Compacted structural fill should be placed in maximum 8-inch thick horizontal, loose lifts. Fill should be compacted to at least 95 percent of the maximum dry density per ASTM D698 (Standard Proctor), except that the top 12 inches in pavement areas should be compacted to at least 100 percent of the same standard. Soil moisture contents at the time of compaction should be within 3 percent of the soils' optimum moisture content.

Backfill placed in excavations, trenches, and other areas that large compaction equipment cannot access should be placed in maximum 6-inch thick lifts. Backfill should meet the material, placement, and compaction requirements outlined above.

Successful re-use of the excavated, on-site soils as compacted structural fill will depend on their natural moisture contents during excavation. Scarifying and drying of these soils should be anticipated to achieve the recommended compaction. Drying of these soils will likely result in some delays, and may not be possible during cooler, wetter weather. We recommend that the earthwork be performed during the warmer, drier times of the year.

6.0 FOUNDATION RECOMMENDATIONS

We based our geotechnical engineering analysis on the information developed from our subsurface exploration and soil laboratory testing, along with the project development plans, site plans, and structural loading furnished to our office. We recommend shallow spread footings for support of the proposed apartment building based on our analysis. The following sections of the report provide our detailed recommendations.

6.1 Spread Footings

The majority of the building will be at-grade and will have a lowest level at EL +345.5 and a portion of the building will extend one level below grade with a lowest level at EL +334. Based on these lowest levels, spread footings are considered suitable for support of the proposed apartment building. Deep fill was encountered along the southeast corner of the site (borings B-7 and B-8B), considering that the building in this area will be founded at about EL +334, footings will need to be lowered to natural soils. Footings should be founded on suitable natural soils consisting of the firm silt and sand of Stratum B and the disintegrated rock of Stratum C. We recommend column footings supported on these materials be designed for a net allowable soil bearing pressure of 8,000 psf and that wall footings be designed for a net allowable soil bearing pressure of 6,000 psf. This bearing pressure provides a factor of safety against general bearing capacity failure of at least 3.0. Where design loads include combinations of transient wind and/or seismic loads that result in non-uniform soil bearing pressure distribution beneath the footing, the maximum allowable soil bearing pressure in these cases may be taken as 1.33 times the net allowable soil bearing pressure given above.

The above allowable soil bearing pressures may be increased by 33 percent for wind and seismic loads when used in conjunction with load combinations defined in IBC Section 1605.3.2, Alternative Basic Load Combinations for use with allowable stress design. This increase is not applicable for other allowable stress load combinations, strength design or load and resistance factor design.

The grades at which suitable natural soils were encountered in the test borings are presented in the tables below:

Estimated Elevation of Suitable Subgrade Soils for Footings
Designed for a Net Allowable Bearing Pressure of 8,000 psf

Boring Number	Proposed Lowest Level Elevation (ft)	Estimated Elevation of Suitable Subgrade Soils (ft)
B-1	EL +345.5	EL +344
B-2		EL +344
B-3		EL +345
B-5A		EL +339
B-6		EL +340
B-7	EL +334	EL +329
B-8B		EL +330
B-9	EL +345.5	EL +340

For planning purposes, the elevation of suitable materials between borings may be considered to vary linearly between boring locations. All footing subgrades should be observed by the Geotechnical Engineer prior to placement of concrete to verify subgrade materials are as anticipated.

If unsuitable soils are encountered at the design bearing grade, these soils should be removed and replaced as recommended by the Geotechnical Engineer. Unsuitable soils should be replaced with lean concrete.

Settlements of shallow foundations supported on suitable natural soils are not expected to exceed about one (1) inch. Differential settlements between similarly loaded footings are not expected to exceed about half this value.

Column and wall footings should be at least 24 and 16 inches wide, respectively, for shear considerations. Exterior footings should be founded at least 2.5 ft below final exterior grades for frost protection. Interior footings may be founded at nominal depths below the floor slabs. Where bearing grades between adjacent footings vary, the slope between the bottom edges of adjacent footings should not be steeper than 1.5H:1V.

7.0 FLOOR SLAB RECOMMENDATIONS

The proposed floor slabs can be supported on the firm existing fill, suitable natural soils of Strata B and C or compacted structural fill. A modulus of subgrade reaction, k, of 150 kcf (87 pci) should be used in design of floor slabs.

A 4-inch crushed stone or washed gravel capillary moisture barrier should underlie floor slabs on grade. Moisture barrier material should consist of AASHTO No. 57 crushed stone. The Contractor should compact the stone in place with at least two passes of suitable vibratory compaction equipment. A 10-mil thick polyethylene liner should be installed over the crushed stone layer as a vapor barrier and to prevent concrete intrusion into the stone.

The Contractor should compact floor slab subgrades to repair any disturbance that may occur due to construction operations before placing moisture barrier materials. Since floors will be slab-on-grade, footing and utility excavations should be backfilled with compacted structural fill as defined in Section 5.0.

8.0 RETAINING STRUCTURE RECOMMENDATIONS

The proposed apartment building will partially extend below grade, and the below-grade walls will need to be designed to withstand lateral earth pressures. Recommendations for the design of these walls are presented in the following sections.

8.1 Basement Walls

Below-grade walls will need to be designed to withstand lateral earth pressures. An average equivalent fluid pressure of 50 H (psf), where H is the height of the wall in feet, is recommended for design of basement walls, as illustrated on Figure 3. The recommended equivalent fluid pressure assumes a horizontal backfill behind the walls. Loading from surcharges, or sloping backfill above the walls will need to be added to the equivalent fluid pressure provided above. Hydrostatic pressures are not included in our recommended lateral earth pressures, as foundation drains should be installed behind the walls. The surcharge pressure ordinate should be obtained by multiplying the surface surcharge pressure, q, by 0.42. The walls should be backfilled as recommended below. A friction factor of 0.35 may be utilized for concrete footings and subgrade soils. Basement walls should be backfilled as recommended below.

Backfill materials for walls designed considering free-draining backfill should consist of non-plastic material classifying as SP-SM, SW-SM, SP, SW, GW-GM, GP-GM, GP or GW according to ASTM D2487. This classification includes open-graded crushed stone such as AASHTO No. 57. Free-draining backfill should be placed in the zone extending from the base of the wall upwards at 45 degrees. On-site materials used for backfill should consist of material classifying ML, SC, SM, SP, SW, GP or GW according to ASTM D2487.

The Contractor should place backfill in maximum 8-inch thick loose lifts, and compact each lift to at least 95 percent of maximum dry density according to ASTM D698 (Standard Proctor). The Contractor should place crushed stone backfill in maximum 12-inch thick lifts, and compact each lift using suitable vibratory equipment. Only light hand-operated equipment should be used to compact backfill against walls. The Structural Engineer of Record should approve the size of the compaction equipment.

9.0 SUBDRAINAGE RECOMMENDATIONS

The subsurface investigation revealed groundwater about 20 ft below existing grades, or at about EL +325 in the building footprint. To account for seasonal fluctuation, we suggest a design table groundwater elevation of EL +330 be considered. Therefore, we anticipate groundwater to be about 5 ft below the proposed lowest level at EL +334. Based on the groundwater observations, subdrainage below the floor slabs will not be necessary. However, it may be prudent to add one subdrainage line along the inside of the partial basement level to collect groundwater. Subdrainage behind the below-grade walls is also recommended.

9.1 Subdrainage for Below-Grade Walls

Earth pressure recommendations provided in this report do not include hydrostatic pressure since subdrainage will be provided behind the basement walls. Subdrainage should consist of perimeter subdrains located on top of the wall footing, next to the wall. Subdrainage lines should consist of 4-inch slotted, corrugated polyethylene tubing according to ASTM F405 surrounded by at least 4 inches of filter drainage material. A drainage geotextile should wrap around the drainage material. Subdrains should drain by gravity to an outlet, sump, or storm sewer. Filter drainage material should consist of AASHTO No. 78 aggregate.

Geocomposite drainage panels consisting of Miradrain G100N or equivalent should be installed on all basement walls. Drainage panels should be placed along the entire wall face to within 1.5 ft of finished grade. The Contractor should bind the edges of the panels with drainage geotextile to limit the potential for soil intrusion into the drainage system.

Elevator pits and other portions of the structure that extend below the lowest level should be water proofed and designed to resist full hydrostatic pressure.

Figure 4 illustrates recommended subdrainage details as discussed above.

10.0 TEMPORARY EXCAVATION SUPPORT RECOMMENDATIONS

10.1 Underpinning

Depending on the proximity of the proposed apartment building to the existing adjacent structures (three-story northern office building and 11-story western office building), as well as the foundation systems of the adjacent buildings, underpinning may be required.

