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October 14, 2022

AEWLA22050

Mr. Michael Carroll, PE
Senior Project Manager
AE-Works
1655 N. Ft. Myer Drive
Suite 630
Arlington VA, 22209

RE: Geotechnical Engineering Services
Armed Forces Retirement Home – Sheridan Building Renovations
140 Rock Creek Church Road NW
Washington, DC 20011

Dear Mr. Carroll,

We are pleased to submit our geotechnical engineering report for the proposed renovation of the existing Sheridan Building located within the Armed Forces Retirement Home (AFRH) located at 140 Rock Creek Church Road NW in Washington D.C. Work was initiated in general accordance with the scope of work presented in our proposal dated June 27, 2022, and your subconsultant contract #AFRH-032-002S dated August 16, 2022.

We trust that the information presented in this report is what you require at this time, and we thank you for the opportunity to assist you with this project. If you have any questions, or if you need any further assistance with this project, please contact this office at your earliest convenience.

Respectfully yours,

PENNONI ASSOCIATES INC.

DISTRICT OF COLUMBIA
JERRY DONAHUE
No. PE907763
LICENSED
PROFESSIONAL ENGINEER

Austin R. Spencer, EIT
Staff Geotechnical Engineer

J. Steven Donahue, PE
Project Geotechnical Engineer
10/14/22

Attachments: Geotechnical Engineering Services Report

GEOTECHNICAL ENGINEERING SERVICES

ARMED FORCES RETIREMENT HOME – SHERIDAN BUILDING RENOVATIONS

WASHINGTON, DC

Submitted To:

AE-Works
1655 N. Ft. Myer Drive, Suite 630
Arlington VA, 22209

Austin R. Spencer, EIT
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1. EXECUTIVE SUMMARY

Pennoni has completed our geotechnical evaluation for the proposed renovation of the existing Sheridan Building located within the Armed Forces Retirement Home (AFRH) located at 140 Rock Creek Church Road NW in Washington D.C. **The executive summary below should be used in conjunction with the body of the report.**

Proposed Construction and Site Conditions		Section(s)
Proposed Construction	Renovations consist of façade treatment, construction of an additional floor above three low-rise annexes located on the east side of the building, upgrading utility services, west entrance renovations, and landscaping.	2.1
Field Work	Seven SPT borings advanced to depths ranging from 6.5 to 35 feet below existing grades. Two Borings located within Center Annex, two borings at existing west entrance, and three borings around perimeter of existing low-rise annexes.	3.2
Surface Materials	Approximately 6 inches of concrete within Central Annex, 3 to 7 inches of bituminous asphalt at perimeter of low-rise annexes, and 9 to 9.5 inches of concrete at existing west entrance.	4.2
Subsoils	Stratum F – very soft to very stiff clay or medium dense to dense sand (4.5 – 12.4 feet thick); Stratum A* – soft to very stiff Clay (0.5 – 13.0+ feet thick); Stratum B – very loose to dense Sand (5.0 – 12.5 feet thick); Stratum C* – very soft to very stiff Silt (4.0 – 7.0 feet thick) [*Not encountered in all borings.]	4.2
Groundwater (GW)	Groundwater was encountered at the project site in Borings "B-2," "B-4" through "B-6" and "B-8" at depths ranging from 15.0 to 25.0 feet (Elev. 275.0 to 299.5 feet, NAVD88) below the existing ground surface.	4.3

Recommendations		Section(s)
Seismic Site Class	Site Class E – a soft clay soil profile in accordance with ASCE-7.	5.3
Lift Thickness & Compaction Requirements	Granular Soil – 10 to 12 in. thick layers loose measure; Foundations and floor slab 98% (standard proctor) or 95% (modified proctor) depending on compaction equipment used.	5.5
Foundations	- Spread Footings with densification in place or localized undercuts as needed designed assuming a net, allowable bearing capacity of 3,000 psf for the proposed West Entrance renovations - Grouted helical piers to depths of 15 to 35 feet below footing elevation for the low-rise annexes with estimated allowable capacities ranging from approximately 6 to 32 kips in compression and tension.	5.1, 5.1.2
Settlement	Total and differential settlements due to structural loading are anticipated on the order of less than 1 inch and 0.5 inches, respectively for the proposed west entrance. Performance specifications should be provided to specialty contractors to achieve tolerable settlements for helical piers	5.1.1 , 5.1.2
Slab-On-Grade	Provided the subgrade is properly prepared, constructing the floor slab on grade is considered feasible. A modulus of subgrade reaction of 125 pci can be used in slab design.	5.2
Frost Depth	30 inches below finished exterior grades or otherwise protected against frost action in accordance with the DCMR 12.	5.1.1 , 5.1.2
Subsurface Utilities	Existing utilities noted in the field included (but may not be limited to): water, electric, sewer and unknown lines located around the perimeter of the existing building and floor drains located underneath the Central Annex slab on grade.	5.6

2. INTRODUCTION

2.1. PROJECT DESCRIPTION

The project consists of renovation of the existing Sheridan Building located within the AFRH located at 140 Rock Creek Church Road NW in Washington D.C., as indicated on the Site Location Sketch, SK-1, provided in Appendix A. We understand the renovations consist of façade treatment, construction of an additional floor above three low-rise annexes, upgrading utility services, west entrance renovations, and landscaping. The proposed floor additions will be located on the eastern side of the building within the north, central, and south annex wings of the existing Sheridan Building. The floor additions generally consist of new apartment style rooms. The west entrance modifications consist of new vestibule and trellis architectural treatment located on the western side of the building. As of the issuance of this report the preferred renovations consist of new spread footings and columns located throughout the existing north, central, and south annex wings. We understand maximum anticipated single-column service loads are approximately 50 kips for the proposed North and South Annexes and approximately 100 to 150 kips for the proposed Central Annex.

Pennoni is also providing survey and civil/site development services for this project.

2.2. INFORMATION REVIEWED

To assist with the development of this proposal we reviewed the following:

- A drawing package titled “Armed Forces Retirement Home BPA Call 01- Sheridan Bldg. 4th Floor – Bridging Design for Design/Build,” prepared by AE Works, dated December 4, 2020;
- An undated drawing package titled “AFRH Sheridan Renovation,” prepared by AE Works;
- An undated document titled “1FL Exp- Option 1” provided by Woods Peacock identifying preliminary renovation foundation options/locations;
- An adapted drawing prepared by Woods Peacock showing proposed footing locations titled “Foundation and Ground Floor Plan – Additions & Renovations to Sheridan Building United States Soldiers’ and Airmens’ Home,” prepared by U.S. Army Engineer District, Baltimore Corps of Engineers, dated July 1992; and
- A topographic survey performed by Pennoni on August 30, 2022.

2.3. EXISTING SITE CONDITIONS

Based on our review of the above referenced documents, available aerial photography, and observations made during our field exploration, it is our understanding that the project site consists of the existing Sheridan Building located in the northeast corner of the AFRH campus. The building is bordered by trees and existing parking lots to the north, parking spaces and Sheridan Drive to the east, open grass areas and Eisenhower Drive to the south, and Grant Drive to the west. Based on the above-mentioned topographic survey the site generally slopes downward from west to east with elevations ranging from approximately 319 feet (NAVD88) at the existing entrance to approximately 300 feet (NAVD88) in the parking lot east of the annexes.

2.4. OBJECTIVES

The objectives of our geotechnical engineering services were to determine subsurface conditions at the project site, evaluate these conditions with respect to the proposed construction, and present our conclusions and recommendations regarding:

- foundation design of the proposed structures, including discussion of alternate solutions, if necessary;
- design frost depth;
- discussion of potential for consolidation and/or differential settlements of substrata encountered;
- "general procedure" soil Site Class based on applicable IBC requirements;
- ground floor slab design considerations;
- groundwater conditions and their influence on design and construction;
- subgrade preparation;
- removal or treatment of objectionable material;
- use and treatment of in-situ materials for controlled fill; and
- quality assurance and field-testing and observations during construction.

3. FIELD AND LABORATORY WORK

3.1. PERMITTING

Prior to performing our field exploration summarized below, Pennoni obtained soil boring permit SB2200416 from the DC Department of Energy and Environment (DOEE). The permit applications included a Well Construction Work Plan dated August 30, 2022, outlining our proposed work procedure, site restoration, and reporting requirements. Authorization was obtained on September 1, 2022, and September 7, 2022, from DOEE and Department of Consumer and Regulatory Affairs (DCRA), respectively.

3.2. FIELD WORK

Pennoni performed seven Standard Penetration Test (SPT) borings between September 19 and September 21, 2022, labeled "B-1," "B-2," and "B-4" through "B-8." Borings "B-1" and "B-2" were performed within the existing Central Annex wing of the building. Borings "B-4" through "B-8" were performed along the exterior of the building adjacent to proposed renovations. Proposed Boring "B-3" was not performed due to conflict with existing utilities. Borings were performed to depths ranging from 6.5 to 35 feet below the existing ground surface. Continuous sampling was performed to a depth of 10 feet below the existing ground surface and then in five feet intervals to the termination or refusal depths for Borings "B-4" through "B-8", whichever depth was encountered first. Refusal to spoon advanced was encountered in Borings "B-1" at a depth of approximately 6.5 feet below existing slab on grade. Boring "B-1" was unable to be offset due to limited access within the building to an alternative location.

At the conclusion of drilling, Borings "B-2" and "B-4" through "B-8" were backfilled with bentonite grout and excess soil cuttings were placed in 55-gallon drums in accordance with the DOEE soil boring permit conditions. Boring "B-1" was backfilled with pea gravel as groundwater was not encountered and was terminated at depth not exceeding 10 feet. The 55-gallon drums were left onsite at a location approved by the Client and are scheduled to be removed pending scheduling from our drilling subcontractor for unregulated disposal based upon the results of environmental testing (see below). Upon conclusion of grouting, the existing concrete/asphalt were patched with rapid set concrete and bituminous concrete asphalt, respectively. Test borings were performed by DMY Engineering Consultants (DMY) using a tripod rig with manual hammer for Borings "B-1" and "B-2" and a truck mounted auger rig with 3¼ inch hollow stem augers and an automatic hammer for Borings "B-4" through "B-8" to the specified termination depths. Our S. Donahue, PE directed the field work and A. Spencer, EIT observed the test drilling. The test boring locations are depicted on the Boring Location Sketch, SK-2, provided in Appendix A. Test boring logs are provided in Appendix B.

3.3. LABORATORY WORK

Following conclusion of the SPT drilling, the soil samples were delivered to our laboratory for testing. The geotechnical laboratory program consisted of the following:

- Moisture Content (ASTM D 2216) 10 tests
- Sieve Analysis (w/out hydrometer, ASTM D 422) 10 tests
- Atterberg Limits (ASTM D 4318) 5 tests

Samples from the excess soil spoils generated during our exploration were obtained by DMY during drilling operations and were delivered to Phase Separation Science for environmental testing to determine soil disposal requirements in accordance with the permit requirements of DOEE Soil Boring Permit SB2200416.

Samples for geotechnical laboratory testing were selected by Pennoni's geotechnical engineer and samples for environmental testing to determine soil disposal requirements were selected by DMY. Results of the laboratory testing are provided in Appendix C of this report.

