorporation of a mud mat as a construction method to provide a firm working surface for installation of the footings and the floor slab. The mud mat should consist of three (3) inches of lean concrete (non-structural) placed directly on a firm subgrade without delay. This method will aid in the reduction of potential undercutting.

Acceptable Fill Materials and Placement

Material satisfactory for structural fill should include clean soil or bankrun sand and gravel mixtures but exclude high plastic CLAY (CH) and high plastic SILT (MH). All materials with more than twelve (12) percent fines can be utilized subject to the following restrictions:

Maximum Dry Density (ASTM D-698)	$\geq$	105 pcf
Liquid Limit	$\leq$	40
Plasticity Index	$\leq$	15

The fill materials should be free from topsoil, organic contaminated soil, and deleterious materials and rock fragments having a major dimension greater than three (3) inches.

Fill placement should be in horizontal layers six (6) to eight (8) inches in loose thickness, compacted uniformly with heavy duty equipment. Fill required to support footings, floor slabs and backfill around and above the footings, should be compacted a dry density of not less than ninety-five (95) percent to maximum dry density as established by ASTM D-698 specifications. The moisture content of any fill material should be within plus or minus two (2) percentage points of its optimum value. The density of each lift of fill should be checked by a certified Soil Technician. For best assurance of proper site preparation, the site preparation should be performed under the guidance of and to the satisfaction of a Soils Engineer.

PAVEMENT DISCUSSION AND RECOMMENDATIONS

Pavement Design Parameters

The pavement design is generally based on an assumed CBR value of 10 for the subgrade soils. Based upon our knowledge of similar soils, it is recommended that the initial pavement section be designed based upon a CBR value on the order of 4. During preliminary construction, it is recommended that the Soils Engineer be notified so that a representative CBR value can be obtained for basis of the final pavement section.

Pavement Design

The pavement design for the proposed parking lot and access driveways are based on the procedures specified in the design manual utilized by the Virginia Highway Research Council "Design Guide for Subdivision Pavements in Virginia (1973)" by N.K. Vaswani, the procedures correlate pavement thickness to a design CBR value and traffic volume (vpd). The pavement design parameters utilized for evaluation of secondary pavement are as follows:

Design CBR	4.0
Resiliency Factor (R.F.)	1.0
Soil Support Value (SSV)	4.0
Traffic Count	600

Based on the above parameters, we recommend the following flexible pavement section for preliminary design:

	Heavy Duty	Light Duty
Surface	1-1/2" S-5	1" S-5
Base	2-1/2" B-3	1-1/2" B-3
Subbase	8" 21A	6" 21A

The surface, base and subbase materials should meet the minimum VDOT requirements. The construction procedures

associated with placement and compaction of structural fill should be performed in accordance with the guidelines specified herein.

Prior to the construction of pavements, all organic material and/or topsoils should be stripped from the area and wasted. The exposed subgrade should be proofroll inspected with a loaded dump truck to a relatively unyielding surface. Some undercutting should be anticipated in the southwest portion of the site where existing fill (Stratum 4) and alluvial deposits (Stratum 5) were encountered. In these areas, proofrolling operations should include a minimum of three (3) passes in longitudinal and transverse directions or until the grade offers a relatively unyielding surface, until the specific degree of compaction has been achieved, or until the Soils Engineer indicates otherwise. Areas of excessive yielding should be excavated and replaced with structural fill.

The on-site materials to be used in the pavement subgrade may become soft when exposed to water; therefore, it would be necessary that every effort is made to keep all areas dry. Some undercutting and replacement of wet soils should be anticipated. Preliminary site grading may be required to divert surface runoff from entering the work area.

Fill materials should be placed in horizontal layers eight (8) inches in loose thickness, compacted uniformly with heavy duty equipment. Fill placed within the pavement areas should be compacted to a dry density of not less than ninety-five (95) percent established by ASTM D-698. The upper six (6) inches of pavement subgrade in cut areas should be compacted to ninety-five (95) percent of ASTM D-698.

GENERAL COMMENTS

When the plans and specifications are complete, or if significant changes are made in the character or location of the proposed structures, a consultation should be arranged to review them with respect to the prevailing soil conditions. At that time, it may be necessary to submit supplementary recommendations.

