

# SESI

CONSULTING  
ENGINEERS

## GEOTECHNICAL INVESTIGATION AND REPORT

FOR

Proposed 7-Story Residential Building  
1311 Webster Ave.  
Bronx, New York

PREPARED FOR:

Jarmel Kizel Architects and Engineers, Inc.  
42 Okner Parkway  
Livingston, New Jersey 07039

PREPARED BY:

SESI CONSULTING ENGINEERS P.C.  
12A Maple Avenue  
Pine Brook, NJ 07058

Job No.: 9320

DATE:

March 14, 2016



## INTRODUCTION AND PROPOSED CONSTRUCTION

In accordance with our Professional Services Agreement, we have completed our geotechnical investigation for the proposed multi-storied residential building to be constructed 1311 Webster Avenue in Bronx, New York. The site is presently bounded by Webster Ave. to the east, an existing 1-story commercial brick building to the north, existing multi-storied brick buildings to the west and East 169<sup>th</sup> Street to the south.

The existing site is a former gas station which has been recently demolished. The former structures have been removed and reportedly the underground fuel storage tanks have been removed and the tank excavations backfilled. The surface of the site is a combination of existing asphalt pavement with soil at the surface in those portions of the site in which excavation operations for the tanks and kiosk removal took place. Currently, a chain link fence surrounds the property with an opening into the lot along Webster Ave. Existing topographic information was not provided at the time of this writing; however, based on visual observations the majority of the site is basically flat with minimal elevation changes across the site. A stone gravity retaining wall was noted along the northern, western and southern sides of the site. Most of the wall is in excess of 10 feet tall and supports both soil and rock within the backfill of the wall. Along the western and northern sides of the site, the slope is highly vegetated; however, rock outcrops were noted within the exposed portions of the slope behind the stone retaining wall. The slope behind the stone retaining wall extends to the property line to the west.

We understand that the proposed construction will consist of an 8-story residential structure with an approximate footprint of 15,000 square feet. It is further our understanding that the proposed building will be constructed with a below grade level of approximately 3,000 sq. ft. positioned closer towards Webster Avenue. We have not been provided with the anticipated column or foundation loads at the time of this writing. In addition, the proposed finished floor elevation was not provided; however, we have assumed that the proposed building will have a first floor elevation approximately equal to the existing sidewalk elevation.

## FIELD INVESTIGATION

Our engineering study consisted of a site reconnaissance, a review of existing soils and geologic data, and a field investigation consisting of the advancement of eight (8) soil borings and the excavation of six (6) test pits. The soil borings were advanced to a maximum depth of approximately 20± feet below the existing ground surface, while the test pits were excavated to a maximum depth of 3 feet below existing grade. The borings were drilled with a truck-mounted drill rig at accessible locations within the footprint of the proposed building using hollow-stem auger drilling techniques. Test pit excavations were made using a crawler mounted excavator primarily along the western side of the site to reveal the depth to bedrock within these areas.

The locations of the soil borings and test pit excavations are shown on the *Boring and Test Pit Location Plan*, which is included as *Figure 1*. Individual soil boring

and test pit logs, which describe the materials encountered, are presented as *Figures 2 through 16*. A key to soil terminology is included as *Figure 17*.

Soil samples suitable for identification purposes were extracted from the borings at closely-spaced intervals in accordance with the Standard Penetration Test. For this test, a standard split-spoon sampler (2 inches outside diameter, one and three-eighths inches inside diameter) is driven into the soil by a 140 pound weight falling 30 inches. After discounting the initial six inches of penetration due to possible disturbance of the material resulting from the drilling operation, the number of blows required to advance the sampler a distance of 12 inches are recorded and designated as the standard penetration resistance or "N" value. The "N" value is an indication of the relative compactness of the soil in-situ.

All fieldwork was performed under the full time technical observation of an engineer/technician from SESI Consulting Engineers P.C. Our field representative located the borings and test pit excavations in the field, maintained continuous logs of the explorations as work proceeded and coordinated the soil sampling operations in order to develop the required subsurface information.

All soil samples were taken to our soils laboratory for further examination and classification.

## **SUBSURFACE CONDITIONS**

Geologically, according to the United States Geologic Survey, the soils expected to be encountered on this site have been mapped as glacial till overlying bedrock deposited during the Quaternary period. The till is primarily composed of an unsorted mixture of rock and soil fragments ranging from clay-size particles to boulders derived from the bedrock to the north and northwest of the site. Generally these soils consist of well graded granular material with numerous boulders, some approaching 10 feet in diameter. Based on the Bedrock Map compiled by the United States Geologic Survey, the depth to bedrock is generally within 20 feet of the surface.

The following subsurface conditions were encountered in order of increasing depth:

**Surface Materials:** Pavement was encountered in each of the six test pit excavations and within three of the soil borings with an approximate thickness of 2 to 3 inches.

**Fill (NYC-DOB Class 7):** An uncontrolled fill was encountered below the surface material to depths of approximately 9 to 10 feet below the ground surface. The fill material was generally a granular material consisting of medium to fine sand with varying amounts of silt and gravel. The higher blow counts obtained in the during the soil sampling operation are likely the result of encountering obstructions or gravel in the fill that impeded the advancement of the split-spoon sampler. The variation in the blow count is also an indication that the fill was originally placed in an uncontrolled manner and/or with variable compactive effort.

**Sand (NYC-DOB Class 3b):** Beneath the surface materials and fill, the natural glacial till soil deposits consist primarily of a brown coarse to fine sand with varying amounts of silt and gravel were encountered. This stratum was only encountered within Boring 8 and extended to the completion depth of the boring. Based on the blow counts obtained from the borings, the granular till soils can be classified as medium dense.

**Bedrock (NYC-DOB Class 1c) :** Bedrock was encountered in all of the soil borings and test pit excavations. The depth to bedrock varied from 2 feet below existing grade to as deep as 20 feet below existing grade. The rock was cored in five of the eight borings for a depth of five feet, with recovery rates varying from 60% to 100%. In addition, the Rock Quality Designation (RQD) was also computed on the recovered rock cores. The RQD varied from 0% to 96% with the average of the five cores being 57.6%. The rock recovered from the coring operation was identified as slightly fractured gray, white gneiss.

<b>RELATIONSHIP OF RQD AND ROCK QUALITY:</b>	
<u>ROCK QUALITY DESIGNATION (RQD)<sup>(1)</sup></u>	<u>DESCRIPTION OF ROCK QUALITY</u>
0 – 25 .....	VERY POOR
25 – 50 .....	POOR
50 – 75 .....	FAIR
75 – 90 .....	GOOD
90 – 100 .....	EXCELLENT

<sup>(1)</sup> "Rock Quality Designation" is defined as the cumulative amount of pieces of the core that are at least 4 inches long divided by the total length of the rock core run. Obvious fractures caused by drilling are ignored in this system.