10.2 Excavation Support

Depending on the available space, partial or full sloping of the excavation may be possible. However, if excavation support is required, we anticipate a soldier pile and wood lagging system will be appropriate excavation support for this project. Soldier piles should not be spaced greater than 8 ft, and wood lagging should have an unfinished thickness of at least 3 inches. Soldier piles should be inserted into predrilled holes to reduce vibrations from driving, obstructions such as concrete and brick and boulders in the natural soils. The predrilled soldier-beam holes should be backfilled with lean concrete. Selection and design of the excavation support system are the responsibility of the Contractor. A licensed Professional Engineer should design the excavation support system.

Tiebacks, struts, or rakers and heel blocks may be used to resist horizontal loads acting on the excavation support system. Permits or easements may be required since tiebacks will penetrate into public and private space. Permission will also be needed to install tiebacks below the adjacent private properties. Tiebacks should be located to avoid buried structures. Rakers or struts may be needed at locations where it is not possible to install tiebacks.

Where tiebacks are used, each tieback must be tested. A detailed specification should be prepared for the installation and testing of earth tiebacks. Design and installation should be performed in accordance with the Post Tensioning Institute's *Soil and Rock Anchors (2006)*. Specifications should require that proof tests be conducted on all tiebacks. Also, at least 5 percent of tiebacks installed on the project should be performance tested. Proof testing should be performed as described below for performance testing, except the maximum load for a proof test is 120 percent of design load. During proof testing, each load step should be held for 5 minutes, and the maximum test load should be held for 15 minutes. Performance testing should involve the incremental loading of the tieback. Load steps of 25, 50, 75, 100, 120 and 133 percent of the design load should be applied. Tieback deflections during loading should be measured. Each load step should be held for at least 15 minutes. The maximum test load should be held for at least 60 minutes.

We recommend that the Geotechnical Engineer be engaged for observation and testing of the tiebacks.

Excavation bracing consisting of soldier piles and lagging is a flexible system; therefore, vertical and lateral movements beyond the limits of the excavation that may cause damage to the adjacent streets, buildings, or utilities should be anticipated. The lateral and vertical movements of the excavation bracing system should be monitored. Also adjacent buildings and ground surface should be monitored for movement. Excavation subgrades should also be monitored for instability both during excavation and following completion of the excavation.

The design and installation of the excavation support system should be performed by a specialty Contractor who has at least 5 years of experience in the construction of this particular work. The excavation support Contractor should be required to furnish bodily injury and property damage liability insurance to adequately protect the owner, the architect and all consulting engineers on this project from claims arising from his work. The Contractor's general liability insurance policy should also name the architect, engineer and this consultant as additional insured for claims arising from this construction.

11.0 CONSTRUCTION CONSIDERATIONS

11.1 Spread Footings

The Contractor should exercise care during excavation for spread footings so that as little disturbance as possible occurs at the foundation level. The Contractor should carefully clean loose or soft soils from the bottom of the excavation before placing concrete. A Geotechnical Engineer from our firm should observe actual footing subgrades during construction to evaluate whether subgrade soils meet the requirements as recommended in this report.

Footing subgrades needing undercut may be concreted at the elevation of undercut or backfilled to the original design subgrade elevation with lean concrete. Concreting should take place the same day as excavation of footings. Subgrades should be protected from freezing if work is performed during cold weather.

11.2 Subdrainage

The Contractor should exercise care when placing and backfilling subdrainage pipe to avoid damage to the subdrainage system during installation.

11.3 Temporary Excavation Support

Drawings should be prepared by the Excavation Contractor to indicate details of the excavation sheeting. These drawings should generally be according to the design requirements outlined in Section 10.2 of this report. However, Contractors should be allowed to submit alternate designs for sheeting plans that they select. The alternate designs should be based on lateral earth pressures indicated herein, provided free draining H-pile and wood-lagging sheeting is used. The drawings should be prepared by a licensed Professional Engineer and submitted to the Structural Engineer and to our office for review.

The recommended scope of excavation sheeting has been prepared without detailed structural plans for the proposed construction or the existing structures and underground utilities on site. The detailed drawings should be prepared based on the structural drawings and/or measurements to consider these additional details.

11.4 Rock Excavation

Based on the information provided by the borings and considering a proposed lowest level at EL +334, mass rock excavation such as hoe-ramming or blasting should not be necessary to reach the lowest level. However, based on the borings, rock excavation is expected at the following elevations:

Estimated Top of Rock Elevations

Boring Number	Estimated Elevation Where Rock Excavation Methods will be Needed (ft)
B-1	EL +333
B-5A	EL +332
B-6	EL +333
B-8A	EL +330
B-9	EL +332

Variation in rock conditions should be expected since rock surface can vary considerably over relatively shortly horizontal distances at this site.

11.5 Engineering Services During Construction

The engineering recommendations provided in this report are based on the information obtained from the subsurface exploration and laboratory testing. However, conditions on the site may vary between the discrete locations observed at the time of our subsurface exploration. The nature and extent of variations between borings may not become evident until during construction.

To account for this variability, we should provide professional observation and testing of subsurface conditions revealed during construction as an extension of our engineering services. These services will also help in evaluating the Contractor's conformance with the plans and specifications. Because of our unique position to understand the intent of the geotechnical engineering recommendations, retaining Schnabel for these services will allow us to provide consistent service throughout the project construction.

12.0 GENERAL SPECIFICATION RECOMMENDATIONS

An allowance should be established to account for possible additional costs that may be required to construct earthwork and foundations as recommended in this report. Additional costs may be incurred for a variety of reasons including variation of soil between borings, greater than anticipated unsuitable soils, need for borrow fill material, wet on-site soils, obstructions, rock excavation, temporary dewatering, etc.

The project specifications should indicate the Contractor's responsibility for providing adequate site drainage during construction. Inadequate drainage will most likely lead to disturbance of soils by construction traffic and increased volume of undercut.

This report may be made available to prospective bidders for informational purposes. We recommend that the project specifications contain the following statement:

> *Schnabel Engineering Consultants, Inc., has prepared this geotechnical engineering report for this project. This report is for informational purposes only and is not part of the contract documents. The opinions expressed represent the Geotechnical Engineer's interpretation of the subsurface conditions, tests, and the results of analyses conducted. Should the data contained in this report not be adequate for the Contractor's purposes, the Contractor may make, before bidding, independent exploration, tests and analyses. This report may be examined by bidders at the office of the Owner, or copies may be obtained from the Owner at nominal charge.*

Additional data and reports prepared by others that could have an impact upon the Contractor's bid should also be made available to prospective bidders for informational purposes.

13.0 LIMITATIONS

We based the analyses and recommendations submitted in this report on the information revealed by our exploration. We attempted to provide for normal contingencies, but the possibility remains that unexpected conditions may be encountered during construction.

This report has been prepared to aid in the evaluation of this site and to assist in the design of the project. It is intended for use concerning this specific project. We based our recommendations on information on the site and proposed construction as described in this report. Substantial changes in loads, locations, or grades should be brought to our attention so we can modify our recommendations as needed. We would appreciate an opportunity to review the plans and specifications as they pertain to the recommendations contained in this report, and to submit our comments to you based on this review.

We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this report, or other instrument of service.

FIGURES

Figure 1: Site Vicinity Map
Figure 2: Approximate Boring Location Plan
Figure 3: Lateral Earth Pressure Diagram for Design of Below-Grade Walls
Figure 4: Subdrainage Details

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Image courtesy of USGS © 2013 Microsoft Corporation © 2010 NAVTEQ © AND
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012
Projection: WGS 1984 Web Mercator Auxiliary Sphere