4. SUBSURFACE CHARACTERISTICS

4.1. GEOLOGY

According to the Geologic Map of Washington West Quadrangle, DC, developed by the U.S. Geological Survey group in 1995, the site is in an urbanized area in D.C., and lies across the Fall Zone, which separates the Appalachian Piedmont on the west and the Atlantic Coastal Plain on the east. The Piedmont is underlain by metamorphosed rocks of sedimentary, volcanic, and plutonic origin. The Coastal Plain is underlain by generally large bodies of sand and gravel with lesser amounts of silt and clay. More specifically, the site is located within the Potomac Group, which generally consists of variegated gravel, sand, silt and clay, with more coarse-grained sand and gravel-filled lenses, with mainly fine-grained sand and thick clay lenses above basal beds. Beds at or near the base reflect the composition of the underlying adjacent basement rocks; that is, they contain feldspathic sand, smectic clay, and clasts of crystalline rocks. Higher in the Potomac Group, the bulk composition tends to be kaolinitic clay. The quartz-rich beds were probably derived from erosion and reworking of older Potomac Group beds farther west.

According to the U.S. Department of Agriculture (USDA) Web Soil Survey the area of interest within the project site primarily consists of Woodstown Sandy Loam (WdaB) and Sassafras Urban/Gravelly Sandy Loam (ScB/ScC/ScD). WdaB consists of sandy loam underlain by fine sandy loam and loamy sand with convex to concave down slope shapes. WdaB is considered hydrologic soil group C. Depth to water table is approximately 20 to 40 inches below existing ground surface with depth to restrictive features exceeding 80 inches. ScC/ScD consists of gravelly sandy loam underlain by sandy loam, loam, and loamy sand and is considered hydrologic soil group B. Depth to water table is greater than 80 inches below existing ground surface with depth to restrictive features exceeding 80 inches.

4.2. SUBSURFACE STRATIGRAPHY

Subsurface stratigraphy encountered by the test borings generally consists of a surficial layer of asphalt pavement or concrete generally underlain by a cohesive very soft to very stiff or granular, medium dense to dense fill material. The fill material was generally underlain by a soft to very stiff clay layer interbedded with very loose to dense sand/gravel or a very soft to very stiff silt layer. The borings were generally terminated within Stratum A. For descriptive purposes the soil layers can be classified as follows:

Stratum	Approximate Thickness (ft)	Description	USCS/USDA Classification
P	0.25 - 0.75	3 to 7 inches Bituminous Asphalt Concrete OR 6 to 9 inches of Concrete	---
F[1]	4.5 – 12.4	FILL: Brown to black silty clay, little to and fine to medium to coarse sand, trace fine gravel, trace concrete debris, (moist, very soft to very stiff) OR FILL: Brown to tan medium to fine to coarse SAND, trace to some fine to coarse gravel, little silt (moist, medium dense to dense)	--
A[2]	0.5 – 13.0 +	Orange to gray to brown to tan to maroon silty CLAY, little fine to medium sand (moist to saturated, soft to very stiff)	CL / CH
B[3]	5.0 – 12.5	Tan to brown to gray medium to fine to coarse SAND, trace to and silt/clay, trace to little fine gravel (moist to saturated, very loose to medium dense) OR Tan to brown fine to coarse GRAVEL, some medium to coarse to fine sand, trace silt (moist, dense)	SP / SM / SC GP
C[4]	4.0 – 7.0 +	Gray to black clayey SILT, trace to some fine to medium sand (moist to saturated, very soft to very stiff)	ML

Notes:
[1] Stratum F was not fully penetrated in Boring “B-1”
[2] Stratum A was not encountered in Boring “B-1” and was not fully penetrated in Borings “B-4” through “B-8”
[3] Stratum B was only encountered in Borings “B-4” through “B-8”
[4] Stratum C was only encountered in Borings “B-2,” “B-4,” and “B-5” and not fully penetrated in Boring “B-2”

4.3. GROUNDWATER

Groundwater observations were made in each boring during sampling and shortly after completion of drilling. Groundwater was encountered at the project site in Borings “B-2,” “B-4” through “B-6” and “B-8” at depths ranging from 15.0 to 25.0 feet (Elev. 275.0 to 299.5 feet, NAVD88) below the existing ground surface. Groundwater was not encountered within Borings “B-1” and “B-7.” Groundwater observations are for the times indicated and may not be indicative of seasonal or daily variations in the groundwater levels. Seasonal variations on the order of several feet should be anticipated.

Results from the field exploration were reviewed for soil composition and redoximorphic features (RMF). RMF, are defined as color patterns in a soil that are caused by loss or gain of pigment compared to the matrix color due to oxidation/reduction of iron and or manganese coupled with their removal, translocation, or accrual typically indicating the seasonal high-water table or a perched water condition. RMFs were observed within Borings "B-4," "B-5," and "B-7" at approximate depths ranging from 10 to 20 feet below the existing ground surface (Elev. 290.0 to 296.0 feet, NAVD88).

5. ANALYSES AND RECOMMENDATIONS

5.1. FOUNDATIONS

Factors effecting foundation design, construction, and performance for this project consist of variable subsurface soil consistency, loose/soft fill material, compressible clay layers, and site access constraints. Based on our understanding of the proposed renovations, we anticipate the proposed foundations will bear within the Strata F/A soft to stiff clay. At this site, soft/loose to firm/medium dense soils were encountered to depths of approximately 10 to 20 feet below existing grade which results in shallow foundation construction being impractical due to the relatively low allowable bearing capacity resulting in excessively large foundations and/or significant settlement in the general vicinity of the annexes. Ground improvement or soil exchange is not considered feasible for the project as the site is developed and the foundations for the annex renovations are proposed within the existing structures which limit access to foundation locations. Therefore, shallow foundations or helical piers were considered for the proposed renovations for the west entrance and annex, respectively, as the entrance renovations are relatively lightly loaded, and the helical piers can be installed in areas requiring tight access. The following are recommendations for foundation systems based on our evaluation of these factors and our experience.

5.1.1. SHALLOW SPREAD FOOTINGS – WEST ENTRANCE

The west entrance modifications consist of new vestibule and trellis architectural treatment located on the western side of the building. Anticipated bearing strata consist predominantly of stiff clay of Strata F/A. We recommend designing the foundations for a maximum, net allowable bearing capacity of 3,000 pounds per square foot (psf) for the proposed vestibule and trellis foundations. Based on the subsurface conditions encountered and an allowable foundation bearing pressure of 3,000 psf we estimate total settlement on the order up to 1 inch, with differential settlement less than 0.5 inches across similarly founded foundations.

Due to the variability in the consistencies/relative densities of the near surface/bearing elevation subsoils, ground modification through densification in place and/or undercutting of the soft soils of Strata F/A may be required in order to improve the subgrade, create a uniform bearing stratum, and minimize total and differential settlements. Excavated soils should be replaced with suitable load-bearing structural fill placed in layers and compacted as outlined in the Earthwork section below.

Continuous and isolated footings should be at least 2 feet wide and 3 feet square, respectively, to prevent localized shear failure in the soil. The subgrades of all foundations exposed to freezing temperatures during construction and/or the life of the structure should be established at least 30 inches below adjacent to exposed grades or otherwise protected against frost action in accordance with the District of Columbia Municipal Regulations (DCMR) 12. High plasticity clay was encountered within Stratum A but is not expected to be encountered at vestibule and trellis footing bearing elevations.

If high plasticity soils are encountered, we recommend that the material be removed to a depth of 4 feet below the exterior grade or until the underlying sand is encountered, followed by backfill of the undercut with granular structural fill compacted in accordance with the Earthwork section below. Foundation subgrades should be checked by a representative of the Geotechnical Engineer to confirm conditions suitable for support of the design bearing pressure. Where an area is questionable, it should be further explored and/or remedied by removal and replacement of unsuitable material.

5.1.2. GROUTED HELICAL PIERS - ANNEXES

Based on the above referenced historical drawings the annexes have an approximate finished floor elevation of 304 feet (NAVD88) with existing shallow foundations bearing at elevations ranging from approximately 297.5 to 299.0 feet (NAVD88). It is assumed that new shallow foundations for the proposed Annexes are anticipated to bear at similar elevations. Anticipated bearing strata consist predominantly of very soft to stiff clay of Strata F/A. Based on the encountered subsurface soils it is our opinion that shallow foundations are not feasible for the renovations due to low allowable bearing capacity resulting in excessively large footings and/or determinantal post construction settlement due to the above-mentioned structural loadings and very soft compressible clays.

It is our opinion that grouted helical piers can be considered for support of the proposed additional floors. This type of foundation system is capable of being constructed in “limited access” locations such as the ground floor of the existing annexes. Grouted helical piers are a deep foundation system that employs the use of a grout column that encases a metal shaft with one or more helices attached. Helical piers are rotated into competent soils while an axial load is applied to the shaft. After the lead section is installed, a displacement plate with subsequent extensions are installed until the termination depth is achieved. Flowable grout is pumped during the installation procedure to encase the shaft as the extensions are added until a termination depth is achieved. The design bearing capacity is confirmed by measuring the torque applied to the shaft by the installation equipment as well as static load testing (if applicable). The helical piers are incorporated into proposed foundations using a concrete pile cap or be attached to existing foundations with a bracket, and the structural loads are transferred to competent soils at an appropriate depth through the helical piers. Helical piers typically develop little lateral resistance but may be improved by providing battered piers as necessary, up to 30 degrees from vertical. Grouted helical piers provide an increase in the buckling resistance of the pier (as compared to non-grouted helical piers), as the pier’s slenderness ratio is inherently large due to the length of the pier and the relatively small cross-sectional area of the pier. The encasement of the steel shaft with grout also provides a benefit against corrosive resistance from the soil.

An analysis was performed assuming a grouted 2.875-inch diameter steel shaft and a 12 in./ 14 in./ 14 in. (helix diameter) configuration with an 8-inch diameter grout encasement of the entire shaft excluding the lead section at several depths for use in foundation design for the proposed renovations. Based on the analysis the helical piers can develop axial and tensile capacities as shown in the table below, for lengths on the order of 15 feet to 35 feet below bottom of footing elevation terminating in stiff to very stiff Strata A/C soils. The length of the pier will be dependent on the depth of the existing footing elevation and the capacity required based on the anticipated structural loading. The piers should be spaced a minimum of 3-times the largest helix diameter to prevent reduction in capacity due to group effects.

Helix Configuration	Loading Condition	Installation Depth		
		15 feet	*25 feet*	*35 feet*
12/14/14 in.	Allowable Capacity – Compression (kips)	6	22	32
	Allowable Capacity – Tension (kips)	6	18	32
	Min. Helix Installation Torque (ft-lbs)	1,435	5,075	7,175

The capacity estimates above are based on a factor of safety of 3.0 for compression and tension. If higher capacities are desired, the factor of safety in compression can be reduced to 2.0 if the contractor performs a minimum of one static load test in accordance with ASTM D1143 in order to verify the as-constructed pier capacity. The static load test is to be performed on a non-production pier to confirm the capacity. The estimated torque required to reach the estimated capacities is also provided in the table above. We note that the results of a load test will only be good for the specific type of pier installed and no substitutions should be permitted without performing another static load test to confirm the axial capacity of an alternate pier.

