UNITED
CONSULTING

REPORT

For
Mr. Rip Robertson
City of Tucker Parks and Recreation

Geotechnical Exploration
Tucker Town Green
Railroad Avenue & 2nd Street
Tucker, Dekalb County, Georgia

Project No.: TUCKE-23-GA-07852-01

625 Holcomb Bridge Road, Norcross, GA 30071 • 770-209-0029 • unitedconsulting.com

UNITED
CONSULTING

October 23, 2023

Mr. Rip Robertson CPRE, CPSI
City of Tucker
Parks and Recreation

Via Email: RRobertson@tuckerga.gov

RE: Report of Geotechnical Exploration
Tucker Town Green
Railroad Avenue & 2nd Street
Tucker, Dekalb County, Georgia 30084
Project No.: TUCKE-23-GA-07852-01

Dear Mr. Robertson:

United Consulting is pleased to submit this Report of Geotechnical Exploration for the above-referenced project. We appreciate the opportunity to assist you with this project and look forward to our continued participation. Please contact us if you have any questions or if we can be of further assistance.

Sincerely,

UNITED CONSULTING

No. PE048731
NHAN T. DANG

Nhan "Yung" Dang, P.E.
Senior Geotechnical Engineer

Chris L. Roberds, P.G.
Senior Executive Vice President

YD/CLR/bk

unc-sps: Geotechnical Documents/TUCKE-23-GA-07852-01- Geo.doc

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

United Consulting has completed a Geotechnical Exploration at the site to the northeast of the intersection of Railroad Avenue and 2nd Street in Tucker, Dekalb County, Georgia. Please refer to the text of the report for a more detailed discussion of the items summarized below.

1. Fill soils were encountered in all borings, except B-3, to depths ranging from approximately 6 inches to 18 feet. The fill was variable in consistency. Low consistency (N≤5 bpf) fill soils were encountered in borings B-5 and B-6 at depths ranging from approximately 3 to 18 feet. With any undocumented fill, it is possible that other areas of poor-quality fill, debris or other deleterious materials could be present intermediate of the boring locations. Hence, we recommend the fill be further evaluated by performing test pits prior to construction and proofrolling with a full-loaded tandem-axle dump truck at the time of construction.

2. In addition to the low consistency fill soils, low consistency residual and alluvial soils were also encountered in the borings at depths ranging from approximately 3 to 23 feet. It is likely that low consistency soils are also present in other areas of the Site. Where not removed during mass site grading, the low consistency soils are not suitable for direct support of shallow foundations, floor slabs, or pavements, and may need to be removed and replaced if they are encountered near planned subgrade or foundation bearing elevations; therefore, we recommend that contingency funds be included in the project budget for such remediation.

3. Based on the boring results, it appears that the onsite soils, including the existing fill, provided it is free of deleterious and organic materials, are generally suitable for reuse as engineered fill.

4. Partially weathered rock (PWR) was not encountered, and auger refusal did not occur in the borings at the termination depths ranging from approximately 20 to 25 feet. Difficult excavation conditions (ripping/blasting) associated with PWR and/or rock are not anticipated for the proposed construction. Also, note that depths to rock and PWR can vary dramatically over short distances in the Piedmont Region and shallower rock/PWR could be encountered outside the boring locations.

5. Groundwater was encountered at the time of drilling in borings B-3, B-7, and B-9 at depths ranging from approximately 11.5 to 23 feet. Groundwater-related difficulties are generally not anticipated to be encountered during construction; however, some of the site soils are susceptible to the formation of shallower perched water levels during periods of wet weather, especially within the fill layer. The contractor should be prepared to manage groundwater and perched water as needed.

6. The existing fill and low consistency soils are not suitable for direct support of the proposed structures on shallow foundations without remediation. The remediation could consist of removal and replacement or re-compaction of the soils to the depth of firm residual or alluvial soils or to a maximum depth that allows for placement of at least 4 feet of engineered fill below foundation.

7. bearing elevations, which would allow for the use of shallow foundations designed for a maximum bearing pressure of 2,500 psf. The viability of this option should be confirmed by the results of the recommended test pits.