0 125 250 500 Feet

Scale: 1 in = 250 feet

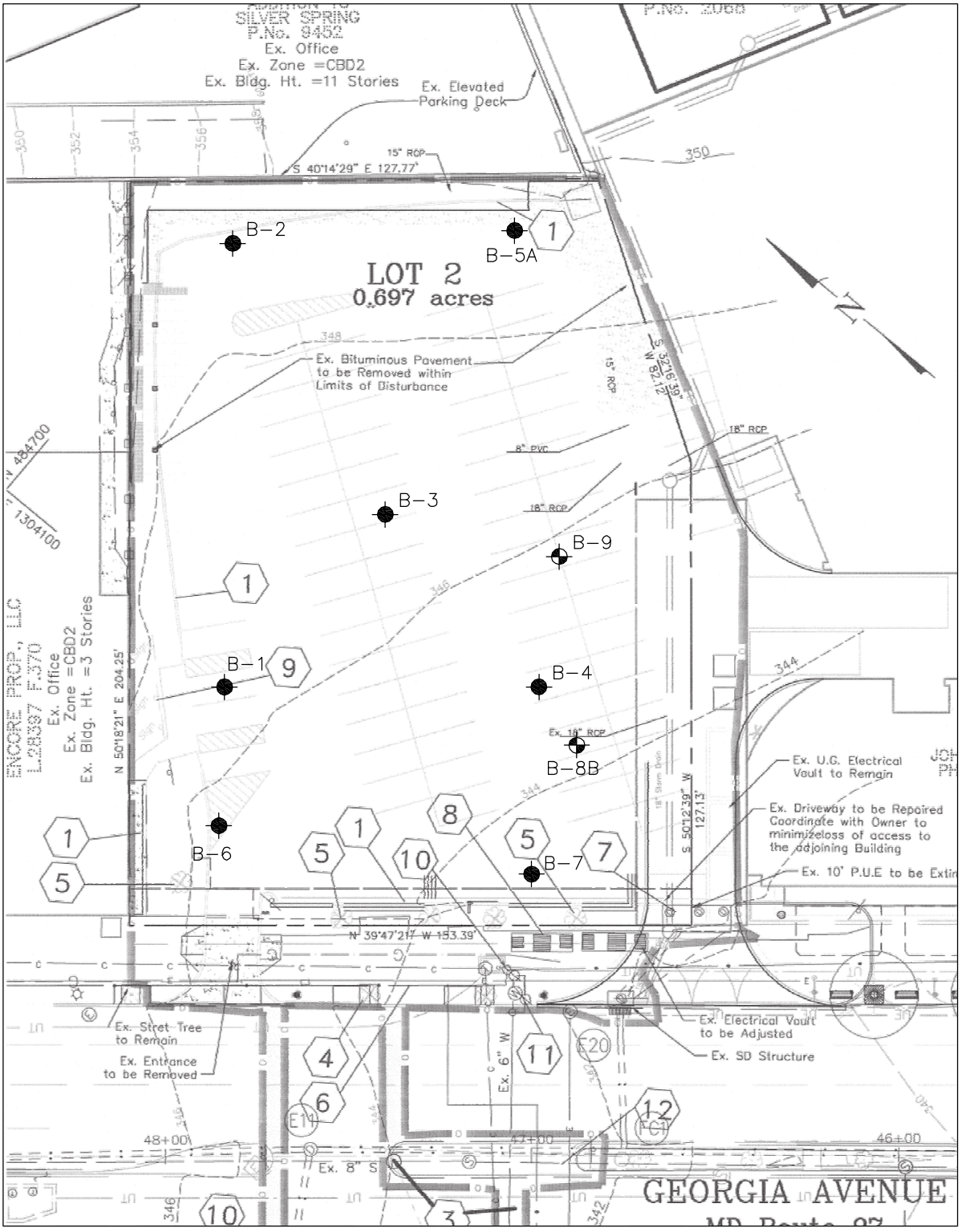
Schnabel ENGINEERING

8621 GEORGIA AVENUE
SILVER SPRING, MARYLAND

PROJECT NO. 12612074

SITE VICINITY MAP

FIGURE 1



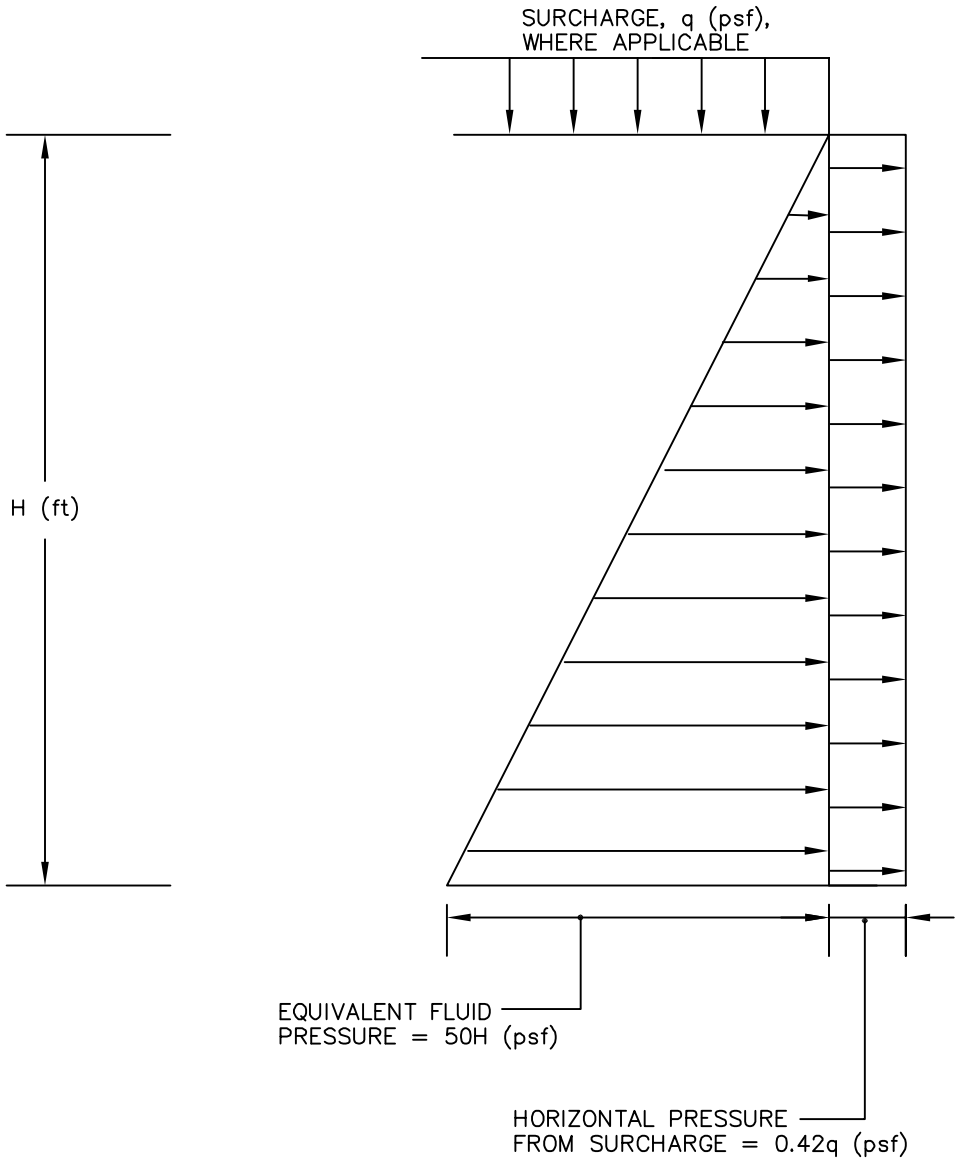
LEGEND

APPROXIMATE SCHNABEL BORING LOCATION (2013)
B-8

APPROXIMATE BORING LOCATIONS (2006 & 2007)
B-1

Base Plan Provided by Macris, Hendricks & Glascock, PA dated February 2001.

Schnabel ENGINEERING	8621 GEORGIA AVENUE SILVER SPRING, MARYLAND	APPROXIMATE BORING LOCATION PLAN PROJECT NO.: 12612074 MAY 2013 | FIGURE NO.: 2



NOTES:

1) EARTH PRESSURE DIAGRAM SHOWN ASSUMES FULL DRAINAGE OF HYDROSTATIC PRESSURE.

2) SEE REPORT FOR BACKFILL MATERIAL REQUIREMENTS.

Schnabel ENGINEERING

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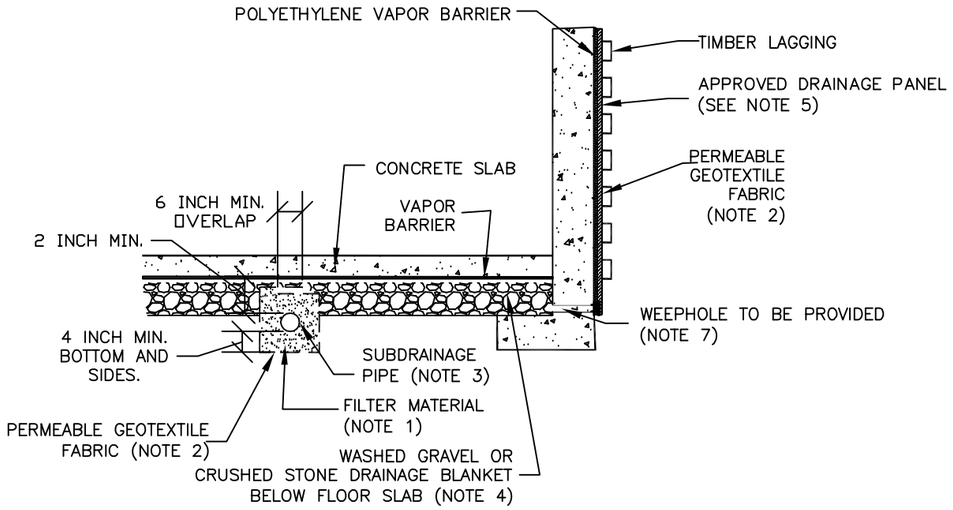
SILVER SPRING, MARYLAND