Based on our analysis, we recommend contract documents specify that the contractor is to provide helical piers capable of achieving the necessary allowable compressive and uplift (tension) capacities and settlement being indicated from the design of the proposed piers signed and sealed by a Professional Engineer licensed in the District of Columbia. The contractor should also have a minimum of 5 years of successful helical pier experience using the type of helical pier specified herein.

5.2. GROUND FLOOR SLAB

The proposed subgrades are anticipated to primarily consist of fine-grained clay of Strata F/A and/or newly placed structural fill. The Stratum A high plasticity clay is expected to be encountered at subgrade elevations, if encountered we recommend that the material be removed to a depth of 4 feet below exterior grades followed by backfill of the undercut with granular structural fill compacted in accordance with the Earthwork section below. Provided the subgrades are prepared as discussed in the Earthwork section below, the concrete slabs on grade can be designed using a modulus of vertical subgrade reaction (k_v) of 125 pci. We recommend that the slabs be designed as “fully floating” (not connected to the structural elements of the building) in order to reduce potential cracking due to differential settlement between the building’s structural elements and slab on grade. A 4 to 6-inch-thick free-draining granular base course should be placed beneath the slabs to provide a uniform bearing surface and to aid in the proper curing of the concrete.

5.3. SEISMIC SITE CLASSIFICATION

The borings disclosed subsurface conditions generally described according to the Table 20.3-1 of ASCE 7 and referenced in Section 1613.3 of the 2018 International Building Code (IBC) as having a soil-profile corresponding to Site Class E – a soft clay soil profile. Site Class determination is based on the properties in the upper 100 feet of the ground surface. The test borings performed herein were advanced to a maximum depth of 35 feet. Values beyond 35 feet were estimated based on our local experience in this area. Based on Figures 22-1 and 22-2 of the ASCE-7, parameters Ss and S_1 for the site can be assumed to be 0.133g and 0.043g, respectively.

5.4. GROUNDWATER AND SURFACE WATER MANAGEMENT

The groundwater observations made in the borings suggests that free-standing groundwater is not anticipated in excavations for the proposed renovations. In the event that wet conditions and/or seepage are encountered, sumps and pumps should be adequate to maintain stable conditions during foundation construction. The foundation excavations should not be used as a detention basin or sump. During construction, surface runoff should be prevented from entering the excavations by creating soil berms or diversion swales along the perimeter if the excavation is expected to be open for a long period of time. Where ponding does occur, the water should be pumped immediately and grades should then be established to prevent further ponding.

Based on groundwater encountered at depths ranging from 15.0 to 25.0 feet (Elev. 275.0 to 299.5 feet, NAVD88) below the existing ground surface and RMFs at approximate depths ranging from 10 to 20 feet below the existing ground surface (Elev. 290.0 to 296.0 feet, NAVD88), it is our opinion that foundation drains are not necessary for the proposed renovation foundations.

5.5. EARTHWORK

Prior to placing any new fill, and before the construction of the proposed foundations, any construction debris, vegetation, existing utilities, and associated topsoil must be removed from within the areas of proposed construction. These materials can remain in proposed landscaped areas provided that future plans do not include building in those areas.

Exposed subgrades should be thoroughly evaluated by a representative of the Geotechnical Engineer in an attempt to identify unstable (soft, yielding, etc.) surface areas. Any unstable area found should be stabilized by excavating and replacing those soils with suitable soil (adequately compacted, see below), by lowering the moisture content of the subgrade soils and compacting them, or by other methods (placing a geotextile and stone layer, etc.). To reduce the potential for damage to the subgrade, we recommend that construction traffic over the subgrade be kept to a minimum. Also, concrete for foundations should be placed as soon as possible following the subgrade preparation.

Our experience indicates that the on-site soils of Strata F and A through C can be reused for the construction, provided all organics and debris larger than 3 inches in its greatest dimension be removed prior to reuse. Strata F, A, and C soils were observed to contain a significant amount of fine-grained material (silts/clays). These types of soils are sensitive to moisture and may therefore require wetting or drying prior to compaction. Drying “wet” soil is difficult during wet periods and during lower temperatures. Therefore, provisions for importing structural fill should be included in the contract documents. If necessary, granular fill should consist of well-graded material with a maximum particle size less than 3 inches, not more than 20 percent passing the No. 200 sieve and have a plasticity index (PI) not greater than 8 percent.

Fills should be placed in layers not exceeding 10 to 12 inches loose measure. This criterion might be adjusted by the geotechnical engineer in the field depending on the conditions present at the time of construction, on the compaction equipment used, and on the fill materials selected. Fills for support of foundations/floor slabs/pavements should be compacted to at least 98 percent of the laboratory determined dry density, ASTM D-698, when small, hand-operated compaction equipment is used, and to at least 95 percent of the laboratory determined maximum dry density, ASTM D-1557, when self-propelled, heavy-duty construction equipment is used. Fills should extend a minimum of 5 feet beyond the exterior edge of a loaded area and have side slopes not steeper than 2 horizontal to 1 vertical.

Specifications should indicate that the percentage of maximum dry density attained in the field is not the only criteria to be used for assessing fill compaction. Observation of the behavior of the fill under the loads of construction equipment should also be used. If the test results indicate that the percentage of compaction is being achieved, but the soil mass is moving under the equipment, placement of additional fill should not be continued until the movement is stabilized. Otherwise, settlement of the fill may occur.

5.6. EXISTING AND PROPOSED UTILITIES

Existing utilities noted in the field included (but may not be limited to): water, electric, sewer and unknown lines located around the perimeter of the existing building and floor drains located underneath the Central Annex slab on grade. We recommend that load bearing elements of the proposed construction not bear over existing utilities in order to reduce the potential for damage and utilities be relocated outside of the footprints of the proposed structure. Utilities were noted to be run parallel through the fire lanes adjacent to the north and south Annexes. Utilities should be protected throughout the construction duration.

6. LIMITATIONS

This work has been done in accordance with our authorized scope of work and in accordance with generally accepted professional practice in the fields of geotechnical and foundation engineering. This warranty is in lieu of all other warranties either expressed or implied. Our conclusions and recommendations are based on the data revealed by this exploration. We are not responsible for any conclusions or opinions drawn from the data included herein, other than those specifically stated, nor are the recommendations presented in this report intended for direct use as construction specifications. This report is intended for use with regard to the specific project described herein; any changes in loads, structures, or locations should be brought to our attention so that we may determine how they may affect our conclusions. An attempt has been made to provide for normal contingencies but the possibility remains that unexpected conditions may be encountered during construction. If this should occur, or if additional or contradictory data are revealed in the future, we should be notified so that modifications to this report can be made, if necessary. If we do not review relevant construction documents and witness the relevant construction operations, then we cannot be responsible for any problems that may result from misinterpretation or misunderstanding of this report or failure to comply with our recommendations.

APPENDICES

APPENDIX A – Location Sketches

SITE LOCATION SKETCH

Site Location Sketch adapted from Google Earth Image dated October 16, 2019.

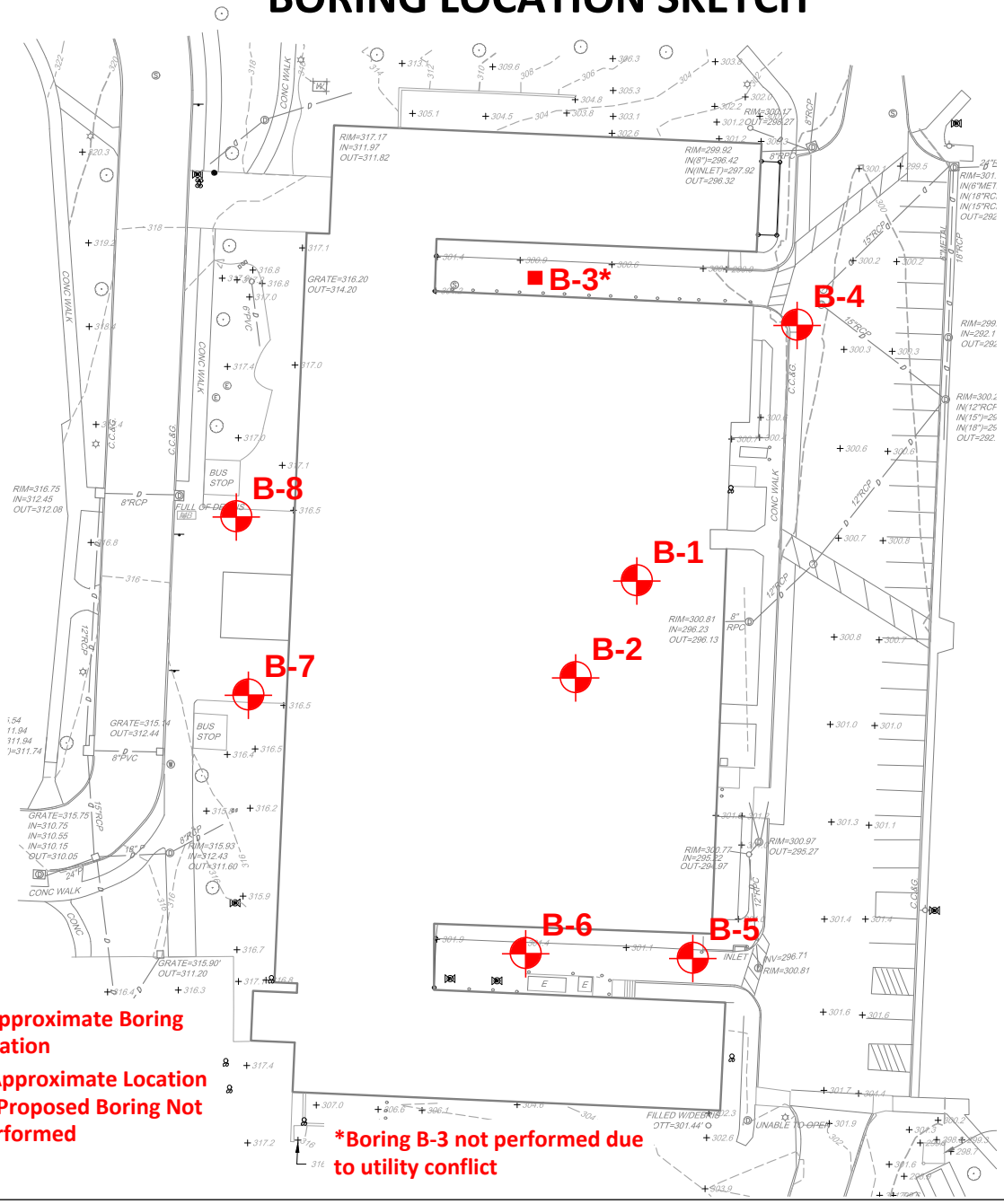
Pennoni Associates, Inc.
8890 McGaw Road, Suite 100
Columbia, MD 21045

ALL DOCUMENTS PREPARED BY PENNONI ASSOCIATES ARE INSTRUMENTS OF SERVICE IN RESPECT OF THE PROJECT. THEY ARE NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR REUSE BY OWNER OR OTHERS ON EXTENSIONS OF THE PROJECT OR ON ANY OTHER PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICATION OR ADAPTATION BY PENNONI ASSOCIATES FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT OWNERS SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO PENNONI ASSOCIATES; AND OWNER SHALL INDEMNIFY AND HOLD HARMLESS PENNONI ASSOCIATES FROM ALL CLAIMS, DAMAGES, LOSSES, AND EXPENSES ARISING OUT OF OR RESULTING THEREFROM.