**Groundwater:** Groundwater was not encountered in any of the borings or test pit excavations at the time of our investigation.

**EVALUATION AND RECOMMENDATIONS**

**General**

From a soils and foundation standpoint, this site may be considered good to excellent with respect to providing adequate support for the proposed 8-story residential building. Existing uncontrolled fill was encountered throughout the site originating at the ground surface; however, the existing fill materials will be excavated as part of the mass excavation for the proposed below grade building level. The natural gneiss bedrock encountered below the existing fill is suitable for the support of the anticipated building loads.

In general, the site preparation procedures should consist of the installation of a temporary excavation support system to support the sides of the mass excavation during foundation construction of the below grade portion of the proposed building.

The primary negative aspect of the existing site conditions is that a temporary excavation support system will be required along two sides of the proposed excavation and the existing building to the north may require underpinning. The excavation support system will be required to support Webster Ave on the eastern side of the site and 169<sup>th</sup> Street on the southern side of the site. Due to the relatively shallow depth to the rock, the excavation support system may require boring the soldier piles into the rock. This would involve coring a rock socket for the pile to be inserted and grouted, otherwise external bracing in the form of rakers or tiebacks will be required to support the surrounding properties. In addition to the excavation support system, rock excavation may be required along the western side of the site due to its shallow depth.

Groundwater most likely will not be encountered during construction of the proposed building foundations; however, we recommend making provisions to remove any water which might collect within the bottom of the excavation due to storm water runoff. Shallow sumps backfilled with crushed stone should be sufficient to remove any collected water. Water seeping along the soil/rock interface should be anticipated, especially during wet weather.

#### **Building Area Preparation Procedures**

In general, the building area preparation procedures should consist of the installation of the excavation support system, to be discussed later, mass excavating the proposed building footprint to the proposed building subgrade elevation and obtain rock suitable for bearing of the proposed building foundations. All foundations should bear on the rock to avoid differential movement between rock supported columns and earth supported columns. In some areas this may require an excavation for a foundation deeper than the mass excavation for the below grade level. In these situations, a pier and grade beam foundation support should be utilized. A smaller local excavation could be extended to the rock and a footing and pier constructed to support the grade beam.

#### **Backfill Procedures**

All backfill shall be done using a granular soil fill placed in maximum 12-inch thick lifts. Each lift of soil should be compacted using a walk-behind vibratory compactor (Rammax or equivalent) making a minimum of 4 complete passes of each lift. The soil fill should be compacted to a minimum of 95 percent of Modified Proctor density as determined by the laboratory ASTM test designation D 1557, to finished sub-grade elevation. In-place field density tests should be performed, when applicable, to determine the adequacy of the compactive effort. Wetting or drying of the fill material should be accomplished as necessary to achieve the required density.

The fill materials may be obtained from suitable excavated existing fill or from off-site borrow. The existing on-site fill material should be segregated during the mass excavation operation to isolate reusable materials from those that need to be disposed. All wood, metal or otherwise decomposable materials should be

removed from the fill soil prior to reuse within the compacted fill. Wetting or drying of the fill soils may be required prior to their reuse.

If offsite borrow material is required, it should consist of sand and gravel. The size and gradation of the material shall be such that no large voids exist after compaction. Proposed fill sources should be inspected and approved by the geotechnical engineer prior to hauling the proposed material to the site to determine if the material is suitable for the intended use. All offsite borrow should have a maximum amount of fines (percentage passing a No. 200 mesh sieve) of 15% to help facilitate construction during wet weather. In addition, the "fines" should be non-plastic.

Backfill in confined areas such as utility trenches and foundations within load bearing or paved areas should be placed in maximum 6-inch thick layers and compacted to a minimum of 92 percent Modified Proctor density and average of greater than 95 percent Modified Proctor density within the layer.

### **Slopes and Excavations**

All temporary excavations greater than 4 feet in depth should have the sides sloped back or be appropriately sheeted and braced in accordance with all applicable codes and should be evaluated by a qualified Geotechnical Engineer.

All excavations should be performed in accordance with OSHA requirements, including but not limited to, temporary shoring, trench boxes and benching and should be evaluated by a qualified Geotechnical Engineer.

### **Utility Lines**

The existing site soils will provide suitable support for utility lines. Cobbles greater than 4 inches in diameter should be removed from the utility line subgrade or a minimum 4-inch thick sand layer placed beneath the utility lines. If utility lines fall within soft soils, the excavation should be extended an additional 12 inches and replaced with 3/4-inch clean crushed stone or clean sand and gravel.

Backfill material placed around utility lines to 6 inches above the utility line should have a maximum particle size of 1.5 inches. Backfill of utility trenches should be placed in maximum 6-inch thick lifts and be compacted to a minimum of 95 percent of the maximum density as determined by the laboratory ASTM test designation D 1557.

## **FOUNDATION DESIGN CRITERIA**

After satisfactory completion of the mass excavation and subgrade preparation procedures, conventional shallow/strip foundations and a slab-on-grade floor system may be constructed bearing on the natural gneiss bedrock. The foundations for the proposed structure may be designed for a maximum allowable soil bearing pressure of 10.0 TSF (20,000 PSF) for rock bearing foundation elements.

Regardless of the loads, the minimum plan dimension of isolated footings should be 36 inches and the minimum width of continuous footings should be 24 inches. Exterior footings and those footings potentially exposed to frost action should be founded a minimum of 3.5 feet below adjacent exterior grade or as required by the local building code. Interior footings within continuously heated building areas may be founded at conventional depths below the floor slab provided they are founded on sound rock.

All below grade walls should be provided with positive drainage behind the wall to preclude hydrostatic pressures from developing. The external drainage system should be tied to the storm water drainage system for permanent drainage.

The floor slab within the proposed structures may be constructed as a slab-on-grade floor system and should be designed using a subgrade modulus of 175 pci, assuming that a 6-inch thick layer of granular material with a maximum particle size of 1.5 inches and a maximum percent passing the No. 200 mesh sieve of 12 percent is placed and compacted beneath the floor slab.

After satisfactory completion of the outlined building area preparation procedures, footings and floor slabs founded on the compacted structural fill/natural soils should have post-construction total settlements of less than 3/4-inch and maximum differential settlements in a 30 foot span of less than 1/2-inch.

## SEISMIC EVALUATION

The soil profile revealed below the site includes a "stiff soil profile"; the design parameters shown below should be used.