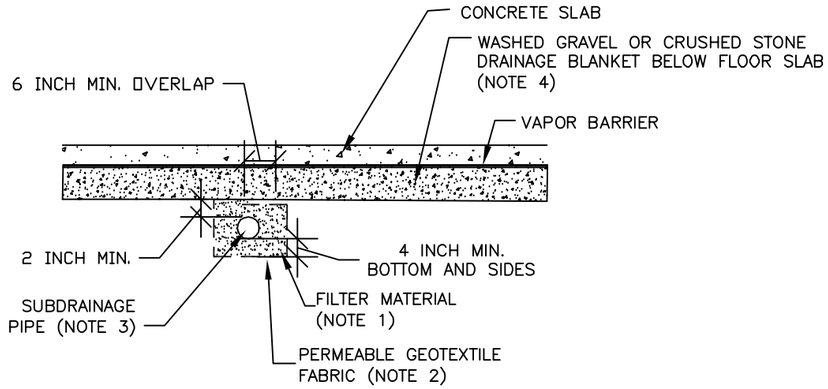
LATERAL EARTH PRESSURE DIAGRAM
FOR DESIGN OF BELOW GRADE WALLS

PROJECT NO.: 12612074

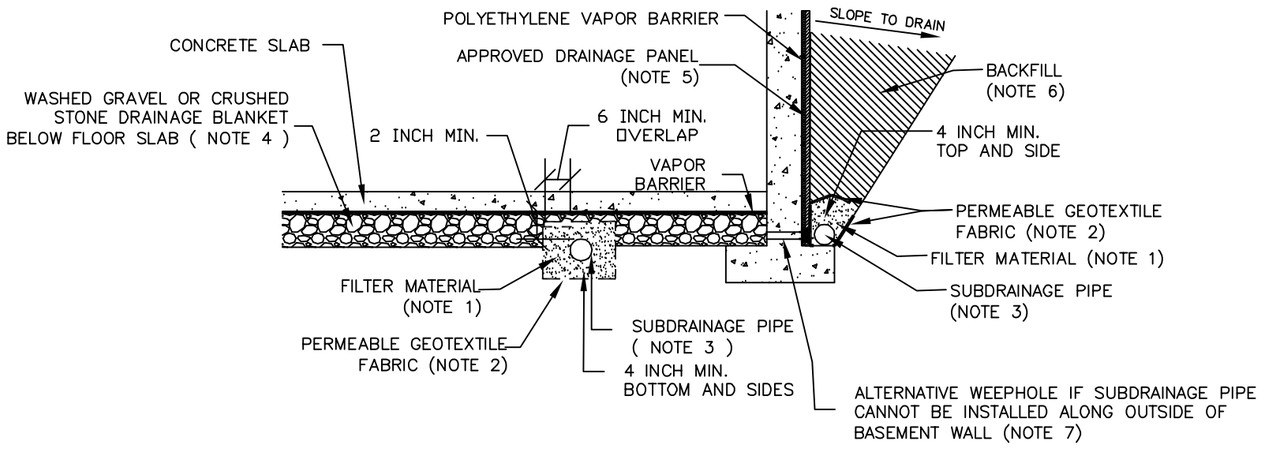
MAY 2013 | FIGURE NO.: 3



DRAINAGE DETAIL



INTERIOR FLOOR SLAB DRAINAGE DETAIL



ALTERNATIVE DRAINAGE DETAIL FOR SLOPED EXCAVATION

FOUNDATION DRAIN NOTES

1. FILTER MATERIAL GRADATION SHOULD SATISFY REQUIREMENTS FOR AASHTO NO.78 COARSE AGGREGATE.
2. PERMEABLE FABRIC SHOULD HAVE EQUIVALENT OPENING SIZE NOT LARGER THAN THE NO. 70 U.S. STANDARD SIEVE SIZE.
3. SUBDRAINAGE PIPING SHOULD BE 4 INCH DIAMETER SLOTTED CORRUGATED POLYETHYLENE (P.E. TUBING) ACCORDING TO ASTM F-405 WITH MAXIMUM ⅛ INCH SLOT WIDTH FOR AT LEAST THE LOWER 120° SECTOR. PIPING SHOULD BE INSTALLED TO OUTLET INTO A STORM SEWER OR SUMP WITH A PUMP.
4. WASHED GRAVEL OR CRUSHED STONE DRAINAGE BLANKET SHOULD SATISFY GRADATION REQUIREMENTS FOR AASHTO NO.57 STONE AND BE AT LEAST 4 INCH THICK.
5. APPROVED DRAINAGE PANEL SHOULD SATISFY MINIMUM THICKNESS OR FLOW CAPACITY REQUIREMENTS AS DETERMINED BY THE GEOTECHNICAL ENGINEER. GEOTEXTILE FILTER CLOTH SHOULD BE PLACED SUCH THAT IT IS IN CONTACT WITH THE SOIL BACKFILL OR EXCAVATION SHEETING.
6. BACKFILL MATERIAL TO MEET REQUIREMENTS IN PROJECT SPECIFICATIONS.
7. WEEPHOLES WHEN USED TO BE PROVIDED AT 8 FEET ON CENTER ALONG BASE OF WALL. WEEPHOLES SHALL CONSIST OF 3 INCH I.D. SOLID POLYETHYLENE PIPE.
8. DRAINGREAT™ SHALL BE USED FOR CONNECTION BETWEEN WEEPHOLE AND DRAINAGE BOARD AS SHOWN ON DETAIL. INSTALLATION TO BE DONE IN ACCORDANCE WITH MANUFACTURERS RECOMENDATIONS.

Schnabel ENGINEERING	8621 GEORGIA AVENUE SILVER SPRING, MARYLAND	Done: J. BENTEL	Figure Number: 4	Figure Name: SUBDRAINAGE DETAILS
		Reviewed: B. KHOURI	Date: MAY 2013	Project Number: 12612074

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APPENDIX A

SUBSURFACE EXPLORATION DATA

Subsurface Exploration Procedures
General Notes for Subsurface Exploration Logs
Identification of Soil
Boring Logs, B-1 through B-5A (2006)
Boring Logs, B-6 and B-7 (2007)
Boring Logs, B-8, B-8B and B-9 (2013)

SUBSURFACE EXPLORATION PROCEDURES

Test Borings – Hollow Stem Augers

The borings are advanced by turning an auger with a center opening of 2¼ or 3¼ 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.

Standard Penetration Test Results

The numbers in the Sampling Data column of the boring logs represent Standard Penetration Test (SPT) results. Each number represents the blows needed to drive a 2-inch O.D., 1⅜-inch I.D. split-spoon sampler 6 inches, using a 140-pound hammer falling 30 inches. The sampler is typically driven a total of 18 or 24 inches. The first 6 inches are considered a seating interval. The total of the number of blows for the second and third 6-inch intervals is the SPT "N value." The Standard Penetration Test is conducted according to ASTM D1586.

Soil Classification Criteria

The group symbols on the logs represent the Unified Soil Classification System Group Symbols (ASTM D2487) based on visual observation and limited laboratory testing of the samples. Criteria for visual identification of soil samples are included in this appendix. Some variation can be expected between samples visually classified and samples classified in the laboratory.

Disintegrated rock is defined as residual material with SPT N values between 60 blows per foot and refusal. Refusal is defined as an N value of 100 blows for a penetration of 2 inches or less.

Boring Locations and Elevations

Borings locations for the recent borings (2013) and the 2006 and 2007 investigations were approximately staked in the field by Schnabel personnel. Approximate boring locations are shown on Figure 2. Ground surface elevations at the boring locations have been estimated from the Macris, Hendricks & Glascock topographic drawing dated February 1, 2001. Locations and elevations should be considered no more accurate than the methods used to determine them.