8. Preliminary site grading and structural loading were provided to us. Once site development plans have more fully progressed, United Consulting should review such documents. The recommendations herein will need to be reevaluated based on that review, and additional subsurface exploration could be needed to finalize our recommendations.

2.0 PROJECT INFORMATION

The Site is located at the northeastern quadrant of the intersection of Railroad Avenue and 2nd Street in Tucker, Dekalb County, Georgia. The Site is bounded to the north by commercial properties and 1st Avenue beyond, to the east by commercial properties and Main Street beyond, to the south by Railroad Avenue and train tracks beyond, and to the west by 2nd Street and commercial properties beyond. The general location of the Site is shown on the attached Boring Location Plan (Figure 1).

Based on the *Tucker Town Green – Existing Site* plan, provided by your office, dated September 13, 2022, and our site observations, the Site is a vacant lot with grass cover and patches of gravel. Concrete sidewalks traverse along the northern, eastern, and western sides of the Site. Existing utilities traverse the center of the Site. Based on the provided topography, the Site grades gradually slope down from high elevations of approximately 1100 feet in the western and northeastern areas to a low elevation of approximately 1089 feet at the southern center area of the Site. A steep slope extends up from a low elevation of approximately 1098 feet to a high elevation of approximately 1106 feet by 2nd Street in the northwestern area of the Site. Based on historical aerial images, it appears some trees and structures existed at the Site prior to 1988 when it was razed. The Site was previously used as a trailer parking lot.

Based on preliminary drawing *C2.01 Grading & Drainage Plan*, prepared by Barge Design Solutions, undated, and our conversations with the structural engineer, the proposed construction consists of a park including two covered canopies, one open canopy, two small masonry enclosures for storage and bathrooms, surface parking, concrete sidewalk, and two underground detention units. Maximum factored column and wall loads for the structures, which were provided by your structural engineer, to be 30 kips and 621 pounds per linear foot (plf) for the pavilion and 8 kips and 643 plf for the restroom building. Based on the proposed grades provided on the preliminary drawing *C2.01 Grading & Drainage Plan,* finished floors of the canopy and restroom areas are 1091.83 and 1092.30 feet, respectively. Bottom grades of the underground detention units are not available. Nominal cuts and fills of up to approximately 2 feet will be required to reach the proposed finished floor and surface grades.

Once site development plans have progressed more fully, United Consulting must be contacted to determine if our recommendations should be re-evaluated and/or revised, or if additional subsurface exploration should be performed.

3.0 PURPOSE

The purpose of this Geotechnical Exploration was to assess the general type and condition of the subsurface materials at the Project Site and to provide recommendations regarding potential foundation types, site grading, earthwork, quality control and other geotechnical related issues deemed pertinent to this project.

4.0 SCOPE

The scope of our Geotechnical Exploration included the following items:

1. A visual reconnaissance of the site from a geotechnical standpoint;
2. Drilling nine (9) Standard Penetration Test (SPT) borings;
3. Visual evaluation of the soil samples obtained during our field-testing program for further identification and classification;
4. Analyzing the existing soil conditions with respect to the proposed construction; and
5. Preparing this report to document the results of our field-testing program, engineering analysis, and to provide our findings and recommendations.

5.0 GEOLOGIC SETTING

Based on Geologic Map of Georgia, the Site is located in the Winder Slope District of the Piedmont Physiographic Province of Georgia. The Winder Slope District is characterized by a gently rolling topography. This district is dissected by headwater tributaries of major streams draining to the Atlantic Ocean. Numerous dome-shaped granitic mountains are located on the interfluves in the southern and western portion of this district. The stream valleys, which are fairly deep and narrow, lie 100 to 200 feet below the narrow, rounded stream divides. The western boundary follows the drainage divide that separates streams draining to the Atlanta Ocean from those draining to the Gulf of Mexico. The southern boundary approximates the 700-foot elevation where a sharp break in regional slope occurs. Bedrock around the Site consists of Biotite Gneiss / Mica Schist / Amphibolite of the Precambrian-Paleozoic.