Description	Parameter	Recommended Value	2014 NYCBC Reference
Mapped Spectral Acceleration for short periods	$S_s$	0.280 g	Section 1613.5.1
Mapped Spectral Acceleration for 1-sec period	$S_1$	0.072 g	Section 1613.5.1
Site Class	<b>C</b>		Table 1613.5.2
Site Coefficient	$F_a$	1.20	Table 1613.5.3(1)
Site Coefficient	$F_v$	1.70	Table 1613.5.3(2)
5 percent damped design spectra response acceleration at short periods:	<b><math>S_{DS}</math></b>	0.224 g	Section 1613.5.4
5 percent damped design spectral response acceleration at 1-sec period:	<b><math>S_{D1}</math></b>	0.082 g	Section 1613.5.4

Based on the above design spectral accelerations and the anticipated use group/occupancy category of the structure (identified as Seismic Use Group II) and in accordance with Section 1613.5.6 of the 2014 NYCBC, we have estimated that the proposed construction will be subject to the requirements of Seismic Design Category (**SDC**) **B**; this should be confirmed by the structural engineer.

### **Liquefaction Potential**

The New York City Building Code requires that the upper 50 feet of the site soils, which is below the water table, be evaluated for their liquefaction potential during a seismic event. The Code provides Figure 1813.1, "*Liquefaction Assessment Diagram*" that plots the Standard penetration resistance (blow counts obtained from the soil borings) normalized to an energy of 60 percent ( $N_{60}$ ) versus the depth of sample. In addition, three different Structural Occupancy Groups are also listed. We have assumed that the proposed use of this structure requires a Structural Occupancy Group of II or III.

Liquefaction occurs when a loose, saturated, non-cohesive material is subject to a large shock or vibration such as a seismic event. The saturated soils temporarily lose their shear strength and large volume changes (settlement) can occur. The basic way to eliminate the potential for soils to liquefy is to increase their in-place density or to provide additional drainage to reduce pore pressure build-up within the soil mass during the seismic event. The site improvement method would consist of an in-situ treatment that improves the density of the site soils such that liquefaction cannot occur or, the installation of drains to reduce pore water pressures from developing during a seismic event or, by driving piles to bridge through the liquefiable soils. Based on the results of the soil borings, liquefaction is not probable for this site and does not need to be considered in the design of the proposed structure,

### **PERMANENT BELOW-GRADE WALLS**

Permanent below grade walls should be designed to resist lateral loadings from static earth pressure, water pressure (if present), and vertical surcharges. Backfill should not be placed against below-grade walls until the concrete has reached its 28-day compressive strength and after adequate lateral bracing has been provided to prevent rotation of the wall. We recommend the following design parameters:

- For braced walls (no rotation) a triangular earth pressure distribution with an equivalent fluid pressure of 60 pounds per square foot per foot of depth for unsaturated soil.
- Lateral pressures due to surface surcharges should have a uniform distribution based on a pressure equal to 0.5 times the vertical pressure for the entire depth of the wall. We recommend using a minimum surcharge load of 250 pounds per square foot to account for fire truck loading scenarios.

### **ADDITIONAL CONSTRUCTION RECOMMENDATIONS**

Our recommendations for excavation, temporary excavation support and testing requirements are provided below.

#### **Excavation**

We have assumed that the proposed finished floor within the below grade level will be constructed approximately 12 feet below the existing sidewalk elevation along the front of the site. Assuming approximately one foot for the floor slab section

and approximately 2.5 feet for the footing thickness, an excavation of approximately 15.5 feet from the sidewalk elevation will be required in order to attain the finished footing subgrade elevation. The general excavation will primarily involve the removal of the miscellaneous fill encountered throughout the site. The general excavation can be performed using conventional earthmoving equipment (e.g. excavators, loaders, etc.).

All excavations should be conducted in accordance with OSHA requirements, but not limited to, temporary shoring, trench boxes, and proper benching. All work plans should be submitted to the Owner and design team review prior to commencement of excavation operations.

### **Excavation Support**

Temporary support of excavation, such as soldier piles and timber lagging with internal bracing (such as rakers) or external bracing (such as tiebacks) will be required in order to attain the proposed elevation for the bottom of excavation.

The design and inspection of all temporary excavation support systems shall be provided by a Professional Engineer in the State of New York. The NYC DOB requires project-specific excavation support drawings to be prepared as part of the New Building submission. The project-specific plans must be fully developed, in conjunction with fully developed structural building plans, in order to be reviewed and approved by NYC DOB so that a construction permit for the new building (or foundations) can be issued.

Temporary excavation support walls should be designed to resist static earth pressures and all construction surcharges. The lateral pressures from sidewalk and any other surcharge loads should be added as a uniform rectangular pressure applied to the full wall height. Large concentrated loads, such as crane loadings, should be analyzed individually on a case-by-case basis. The temporary excavation support system should be designed in accordance with OSHA and local requirements.

Due to the close proximity of the surrounding buildings, we recommended that the support of excavation system should consist of soldier piles with timber lagging installed within pre-drilled shafts and steel beams concreted into the pre-drilled shafts. The soldier piles may be structural shapes installed within a predrilled, cased shaft or may be pipe sections drilled directly into the soil and grouted in-place. Tiebacks and/or raker beams will be required in order to provide lateral restraint to the pile. We do not recommend installing the soldier piles by driving.

### **Testing Requirements**

During the placement of all fill, visual observations and in place density tests should be performed to determine the adequacy of the fill. Density testing should be done in accordance with the following minimum frequency requirements:

Building Areas: A minimum of 4 in place density tests per each 12-inch lift of compacted fill; spacing between test locations not to exceed 50 feet.

Parking/Roadway Areas: A minimum of 3 in place density tests per each 12-inch lift of compacted fill; spacing between test locations not to exceed 100 feet

Minimum density requirements are outlined in the previous sections of this report.

## **INSPECTION**

The recommendations presented in the previous sections of this report are based on the assumption that the site preparation procedures will be done under engineering inspection by a representative of this office. SESI should inspect the proofrolling operations, and the subgrade of all foundation elements. Visual observations and in-place density testing should be done throughout fill construction to determine that the work is done in accordance with our recommendations. The New York City Building Code requires Special Inspections for the subgrade of all foundation elements. SESI can provide you with these inspections if requested.

## **LIMITATIONS**

The subsurface investigation performed identifies the subsurface conditions only at the locations of the explorations and at the depths where the samples were taken. SESI Consulting Engineers P.C. reviews the published geologic data and the field and laboratory data and uses their professional judgment and experience to render an opinion on the subsurface conditions throughout the site. Because the actual subsurface conditions may differ, we recommend that SESI be retained to provide construction inspection in order to minimize the risks associated with unanticipated conditions.

This report should not be used:

1. When the nature of the proposed building is changed;
2. When the size or configuration of the proposed building is altered;
3. When the location or orientation of the proposed building is modified;
4. When there is a change in ownership; or
5. For application to an adjacent or any other site.

SESI shall not accept any responsibility for problems, which may occur if SESI is not consulted when there are changes to the factors considered in this report's development. The soil logs should not be separated from the Engineering Report in order to minimize the possibility of soil log misinterpretation.