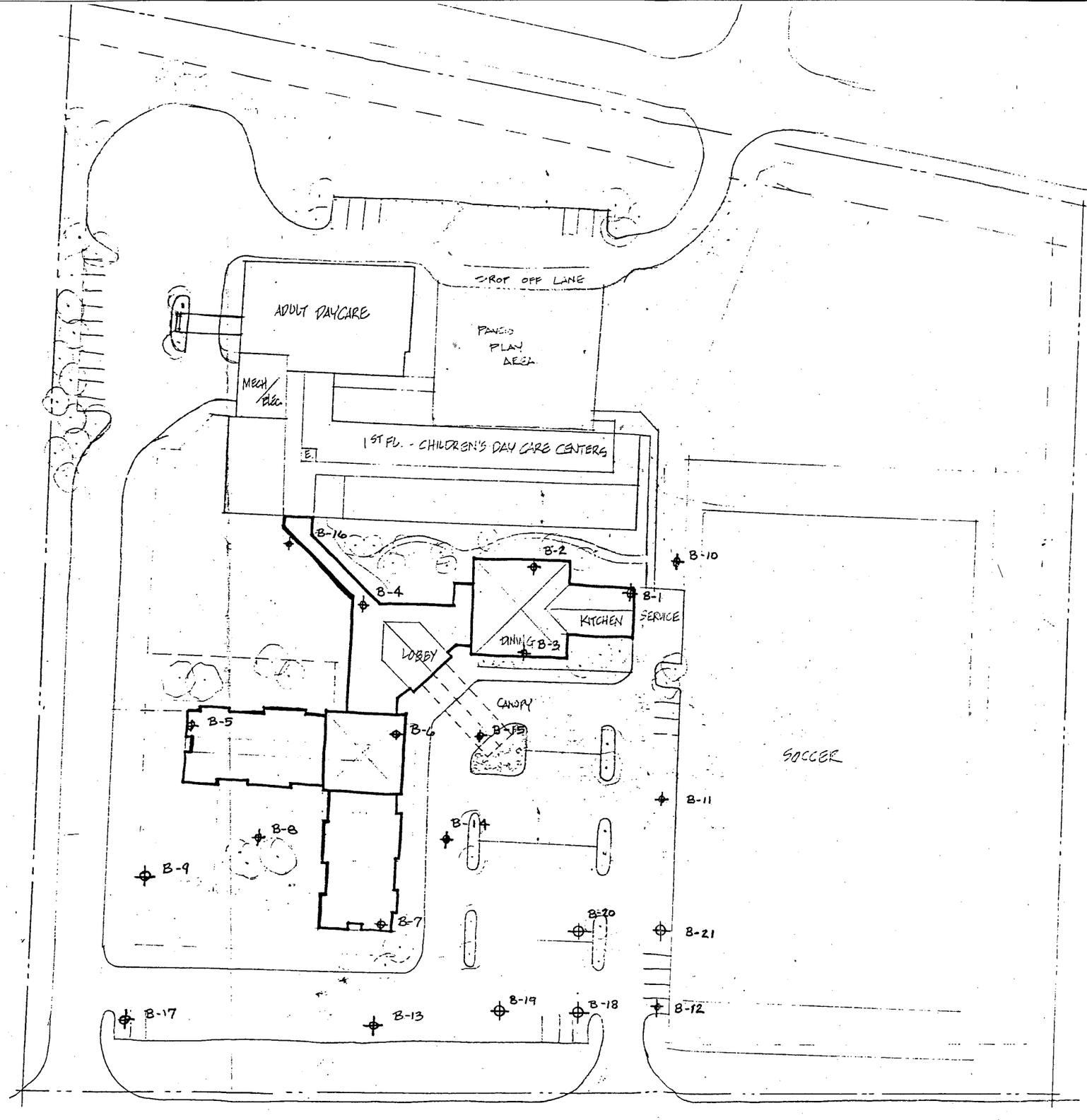
It is recommended that the services of qualified Soils Engineer be engaged to test and evaluate the soils in the footing excavations prior to concreting in order to determine that the soils have the required bearing capacities.

Monitoring and testing should also be performed to verify that suitable materials are used for structural fills and that they are properly placed and compacted.

APPENDIX

Professional Service Industries

PROJECT NAME	SITE VICINITY MAP	
Lewinsville Center McLean, Virginia	PROJECT NO. 483-25026	DATE 5/13/92



LEWINSVILLE HOME FOR ADULTS
McLEAN, VA.