GENERAL NOTES FOR SUBSURFACE EXPLORATION LOGS

1. Numbers in sampling data column next to Standard Penetration Test (SPT) symbols indicate blows required to drive a 2-inch O.D., 1⅜-inch I.D. sampling spoon 6 inches using a 140 pound hammer falling 30 inches. The Standard Penetration Test (SPT) N value is the number of blows required to drive the sampler 12 inches, after a 6 inch seating interval. The Standard Penetration Test is performed in general accordance with ASTM D1586.
2. Visual classification of soil is in accordance with terminology set forth in "Identification of Soil." The ASTM D2487 group symbols (e.g., CL) shown in the classification column are based on visual observations.
3. Estimated water levels indicated on the logs are only estimates from available data and may vary with precipitation, porosity of the soil, site topography, and other factors.
4. Refusal at the surface of rock, boulder, or other obstruction is defined as an SPT resistance of 100 blows for 2 inches or less of penetration.
5. The logs and related information depict subsurface conditions only at the specific locations and at the particular time when drilled or excavated. Soil conditions at other locations may differ from conditions occurring at these locations. Also, the passage of time may result in a change in the subsurface soil and water level conditions at the subsurface exploration location.
6. The stratification lines represent the approximate boundary between soil and rock types as obtained from the subsurface exploration. Some variation may also be expected vertically between samples taken. The soil profile, water level observations and penetration resistances presented on these 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.
7. Key to symbols and abbreviations:

	S-1, SPT 5+10+1	Sample No., Standard Penetration Test Number of blows in each 6-inch increment
	UD-1, UNDIST Rec=24", 100%	Sample No., 2" or 3" Undisturbed Tube Sample Recovery in inches, Percent Recovery
	SH-1, SH Rec=24", 100%	Sample No., 2" or 3" Shelby Tube Sample Recovery in inches, Percent Recovery
	PB-1, PB Rec=24", 100%	Sample No., 3" Pitcher Barrel Sample Recovery in inches, Percent Recovery
	OS-1, OS Rec=24", 100%	Sample No., 3" Osterberg Piston Sample Recovery in inches, Percent Recovery
	CAL-1, CAL Rec=18", 100%	Sample No., 3" Split-barrel sampler with rings Recovery in inches, Percent Recovery

	Run #1, CORE	Core No., Rock Core
	Run = 5.0 ft	Run length in feet
	REC = 60", 100%	Recovery in inches, Percent Recovery
	RQD = 60", 100%	RQD in inches, Percent RQD
	S-1, GEOPROBE	Sample No., Direct Push Sample
	Rec=24", 100%	Recovery in inches, Percent Recovery
	S-1, SAMPLE	Sample No., Hand Auger or Test Pit sample

DCP	Dynamic Cone Penetrometer
FID	Flame Ionization Detector Reading (ppm)
GP	Geostick Penetration Reading (inches)
LL	Liquid Limit
MC	Moisture Content (percent)
PID	Photoionization Detector Reading (ppm)
PL	Plastic Limit
PP	Pocket Penetrometer Reading (tsf)
TPH	Total Petroleum Hydrocarbons
%Passing#200	Percent by weight passing a No. 200 Sieve

IDENTIFICATION OF SOIL

I. DEFINITION OF SOIL GROUP NAMES (ASTM D2487)

			SYMBOL	GROUP NAME
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels – More than 50% of coarse fraction retained on No. 4 sieve Coarse, ¾" to 3" Fine, No. 4 to ¾"	Clean Gravels Less than 5% fines	GW	WELL GRADED GRAVEL
			GP	POORLY GRADED GRAVEL
		Gravels with fines More than 12% fines	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	Sands – 50% or more of coarse Fraction passes No. 4 sieve Coarse, No. 10 to No. 4 Medium, No. 40 to No. 10 Fine, No. 200 to No. 40	Clean Sands Less than 5% fines	SW	WELL GRADED SAND
			SP	POORLY GRADED SAND
		Sands with fines More than 12% fines	SM	SILTY SAND
			SC	CLAYEY SAND
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays – Liquid Limit less than 50 Low to medium plasticity	Inorganic	CL	LEAN CLAY
			ML	SILT
		Organic	OL	ORGANIC CLAY
				ORGANIC SILT
	Silts and Clays – Liquid Limit 50 or more Medium to high plasticity	Inorganic	CH	FAT CLAY
			MH	ELASTIC SILT
		Organic	OH	ORGANIC CLAY
				ORGANIC SILT
Highly Organic Soils	Primarily organic matter, dark in color and organic odor		PT	PEAT

II. DEFINITION OF SOIL COMPONENT PROPORTIONS (ASTM D2487)

			Examples
Adjective Form	GRAVELLY SANDY	>30% to <50% coarse grained component in a fine-grained soil	GRAVELLY LEAN CLAY
	CLAYEY SILTY	>12% to <50% fine grained component in a coarse-grained soil	SILTY SAND
"With"	WITH GRAVEL WITH SAND	>15% to <30% coarse grained component in a fine-grained soil	FAT CLAY WITH GRAVEL
	WITH GRAVEL WITH SAND	>15% to <50% coarse grained component in a coarse-grained soil	POORLY GRADED GRAVEL WITH SAND
	WITH SILT WITH CLAY	>5% to <12% fine grained component in a coarse-grained soil	POORLY GRADED SAND WITH SILT

III. GLOSSARY OF MISCELLANEOUS TERMS

SYMBOLS ..... Unified Soil Classification Symbols are shown above as group symbols. A dual symbol "-" indicates the soil belongs to two groups. A borderline symbol "/" indicates the soil belongs to two possible groups.

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

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

DISINTEGRATED ROCK (DR)..... Residual materials with a standard penetration resistance (SPT) between 60 blows per foot and refusal. Refusal is defined as an SPT of 100 blows for 2" or less penetration.

PARTIALLY WEATHERED ROCK (PWR)..... Residual materials with a standard penetration resistance (SPT) between 100 blows per foot and refusal. Refusal is defined as an SPT of 100 blows for 2" or less penetration.

BOULDERS & COBBLES..... Boulders are considered rounded pieces of rock larger than 12 inches, while cobbles range from 3 to 12-inch size.

LENSES..... 0 to ½-inch seam within a material in a test pit.

LAYERS..... ½ to 12-inch seam within a material in a test pit.

POCKET ..... Discontinuous body within a material in a test pit.

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

COLOR ..... Overall color, with modifiers such as light to dark or variation in coloration.

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Schnabel Engineering

TEST BORING LOG

Project: 8651 Georgia Avenue
Silver Spring, Maryland

Boring Number: **B-1**
Contract Number: 06120154
Sheet: 1 of 1

Boring Contractor: Recon Drilling, Inc.

Boring Foreman: V. Rodas
Drilling Method: 2-1/4 I.D. Hollow Stem Auger
Drilling Equipment: CME 550 ATV
SEA Representative: Joan Bentel
Dates Started: 9/22/06 **Finished:** 9/22/06
Location: See Boring Location Plan
Hammer Type: Automatic
Ground Surface Elevation: 346.5± (feet)

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Completion	9/22	---	Dry	---	---
Casing Pulled	9/22	---	Dry	---	16.7'
Long Term	9/25	---	Dry	---	16.5'

DEPTH (ft)	STRATA DESCRIPTION	SYMBOL	ELEV. (ft)	STRA-TUM	WL	SAMPLING DEPTH	SAMPLING DATA
0.6	Asphalt		345.9				
1.0	Gravel	SM	345.5				6+10+11
	silty SAND, with mica, moist, brown, trace gray and orangish-brown						
	light brown and gray at 3.5 feet						8+11+15
						5	
							15+21+22
				B			
	trace dark brown at 8.5 feet						12+16+20
						10	
13.5	DISINTEGRATED ROCK, with mica, moist, brown		333.0				100/6
						15	
				C			
18.6	light brown and gray at 18.5 feet BOTTOM OF BORING @ 18.6 FT.		327.9				100/2

Unconfined Compressive Strength, tons/ft.^{2}
1 2 3 4 5
PL MC LL
N VALUE, blows/ft.
20 40 60 80 100
8.4
8.9

Comments:
Spoon Refusal at 18.6 feet.
Boring backfilled and patched after long term water level reading.

TEST BORING LOG GAITHERSBURG BORING LOGS 06120154.GPJ SCHNABEL.GDT 6/11/13

Schnabel Engineering

TEST BORING LOG

Project: 8651 Georgia Avenue
Silver Spring, Maryland

Boring Number: **B-2**
Contract Number: 06120154
Sheet: 1 of 1

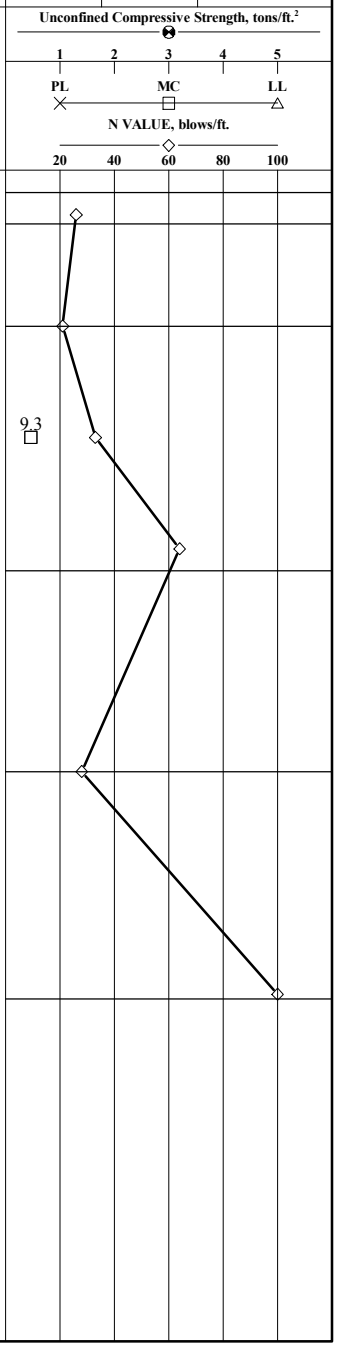
Boring Contractor: Recon Drilling, Inc.