## **DISCLAIMER**

This Report was prepared by SESI for the sole and exclusive use of the Jarmel Kizel Architects and Engineers, Inc.. Nothing under the Professional Services Agreement between SESI and its client Jarmel Kizel Architects and Engineers, Inc., shall be constructed to give any rights or benefits to anyone other than Client

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**TABLE I**  
**SUMMARY OF SOIL DESIGN PARAMETERS**

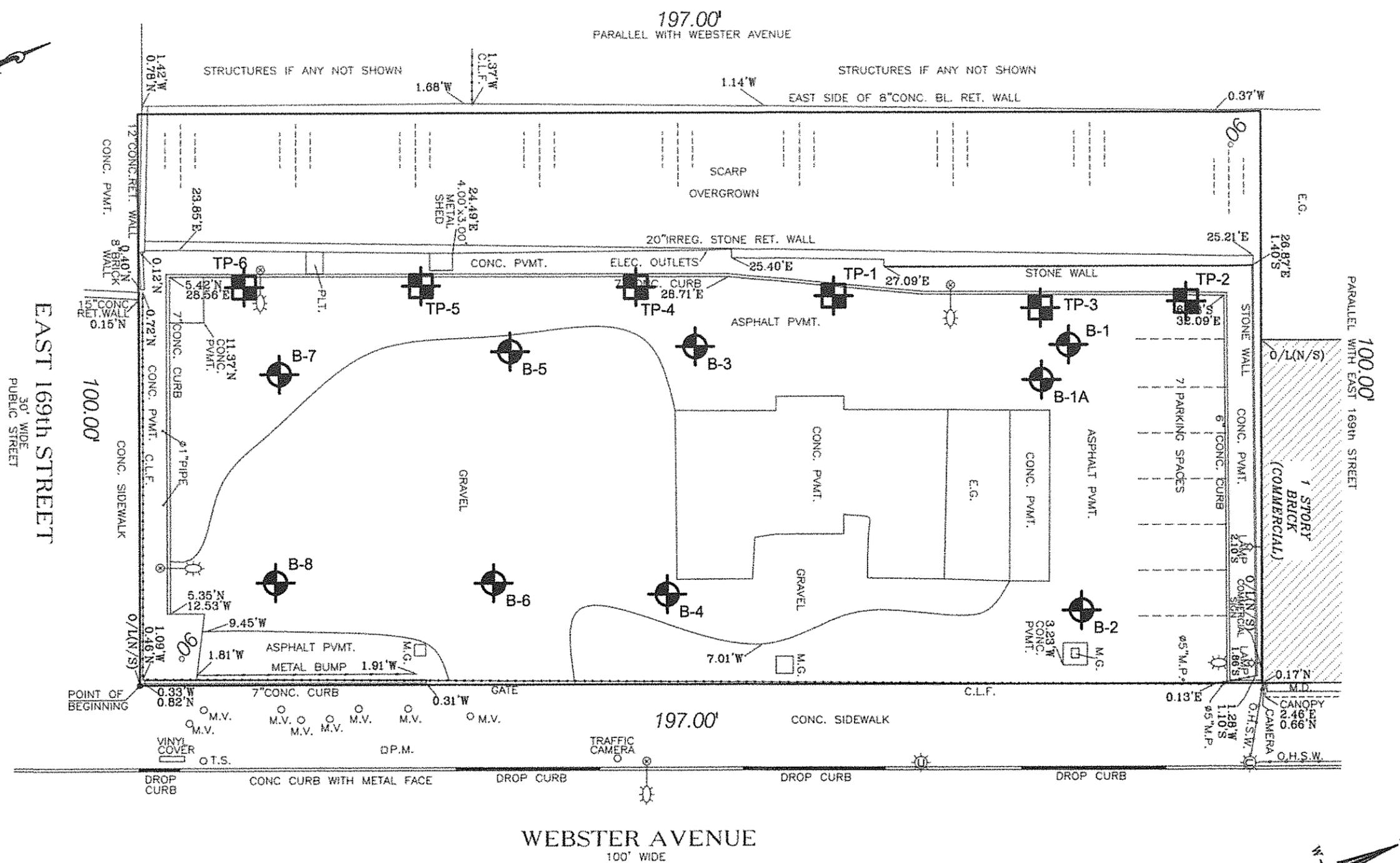
PARAMETER	VALUE
1. Allowable Bearing Capacity - Rock bearing	20,000 psf
2. Total Unit Weight	120 pcf
3. Angle of Internal Friction - Backfill against Structures	32 degrees
4. Earth Pressure Coefficient (See Note 1)	
Active Earth Pressure (Ka)	0.31
Earth Pressure @ Rest (Ko)	0.47
Passive Earth Pressure (Kp)	3.25
5. Coefficient of Sliding (concrete over soil)	0.35
6. Subgrade Modulus for Floor Slab Design Granular Fill	175 pci
7. Subgrade Modulus for Mat Design	150 pci
8. Slopes (above groundwater)	
Maximum Cut Slope in Soil	2.0 H:1V
Maximum Fill Slope in Soil	2.0 H:1V
9. Seismic Design Criteria- Site Class	B
10. Minimum Footing Depth (exterior footings)	3.5 feet

Notes:

- 1.) A drainage medium should be installed along all retaining walls to avoid hydrostatic pressures from developing.
- 2.) Compaction equipment used within 5± feet of permanent walls should not weigh more than 5,000 pounds.

N:\ACAD\9320\9320 borings and test pit location plan.dwg, 1117, 3/3/2016 5:20:08 PM, 1:1

N:\ACAD\9320\9320 BORING AND TEST PIT LOCATION PLAN.DWG 03/03/16 05:20:08PM, Jenny, LAYOUT:1117



**NOTE:**  
 THIS PLAN IS FOR LOCATING BORINGS AND TEST PITS ONLY.  
 OTHER SITE WORK SHOWN HERE IS NOT INTENDED FOR  
 CONSTRUCTION.

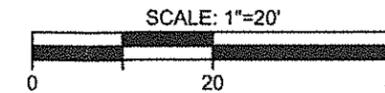
**LEGEND:**

-  B-1 - APPROX. LOCATION AND NO. OF BORING
-  TP-1 - APPROX. LOCATION AND NO. OF BORING

**REFERENCE**

SURVEY PREPARED BY ROGUSKI LAND SURVEYING, P.C. DATED SEPTEMBER 15, 2015, UPDATE OCTOBER 1, 2015.