BORING LOCATION PLAN
Plate No. 2

SOIL BORING LOG

BORING: B-1 DATE: 4/28/92

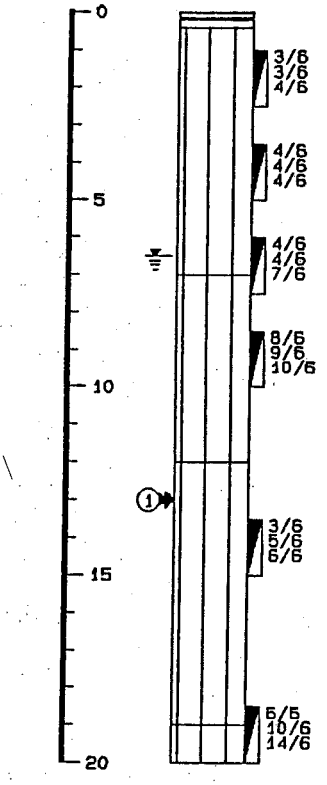
PROJECT NAME: Lewinsville Center

SITE: Building Area

DEPTH TO WATER: 6.5 FT DATE CHECKED: 4/29/92

DEPTH TO CAVING: 13 FT

ELEVATION: n/a FT PROJECT NO: 483-25026



ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
			5" Topsoil					
		ML	Medium dense, moist, tan slightly micaceous sandy SILT	7				
				8	29	38	NP	68
				11				
		ML	Dense, slightly moist, tan micaceous sandy SILT, some rock structure					
				19	23			
		ML	Medium dense, wet, tan micaceous sandy SILT					
				11				
		ML	Dense, moist, tan micaceous sandy SILT, some rock structure	24				

End of boring at 20 feet.

Plate Number 3

SOIL BORING LOG

BORING: B-2 DATE: 4/28/92

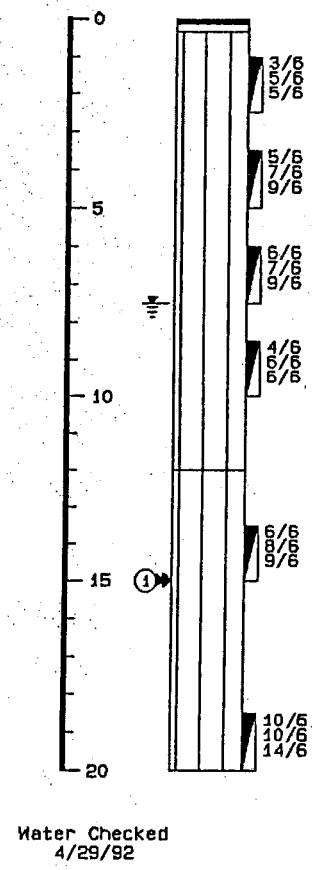
PROJECT NAME: Lewinsville Center

SITE: Building Area

DEPTH TO WATER: 7.5 FT DATE CHECKED: 4/29/92

DEPTH TO CAVING: 15 FT

ELEVATION: n/a FT PROJECT NO: 483-25026



Water Checked 4/29/92

ELEV / DEPTH	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
		4" Topsoil					
	ML	Medium dense, moist, tan micaceous sandy SILT, some rock structure	10				
			15				
			16				
			12				
	ML	Dense, moist, tan micaceous sandy SILT, some quartz fragments	17				
			24				

End of boring at 20 feet.

Plate Number 4

SOIL BORING LOG

BORING: B-3 DATE: 4/28/92

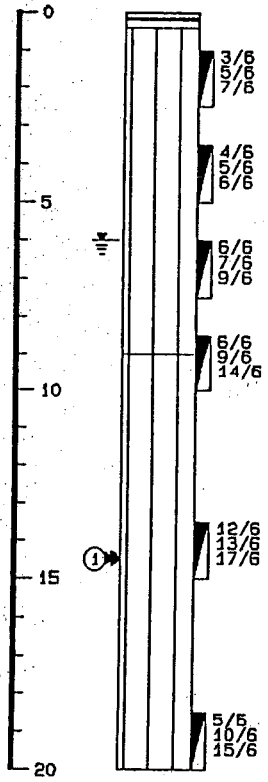
PROJECT NAME: Lewinsville Center

SITE: Building Area

DEPTH TO WATER: 6 FT DATE CHECKED: 4/29/92

DEPTH TO CAVING: 14.5 FT

ELEVATION: n/a FT PROJECT NO: 483-25026



Water Checked 4/29/92

ELEV / DEPTH	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
		5" topsoil					
	ML	Medium dense, moist, tan to orange brown sandy SILT	12				
			11	35			
			16				
	ML	Very dense, moist, tan micaceous sandy SILT, some rock structure	23	37			
			30				
			25				

End of boring at 20 feet.