DRAWN BY:	SCALE:	DATE:
ARS	As Shown	10/14/2022
CHECKED BY:	FIGURE No.	
JSD	SK-1	
PROJECT No.		
AEWLA22050		

AFRH Sheridan Building Renovations – Washington, DC

BORING LOCATION SKETCH



Boring Location Sketch adapted from an undated Topography Survey Plan titled "AFRH – Topography Survey," prepared by Pennoni Associates Inc.

Pennoni Associates, Inc.
8890 McGaw Road, Suite 100
Columbia, MD 21045

ALL DOCUMENTS PREPARED BY PENNONI ASSOCIATES ARE INSTRUMENTS OF SERVICE IN RESPECT OF THE PROJECT. THEY ARE NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR REUSE BY OWNER OR OTHERS ON EXTENSIONS OF THE PROJECT OR ON ANY OTHER PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICATION OR ADAPTATION BY PENNONI ASSOCIATES FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT OWNERS SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO PENNONI ASSOCIATES; AND OWNER SHALL INDEMNIFY AND HOLD HARMLESS PENNONI ASSOCIATES FROM ALL CLAIMS, DAMAGES, LOSSES, AND EXPENSES ARISING OUT OF OR RESULTING THEREFROM.

DRAWN BY:	SCALE:	DATE:
ARS	NTS	10/14/2022
CHECKED BY:	FIGURE No.	
JSD	SK-2	
PROJECT No.		
AEWLA22050		

AFRH Sheridan Building Renovations – Washington, DC

APPENDIX B – Boring Logs

TEST BORING LOG

TEST BORING B-1

LATITUDE 38.940976

LONGITUDE -77.009656

CLIENT AE-Works

PROJECT NAME AFRH Sheridan Building Renovations

PROJECT NUMBER AEWLA22050

PROJECT LOCATION 140 Rock Creek Church Road NW, Washington, DC.

DATE STARTED 9/19/22 **COMPLETED** 9/19/22

GROUND ELEVATION 304.0' NAVD88

DRILLING CONTRACTOR DMY Engineering Consultants

WATER ENCOUNTERED:

DRILLING METHOD Tripod

DURING DRILLING Not Encountered

DRILLER / HELPER David Vazquez / Daniel Pao

AT END OF DRILLING Not Encountered

LOGGED BY A. Spencer **CHECKED BY** S. Donahue

AFTER DRILLING Not Encountered

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION	REMARKS
0						Depth / Elev.	
					P	0.5 — 6" CONCRETE — 303.5	
						0.8 — 4" Graded Aggregate Base Coarse	
	S-1	20	2-3-4-6			FILL: Brown to black clay, little fine to medium to coarse sand, trace fine gravel	
	S-2	14	6-5-5-5		F		
5						5.0	
	S-3	3	5-5-50/4"			FILL: Brown to black clay, little fine to medium to coarse sand, trace fine gravel, trace concrete debris	
						6.5 — 297.5	Spoon refusal at 6.5 ft Apparent Concrete Obstruction
						Borehole terminated at 6.5 feet.	

NOTES:

Elevations estimated from an undated Topographic Survey titled "AFRH," prepared by Pennoni Associates Inc.

TEST BORING LOG

TEST BORING B-2

LATITUDE 38.940901

LONGITUDE -77.009745

CLIENT AE-Works

PROJECT NAME AFRH Sheridan Building Renovations

PROJECT NUMBER AEWLA22050

PROJECT LOCATION 140 Rock Creek Church Road NW, Washington, DC.

DATE STARTED 9/20/22 **COMPLETED** 9/20/22

GROUND ELEVATION 304.0' NAVD88

DRILLING CONTRACTOR DMY Engineering Consultants

WATER ENCOUNTERED:

DRILLING METHOD Tripod

DURING DRILLING 14.0' / Elev 290.0'

DRILLER / HELPER David Vazquez / Hernan Guzman

AT END OF DRILLING

LOGGED BY A. Spencer **CHECKED BY** S. Donahue

AFTER DRILLING 13.5' / Elev 290.5'

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0					P	0.5	6" CONCRETE	303.5	
						0.8	4" Graded Aggregate Base Coarse		
	S-1	18	10-15-21-23		F	3.0	FILL: Tan fine to medium sand, little silt		
	S-2	19	15-10-6-6				FILL: Brown clay and fine to medium to coarse		
5						5.0	sand, little fine gravel	299.0	
	S-3	12	6-5-4-4			7.0	Brown to tan CLAY, some fine to medium to coarse sand, trace fine gravel		
	S-4	24	6-7-7-12				Brown to tan to gray silty CLAY		
10	S-5	24	9-10-12-15		A				
						13.0			
	S-6	24	5-5-5-6				Gray to orange silty CLAY		Saturated
15									
						18.0		286.0	
	S-7	24	6-8-8-10				Gray to black fine to medium SAND and SILT		
20					C				
	S-8	24	13-12-14-16			25.0		279.0	
25							Borehole terminated at 25.0 feet.		

NOTES:

Elevations estimated from an undated Topographic Survey titled "AFRH," prepared by Pennoni Associates Inc.

TEST BORING LOG

TEST BORING B-4

LATITUDE 38.941301

LONGITUDE -77.009499

CLIENT AE-Works

PROJECT NAME AFRH Sheridan Building Renovations

PROJECT NUMBER AEWLA22050

PROJECT LOCATION 140 Rock Creek Church Road NW, Washington, DC.

DATE STARTED 9/20/22 **COMPLETED** 9/20/22

GROUND ELEVATION 300.0' NAVD88

DRILLING CONTRACTOR DMY Engineering Consultants

WATER ENCOUNTERED:

DRILLING METHOD 3.25 Hollow Stem Auger

▽ **DURING DRILLING** 25.0' / Elev 275.0'

DRILLER / HELPER Michael Beccerra / Lance James

AT END OF DRILLING

LOGGED BY A. Spencer **CHECKED BY** S. Donahue

▼ **AFTER DRILLING** 25.0' / Elev 275.0'

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION	REMARKS
0					P	Depth 0.6 — 7" ASPHALT — Elev. 299.4	
	S-1	8	7-5			2.0 FILL: Brown to tan medium fine to coarse sand, some fine to coarse gravel, little silt	
	S-2	6	2-3-2-2			4.0 FILL: Brown clay, some medium to fine to coarse sand, little fine gravel	
5	S-3	14	1-2-2-2			FILL: Brown clay and fine to medium to coarse sand, trace fine gravel	
	S-4	12	2-1-2-2		F		Moist
	S-5	24	WOH-1-1-1				Mottling
10						13.0 — Elev. 287.0	
	S-6	8	2-1-2-3			Tan to orange to gray CLAY, little fine to medium sand	
15					A	18.0 — Elev. 282.0	
	S-7	20	2-1-2-3			Black clayey SILT, little fine to medium sand	Moist
20					C	23.0 — Elev. 277.0	
	S-8	24	2-3-4-7			Gray CLAY	
25 ▼					A		
	S-9	24	4-7-8-18			29.5 — Elev. 270.5	
30						Gray to orange fine to medium to coarse SAND and CLAY, trace fine gravel	
©					B	33.0 — Elev. 267.0	
	S-10	24	3-6-8-13			Gray to maroon CLAY	
35					A	35.0 — Elev. 265.0	
						Borehole terminated at 35.0 feet.	

NOTES:

Elevations estimated from an undated Topographic Survey titled "AFRH," prepared by Pennoni Associates Inc.

TEST BORING LOG

TEST BORING B-5

LATITUDE 38.94057

LONGITUDE -77.009597

CLIENT AE-Works

PROJECT NAME AFRH Sheridan Building Renovations

PROJECT NUMBER AEWLA22050

PROJECT LOCATION 140 Rock Creek Church Road NW, Washington, DC.

DATE STARTED 9/20/22 **COMPLETED** 9/20/22

GROUND ELEVATION 301.5' NAVD88

DRILLING CONTRACTOR DMY Engineering Consultants

WATER ENCOUNTERED:

DRILLING METHOD 3.25 Hollow Stem Auger

DURING DRILLING 18.0' / Elev 283.5'

DRILLER / HELPER Michael Beccerra / Lance James

AT END OF DRILLING

LOGGED BY A. Spencer **CHECKED BY** S. Donahue

AFTER DRILLING 15.0' / Elev 286.5'

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION	REMARKS
0					P	Depth 0.3 — 3" ASPHALT — Elev. 301.3	Auger through base coarse
						2.0 — 16" Graded Aggregate Base Coarse	
	S-2	12	4-4-2-2		F	FILL: Brown clay, some medium to fine to coarse sand, trace fine gravel	
5	S-3	12	5-9-10-6			4.0 — FILL: Brown clay and medium to fine to coarse sand, little fine gravel	
	S-4	24	2-2-3-3			6.5 — Elev. 295.0	
	S-5	20	3-3-4-4			8.0 — Brown to tan silty CLAY, little fine to medium sand	
10						Brown to orange to gray CLAY, some fine to medium sand	Moist Mottling
					A	13.0 — Brown to orange to gray silty CLAY	
15 ▼	S-6	24	2-2-3-3				
C	S-7	24	1-1-1-1			19.0 — Elev. 282.5	Saturated
20					C	Black SILT, some fine sand	
						23.0 — Elev. 278.5	
25	S-8	24	1-3-5-8		B	Gray medium to fine to coarse SAND and CLAY	Wet on spoon
						28.0 — Gray to maroon medium to fine to coarse SAND and CLAY	
30	S-9	24	4-12-13-20				
						33.0 — Elev. 268.5	
35	S-10	24	10-8-9-13		A	35.0 — Gray to orange silty CLAY, little to some fine to medium sand — Elev. 266.5	
						Borehole terminated at 35.0 feet.	

NOTES:

Elevations estimated from an undated Topographic Survey titled "AFRH," prepared by Pennoni Associates Inc.

TEST BORING LOG

TEST BORING B-6

LATITUDE 38.940579

LONGITUDE -77.009842

CLIENT AE-Works

PROJECT NAME AFRH Sheridan Building Renovations

PROJECT NUMBER AEWLA22050

PROJECT LOCATION 140 Rock Creek Church Road NW, Washington, DC.

DATE STARTED 9/19/22 **COMPLETED** 9/19/22

GROUND ELEVATION 301.0' NAVD88

DRILLING CONTRACTOR DMY Engineering Consultants

WATER ENCOUNTERED:

DRILLING METHOD 3.25 Hollow Stem Auger

DURING DRILLING 20.0' / Elev 281.0'

DRILLER / HELPER Michael Beccerra / Adrian Quijada

AT END OF DRILLING

LOGGED BY A. Spencer **CHECKED BY** S. Donahue

AFTER DRILLING 20.5' / Elev 280.5'

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION	REMARKS
0					P	Depth 0.3 / Elev. 300.8: 3" ASPHALT	Auger through subbase
						2.0: 16.5" Graded Aggregate Base Coarse	
	S-2	18	2-2-2-3		F	FILL: Tan to gray to maroon silty clay, little fine to medium sand	Obstruction encountered at 3 feet below existing grade. Boring offset approximately 1 feet north
5	S-3	24	1-2-1-2			4.0: FILL: Tan to gray to maroon silty clay	Moist
	S-4	24	2-2-2-3			6.0 / Elev. 295.0: Gray silty CLAY	
10	S-5	24	1-2-2-3				
					A		
15	S-6	24	1-2-2-4				
						18.0 / Elev. 283.0: Gray fine to medium SAND, some silt	
20	S-7	24	1-1-2-1		B		Saturated
	C						
						23.0 / Elev. 278.0: Gray CLAY	
25	S-8	24	3-5-5-7		A		
						29.0: Maroon CLAY	
30	S-9	24	8-10-12-18				
						33.0: Maroon to gray CLAY, little fine to medium sand	
35	S-10	24	3-5-9-13			35.0 / Elev. 266.0	
						Borehole terminated at 35.0 feet.	