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dwg by: JY  
 chk by: KQ  
 scale: 1" = 20'  
 date: 03/03/16

CERT. OF AUTH. # 24GA27934700  
**SESI**  
 CONSULTING ENGINEERS  
 SOILS / FOUNDATIONS  
 SITE DESIGN  
 ENVIRONMENTAL  
 12A MAPLE AVE. PINE BROOK, N.J. 07058 P.H. 973-808-9050

project: 1311 WEBSTER AVENUE  
 BRONX, NY  
 drawing title: BORING AND TEST PIT  
 LOCATION PLAN

job no: 9320  
 drawing no:

**FIG-1**

			PROJECT NAME: Proposed 7-Story Residential Building				BORING NO. 1							
			LOCATION: 1311 Webster Ave Bronx NY				JOB NO. 9320							
			METHOD: Hollow-stem Augers				GROUND ELEVATION: n/a							
BORING BY: General Borings			DATE STARTED: 2/25/2016				GROUNDWATER TABLE DEPTH							
INSPECTOR: HS			DATE COMPLETED: 2/25/2016				0 Hr.		Date		24 Hr.		Date	
DEPTH (ft)	SAMPLE No.	REC (in)	DEPTH		Blows on Spoon				N (bl/ft)	SOIL DESCRIPTION AND STRATIFICATION	NYC DOB Class			
			FROM (ft)	TO (ft)	0/6	6/12	12/18	18/24						
0														
5										Auger refusal at 1.5 feet Relocate hole				
10														
15														
20														
25														
30														
35														
40														

Nominal I.D. of Hole	in
Nominal I.D. of Split Barrel Sampler	1 1/2 in
Weight/type of Hammer on Drive Pipe	300 lb
Weight/type of Hammer on Split Barrel	140 lb
Drop of Hammer on Drive Pipe	30 in
Core Size	in

The subsurface information shown hereon was obtained for the design and estimating purposes for our client. It is made available to authorized users only that they may have access to the same information available to our client. It is presented in good faith, but it is not intended as a substitute for investigations, interpretations or judgment of such authorized users. Information on the logs should not be relied upon without the geotechnical engineers recommendations contained in the report from which these logs were extracted.

Pp: Pocket Penetrometer; WOH: Weight of Hammer; WOR: Weight of Rod

Approximate Change in Strata: \_\_\_\_\_ Inferred Change in Strata: \_\_\_\_\_

Soil descriptions represent a field identification after D. M. Burmister unless otherwise noted.

FIGURE 2

			PROJECT NAME: Proposed 7-Story Residential Building				BORING NO. 1A				
			LOCATION: 1311 Webster Ave Bronx NY				JOB NO. 9320				
			METHOD: Hollow-stem Augers				GROUND ELEVATION: n/a				
BORING BY: General Borings			DATE STARTED: 2/25/2016				GROUNDWATER TABLE DEPTH				
INSPECTOR: HS			DATE COMPLETED: 2/25/2016				0 Hr.	Date	24 Hr.	Date	
DEPTH (ft)	SAMPLE No.	REC (in)	DEPTH		Blows on Spoon				N (bl/ft)	SOIL DESCRIPTION AND STRATIFICATION	NYC DOB Class
			FROM (ft)	TO (ft)	0/6	6/12	12/18	18/24			
0											
	S-1		1	3	6	8			21	FILL: Brown, gray coarse to fine SAND, some medium to fine Gravel, little Silt; asphalt	7
5										Auger and Spoon refusal at 3 feet End of Boring at 3 feet	
10											
15											
20											
25											
30											
35											
40											

Nominal I.D. of Hole	in
Nominal I.D. of Split Barrel Sampler	1 1/2 in
Weight/type of Hammer on Drive Pipe	300 lb
Weight/type of Hammer on Split Barrel	140 lb
Weight/type of Hammer on Drive Pipe	30 in
Core Size	in

The subsurface information shown hereon was obtained for the design and estimating purposes for our client. It is made available to authorized users only that they may have access to the same information available to our client. It is presented in good faith, but it is not intended as a substitute for investigations, interpretations or judgment of such authorized users. Information on the logs should not be relied upon without the geotechnical engineers recommendations contained in the report from which these logs were extracted.

Pp: Pocket Penetrometer; WOH: Weight of Hammer; WOR: Weight of Rod

Approximate Change in Strata: \_\_\_\_\_ Inferred Change in Strata: \_\_\_\_\_

Soil descriptions represent a field identification after D. M. Burmister unless otherwise noted.

FIGURE 3

			PROJECT NAME: Proposed 7-Story Residential Building				BORING NO. 2				
			LOCATION: 1311 Webster Ave Bronx NY				JOB NO. 9320				
			METHOD: Hollow-stem Augers				GROUND ELEVATION: n/a				
BORING BY: General Borings			DATE STARTED: 2/25/2016				GROUNDWATER TABLE DEPTH				
INSPECTOR: HS			DATE COMPLETED: 2/25/2016				0 Hr.	Date	24 Hr.	Date	
DEPTH (ft)	SAMPLE No.	REC (in)	DEPTH		Blows on Spoon				N (bl/ft)	SOIL DESCRIPTION AND STRATIFICATION	NYC DOB Class
			FROM (ft)	TO (ft)	0/6	6/12	12/18	18/24			
0											
5	S-1	12	1		8	7			29	FILL: Gray brown coarse to fine SAND, and medium to fine Gravel, little Silt; brick fragments	7
	S-2	6	3	3	40	31			58	FILL: Gray brown coarse to fine SAND, and medium to fine Gravel, little Silt;	7
10	S-3	18	5	5	23	16			38	FILL: Brown coarse to fine SAND, some Silt, little medium to fine Gravel	7
	S-4	2	7	7	54/4					FILL: Light brown coarse to fine SAND, little medium to fine Gravel, little Silt; brick fragments	7
15	S-5	3	10	9						FILL: Gray medium to fine SAND, little Silt, trace Gravel	7
				12						Auger refusal on rock at 10.5 feet	1c
									1:00	Gray white slightly fractured Gneiss with mica seams	
									1:44	Cored rock from 11 to 16 feet Coring time in minutes	
									2:20	No Recovery	
									2:59	ROD = 0/60 = 0%	
									3:36	End of Boring at 16 feet	
20											
25											
30											
35											
40											

Nominal I.D. of Hole	in
Nominal I.D. of Split Barrel Sampler	1 1/2 in
Weight/type of Hammer on Drive Pipe	300 lb
Weight/type of Hammer on Split Barrel	140 lb
Weight/type of Hammer on Drive Pipe	30 in
Core Size	in

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Pp: Pocket Penetrometer; WOH: Weight of Hammer; WOR: Weight of Rod

Approximate Change in Strata: \_\_\_\_\_ Inferred Change in Strata: \_\_\_\_\_

Soil descriptions represent a field identification after D. M. Burmister unless otherwise noted.