Boring Foreman: V. Rodas
Drilling Method: 2-1/4 I.D. Hollow Stem Auger
Drilling Equipment: CME 550 ATV
SEA Representative: Joan Bentel
Dates Started: 9/22/06 **Finished:** 9/22/06
Location: See Boring Location Plan
Hammer Type: Automatic
Ground Surface Elevation: 349.0± (feet)

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Completion	9/22	---	Dry	---	---
Casing Pulled	9/22	---	Dry	---	16.5'
Long Term	9/25	---	Dry	---	16.3'

DEPTH (ft)	STRATA DESCRIPTION	SYMBOL	ELEV. (ft)	STRA-TUM	WL	SAMPLING DEPTH	SAMPLING DATA
0.5	Asphalt		348.5				
1.2	Gravel		347.8				
	silty sand FILL, with concrete, brick and asphalt fragments, trace gravel, moist, brown and gray	FILL		A			9+16+10
3.5	silty SAND, with mica, moist, brown	SM	345.5				7+11+10
	trace rock fragments and mica flakes, trace orangish-brown and dark brown at 6.0 feet			B		5	10+18+15
9.0	DISINTEGRATED ROCK, trace mica, moist, brown		340.0			10	10+24+40
				C			
13.5	silty SAND, with mica, moist, light brown and gray, trace dark brown and orangish-brown	SM	335.5			15	9+12+16
				B			
18.6	rock fragments at 18. 5 feet BOTTOM OF BORING @ 18.6 FT.		330.4				100/1



Comments:
Spoon Refusal at 18.6 feet.
Boring backfilled and patched after long term water level reading.

TEST BORING LOG GAITHERSBURG BORING LOGS 06120154.GPJ SCHNABEL.GDT 6/11/13

Schnabel Engineering

TEST BORING LOG

Project: 8651 Georgia Avenue
Silver Spring, Maryland

Boring Number: **B-3**
Contract Number: 06120154
Sheet: 1 of 2

Boring Contractor: Recon Drilling, Inc.

Boring Foreman: V. Rodas
Drilling Method: 2-1/4 I.D. Hollow Stem Auger
Drilling Equipment: CME 550 ATV
SEA Representative: Joan Bentel
Dates Started: 9/25/06 **Finished:** 9/25/06
Location: See Boring Location Plan
Hammer Type: Automatic
Ground Surface Elevation: 347.0± (feet)

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Completion	9/25	---	Dry	---	---
Casing Pulled	9/25	---	28.0'	---	29.0'

DEPTH (ft)	STRATA DESCRIPTION	SYMBOL	ELEV. (ft)	STRA-TUM	WL	SAMPLING DEPTH	SAMPLING DATA
0.2	Asphalt		346.8				
0.8	Gravel	SM	346.3				
	silty SAND, with mica, moist, brown, trace light gray and black						9+11+14
	trace rock fragments, brown at 3.5 feet					5	7+12+15
	trace orangish-brown at 6.0 feet						17+23+24
	trace tan, dark brown and gray at 8.5 feet			B		10	17+18+21
						15	16+17+17
19.0	DISINTEGRATED ROCK, with mica, moist, brown and gray, trace off-white and orangish-brown		328.0			20	16+33+55
				C			
	brown at 23.5 feet					25	25+32+28
	continued on next page						

Unconfined Compressive Strength, tons/ft.^{2}
1 2 3 4 5
PL MC LL
N VALUE, blows/ft.
20 40 60 80 100
11.5

Comments:
Spoon Refusal at 33.6 feet.
Boring backfilled and patched upon completion.

TEST BORING LOG GAITHERSBURG BORING LOGS 06120154.GPJ SCHNABEL.GDT 6/11/13

Schnabel Engineering

TEST BORING LOG

Project: 8651 Georgia Avenue
Silver Spring, Maryland

Boring Number: **B-3**
Contract Number: 06120154
Sheet: 2 of 2

DEPTH (ft)	STRATA DESCRIPTION	SYMBOL	ELEV. (ft)	STRA-TUM	WL	SAMPLING DEPTH	SAMPLING DATA
	DISINTEGRATED ROCK, with mica, moist, brown and gray, trace off-white and orangish-brown *(continued)*						
	light brown and gray at 28.5 feet			C		30	70+30/1
33.6	gray at 33.5 feet BOTTOM OF BORING @ 33.6 FT.		313.4				100/1

Unconfined Compressive Strength, tons/ft.^{2}
1 2 3 4 5
PL MC LL
N VALUE, blows/ft.
20 40 60 80 100

Comments:
Spoon Refusal at 33.6 feet.
Boring backfilled and patched upon completion.

TEST BORING LOG GAITHERSBURG BORING LOGS 06120154.GPJ SCHNABEL.GDT 6/11/13

Schnabel Engineering

TEST BORING LOG

Project: 8651 Georgia Avenue
Silver Spring, Maryland

Boring Number: **B-4**
Contract Number: 06120154
Sheet: 1 of 1

Boring Contractor: Recon Drilling, Inc.

Boring Foreman: V. Rodas
Drilling Method: 2-1/4 I.D. Hollow Stem Auger
Drilling Equipment: CME 550 ATV
SEA Representative: Joan Bentel
Dates Started: 9/25/06 **Finished:** 9/25/06
Location: See Boring Location Plan
Hammer Type: Automatic
Ground Surface Elevation: 345.0± (feet)

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Completion	9/25	---	Dry	---	---
Casing Pulled	9/25	---	Dry	---	2.7'

DEPTH (ft)	STRATA DESCRIPTION	SYMBOL	ELEV. (ft)	STRA-TUM	WL	SAMPLING DEPTH	SAMPLING DATA	Unconfined Compressive Strength, tons/ft.² (1 2 3 4 5) PL MC LL; N VALUE, blows/ft. (20 40 60 80 100)
0.3	Asphalt		344.8					
0.5	Gravel	FILL	344.5					
	silty sand FILL, with asphalt, brick, stone fragments, and wood fragments, moist, dark brown, trace black			A			18+23+31	
3.5			341.5				100/0 *	
	BOTTOM OF BORING @ 3.5 FT.							

Comments:
Auger and spoon refusal at 3.5 feet.
Offset boring 10 feet towards boring B-5. Refused again due to possible concrete obstructions at same elevation. Offset boring total of four times, boring cancelled.
Boring and offset borings backfilled and patched upon completion.
* = no recovery

TEST BORING LOG GAITHERSBURG BORING LOGS 06120154.GPJ SCHNABEL.GDT 6/11/13

Schnabel Engineering

TEST BORING LOG

Project: 8651 Georgia Avenue
Silver Spring, Maryland

Boring Number: **B-5**
Contract Number: 06120154
Sheet: 1 of 1

Boring Contractor: Recon Drilling, Inc.

Boring Foreman: V. Rodas
Drilling Method: 2-1/4 I.D. Hollow Stem Auger
Drilling Equipment: CME 550 ATV
SEA Representative: Joan Bentel
Dates Started: 9/22/06 **Finished:** 9/22/06
Location: See Boring Location Plan
Hammer Type: Automatic
Ground Surface Elevation: 349.0± (feet)

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Completion	9/22	---	Dry	---	---
Casing Pulled	9/22	---	Dry	---	6.8'

DEPTH (ft)	STRATA DESCRIPTION	SYMBOL	ELEV. (ft)	STRA-TUM	WL	SAMPLING DEPTH	SAMPLING DATA
0.3	Asphalt		348.7				
0.8	Gravel	FILL	348.3				7+11+41
	sandy silt FILL, with clay pockets and wood fragments, trace brick fragments, gravel and asphalt, moist,						
3.5	brown, trace tan	FILL	345.5	A			14+7+14
	silty sand FILL, with brick, concrete and asphalt fragments, moist, tan and dark gray					5	
6.0	BOTTOM OF BORING @ 6.0 FT.		343.0				100/0 ✳

Unconfined Compressive Strength, tons/ft.^{2}
1 2 3 4 5
PL MC LL
N VALUE, blows/ft.
20 40 60 80 100

Comments:
Auger and spoon refusal at 6.0 feet.
Boring backfilled and patched upon completion.
* = no recovery

TEST BORING LOG GAITHERSBURG BORING LOGS 06120154.GPJ SCHNABEL.GDT 6/11/13

Schnabel Engineering

TEST BORING LOG

Project: 8651 Georgia Avenue
Silver Spring, Maryland

Boring Number: **B-5A**
Contract Number: 06120154
Sheet: 1 of 1

Boring Contractor: Recon Drilling, Inc.