NOTES:

Elevations estimated from an undated Topographic Survey titled "AFRH," prepared by Pennoni Associates Inc.

TEST BORING LOG

TEST BORING B-7

LATITUDE 38.940875

LONGITUDE -77.010245

CLIENT AE-Works

PROJECT NAME AFRH Sheridan Building Renovations

PROJECT NUMBER AEWLA22050

PROJECT LOCATION 140 Rock Creek Church Road NW, Washington, DC.

DATE STARTED 9/21/22 **COMPLETED** 9/21/22

GROUND ELEVATION 316.5' NAVD88

DRILLING CONTRACTOR DMY Engineering Consultants

WATER ENCOUNTERED:

DRILLING METHOD 3.25 Hollow Stem Auger

DURING DRILLING Not Encountered

DRILLER / HELPER Michael Beccerra / Lance James

AT END OF DRILLING Not Encountered

LOGGED BY A. Spencer **CHECKED BY** S. Donahue

AFTER DRILLING Not Encountered

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION	REMARKS
0					P	Depth 0.8 — 9" CONCRETE — Elev. 315.8	
						1.0 — 3" Graded Aggregate Base Coarse	
	S-1	13	3-9-10-8			FILL: Brown CLAY, some medium to fine to coarse sand, trace fine gravel	
5	S-2	11	6-7-6-8		F		
	S-3	11	3-4-4-7			7.0 — Elev. 309.5	
	S-4	15	5-6-5-6			9.0 — Tan to brown medium to fine to coarse SAND, little fine gravel, trace silt	
10	S-5	19	10-22-22-17			Tan to brown fine to coarse GRAVEL, some medium to coarse to fine sand, trace silt	Moist
					B	13.0	
15	S-6	0	5-5-6-6			Tan to brown medium to fine to coarse SAND, little fine gravel, trace silt	
						18.0 — Elev. 298.5	
20	S-7	24	2-1-3-2		A	20.0 — Gray to orange CLAY — Elev. 296.5	Iron staining

Borehole terminated at 20.0 feet.

NOTES:

Elevations estimated from an undated Topographic Survey titled "AFRH," prepared by Pennoni Associates Inc.

TEST BORING LOG

TEST BORING B-8

LATITUDE 38.941049

LONGITUDE -77.010222

CLIENT AE-Works

PROJECT NAME AFRH Sheridan Building Renovations

PROJECT NUMBER AEWLA22050

PROJECT LOCATION 140 Rock Creek Church Road NW, Washington, DC.

DATE STARTED 9/21/22 **COMPLETED** 9/21/22

GROUND ELEVATION 316.5' NAVD88

DRILLING CONTRACTOR DMY Engineering Consultants

WATER ENCOUNTERED:

DRILLING METHOD 3.25 Hollow Stem Auger

▽ **DURING DRILLING** 18.0' / Elev 298.5'

DRILLER / HELPER David Vazquez / Hernan Guzman

AT END OF DRILLING

LOGGED BY A. Spencer **CHECKED BY** S. Donahue

▼ **AFTER DRILLING** 17.0' / Elev 299.5'

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION	REMARKS
0					P	Depth 0.8 — 9.5" CONCRETE — Elev. 315.8	
						1.0 — 3" Graded Aggregate Base Coarse	
	S-1	20	2-3-4-6			3.0 — FILL: Brown to tan clay, some medium to fine to coarse sand	
5	S-2	12	5-6-8-9		F	FILL: Brown to tan clay, some medium to fine to coarse sand, trace fine gravel	
	S-3	20	5-5-7-11			7.0 — Elev. 309.5	Moist
	S-4	18	4-5-5-8			Brown to tan medium to fine to coarse SAND and CLAY, trace fine gravel	
10	S-5	15	5-5-6-8			9.0 — Brown to tan medium to fine to coarse SAND, some clay, trace fine gravel	Moist
						13.0	
15	S-6	10	8-16-13-6		B	Brown to orange medium to fine to coarse SAND, little fine to coarse gravel, little silt	
20	S-7	10	4-4-4-7			19.5 — Elev. 297.0	Saturated
					A	20.0 — Orange to gray CLAY — Elev. 296.5	
						Borehole terminated at 20.0 feet.	

NOTES:

Elevations estimated from an undated Topographic Survey titled "AFRH," prepared by Pennoni Associates Inc.

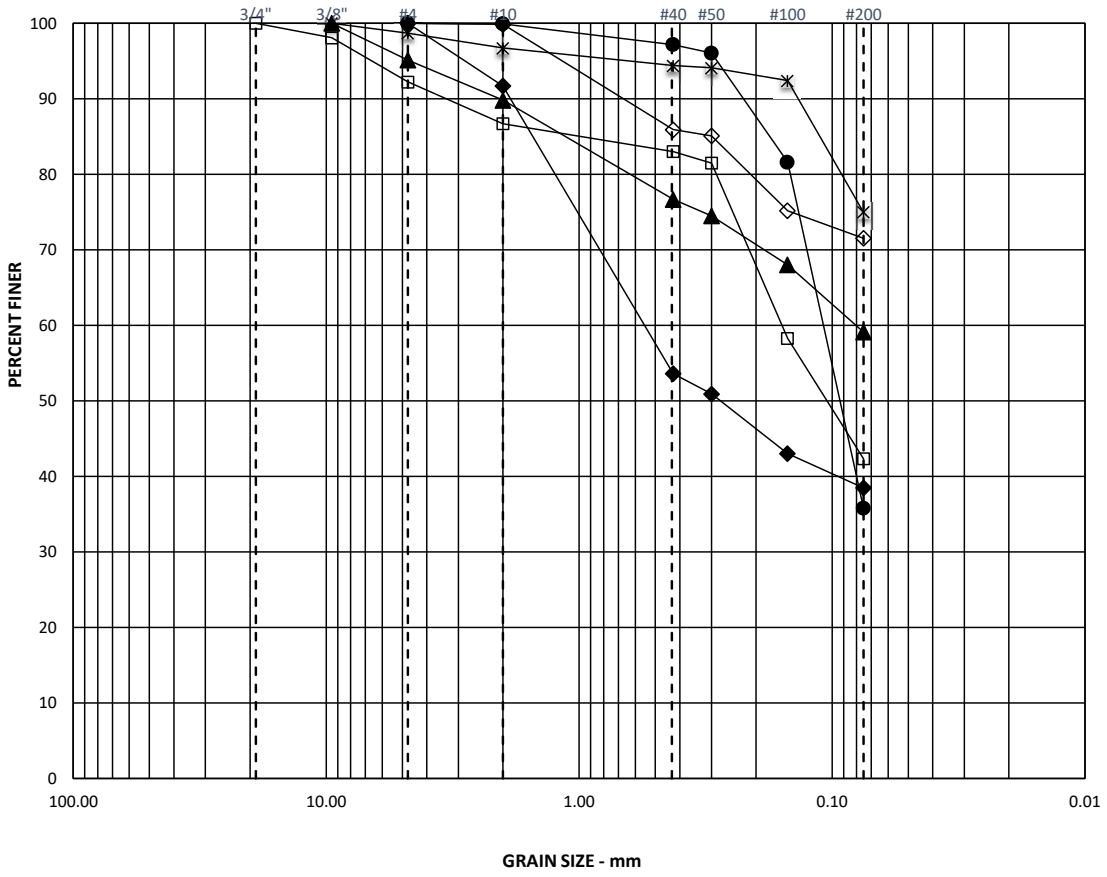
APPENDIX C – Geotechnical Laboratory Test Results

SUMMARY OF LABORATORY DATA

BORING NUMBER	SAMPLE NUMBER	DEPTH (ft)	SOIL CLASSIFICATION	GRAIN SIZE DISTRIBUTION			PLASTICITY				MOISTURE CONTENT w %	pH		ORGANIC CONTENT (%)	RESISTIVITY (ohm-cm) at T°C	VOLUMETRIC				
				GRAVEL %	SAND %	SILT/CLAY %	LIQUID LIMIT w_l	PLASTIC LIMIT wp	PLASTICITY INDEX I_P	LIQUIDITY INDEX I_L		pH in H_2O	pH in $CaCl_2$			SPECIFIC GRAVITY (G) (*) ASSUMED	DRY UNIT WEIGHT (pcf)	MOIST UNIT WEIGHT (pcf)	VOID RATIO (e)	DEGREE OF SATURATION %
B-2	S-3	5-7	CL	1	24	75	38	21	17	0.03	21.5									
B-2	S-7	18-20	ML	0	64	36	NV	NP	NP	NV	38.0									
B-4	S-5	8-10	CL	5	36	59	43	17	26	0.18	21.6									
B-4	S-9	28-30		8	50	42					18.1									
B-5	S-5	8-10	CH	0	28	72	65	24	41	0.27	34.9									
B-5	S-9	28-30	ML	0	62	38	42	27	15	0.31	31.7									
B-6	S-4	7-9		0	1	99					55.1									
B-6	S-7	18-20		0	78	22					38.0									
B-7	S-5	9-11		58	35	7					3.2									
B-8	S-4	7-9		6	67	28					14.7									

PENNONI ASSOCIATES INC.	DRAWN BY:	DATE:	PROJECT:		JOB No.:
	JEK	10/5/2022	**AFRH Sheridan Building Renovations**		**AEWLA22050**
	CHECKED BY:	DATE:	LOCATION:		TABLE No.:
	ARS	10/6/2022	**Washington, DC**		**L-1**