FIGURE 4

				PROJECT NAME: Proposed 7-Story Residential Building				BORING NO. 3							
				LOCATION: 1311 Webster Ave Bronx NY				JOB NO. 9320							
				METHOD: Hollow-stem Augers				GROUND ELEVATION: n/a							
BORING BY: General Borings				DATE STARTED: 2/25/2016				GROUNDWATER TABLE DEPTH							
INSPECTOR: HS				DATE COMPLETED: 2/25/2016				0 Hr.		Date		24 Hr.		Date	
DEPTH (ft)	SAMPLE No.	REC (in)	DEPTH		Blows on Spoon				N (bl/ft)	SOIL DESCRIPTION AND STRATIFICATION	NYC DOB Class				
			FROM (ft)	TO (ft)	0/6	6/12	12/18	18/24							
0															
	S-1		1		6	21			64	FILL: Gray brown coarse to fine SAND, little medium to fine Gravel, little Silt; brick fragments	7				
				3											
5									3:11	Auger refusal on rock at 4 feet	1c				
									5:19	Gray white slightly fractured Gneiss with mica seams					
									4:10	Cored rock from 4 to 9 feet Coring time in minutes					
									4:00	60 inch recovery = 100% recovery					
									3:30	ROD = 47/60 = 78%					
10										End of Boring at 9 feet					
15															
20															
25															
30															
35															
40															

Nominal I.D. of Hole	in
Nominal I.D. of Split Barrel Sampler	1 7/8 in
Weight/type of Hammer on Drive Pipe	300 lb
Weight/type of Hammer on Split Barrel	140 lb
Weight/type of Hammer on Drive Pipe	30 in
Core Size	in

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Pp: Pocket Penetrometer; WOH: Weight of Hammer; WOR: Weight of Rod

Approximate Change in Strata: \_\_\_\_\_ Inferred Change in Strata: \_\_\_\_\_

Soil descriptions represent a field identification after D. M. Burmister unless otherwise noted.

FIGURE 5

				PROJECT NAME: Proposed 7-Story Residential Building				BORING NO. 4							
				LOCATION: 1311 Webster Ave Bronx NY				JOB NO. 9320							
				METHOD: Hollow-stem Augers				GROUND ELEVATION: n/a							
BORING BY: General Borings				DATE STARTED: 2/25/2016				GROUNDWATER TABLE DEPTH							
INSPECTOR: HS				DATE COMPLETED: 2/25/2016				0 Hr.		Date		24 Hr.		Date	
DEPTH (ft)	SAMPLE No.	REC (in)	DEPTH		Blows on Spoon				N (bl/ft)	SOIL DESCRIPTION AND STRATIFICATION	NYC DOB Class				
			FROM (ft)	TO (ft)	0/6	6/12	12/18	18/24							
0															
5	S-1	10	0		17	19			43	FILL: Dark brown, black coarse to fine SAND, little medium to fine Gravel, little Silt; brick fragments	7				
				2			24	14							
5	S-2	4	2		10	8			15	FILL: Gray brown coarse to fine SAND, some Silt, little medium to fine Gravel; brick fragments	7				
				4			7	8							
10	S-3	5	5		15	15			30	FILL: Gray brown coarse to fine SAND, some medium to fine Gravel, little Silt; wood and brick fragments	7				
				7			15	9							
10	S-4	6	7		8	50/4									
				9											
15	S-5	3	10		50/3					FILL: Brown medium to fine SAND, little Silt	7				
				12											
15										Auger refusal at 10.5 feet End of Boring at 10.5 feet					
20															
25															
30															
35															
40															

Nominal I.D. of Hole	in
Nominal I.D. of Split Barrel Sampler	1 1/4 in
Weight/type of Hammer on Drive Pipe	300 lb
Weight/type of Hammer on Split Barrel	140 lb
Drop of Hammer on Drive Pipe	30 in
Core Size	in

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Pp: Pocket Penetrometer; WOH: Weight of Hammer; WOR: Weight of Rod

Approximate Change in Strata: \_\_\_\_\_ Inferred Change in Strata: \_\_\_\_\_

Soil descriptions represent a field identification after D. M. Burmister unless otherwise noted.

FIGURE 6

			PROJECT NAME: Proposed 7-Story Residential Building				BORING NO. 5							
			LOCATION: 1311 Webster Ave Bronx NY				JOB NO. 9320							
			METHOD: Hollow-stem Augers				GROUND ELEVATION: n/a							
BORING BY: General Borings			DATE STARTED: 2/26/2016				GROUNDWATER TABLE DEPTH							
INSPECTOR: HS			DATE COMPLETED: 2/26/2016				0 Hr.		Date		24 Hr.		Date	
DEPTH (ft)	SAMPLE No.	REC (in)	DEPTH		Blows on Spoon				N (bl/ft)	SOIL DESCRIPTION AND STRATIFICATION	NYC DOB Class			
			FROM (ft)	TO (ft)	0/6	6/12	12/18	18/24						
0														
5	S-1	6	0		9	11			22	FILL: Gray brown coarse to fine SAND, some medium to fine Gravel, little Silt; brick fragments	7			
				2				11	11					
5	S-2	8	2		20	50/4				FILL: Same	7			
				4					4:12	Auger refusal on rock at 3.5 feet Gray white slightly fractured Gneiss with mica seams Cored rock from 3.5 to 8.5 feet. Coring time in minutes 60 inch recovery = 100% recovery $RQD = 58/60 = 96\%$ End of Boring at 8.5 feet	1c			
								3:18						
								4:32						
								5:18						
								3:00						
10														
15														
20														
25														
30														
35														
40														

Nominal I.D. of Hole	in	The subsurface information shown hereon was obtained for the design and estimating purposes for our client. It is made available to authorized users only that they may have access to the same information available to our client. It is presented in good faith, but it is not intended as a substitute for investigations, interpretations or judgment of such authorized users. Information on the logs should not be relied upon without the geotechnical engineers recommendations contained in the report from which these logs were extracted.
Nominal I.D. of Split Barrel Sampler	1 1/4 in	
Weight/type of Hammer on Drive Pipe	300 lb	
Weight/type of Hammer on Split Barrel	140 lb	
Top of Hammer on Drive Pipe	30 in	
Core Size	in	

Pp: Pocket Penetrometer; WOH: Weight of Hammer; WOR: Weight of Rod  
 Approximate Change in Strata: \_\_\_\_\_ Inferred Change in Strata: \_\_\_\_\_

Soil descriptions represent a field identification after D. M. Burmister unless otherwise noted.