Plate Number 5

SOIL BORING LOG

BORING: B-4 DATE: 04/29/92

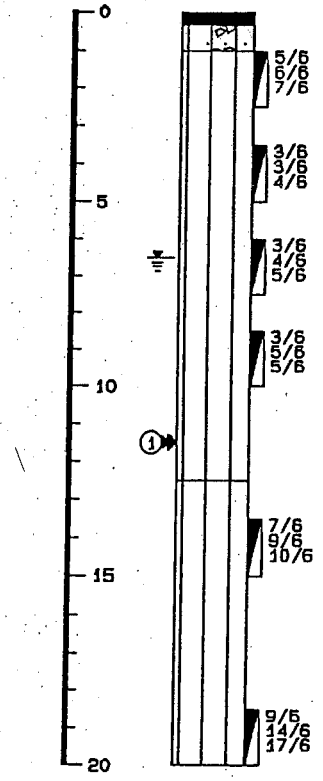
PROJECT NAME: Lewinsville Center

SITE: Building Area

DEPTH TO WATER: 6.5 FT DATE CHECKED: 4/30/92

DEPTH TO CAVING: 11.5 FT

ELEVATION: n/a FT PROJECT NO: 483-25026



Water Checked 4/30/92

ELEV / DEPTH	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
		4" Asphalt					
	GM	8" Crushed Stone					
	ML	Medium dense, moist, tan to red slightly micaceous sandy SILT	13				
			7				
			9				
			10				
	ML	Dense to very dense, moist, tan to red slightly micaceous sandy SILT	19				
			31				

End of boring at 20 feet.

Plate Number 6

SOIL BORING LOG

BORING: B-5

DATE: 04/29/92

PROJECT NAME: Lewinsville Center

SITE: Building Area

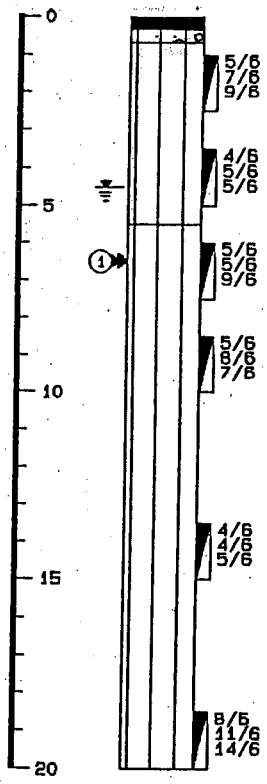
DEPTH TO WATER: 4.5 FT

DATE CHECKED: 4/30/92

DEPTH TO CAVING: 6.5 FT

ELEVATION: n/a FT

PROJECT NO: 483-25026



Water Checked 4/30/92

ELEV / DEPTH	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
		4" Asphalt					
	GM	5" Crushed Stone					
	ML	Medium dense, moist, light brown slightly micaceous sandy SILT	16				
			10	28			
	ML	Medium dense, moist, red sandy SILT	14				
			15	20			
			9				
		some rock fragments	25				

End of boring at 20 feet.

Plate Number 7

SOIL BORING LOG

BORING: B-6 DATE: 04/29/92

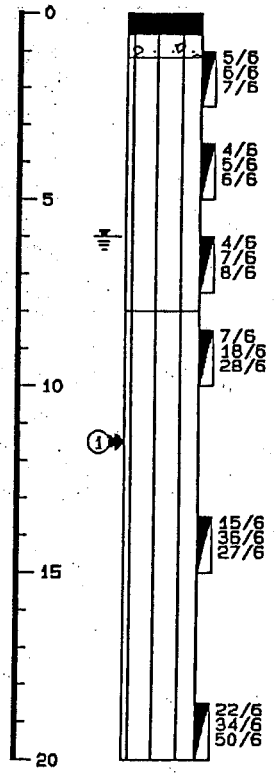
PROJECT NAME: Lewinsville Center

SITE: Building Area

DEPTH TO WATER: 6 FT DATE CHECKED: 4/30/92

DEPTH TO CAVING: 11.5 FT

ELEVATION: n/a FT PROJECT NO: 483-25026



Water Checked 4/30/92

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
			7" Asphalt					
		GM	7" Crushed Stone					
		ML	Medium dense, moist, tan to light brown slightly micaceous sandy SILT	13				
				11				
				15				
		ML	Medium dense, moist, tan to light brown micaceous sandy SILT	46				
				63				
				84				

End of boring at 20 feet.