Particle Size Distribution Report



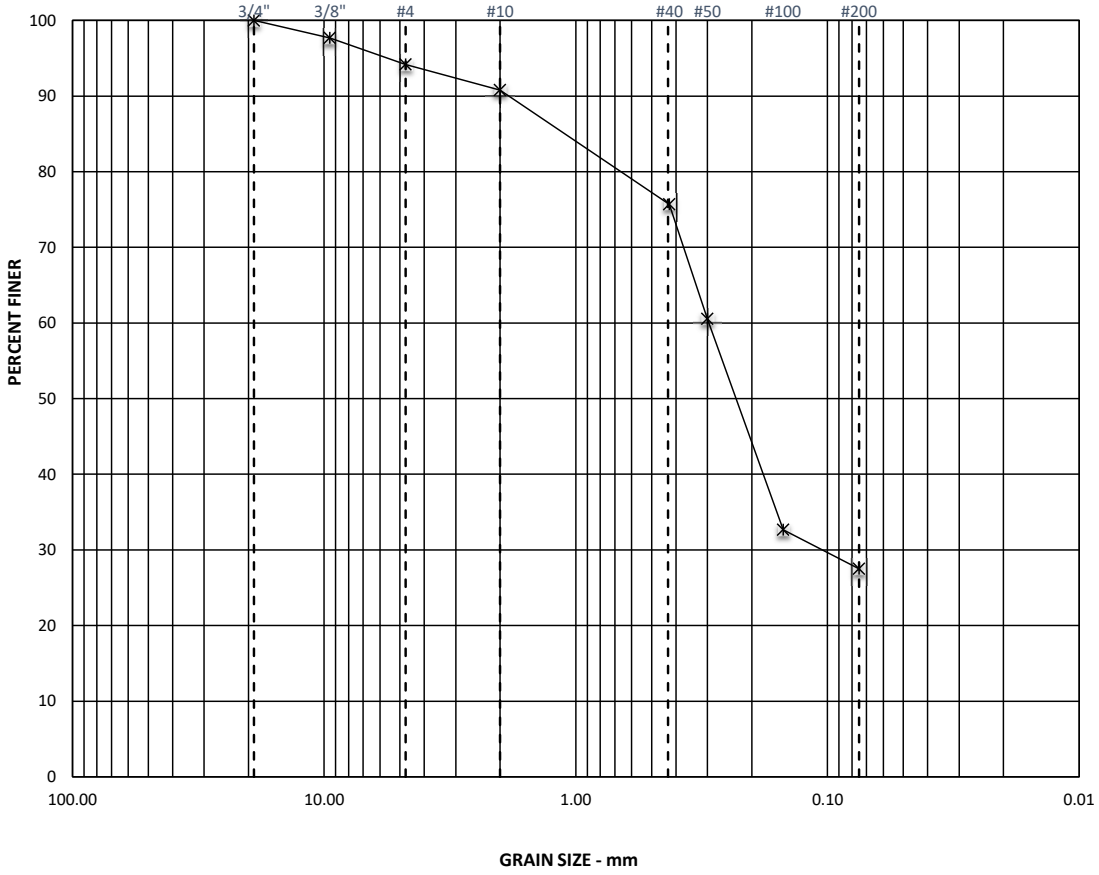
	% Gravel		% Sand			% Fines		Moisture (%)
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
*	0.0	1.3	2.0	2.3	19.4	75.0		21.5
●	0.0	0.0	0.1	2.8	61.4	35.8		38.0
▲	0.0	4.9	5.3	13.1	17.6	59.1		21.6
□	0.0	7.8	5.5	3.7	40.6	42.4		18.1
◇	0.0	0.0	0.1	13.9	14.4	71.5		34.9
◆	0.0	0.0	8.3	38.1	15.1	38.5		31.7
■	0.0	0.0	0.0	0.1	0.4	99.5		55.1
○	0.0	0.0	0.0	5.1	72.7	22.2		38.0
△	16.5	41.3	9.9	15.6	9.4	7.3		3.2

SYMBOL	SOURCE	SAMPLE	DEPTH (ft)	MATERIAL DESCRIPTION
*	B-2	S-3	5-7	CLAY, SOME F/M/C SAND, TRACE F GRAVEL
●	B-2	S-7	18-20	F/M SAND, AND SILT
▲	B-4	S-5	8-10	CLAY, AND F/M/C SAND, TRACE F GRAVEL
□	B-4	S-9	28-30	F/M/C SAND, AND SILT/CLAY, TRACE F GRAVEL
◇	B-5	S-5	8-10	CLAY, SOME F/M SAND
◆	B-5	S-9	28-30	M/F/C SAND, AND SILT
■	B-6	S-4	7-9	SILT/CLAY
○	B-6	S-7	18-20	F/M SAND, SOME SILT/CLAY
△	B-7	S-5	9-11	F/C GRAVEL, SOME M/C/F SAND, TRACE SILT/CLAY

PENNONI ASSOCIATES INC.

Client: AE Works
Project: AFRH Sheridan Building Renovations
Location: Washington, DC
Lab No. 10-
Figure S-1

Particle Size Distribution Report



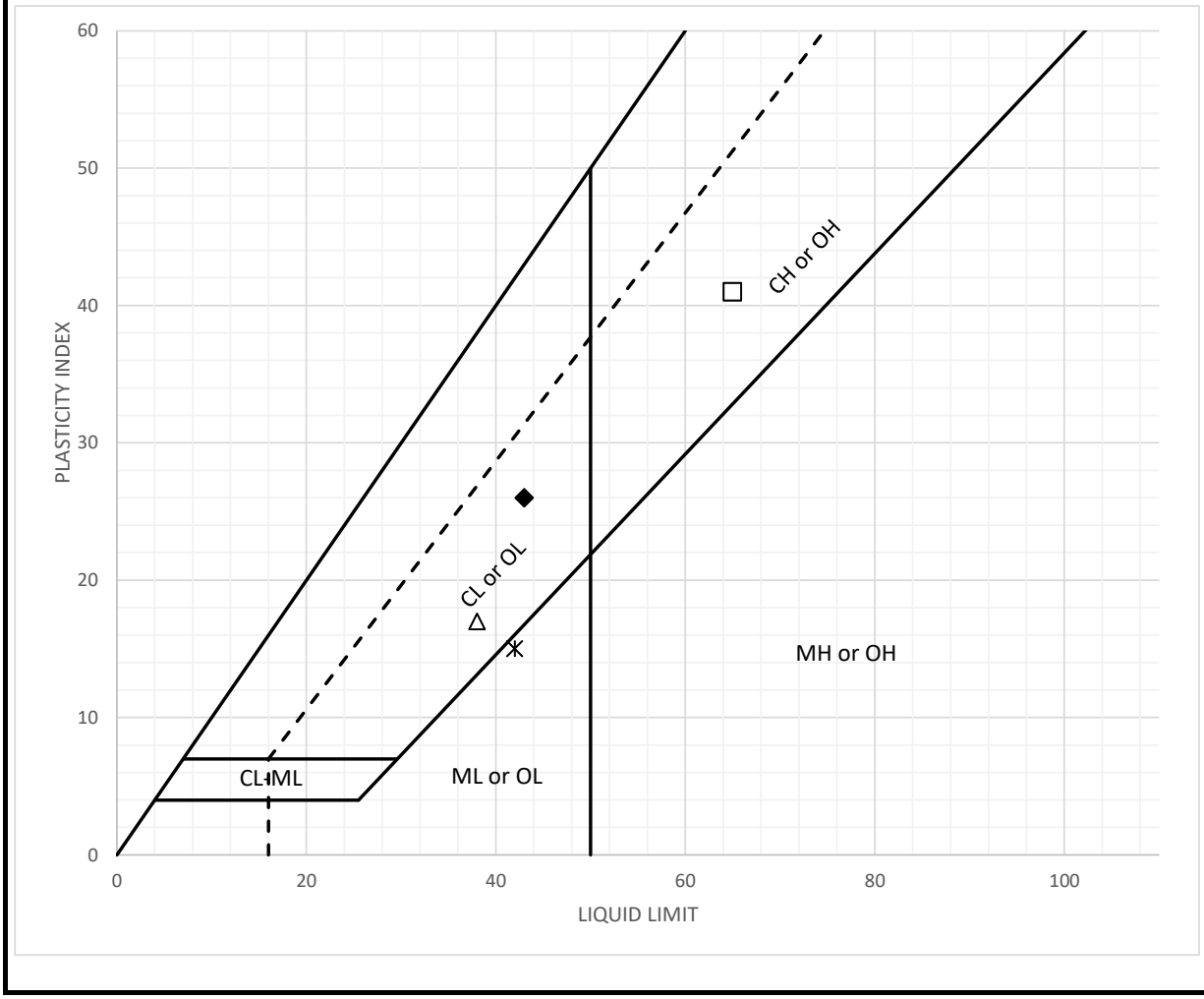
	% Gravel		% Sand			% Fines		Moisture (%)
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
*	0.0	5.8	3.4	15.1	48.2	27.5		14.7

SYMBOL	SOURCE	SAMPLE	DEPTH (ft)	MATERIAL DESCRIPTION
*	B-8	S-4	7-9	F/M/C SAND, SOME SILT/CLAY, TRACE F GRAVEL

PENNONI ASSOCIATES INC.

Client:	AE Works
Project:	AFRH Sheridan Building Renovations
Location:	Washington, DC
Lab No.	10-
	Figure S-2

ASTM D4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils



Symbol	Source	Sample No.	Depth	Natural Water Content (%)	Plastic Limit (%)	Liquid Limit (%)	Plasticity Index	USCS (fines only)
△	B-2	S-3	5-7	21.5	21	38	17	CL
●	B-2	S-7	18-20	38.0	NP	NV	NP	ML
◆	B-4	S-5	8-10	21.6	17	43	26	CL
□	B-5	S-5	8-10	34.9	24	65	41	CH
*	B-5	S-9	28-30	31.7	27	42	15	ML

PENNONI ASSOCIATES INC.
Bethlehem, PA

Project No.: AEWLA22050 **Client:** AE Works
Project: AFRH Sheridan Building Renovations
Notes: Plastic Limit Procedure 1
Manual liquid limit device and plastic grooving tool

Figure A-1

2041 Avenue C ▪ Suite 100 ▪ Bethlehem, PA 18017 ▪ Tel: 610▪231▪0600 ▪ Fax: 610▪231▪2033
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AASHTO R18

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Certificate of Analysis

Project Name: Sheridan Building
PSS Project No.: 22092909

October 6, 2022

Ayche Damtew
DMY Engineering
4170 Lafayette Center Dr., Ste. 500
Chantilly, VA 20151

Reference: PSS Project No: **22092909**
Project Name: Sheridan Building
Project Location: NW District of Columbia
Project ID.: 01.5864.01

Dear Ayche Damtew:

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Project number(s) **22092909**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on November 3, 2022, with the exception of air canisters which are cleaned immediately following analysis. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Sincerely,

Dan Prucnal
Laboratory Manager

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Explanation of Qualifiers

Project Name: Sheridan Building
PSS Project No.: 22092909

Project ID: 01.5864.01

The following samples were received under chain of custody by Phase Separation Science (PSS) on 09/29/2022 at 12:40 pm

PSS Sample ID	Sample ID	Matrix	Date/Time Collected
22092909-001	B-4	SOIL	09/20/22 11:30
22092909-002	B-7	SOIL	09/21/22 11:30

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. Unless otherwise noted in the case narrative, results are reported on a dry weight basis with the exception of pH, flashpoint, moisture, and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminates, and part 141.3, for the secondary drinking water contaminates.
5. Sample prepared under EPA 3550C with concentrations greater than 20 mg/Kg should employ the microtip extraction procedure if required to meet data quality objectives.
6. The analysis of acrolein by EPA 624 must be analyzed within three days of sampling unless pH is adjusted to 4-5 units [40 CFR part 136.3(e)].
7. Method 180.1, The Determination of Turbidity by Nephelometry, recommends samples over 40 NTU be diluted until the turbidity falls below 40 units. Routine samples over 40 NTU may not be diluted as long as the data quality objectives are not affected.
8. Alkalinity results analyzed by EPA 310.2 that are reported by dilution are estimated and are not in compliance with method requirements.