FIGURE 7

			PROJECT NAME: Proposed 7-Story Residential Building				BORING NO. 6				
			LOCATION: 1311 Webster Ave Bronx NY				JOB NO. 9320				
			METHOD: Hollow-stem Augers				GROUND ELEVATION: n/a				
BORING BY: General Borings			DATE STARTED: 2/26/2016				GROUNDWATER TABLE DEPTH				
INSPECTOR: HS			DATE COMPLETED: 2/26/2016				0 Hr.	Date	24 Hr.	Date	
DEPTH (ft)	SAMPLE No.	REC (in)	DEPTH		Blows on Spoon				N (bl/ft)	SOIL DESCRIPTION AND STRATIFICATION	NYC DOB Class
			FROM (ft)	TO (ft)	0/6	6/12	12/18	18/24			
0	S-1	3	0	2	19	19			40	FILL: Gray, black coarse to fine SAND, little medium to fine Gravel, little Silt	7
								21	21		
5	S-2	12	2	4	11	6			11	FILL: Gray, black coarse to fine SAND, little medium to fine Gravel, little Silt; wood	7
								5	8		
10	S-3	4	5	7	7	50/4				FILL: Gray black coarse to fine SAND, some Silt, little medium to fine Gravel; wood	7
	S-4	0	7	8	54/4				No Recovery		
15	S-5	3	10	12	29	50/4				FILL: Gray black coarse to fine SAND, some medium to fine Gravel, little Silt; wood	7
								3:00	Auger refusal at 11 feet Gray white slightly fractured Gneiss with mica seams Cored rock from 11 to 16 feet Coring time in minutes 60 inch recovery = 100% recovery RQD = 40/60 = 67%	lc	
							3:20				
							5:20				
							2:02				
							1:55				
20											
25											
30											
35											
40											

Nominal I.D. of Hole	in	The subsurface information shown hereon was obtained for the design and estimating purposes for our client. It is made available to authorized users only that they may have access to the same information available to our client. It is presented in good faith, but it is not intended as a substitute for investigations, interpretations or judgment of such authorized users. Information on the logs should not be relied upon without the geotechnical engineers recommendations contained in the report from which these logs were extracted.
Nominal I.D. of Split Barrel Sampler	1 3/8 in	
Weight/type of Hammer on Drive Pipe	300 lb	
Weight/type of Hammer on Split Barrel	140 lb	
Weight/type of Hammer on Drive Pipe	30 in	
Core Size	in	

Pp: Pocket Penetrometer; WOH: Weight of Hammer; WOR: Weight of Rod  
 Approximate Change in Strata: \_\_\_\_\_ Inferred Change in Strata: \_\_\_\_\_

Soil descriptions represent a field identification after D. M. Burmister unless otherwise noted.

FIGURE 8

				PROJECT NAME: Proposed 7-Story Residential Building				BORING NO. 7							
				LOCATION: 1311 Webster Ave Bronx NY				JOB NO. 9320							
				METHOD: Hollow-stem Augers				GROUND ELEVATION: n/a							
BORING BY: General Borings				DATE STARTED: 2/26/2016				GROUNDWATER TABLE DEPTH							
INSPECTOR: HS				DATE COMPLETED: 2/26/2016				0 Hr.		Date		24 Hr.		Date	
DEPTH (ft)	SAMPLE No.	REC (in)	DEPTH		Blows on Spoon				N (bl/ft)	SOIL DESCRIPTION AND STRATIFICATION	NYC DOB Class				
			FROM (ft)	TO (ft)	0/6	6/12	12/18	18/24							
0										2-inches asphalt					
	S-1		1		17	50/5				FILL: Brown coarse to fine SAND, little medim to fine Gravel, little Silt; brick fragments	7				
				3											
5									1:27	Auger refusal at 3.5 feet	Ic				
									0:58	Gray white slightly fractured Gneiss with mica seams					
									2:00	Cored rock from 3.5 to 8.5 feet. Coring time in minutes					
									4:09	36 inch recovery = 60% recovery					
									8:10	ROD = 28/60 = 47%					
10										End of boring at 8.5 feet					
15															
20															
25															
30															
35															
40															

Nominal I.D. of Hole	in
Nominal I.D. of Split Barrel Sampler	1 3/4 in
Weight/type of Hammer on Drive Pipe	300 lb
Weight/type of Hammer on Split Barrel	140 lb
Weight/type of Hammer on Drive Pipe	30 in
Core Size	in

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Pp: Pocket Penetrometer; WOH: Weight of Hammer; WOR: Weight of Rod

Approximate Change in Strata: \_\_\_\_\_ Inferred Change in Strata: \_\_\_\_\_

Soil descriptions represent a field identification after D. M. Burnister unless otherwise noted.

FIGURE 9

			PROJECT NAME: Proposed 7-Story Residential Building						BORING NO. 8		
			LOCATION: 1311 Webster Ave Bronx NY						JOB NO. 9320		
			METHOD: Hollow-stem Augers						GROUND ELEVATION: n/a		
BORING BY: General Borings			DATE STARTED: 2/26/2016			GROUNDWATER TABLE DEPTH					
INSPECTOR: HS			DATE COMPLETED: 2/26/2016			0 Hr.	Date	24 Hr.	Date		
DEPTH (ft)	SAMPLE No.	REC (in)	DEPTH		Blows on Spoon				N (bl/ft)	SOIL DESCRIPTION AND STRATIFICATION	NYC DOB Class
			FROM (ft)	TO (ft)	0/6	6/12	12/18	18/24			
0											
	S-1	5	0		3	3			6	FILL: Gray, dark brown coarse to fine SAND, some Silt, little medium to fine Gravel, brick fragments	7
				2				3	4		
	S-2	2	2		4	5			12	FILL: Dark brown medium to fine SAND, little medium to fine Gravel, little Silt: glass, brick fragments	7
				4				7	8		
5											
	S-3	2	5		4	5			8	FILL: Dark brown coarse to fine SAND, little medium to fine Gravel, little Silt	7
				7				3	9		
	S-4	6	7		3	42				FILL: Gray brown coarse to fine SAND, some medium to fine Gravel, little Silt	7
				9				50/4			
10											
	S-5		10		13	17			22	Brown coarse to fine SAND, some medium to fine Gravel, little Silt	3b
				12				5	9		
15											
	S-6		15		12	7			16	Brown coarse to fine SAND, some medium to fine Gravel, trace Silt	3b
				17				9	16		
20											
										Auger refusal at 20 feet End of Boring at 20 feet	
25											
30											
35											
40											

Nominal I.D. of Hole	in	The subsurface information shown hereon was obtained for the design and estimating purposes for our client. It is made available to authorized users only that they may have access to the same information available to our client. It is presented in good faith, but it is not intended as a substitute for investigations, interpretations or judgment of such authorized users. Information on the logs should not be relied upon without the geotechnical engineers recommendations contained in the report from which these logs were extracted.
Nominal I.D. of Split Barrel Sampler	1 1/2 in	
Weight/type of Hammer on Drive Pipe	300 lb	
Weight/type of Hammer on Split Barrel	140 lb	
Weight/type of Hammer on Drive Pipe	30 in	
Core Size	in	Pp: Pocket Penetrometer; WOH: Weight of Hammer; WOR: Weight of Rod

Approximate Change in Strata: \_\_\_\_\_ Inferred Change in Strata: \_\_\_\_\_

Soil descriptions represent a field identification after D. M. Burmister unless otherwise noted.