Plate Number 8

SOIL BORING LOG

BORING: B-7

DATE: 04/29/92

PROJECT NAME: Lewinsville Center

SITE: Building Area

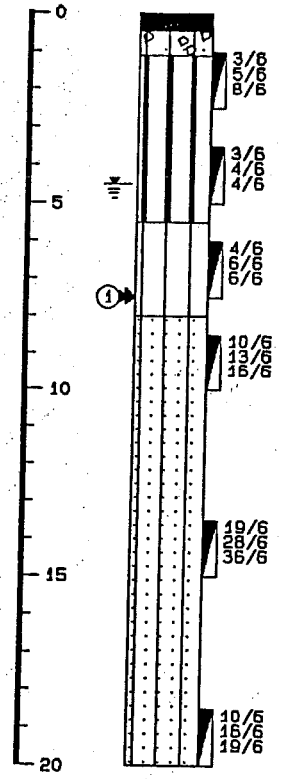
DEPTH TO WATER: 4.5 FT

DATE CHECKED: 4/30/92

DEPTH TO CAVING: 7.5 FT

ELEVATION: n/a FT

PROJECT NO: 483-25026



Water Checked 4/30/92

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
			5-1/2" Asphalt					
		GM	8" Crushed Stone					
		MH	Medium stiff, very moist, tan to light gray clayey SILT	13				
				8	27	52	15	76
		ML	Medium dense, moist, tan micaceous sandy SILT	12				
		SM	Very dense, slightly moist, tan to light gray silty SAND, some rock structure	29	18			
				64				
				35				

End of boring at 20 feet.

Plate Number 9

SOIL BORING LOG

BORING: B-8

DATE: 04/29/92

PROJECT NAME: Lewinsville Center

SITE: Building Area

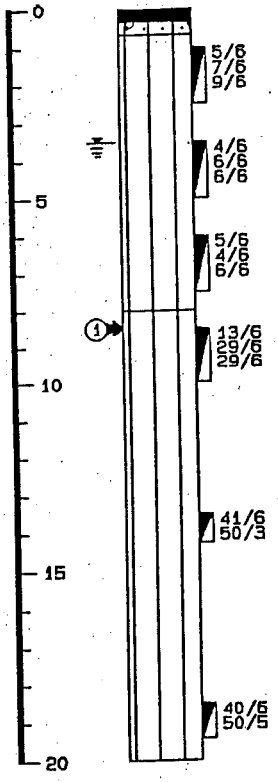
DEPTH TO WATER: 3.5 FT

DEPTH TO CAVING: 8.5 FT

ELEVATION: n/a FT

DATE CHECKED: 4/30/92

PROJECT NO: 483-25026



Water Checked
4/30/92

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
			4" Asphalt					
		GM	5" Crushed Stone					
		ML	Medium dense, moist, light brown slightly micaceous sandy SILT	16				
				12	23			
				10				
		ML	Very dense, slightly moist, greenish tan sandy SILT, some rock structure	58	12			
				50/3				
				50/5				

End of boring at 20 feet.

Plate Number 10

SOIL BORING LOG

BORING: B-9

DATE: 04/29/92

PROJECT NAME: Lewinsville Center

SITE: Building Area

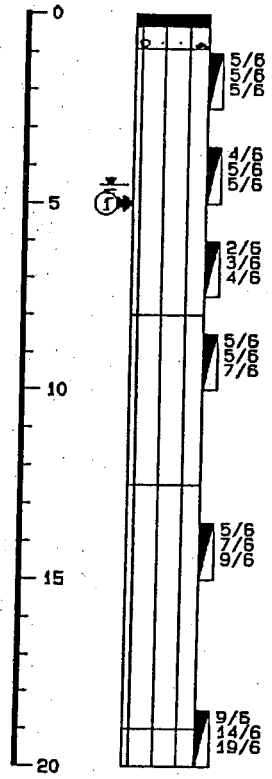
DEPTH TO WATER: 4.5 FT

DATE CHECKED: 4/30/92

DEPTH TO CAVING: 5 FT

ELEVATION: n/a FT

PROJECT NO: 483-25026



ELEV / DEPTH	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
	PV	4" Asphalt					
	GM	7" Crushed Stone					
	ML	Medium dense, moist, light gray to tan slightly micaceous sandy SILT	10				
			10	30	40	5	78
			7				
	ML	Medium dense, slightly moist, greenish tan silty SAND	12	21			
	ML	Medium dense, moist, light brown sandy SILT	16				
	ML	Very dense, moist, tan slightly micaceous sandy SILT	33				

End of boring at 20 feet.