Boring Foreman: V. Rodas
Drilling Method: 2-1/4 I.D. Hollow Stem Auger
Drilling Equipment: CME 550 ATV
SEA Representative: Joan Bentel
Dates Started: 9/22/06 **Finished:** 9/22/06
Location: See Boring Location Plan
Hammer Type: Automatic
Ground Surface Elevation: 349.0± (feet)

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Completion	9/22	---	Dry	---	---
Casing Pulled	9/22	---	Dry	---	14.5'
Long Term	9/25	---	Dry	---	14.5'

DEPTH (ft)	STRATA DESCRIPTION	SYMBOL	ELEV. (ft)	STRA-TUM	WL	SAMPLING DEPTH	SAMPLING DATA
0.4	Asphalt		348.6				
0.8	Gravel		348.3				
	Auger Probe					5	
6.0	silty SAND, with mica, trace rock fragments, moist, brown, trace off-white and gray	SM	343.0				6+25+28
	trace orangish-brown at 8.5 feet			B		10	14+12+10
13.5	DISINTEGRATED ROCK, trace mica, moist, brown ,trace off-white and orangish-brown		335.5				100/6
				C		15	
18.6	gray at 18.5 feet BOTTOM OF BORING @ 18.6 FT.		330.4				100/1

Unconfined Compressive Strength, tons/ft.^{2}
1 2 3 4 5
PL MC LL
N VALUE, blows/ft.
20 40 60 80 100
10.2

Comments:
Spoon refusal at 18.6 feet.
Offset boring 10 feet towards B-2 (same elevation).
Boring backfilled and patched after long term water level reading.

TEST BORING LOG GAITHERSBURG BORING LOGS 06120154.GPJ SCHNABEL.GDT 6/11/13

Schnabel Engineering | **TEST BORING LOG**

Project: Additional Services at 8651 Georgia Avenue
Silver Spring, Maryland

Boring Number: **B-6**
Contract Number: 07120150
Sheet: 1 of 1

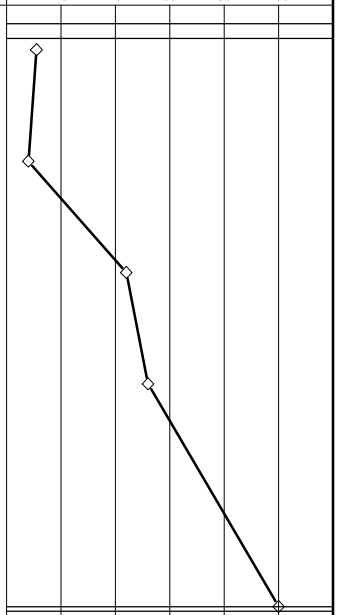
Boring Contractor: Recon Drilling, Inc.
Boring Foreman: Nick T.
Drilling Method: 2-1/4 I.D. Hollow Stem Auger
Drilling Equipment: CME 550 ATV
SEA Representative: Joan Bentel
Dates Started: 9/5/07 **Finished:** 9/5/07
Location: See Boring Location Plan
Hammer Type: Automatic
Ground Surface Elevation: 345.5± (feet)

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Completion	9/5	---	Dry	---	---
Casing Pulled	9/5	---	Dry	---	8.5'

DEPTH (ft)	STRATA DESCRIPTION	SYMBOL	ELEV. (ft)	STRA-TUM	WL	SAMPLING DEPTH	SAMPLING DATA
0.4	Asphalt		345.1				
0.8	Crushed Stone	SM	344.8				6+6+5
	silty SAND, micaceous, trace clay seams, moist, brown						4+4+4
						5	
	tan and brown, trace orangish-brown at 6.5 feet			B			10+17+27
	trace clay seams, orangish-brown and grayish-broen, trace black and yellowish-brown at 8.5 feet						14+15+37
						10	
13.5			332.0				
13.6	DISINTEGRATED ROCK, with mica, moist, grayish-brown, trace white and orangish-brown		331.9	C			100/1
	BOTTOM OF BORING @ 13.6 FT.						

Unconfined Compressive Strength, tons/ft.^{2}
1 2 3 4 5
PL MC LL
N VALUE, blows/ft.
20 40 60 80 100



Comments:
Boring backfilled and asphalt patched upon completion.
Spoon refusal at 13.6 ft.

TEST BORING LOG GAITHERSBURG BORING LOGS 07120150.GPJ SCHNABEL.GDT 5/20/13

Schnabel Engineering

TEST BORING LOG

Project: Additional Services at 8651 Georgia Avenue
Silver Spring, Maryland

Boring Number: B-7
Contract Number: 07120150
Sheet: 1 of 1

Boring Contractor: Recon Drilling, Inc.

Boring Foreman: Nick T.

Drilling Method: 2-1/4 I.D. Hollow Stem Auger

Drilling Equipment: CME 550 ATV

SEA Representative: Joan Bentel

Dates Started: 9/5/07 **Finished:** 9/5/07

Location: See Boring Location Plan

Hammer Type: Automatic

Ground Surface Elevation: 343.5± (feet)

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Completion	9/5	---	Dry	---	---
Casing Pulled	9/5	---	Dry	---	7.0'

DEPTH (ft)	STRATA DESCRIPTION	SYMBOL	ELEV. (ft)	STRA-TUM	WL	SAMPLING DEPTH	SAMPLING DATA
0.3	Asphalt		343.3				
0.7	Crushed Stone	FILL	342.8				
	silty sand FILL, with concrete, brick and wood fragments, moist, brown and light brown						11+15+12
	with clay pockets, trace asphalt, dark brown at 3.5 feet						3+4+20
						5	
							15+10+4
				A			
	trace foam (demolition debris) and roots at 8.5 feet						4+3+100/2
						10	
14.0	trace wire fragments at 13.5 feet		329.5				58+27+15/5
	DISINTEGRATED ROCK, with mica, moist, grayish-brown, trace dark brown and tan					15	
				C			
18.7	BOTTOM OF BORING @ 18.7 FT.		324.8				100/2

Unconfined Compressive Strength, tons/ft.^{2}
1 2 3 4 5
PL MC LL
N VALUE, blows/ft.
20 40 60 80 100

Comments:
Boring offset three times. Encountered refusal at 8 ft at first location. Boring offset 5 ft towards B-6 (north), refusal encountered at 14 ft due to concrete obstruction. Boring offset 15 ft toward Georgia Avenue (west). Approximately the same elevation as originally staked.
Boring backfilled and asphalt patched upon completion.
Spoon refusal at 18.7 ft.

TEST BORING LOG GAITHERSBURG BORING LOGS 07120150.GPJ SCHNABEL.GDT 5/20/13

Schnabel ENGINEERING **TEST BORING LOG**

Project: 8621 Georgia Avenue
Silver Spring, Maryland

Boring Number: **B-8**
Contract Number: 12612074
Sheet: 1 of 1

Contractor: Recon Drilling
Leesburg, Virginia
Contractor Foreman: Chris Gudiel
Schnabel Representative: Eoin Durcan
Equipment: CME 550 ATV
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/18/13 **Finished:** 2/18/13
Location: See Location Plan

Ground Surface Elevation: 344± (ft) **Total Depth:** 10.0 ft

Groundwater Observations

Date	Time	Depth	Casing	Caved

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Asphalt		343.8					
0.5	GRAVEL BASE		343.5					
	FILL, sampled as silty sand; moist, dark brown, contains asphalt fragments, brick fragments, concrete fragments, and lean clay pockets	FILL		A		SS 16+19+10 REC=6", 33%		
					5	SS 4+3+1 REC=6", 33%		
	Change: contains wire fragment					SS 3+3+3 REC=5", 28%		
8.5	FILL, sampled as poorly graded gravel with silt and sand; moist, brown, contains brick fragments, contains concrete	FILL	335.5					
10.0			334.0		10	SS 3+4+3 REC=8", 44%		

Bottom of Boring at 10.0 ft.
Auger refusal at 10 ft (believed to have refused on construction debris, possibly old foundation or wall). Boring offset 5 ft north due to refusal in fill (Boring B-8A).
Auger refusal encountered at 10 ft in Boring B-8A (due to construction debris), boring offset a second time (see boring log B-8B for details).
Borings B-8 and B-8A were backfilled upon completion and asphalt was patched.