FIGURE 10

PROJECT NO.	9320	PROJECT	1311 Webster Ave	TEST PIT NO.	TP- 1
LOCATION	SEE FIGURE 1	APPROX. ELEV.	±	INSPECTED BY	KQ
WATER OBSERVATION	None Encountered			DATE EXCAVATED	2/25/2016
DEPTH FT.	DESCRIPTION / SOIL CLASSIFICATION			RELATIVE DENSITY OR CONSISTENCY	
0	3-inches Asphalt				
1	FILL: Brown, black coarse to fine SAND, some Silt, little medium to fine Gravel; bricks				
2	Refusal on Fractured Gneiss				
3	End of Test Pit Excavation @ 2 feet				
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

NOTE:

Fig. 11

PROJECT NO.	9320	PROJECT	1311 Webster Ave	TEST PIT NO.	TP-2
LOCATION	SEE FIGURE 1	APPROX. ELEV.	±	INSPECTED BY	KQ
WATER OBSERVATION	None Encountered			DATE EXCAVATED	2/25/2016

DEPTH FT.	DESCRIPTION / SOIL CLASSIFICATION	RELATIVE DENSITY OR CONSISTENCY
0	3-inches Asphalt	
1	FILL: Brown, gray coarse to fine SAND, some medium to fine Gravel, little Silt; bricks	---
3	Refusal on Fractured Gneiss End of Test Pit Excavation @ 2.5 feet	
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

NOTE:

Fig. 12

PROJECT NO. <u>9320</u>	PROJECT <u>1311 Webster Ave</u>	TEST PIT NO.	<b>TP-3</b>
LOCATION <u>SEE FIGURE 1</u>	APPROX. ELEV. <u>±</u>	INSPECTED BY	<b>KQ</b>
WATER OBSERVATION <u>None Encountered</u>		DATE EXCAVATED	<u>2/25/2016</u>

DEPTH FT.	DESCRIPTION / SOIL CLASSIFICATION	RELATIVE DENSITY OR CONSISTENCY
0	3-inches Asphalt	
1	FILL: Brown, gray coarse to fine SAND, some medium to fine Gravel, little Silt; bricks	---
3	Refusal on Fractured Gneiss End of Test Pit Excavation @ 3 feet	
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

NOTE:

Fig. 13

PROJECT NO. <u>9320</u>	PROJECT <u>1311 Webster Ave</u>	TEST PIT NO.	<b>TP-4</b>
LOCATION <u>SEE FIGURE 1</u>	APPROX. ELEV. <u>±</u>	INSPECTED BY	<b>KQ</b>
WATER OBSERVATION <u>None Encountered</u>		DATE EXCAVATED	<u>2/25/2016</u>

DEPTH FT.	DESCRIPTION / SOIL CLASSIFICATION	RELATIVE DENSITY OR CONSISTENCY
0 —	3-inches Asphalt	
—	FILL: Brown coarse to fine SAND, some medium to fine Gravel,	---
1 —	little Silt; bricks	
—		
2 —		
—		
3 —		
—	Refusal on Fractured Gneiss	
4 —	End of Test Pit Excavation @ 3 feet	
—		
5 —		
—		
6 —		
—		
7 —		
—		
8 —		
—		
9 —		
—		
10 —		
—		
11 —		
—		
12 —		
—		
13 —		
—		
14 —		

NOTE:

Fig. 14

PROJECT NO. <u>9320</u>	PROJECT <u>1311 Webster Ave</u>	TEST PIT NO.	<b>TP- 5</b>
LOCATION <u>SEE FIGURE 1</u>	APPROX. ELEV. <u>±</u>	INSPECTED BY	<b>KQ</b>
WATER OBSERVATION <u>None Encountered</u>		DATE EXCAVATED	<u>2/25/2016</u>

DEPTH FT.	DESCRIPTION / SOIL CLASSIFICATION	RELATIVE DENSITY OR CONSISTENCY
0 —	2-inches Asphalt	
—	FILL: Red brown coarse to fine SAND, little medium to fine	---
1 —	Gravel, little Silt; bricks	
—		
2 —		
—		
3 —	Refusal on Fractured Gneiss	
—	End of Test Pit Excavation @ 2.5 feet	
4 —		
—		
5 —		
—		
6 —		
—		
7 —		
—		
8 —		
—		
9 —		
—		
10 —		
—		
11 —		
—		
12 —		
—		
13 —		
—		
14 —		

NOTE:

Fig. 15

PROJECT NO. 9320

PROJECT 1311 Webster Ave

TEST PIT NO.

TP-6

LOCATION SEE FIGURE 1

APPROX. ELEV. ±

INSPECTED BY

KQ

WATER OBSERVATION None Encountered

DATE EXCAVATED 2/25/2016

DEPTH FT.	DESCRIPTION / SOIL CLASSIFICATION	RELATIVE DENSITY OR CONSISTENCY
0	2-inches Asphalt	
—	FILL: Red brown coarse to fine SAND, little medium to fine	---
1	Gravel, little Silt; bricks	
—		
2		
—		
3	Refusal on Fractured Gneiss	
—	End of Test Pit Excavation @ 2.5 feet	
4		
—		
5		
—		
6		
—		
7		
—		
8		
—		
9		
—		
10		
—		
11		
—		
12		
—		
13		
—		
14		

NOTE:

Fig. 16

## Definitions of Identification Terms for Granular Soils

Our experience has shown that the following field identification system, which is patterned somewhat after the Burmister System, permits a more detailed breakdown of the components within a soil sample than other identification systems allow. It also compels the supervising technician to examine a sample quite closely in order to accurately describe the components within the sample.

### Principal Component (All Capitalized)

- GRAVEL More than 50% of the sample by weight is Gravel
- SAND More than 50% of the sample by weight is Sand
- SILT More than 50% of the sample by weight is Silt

### Minor Component (Proper Case)

- Gravel Less than 50% of the sample by weight is Gravel
- Sand Less than 50% of the sample by weight is Sand
- Silt Less than 50% of the sample by weight is Silt

### Proportion Terms

- and Component ranges from 35% to 50% of the sample by weight
- some Component ranges from 20% to 35% of the sample by weight
- little Component ranges from 10% to 20% of the sample by weight
- trace Component ranges from 0% to 10% of the sample by weight

### Size of Soil Components

- Gravel
  - Coarse gravel ranges from 3 inches to 1 inch
  - Medium gravel ranges from 1 inch to 3/8 inch
  - Fine gravel ranges from 3/8 inch to No. 10 sieve
- Sand
  - Coarse sand ranges from No. 10 sieve to No. 30 sieve
  - Medium sand ranges from No. 30 sieve to No. 60 sieve
  - Fine sand ranges from No. 60 sieve to No. 200 sieve
- Silt
  - Material which passes the No. 200 sieve
- Clay
  - Material which passes the No. 200 sieve
  - Exhibits varying degrees of plasticity

### Gradation Designations

- Coarse to fine (c-f) All fractions greater than 10% of the component
- Coarse to medium (c-m) Less than 10% of the component is fine
- Medium to fine (m-f) Less than 10% of the component is coarse
- Coarse (c) Less than 10% of the component is medium and fine
- Medium (m) Less than 10% of the component is coarse and fine
- Fine (f) Less than 10% of the component is coarse and medium