Plate Number 11

SOIL BORING LOG

BORING: B-10 DATE: 04/28/92

PROJECT NAME: Lewinsville Center

SITE: Pavement Area

DEPTH TO WATER: Dry FT DATE CHECKED: 04/28/92

DEPTH TO CAVING: n/a FT

ELEVATION: n/a FT PROJECT NO: 483-25026

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
0			5" Topsoil					
	3/6 3/6 5/6	ML	Medium dense, moist, tan slightly micaceous sandy SILT	8				
	6/6 6/6 7/6			13				
5								

End of boring at 5 feet.

Plate Number 12

SOIL BORING LOG

BORING: B-11

DATE: 04/28/92

PROJECT NAME: Lewinsville Center

SITE: Pavement Area

DEPTH TO WATER: Dry FT

DATE CHECKED: 04/28/92

DEPTH TO CAVING: n/a FT

ELEVATION: n/a FT

PROJECT NO: 483-25026

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
0			4" Topsoil					
	4/6 6/6 6/6	ML	Medium dense, moist, tan slightly micaceous sandy SILT	12	24			
	4/6 6/6 7/6			13	25			
5								

End of boring at 5 feet.

Plate Number 13

SOIL BORING LOG

BORING: B-12 DATE: 04/28/92

PROJECT NAME: Lewinsville Center

SITE: Pavement Area

DEPTH TO WATER: Dry FT DATE CHECKED: 04/28/92

DEPTH TO CAVING: 6.5 FT

ELEVATION: n/a FT PROJECT NO: 483-25026

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
0	3/6 4/6 6/6		3" Topsoil					
		ML	Medium dense, moist, tan to greenish gray sandy SILT FILL	10				
	6/6 3/6 2/6							
5		CL	Soft, wet, dark gray, sandy CLAY, abundant organics and wood ALLUVIAL	5				
	①							
	4/6 7/6 8/6	ML	Medium dense, slightly moist, micaceous greenish tan sandy SILT NATURAL	15				
10								

End of boring at 10 feet.

Plate Number 14

SOIL BORING LOG

BORING: B-13

DATE: 04/29/92

PROJECT NAME: Lewinsville Center

SITE: Pavement Area

DEPTH TO WATER: Dry FT

DATE CHECKED: 04/29/92

DEPTH TO CAVING: n/a FT

ELEVATION: n/a FT

PROJECT NO: 483-25026

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
0		PV	5" Asphalt					
		GM	7" Crushed Stone					
	7/6 11/6 19/6	ML	Very dense, slightly moist, tan slightly micaceous sandy SILT	30	18			
	7/6 12/6 24/6			36	24			
5								

End of boring at 5 feet.

Plate Number 15

SOIL BORING LOG

BORING: B-14 DATE: 04/29/92

PROJECT NAME: Lewinsville Center

SITE: Pavement Area

DEPTH TO WATER: Dry FT DATE CHECKED: 04/29/92

DEPTH TO CAVING: n/a FT

ELEVATION: n/a FT PROJECT NO: 483-25026

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
0			4" Topsoil					
	4/6 4/6 6/6	ML	Medium dense, moist, tan to light gray slightly micaceous sandy SILT	10				
5	4/6 4/6 6/6			10				

End of boring at 5 feet.

Plate Number 16

SOIL BORING LOG

BORING: B-15

DATE: 04/29/92

PROJECT NAME: Lewinsville Center

SITE: Pavement Area

DEPTH TO WATER: Dry FT

DATE CHECKED: 04/29/92

DEPTH TO CAVING: n/a FT

ELEVATION: n/a FT

PROJECT NO: 483-25026

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	MC	LL	PI	-#200
0			4" Topsoil					
	6/6 7/6 9/6	ML	Medium dense, moist, slightly micaceous sandy SILT	16	20			
	6/6 8/6 9/6			17	20			
5								

End of boring at 5 feet.

Plate Number 17

SOIL BORING LOG

BORING: B-16 DATE: 04/29/92

PROJECT NAME: Lewinsville Center

SITE: Pavement Area

DEPTH TO WATER: Dry FT DATE CHECKED: 04/29/92

DEPTH TO CAVING: n/a FT

ELEVATION: n/a FT PROJECT NO: 483-25026

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
0		PV	4" Asphalt					
		GM	6" Crushed Stone					
	4/6 6/6 8/6	ML	Medium dense, moist, red to tan slightly micaceous sandy SILT	14				
	6/6 9/6 10/6	ML	Dense, moist, tan slightly micaceous sandy SILT	19				
5								

End of boring at 5 feet.