Standard Flags/Abbreviations:

B	A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
C	Results Pending Final Confirmation.
E	The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
Fail	The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
J	The target analyte was positively identified below the reporting limit but greater than the MDL.
MDL	This is the Laboratory Method Detection Limit which is equivalent to the Limit of Detection (LOD). The LOD is the minimum result, which can be reliably discriminated from a blank with a predetermined confidence level. This value will remain constant across multiple similar instrumentation and among different analysts. An LOD is analyte and matrix specific. instrumentation and among different analysts. An LOD is analyte and matrix specific.
ND	Not Detected at or above the reporting limit.
RL	PSS Reporting Limit.
U	Not detected.

Certifications:

NELAP Certifications: PA 68-03330, VA 460156
State Certifications: MD 179, WV 303
Regulated Soil Permit: P330-12-00268
NSWC USCG Accepted Laboratory
LDBE MWAA LD1997-0041-2015

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Certificate of Analysis

Project Name: Sheridan Building
PSS Project No.: 22092909

Sample ID: B-4 **Date/Time Sampled: 09/20/2022 11:30** **PSS Sample ID: 22092909-001**
Matrix: SOIL **Date/Time Received: 09/29/2022 12:40** **% Solids SM2540G-11: 73.6**

RCRA Metals — Analytical Method: SW-846 6020 B — Preparation Method: SW3050B

Qualifier(s): See Sample Receipt section on Case Narrative. See Batch 197853 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Arsenic	**5.3**	mg/kg	0.53		1	10/03/22	10/03/22 14:32	1064
Barium	**32**	mg/kg	0.53		1	10/03/22	10/03/22 14:32	1064
Cadmium	ND	mg/kg	0.53		1	10/03/22	10/03/22 14:32	1064
Chromium	**30**	mg/kg	0.53		1	10/03/22	10/03/22 14:32	1064
Lead	**10**	mg/kg	0.53		1	10/03/22	10/03/22 14:32	1064
Mercury	ND	mg/kg	0.11		1	10/03/22	10/03/22 14:32	1064
Selenium	**0.63**	mg/kg	0.53		1	10/03/22	10/03/22 14:32	1064
Silver	ND	mg/kg	0.53		1	10/03/22	10/03/22 14:32	1064

Total Petroleum Hydrocarbons - DRO — Analytical Method: SW-846 8015C DRO — Preparation Method: SW3550C

Qualifier(s): See Sample Receipt section on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	ND	mg/kg	4.6		1	09/30/22	09/30/22 16:01	1069

Surrogate(s)	*Recovery*		*Limits*				
o-Terphenyl	*85*	*%*	*39-119*		*1*	*09/30/22*	*09/30/22 16:01*	*1069*

Total Organic Halides (TOX) — Analytical Method: SW-846 9078

Qualifier(s): See Sample Receipt section on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Total Organic Halides (TOX)	ND	mg/kg	13		1	09/30/22	10/03/22 11:05	1064

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Certificate of Analysis

Project Name: Sheridan Building
PSS Project No.: 22092909

Sample ID: B-7 **Date/Time Sampled: 09/21/2022 11:30** **PSS Sample ID: 22092909-002**
Matrix: SOIL **Date/Time Received: 09/29/2022 12:40** **% Solids SM2540G-11: 85.5**

RCRA Metals — Analytical Method: SW-846 6020 B — Preparation Method: SW3050B

Qualifier(s): See Sample Receipt section on Case Narrative. See Batch 197853 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Arsenic	**5.7**	mg/kg	0.46		1	10/03/22	10/03/22 14:11	1064
Barium	**29**	mg/kg	0.46		1	10/03/22	10/03/22 14:11	1064
Cadmium	ND	mg/kg	0.46		1	10/03/22	10/03/22 14:11	1064
Chromium	**59**	mg/kg	0.46		1	10/03/22	10/03/22 14:11	1064
Lead	**12**	mg/kg	0.46		1	10/03/22	10/03/22 14:11	1064
Mercury	ND	mg/kg	0.093		1	10/03/22	10/03/22 14:11	1064
Selenium	**0.87**	mg/kg	0.46		1	10/03/22	10/03/22 14:11	1064
Silver	ND	mg/kg	0.46		1	10/03/22	10/03/22 14:11	1064

Total Petroleum Hydrocarbons - DRO — Analytical Method: SW-846 8015C DRO — Preparation Method: SW3550C

Qualifier(s): See Sample Receipt section on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	ND	mg/kg	3.9		1	09/30/22	09/30/22 16:26	1069

Surrogate(s)	*Recovery*		*Limits*				
o-Terphenyl	*94*	*%*	*39-119*		*1*	*09/30/22*	*09/30/22 16:26*	*1069*

Total Organic Halides (TOX) — Analytical Method: SW-846 9078

Qualifier(s): See Sample Receipt section on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Total Organic Halides (TOX)	ND	mg/kg	12		1	09/30/22	10/03/22 11:05	1064

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Project Name: Sheridan Building

PSS Project No.: 22092909

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

Matrix spike and matrix spike duplicate analyses may not be performed due to insufficient sample quantity. In these instances, a laboratory control sample and laboratory control sample duplicate are analyzed unless otherwise noted or specified in the method.

Sample Receipt:

Ice was not present; sample(s) received at a temperature greater than 6 degrees C.
Samples composited at the lab, per client instructions.

Analytical:

Total Metals

Batch: 197853

Matrix spike/matrix spike duplicate (MS/MSD) and/or Relative Percent Difference (RPD) exceedances identified; see QC summary.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.

Analytical Method(s): SW-846 9078

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Lab Chronology

Project Name: Sheridan Building
PSS Project No.: 22092909

Method	Client Sample ID	Analysis Type	PSS Sample ID	Mtx	Prep Batch	Analytical Batch	Prepared	Analyzed
SM2540G	B-4	Initial	22092909-001	S	197786	197786	09/29/2022 15:45	09/29/2022 15:45
	B-7	Initial	22092909-002	S	197786	197786	09/29/2022 15:45	09/29/2022 15:45
	197786-1-BLK	BLK	197786-1-BLK	S	197786	197786	09/29/2022 15:45	09/29/2022 15:45
	B-36, S-2 D	MD	22092907-001 D	S	197786	197786	09/29/2022 15:45	09/29/2022 15:45
SW-846 6020 B	B-4	Initial	22092909-001	S	92569	197853	10/03/2022 09:05	10/03/2022 14:32
	B-7	Initial	22092909-002	S	92569	197853	10/03/2022 09:05	10/03/2022 14:11
	92569-1-BKS	BKS	92569-1-BKS	S	92569	197853	10/03/2022 09:05	10/03/2022 14:07
	92569-1-BLK	BLK	92569-1-BLK	S	92569	197853	10/03/2022 09:05	10/03/2022 14:03
	B-7 S	MS	22092909-002 S	S	92569	197853	10/03/2022 09:05	10/03/2022 14:16
	B-7 SD	MSD	22092909-002 S	S	92569	197853	10/03/2022 09:05	10/03/2022 14:20
SW-846 8015C DRO	B-7	Initial	22092909-002	S	92563	197866	09/30/2022 08:53	09/30/2022 16:26
	92563-1-BKS	BKS	92563-1-BKS	S	92563	197866	09/30/2022 08:53	09/30/2022 15:11
	92563-1-BLK	BLK	92563-1-BLK	S	92563	197866	09/30/2022 08:53	09/30/2022 14:46
	92563-1-BSD	BSD	92563-1-BSD	S	92563	197866	09/30/2022 08:53	09/30/2022 15:36
	B-4	Initial	22092909-001	S	92563	197867	09/30/2022 08:53	09/30/2022 16:01
	B-4 S	MS	22092909-001 S	S	92563	197867	09/30/2022 08:53	09/30/2022 15:11
	B-4 SD	MSD	22092909-001 S	S	92563	197867	09/30/2022 08:53	09/30/2022 15:36
SW-846 9078	B-4	Initial	22092909-001	S	197833	197833	09/30/2022 16:00	10/03/2022 11:05
	B-7	Initial	22092909-002	S	197833	197833	09/30/2022 16:00	10/03/2022 11:05
	197833-1-BKS	BKS	197833-1-BKS	S	197833	197833	09/30/2022 16:00	10/03/2022 11:05
	197833-1-BLK	BLK	197833-1-BLK	S	197833	197833	09/30/2022 16:00	10/03/2022 11:05
	B-1 S	MS	22092910-001 S	S	197833	197833	09/30/2022 16:00	10/03/2022 11:05
	B-1 SD	MSD	22092910-001 S	S	197833	197833	09/30/2022 16:00	10/03/2022 11:05

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QC Summary

Project Name Sheridan Building
PSS Project No.: 22092909

Analytical Method: SW-846 6020 B Prep Method: SW3050B
Seq Number: 197853 Matrix: Solid Date Prep: 10/03/22
MB Sample Id: 92569-1-BLK LCS Sample Id: 92569-1-BKS

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Flag
Arsenic	<0.4331	18.89	17.74	94	80-120	mg/kg	
Barium	<0.4331	18.89	17.57	93	80-120	mg/kg	
Cadmium	<0.4331	18.89	17.26	91	80-120	mg/kg	
Chromium	<0.4331	18.89	17.38	92	80-120	mg/kg	
Lead	<0.4331	18.89	17.43	92	80-120	mg/kg	
Mercury	<0.08661	0.3777	0.3464	92	80-120	mg/kg	
Selenium	<0.4331	18.89	17.71	94	80-120	mg/kg	
Silver	<0.4331	1.889	1.734	92	80-120	mg/kg	

Analytical Method: SW-846 6020 B Prep Method: SW3050B
Seq Number: 197853 Matrix: Soil Date Prep: 10/03/22
Parent Sample Id: 22092909-002 MS Sample Id: 22092909-002 S MSD Sample Id: 22092909-002 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	RPD	RPD Limit	Units	Flag
Arsenic	5.720	27.54	25.80	73	27.27	74	75-125	6	30	mg/kg	X
Barium	29.48	27.54	92.23	228	89.59	206	75-125	3	30	mg/kg	X
Cadmium	<0.4636	27.54	29.50	107	31.40	108	75-125	6	30	mg/kg	
Chromium	59.17	27.54	89.77	111	100	140	75-125	11	30	mg/kg	X
Lead	12.04	27.54	42.86	112	47.05	120	75-125	9	30	mg/kg	
Mercury	<0.09271	0.5508	0.6164	112	0.6693	115	75-125	8	30	mg/kg	
Selenium	0.8701	27.54	30.72	108	31.55	105	75-125	3	30	mg/kg	
Silver	<0.4636	2.754	3.229	117	3.450	118	75-125	7	30	mg/kg	

Analytical Method: SW-846 9078
Seq Number: 197833 Matrix: Solid
MB Sample Id: 197833-1-BLK LCS Sample Id: 197833-1-BKS

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Flag
Total Organic Halides (TOX)	<9.886	74.81	93.58	125	74-134	mg/kg	

Analytical Method: SW-846 8015C DRO Prep Method: SW3550C
Seq Number: 197866 Matrix: Solid Date Prep: 09/30/22
MB Sample Id: 92563-1-BLK LCS Sample Id: 92563-1-BKS LCSD Sample Id: 92563-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	RPD	RPD Limit	Units	Flag
TPH-DRO (Diesel Range Organics)	<3.330	32.86	30.68	93	30.53	90	67-118	0	22	mg/kg	

Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units
o-Terphenyl	85		88		85		39-119	%

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QC Summary

Project Name Sheridan Building
PSS Project No.: 22092909

Analytical Method: SW-846 8015C DRO Prep Method: SW3550C
Seq Number: 197867 Matrix: Soil Date Prep: 09/30/22
Parent Sample Id: 22092909-001 MS Sample Id: 22092909-001 S MSD Sample Id: 22092909-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	RPD	RPD Limit	Units	Flag
TPH-DRO (Diesel Range Organics)	<4.584	44.84	39.20	87	41.21	91	42-127	5	31	mg/kg	

Surrogate	MS Result	MS Flag	MSD Result	MSD Flag	Limits	Units
o-Terphenyl	86		89		39-119	%

F = RPD exceeded the laboratory control limits
X = Recovery of MS, MSD or both outside of QC Criteria
H= Recovery of BS,BSD or both exceeded the laboratory control limits
L = Recovery of BS,BSD or both below the laboratory control limits

Analytical Method: SW-846 6020 B
Seq Number: 197853 Matrix: Solid
CCV Sample Id: CCV 1 Analyzed Date: 10/03/22 14:49

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
Arsenic	100	99.87	100	90-110	ug/kg	
Barium	100	96.42	96	90-110	ug/kg	
Cadmium	100	97.14	97	90-110	ug/kg	
Chromium	100	95.96	96	90-110	ug/kg	
Lead	100	97.74	98	90-110	ug/kg	
Mercury	1.000	0.9910	99	90-110	ug/kg	
Selenium	100	98.26	98	90-110	ug/kg	
Silver	10.00	9.772	98	90-110	ug/kg	

Analytical Method: SW-846 6020 B
Seq Number: 197853 Matrix: Solid
CCV Sample Id: CCV 2 Analyzed Date: 10/03/22 15:18

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
Arsenic	100	99.79	100	90-110	ug/kg	
Barium	100	94.69	95	90-110	ug/kg	
Cadmium	100	99.21	99	90-110	ug/kg	
Chromium	100	95.86	96	90-110	ug/kg	
Lead	100	98.38	98	90-110	ug/kg	
Mercury	1.000	0.9740	97	90-110	ug/kg	
Selenium	100	96.34	96	90-110	ug/kg	
Silver	10.00	9.877	99	90-110	ug/kg	

Analytical Method: SW-846 6020 B
Seq Number: 197853 Matrix: Solid
Parent Sample Id: ICV 1 ICV Sample Id: ICV 1 Analyzed Date: 10/03/22 13:15

Parameter	Spike Amount	ICV Result	ICV %Rec	Limits	Units	Flag
Arsenic	50.00	53.73	107	90-110	ug/kg	
Barium	50.00	52.59	105	90-110	ug/kg	
Cadmium	50.00	52.04	104	90-110	ug/kg	
Chromium	50.00	51.62	103	90-110	ug/kg	
Lead	50.00	52.30	105	90-110	ug/kg	
Mercury	1.000	1.057	106	90-110	ug/kg	
Selenium	50.00	54.39	109	90-110	ug/kg	
Silver	5.000	5.232	105	90-110	ug/kg	

Analytical Method: SW-846 9078
Seq Number: 197833 Matrix: Solid
CCV Sample Id: CCV-01 Analyzed Date: 10/03/22 11:05

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
Total Organic Halides (TOX)	156	156	100	90-110	mg/kg	

Analytical Method: SW-846 9078

Seq Number: 197833 Matrix: Solid

CCV Sample Id: CCV-02 Analyzed Date: 10/03/22 11:05

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
Total Organic Halides (TOX)	156	163	104	90-110	mg/kg	

Analytical Method: SW-846 8015 C TCLP

Seq Number: 192711 Matrix: Water

Parent Sample Id: ICV-01 ICV Sample Id: ICV-01 Analyzed Date: 03/29/22 16:06

Parameter	Spike Amount	ICV Result	ICV %Rec	Limits	Units	Flag
TPH-DRO (Diesel Range Organics)	2500	2418	97	80-120	mg/L	

Surrogate	ICV Result	Limits	Units	Flag
o-Terphenyl	97	80-120	%	

Analytical Method: SW-846 8015C DRO

Seq Number: 197866 Matrix: Water

CCV Sample Id: CCV-R1 Analyzed Date: 09/30/22 10:12

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
TPH-DRO (Diesel Range Organics)	2500	2623	105	80-120	mg/L	

Surrogate	CCV Result	Limits	Units	Flag
o-Terphenyl	99	80-120	%	

Analytical Method: SW-846 8015C DRO

Seq Number: 197867 Matrix: Water

CCV Sample Id: CCV-F1 Analyzed Date: 09/30/22 10:12

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
TPH-DRO (Diesel Range Organics)	2500	2228	89	80-120	mg/L	

Surrogate	CCV Result	Limits	Units	Flag
o-Terphenyl	80	80-120	%	

Analytical Method: SW-846 8015C DRO
Seq Number: 197866 Matrix: Water
CCV Sample Id: CCV-R2 Analyzed Date: 09/30/22 18:40

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
TPH-DRO (Diesel Range Organics)	2500	2619	105	80-120	mg/L	

Surrogate	CCV Result	Limits	Units	Flag
o-Terphenyl	100	80-120	%	

Analytical Method: SW-846 8015C DRO
Seq Number: 197867 Matrix: Water
CCV Sample Id: CCV-F2 Analyzed Date: 09/30/22 18:40

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
TPH-DRO (Diesel Range Organics)	2500	2400	96	80-120	mg/L	

Surrogate	CCV Result	Limits	Units	Flag
o-Terphenyl	88	80-120	%	

Analytical Method: SW-846 8015C DRO
Seq Number: 191075 Matrix: Water
Parent Sample Id: ICV-01 ICV Sample Id: ICV-01 Analyzed Date: 01/27/22 17:43

Parameter	Spike Amount	ICV Result	ICV %Rec	Limits	Units	Flag
TPH-DRO (Diesel Range Organics)	2500	2796	112	80-120	mg/L	

Surrogate	ICV Result	Limits	Units	Flag
o-Terphenyl	113	80-120	%	

X = Recovery outside of QC Criteria

CHAIN OF CUSTODY FORM

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All fields must be completed accurately. Shaded sections for lab use only.

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① PSS CLIENT: DMY Engineering Consultants OFFICE LOCATION: Chantilly, VA

BILL TO (if different): PHONE #: 7038178108

CONTACT: Ayche Damtew EMAIL: adamtew@dmyec.com

PROJECT NAME: Sheridan Building PROJECT #: 01.05864.01

SITE LOCATION: NW District of Columbia P.O. #:

SAMPLER(S): DW CERT #:

PSS Work Order #: 22092909 PAGE __ OF __

Matrix Codes: SW=Surface Water DW=Drinking Water GW=Ground Water WW=Waste Water O=Oil S=Soil SOL=Solid A=Air WI=Wipe

Preservative Codes: 1 - HCL; 2 - H_2SO_4; 3 - HNO_3; 4 - NaOH; 5 - E624KIT; 6 - ICE; 7 - Sodium Thiosulfate; 8 - Ascorbic Acid; 9 - TerraCore Kit

② ③

PSS ID	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	MATRIX Use Codes	# OF CONTAINERS	SAMPLE TYPE: C=COMPOSITE G=GRAB	Preservatives Use Codes		Analysis/ Method Required: DRO	TOX	RCRA 8 metals
1	B-4	9/20/2022	10:30 am	S	1	G			✓	✓	✓
1	B-4	9/20/2022	11:30 am	S	1	G			✓	✓	✓
2	B-7	9/21/2022	11:00 am	S	1	G			✓	✓	✓
2	B-7	9/21/2022	11:30 am	S	1	G			✓	✓	✓

⑤

Relinquished By: (1)	Date	Time	Received By:
Sarah	9/29	10:11am	
Relinquished By: (2)	Date	Time	Received By:
	9/29/22	1240	
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

④

Requested TAT (One TAT per COC): ☑ 5-Day ☐ 3-Day ☐ 2-Day ☐ Next Day ☐ Emergency ☐ Other

STATE RESULTS REPORTED TO: ☑ MD ☐ DE ☐ PA ☐ VA ☐ WV ☐ OTHER

COMPLIANCE? ☐ DW ☐ WW

EDD FORMAT TYPE

Ice Present: ABS

Custody Seal: ABS

Coolers: 0 Temp: 19.0-19.4°C

Shipping Carrier: FTE

Special Instructions:

lab needs to mix samples from the same boring prior to testing. For example, if lab gets 2 jars from each boring, the jars from the same boring need to be mixed.

This chain of custody is a legal document. The client (PSS Client), by signing, or having client's agent sign, this "Chain of Custody Form", agrees to pay for the above requested services per the latest version of the Service Brochure or PSS-provided quotation including any and all attorney's or other reasonable fees if collection becomes necessary.

PHASE SEPARATION SCIENCE

6630 Baltimore National Pike
Baltimore, MD 21228
410-747-8770
800-932-9047
www.phaseonline.com

Sample Receipt Checklist

Project Name: Sheridan Building
PSS Project No.: 22092909

Client Name DMY Engineering
Disposal Date 11/03/2022

Received By Jillian Chapman
Date Received 09/29/2022 12:40:00 PM
Delivered By Trans Time Express
Tracking No Not Applicable
Logged In By Jillian Chapman

Shipping Container(s)
No. of Coolers 0

		Ice	Absent
Custody Seal(s) Intact?	N/A	Temp (deg C)	19.4
Seal(s) Signed / Dated?	N/A	Temp Blank Present	No

Documentation

		Sampler Name	Not Provided
COC agrees with sample labels?	Yes		N/A
Chain of Custody	Yes		

Sample Container

		Custody Seal(s) Intact?	Not Applicable
Appropriate for Specified Analysis?	Yes	Seal(s) Signed / Dated	Not Applicable
Intact?	Yes		
Labeled and Labels Legible?	Yes		

Holding Time

		Total No. of Samples Received	2
All Samples Received Within Holding Time(s)?	Yes	Total No. of Containers Received	2

Preservation

Total Metals	(pH<2)	N/A
Dissolved Metals, filtered within 15 minutes of collection	(pH<2)	N/A
Orthophosphorus, filtered within 15 minutes of collection		N/A
Cyanides	(pH>12)	N/A
Sulfide	(pH>9)	N/A
TOC, DOC (field filtered), COD, Phenols	(pH<2)	N/A
TOX, TKN, NH3, Total Phos	(pH<2)	N/A
VOC, BTEX (VOA Vials Rcvd Preserved)	(pH<2)	N/A
Do VOA vials have zero headspace?		N/A
624 VOC (Rcvd at least one unpreserved VOA vial)		N/A
524 VOC (Rcvd with trip blanks)	(pH<2)	N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Ice was not present; sample(s) received at a temperature greater than 6 degrees C.
Samples composited at the lab, per client instructions.

Samples Inspected/Checklist Completed By: Jillian Chapman Date: 09/29/2022

PM Review and Approval: Amber L Cooper Date: 09/29/2022

APPENDIX D – Important Information About This Geotechnical Engineering Report

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

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