Schnabel ENGINEERING **TEST BORING LOG**

Project: 8621 Georgia Avenue
Silver Spring, Maryland

Boring Number: **B-8B**
Contract Number: 12612074
Sheet: 1 of 1

Contractor: Recon Drilling
Leesburg, Virginia
Contractor Foreman: Chris Gudiel
Schnabel Representative: Eoin Durcan
Equipment: CME 550 ATV
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/18/13 **Finished:** 2/18/13
Location: See Location Plan

Ground Surface Elevation: 344± (ft) **Total Depth:** 26.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	2/18	---	20.0'	---	---
Completion ▼	2/18	---	19.0'	---	---
Casing Pulled	2/18	---	Dry	---	18.9'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	Auger Probe							
13.5	DISINTEGRATED ROCK, sampled as sandy silt; moist, light brown, estimated 5 - 10% mica	DR	330.2	C	15	SS 100/2" REC=2", 100%		
	Change: light brownish gray, estimated 5 - 10% rock fragments ▼ ▽				20	SS 100/2" REC=2", 100%		
23.5	DISINTEGRATED ROCK, sampled as silty sand; moist, estimated 15 - 25% rock fragments	DR	320.2		25	SS 100/1" REC=1", 100%		
26.0			317.7			SS 100/0" REC=0"		

Bottom of Boring at 26.0 ft.
Auger and spoon refusal at 26 ft.
Boring located 6 ft east from B-8A offset. Augered to a depth of 13.5 ft where sampling began.
Boring backfilled upon completion and asphalt patched.
Excess soil spoils removed from site.

TEST BORING LOG DRAFT LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/20/13

Schnabel ENGINEERING **TEST BORING LOG**

Project: 8621 Georgia Avenue
Silver Spring, Maryland

Boring Number: **B-9**
Contract Number: 12612074
Sheet: 1 of 2

Contractor: Recon Drilling
Leesburg, Virginia
Contractor Foreman: Chris Gudiel
Schnabel Representative: Eoin Durcan
Equipment: CME 550 ATV
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/18/13 **Finished:** 2/18/13
Location: See Location Plan

Ground Surface Elevation: 346± (ft) **Total Depth:** 33.6 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	2/18	---	20.0'	---	---
Completion ▽	2/18	---	20.0'	---	---
Casing Pulled ▽	2/18	---	22.0'	---	31.1'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Asphalt		345.7					
0.5	GRAVEL BASE		345.5					
	FILL, sampled as silty sand; moist, dark brown, contains metal, wood, brick fragments, and concrete fragments	FILL		A		SS 32+40+27 REC=18", 100%		
	Change: contains asphalt				5	SS 100/2" REC=2", 11%		
6.0	SANDY SILT; moist, estimated <5% quartz fragments, estimated 5 - 10% mica, light brown with speckles of white and dark brown	ML	340.0	B		SS 16+28+29 REC=15", 83%		
8.5	DISINTEGRATED ROCK, sampled as sandy silt; moist, estimated 5 - 10% mica, estimated <5% quartz fragments, yellowish brown with mottles of dark brown and speckles of white		337.5		10	SS 23+37+52 REC=14", 78%		
	Change: grayish brown with mottles of dark brown and speckles of white				15	SS 32+100/5" REC=10", 91%		
	Change: light gray	DR		C	20	SS 100/1" REC=1", 100%		
	Change: brown, estimated 5 - 10% rock fragments				25	SS 100/0" REC=2"		
	Change: very moist, dark brown, estimated 50 - 100% rock fragments					SS 100/1" REC=1", 100%		

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: 8621 Georgia Avenue
Silver Spring, Maryland

Boring Number: **B-9**
Contract Number: 12612074
Sheet: 2 of 2

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
33.6	Change: estimated 30 - 45% rock fragments	DR	312.4	C		SS 100/1" REC=1", 100%		

Bottom of Boring at 33.6 ft.
Spoon refusal at 33.6 ft.
Boring backfilled upon completion and asphalt patched.
Excess soil spoils removed from site.

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APPENDIX B

SOIL LABORATORY TEST DATA

Summary of Laboratory Tests (2006 – 1 Sheet)
Gradation Curve (2006 – 1 Sheet)

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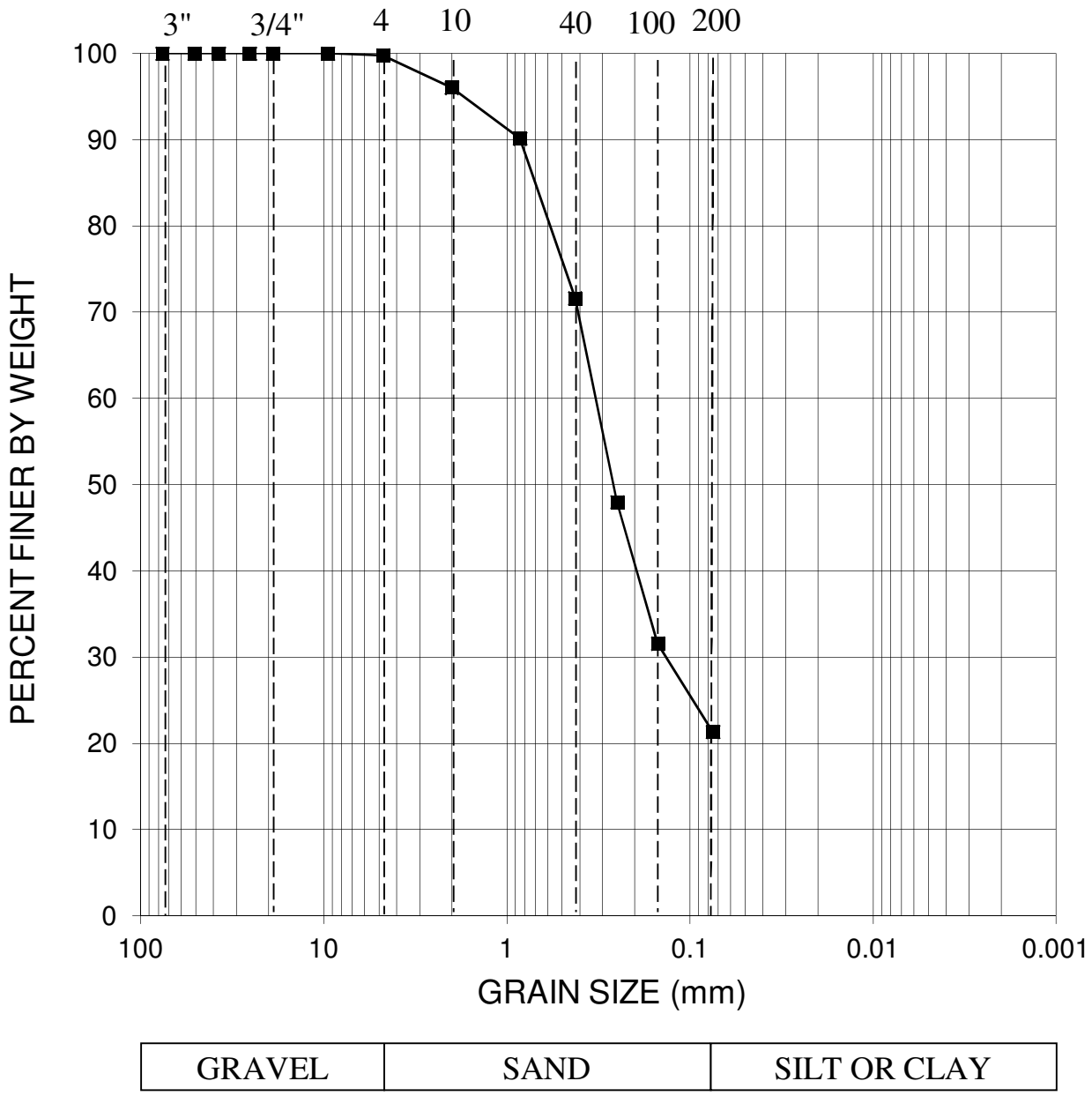
Contract Number: 06120154.00
Project Name: 8651 Georgia Avenue

SUMMARY OF SOIL LABORATORY TEST RESULTS

BORING NO.	DEPTH (ft.)	STRATUM	DESCRIPTION OF SOIL SPECIMEN	SAMPLE CLASS.	SIEVE RESULTS		ATTERBERG LIMITS			NATURAL MOISTURE (%)
					PERCENT PASSING NO.200	PERCENT RETAINED NO.4	LL	PL	PI	
B-1	6.0-7.5	B	Silty SAND, brown	SM	21.3	0.2	NP	NP	NP	8.4

NOTES:

1. Soil tests are in accordance with applicable ASTM standards
2. Soil classification symbols are in accordance with Unified soil classification system, based on testing indicated and visual identification.
3. Visual identification of samples is in accordance with the system used by the firm.
4. Key to abbreviation: LL = Liquid Limit; PL = Plastic Limit; PI = Plasticity Index; NP = Nonplastic



Key	Sample	Depth(ft.)	Sample Description	Class.	LL	PI
■	B-1	6.0-7.5	Silty SAND, brown	SM	NP	NP

Schnabel Engineering North, LLC

GRADATION CURVES

Project: 8651 Georgia Avenue

Contract No. 06120154.00

Date: 10/04/06 Method: ASTM D422