Plate Number 18

SOIL BORING LOG

BORING: B-17 DATE: 04/29/92

PROJECT NAME: Lewinsville Center

SITE: Pavement Area

DEPTH TO WATER: Dry FT DATE CHECKED: 04/29/92

DEPTH TO CAVING: n/a FT

ELEVATION: n/a FT PROJECT NO: 483-25026

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
0		PV	4" Asphalt					
		GM	3" Crushed Stone					
	2/6 2/6 4/6	ML	Slightly compact, very moist, tan to light gray micaceous sandy SILT	6	39			
5	2/6 3/6 4/6			7	39			

End of boring at 5 feet.

Plate Number 19

SOIL BORING LOG

BORING: B-18 DATE: 04/30/92

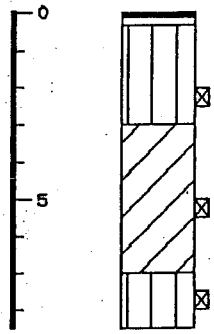
PROJECT NAME: Lewinsville Center

SITE: Pavement Area

DEPTH TO WATER: Dry FT DATE CHECKED: 04/30/92

DEPTH TO CAVING: n/a FT

ELEVATION: n/a FT PROJECT NO: 483-25026

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
0			4" Topsoil					
		ML	Medium dense, moist, brown micaceous sandy SILT, trace organics FILL					
		CL	Soft, wet, gray, silty CLAY some organics ALLUVIAL					
5		ML	Medium dense, moist, tan to yellow sandy SILT NATURAL					

End of boring at 8.5 feet.

Plate Number 20

SOIL BORING LOG

BORING: B-19

DATE: 04/30/92

PROJECT NAME: Lewinsville Center

SITE: Pavement Area

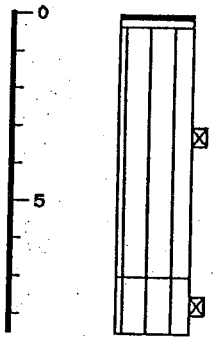
DEPTH TO WATER: Dry FT

DEPTH TO CAVING: n/a FT

ELEVATION: n/a FT

DATE CHECKED: 04/30/92

PROJECT NO: 483-25026

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
0			4" Topsoil					
		ML	Medium dense, moist, brown sandy SILT					
5		ML	Medium dense, moist, tan to yellow sandy SILT					

End of boring at 8.5 feet.

SOIL BORING LOG

BORING: B-20 DATE: 04/30/92

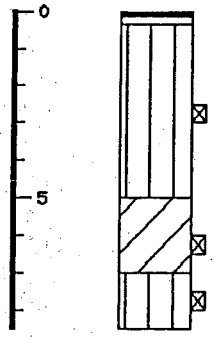
PROJECT NAME: Lewinsville Center

SITE: Pavement Area

DEPTH TO WATER: Dry FT DATE CHECKED: 04/30/92

DEPTH TO CAVING: n/a FT

ELEVATION: n/a FT PROJECT NO: 483-25026

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
0			4" Topsoil					
		ML	Medium dense, moist, red to tan micaceous SILT FILL					
5		CL	Soft, wet, gray, micaceous silty CLAY some organics ALLUVIAL					
		ML	Medium dense, moist, tan to yellow micaceous sandy SILT NATURAL					

End of boring at 8.5 feet.

Plate Number 22

SOIL BORING LOG

BORING: B-21

DATE: 04/30/92

PROJECT NAME: Lewinsville Center

SITE: Pavement Area

DEPTH TO WATER: Dry FT

DEPTH TO CAVING: n/a FT

ELEVATION: n/a FT

DATE CHECKED: 04/30/92

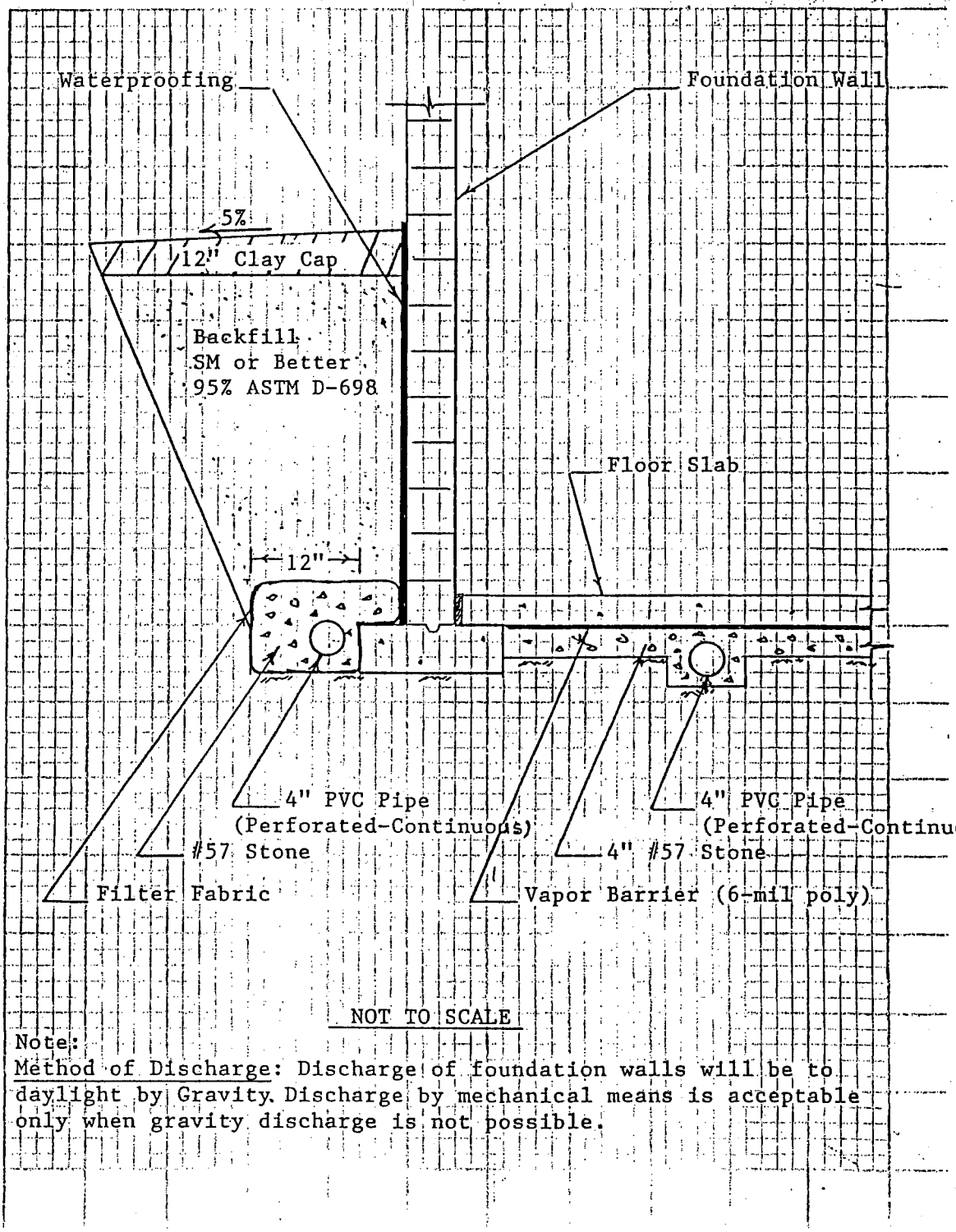
PROJECT NO: 483-25026

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	N	Mc	LL	PI	-#200
0			4" Topsoil					
		CL	Medium dense, moist, tan micaceous SILT FILL					
5		CL	Soft, very moist, gray sandy SILT trace organics ALLUVIAL					
		ML	Medium dense, moist, red to tan micaceous sandy SILT NATURAL					

End of boring at 8.5 feet.

Plate Number 23

Professional Service Industries



NOT TO SCALE

Note:
Method of Discharge: Discharge of foundation walls will be to daylight by Gravity. Discharge by mechanical means is acceptable only when gravity discharge is not possible.

PROJECT NAME		
Lewinsville Center McLean, Virginia	FOUNDATION DRAINDDETAIL	
	PROJECT NO. 483-25026	DATE 5/13/92

PSI A-700-3

Plate No. 24

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split-spoon.

Qu: Unconfined compressive strength, TSF

Qp: Penetrometer value, unconfined compressive strength, TSF

Mc: Water content, %

LL: Liquid limit, %

PI: Plasticity Index, %

δ_d: Natural dry density, PCF

▼: Apparent groundwater level at time noted after completion.

DRILLING AND SAMPLING SYMBOLS

SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3". O.D., except where noted.
AU: Auger Sample.
DB: Diamond Bit.
CB: Carbide Bit.
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

TERM (NON-COHESIVE SOILS)	STANDARD PENETRATION RESISTANCE
Very Loose	0 - 2
Loose	2 - 4
Slightly Compact	4 - 8
Medium Dense	8 - 16
Dense	16 - 26
Very Dense	Over 26

TERM (COHESIVE SOILS)	Qu - (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in. +	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		