Based on the Natural Resources Conservation Services (NRCS) Soil Survey of DeKalb County, Georgia, the soils around the Site are mapped as Appling-Urban land complex, 2 to 10 percent slopes (AuC), Cecil-Urban land complex, 2 to 10 percent slopes (CuC), Urban land (Ud), and Wedowee sandy loam, 2 to 6 percent slopes (WeB). Urban land soil descriptions are not available.

The Appling soils of the Appling-Urban land complex typically consist of sandy loam, sandy clay, and sandy clay loam to the study depth of approximately 68 inches. The soils have moderately high to high hydraulic permeability ranging from 0.57 to 1.98 inches per hour. The depth of the water table and restrictive features are more than 80 inches. Shrink-swell potential is low.

The Cecil soils of the Cecil-Urban land complex typically consist of sandy loam, sandy clay, and loam to the study depth of approximately 60 inches. The soils have moderately high to high hydraulic permeability ranging from 0.57 to 1.98 inches per hour. The depths of the water table and restrictive features are more than 80 inches. Shrink-swell potential is low.

The Wedowee sandy loam soils typically consist of sandy loam, sandy clay loam, and clay to the study depth of approximately 75 inches. The soils have moderately high to high hydraulic permeability ranging from 0.57 to 1.98 inches per hour. The depths of the water table and restrictive features are more than 80 inches. Shrink-swell potential is low.

The NRCS Soil Map (Figure 2) is attached in the Appendix.

6.0 SUBSURFACE CONDITIONS

Initially, grass or gravel was encountered in the majority of the borings. Possible thin layers of topsoil were encountered in borings B-4, B-5, and B-7. Below the surficial materials, fill soils were encountered in all borings except B-3 to depths ranging from approximately 6 inches to 18 feet. The fill soils encountered consisted of loose to firm sand or very soft to stiff clay or silt with varying amounts of minor constituents including roots, mica, and rock fragments. Standard penetration test resistance (N-values) within the fill soils ranged from 0 to 19 blows per foot (bpf). Low consistency (N≤5 bpf) fill soils were encountered in borings B-5 and B-6 at depths ranging from approximately 3 to 18 feet.

Below the fill, alluvial soils were encountered in borings B-4, B-6, and B-7 to depths ranging from approximately 6 to 13 feet. The alluvium encountered generally consisted of very loose to loose sand or firm to stiff clay, with minor constituents including organic fragments. N-values within the alluvium ranged from 4 to 9 bpf. Low consistency alluvium was encountered in boring B-4 at depths ranging from approximately 6 to 8 feet. Alluvium is deposited by flowing water and often in a soft or loose condition.

Below the surficial materials, fill, or alluvium, typical residual soils of the Piedmont Physiographic Province of Georgia were encountered. The residuum encountered generally consisted of very loose to firm sand or very soft to very stiff silt or clay with varying amounts of minor constituents including mica and rock fragments. N-values within the residuum ranged from 2 to 19 bpf. Low consistency residuum was encountered in all borings at depths ranging from approximately 3 to 23 feet.

Partially weathered rock (PWR) was not encountered, and auger refusal did not occur in the borings at the termination depths ranging from approximately 20 to 25 feet. PWR denotes residual material having an N-value of 100 bpf or greater. Auger refusal is the depth below which a boring cannot be advanced with a soil drilling auger. Auger refusal below residuum generally represents a seam of rock, a boulder, or top of massive bedrock.

Groundwater was encountered at the time of drilling in borings B-3, B-7, and B-9 at depths ranging from approximately 11.5 to 23 feet. Stabilized groundwater levels are often several feet shallower than those at the time of drilling. Groundwater levels will fluctuate based on yearly and seasonal rainfall variations and may rise in the future. This site is also susceptible to the formation of shallower perched water levels during periods of wet weather, especially within the fill layer.

Table 1: Summary of Subsurface Conditions

Boring No.	Approx. Ground Elevation * (ft.)	Proposed Elevations (ft.)	Bottom of Fill Depth (ft.)	Top of Partially Weathered Rock (ft.)	Refusal Depth (ft.)	Termination Depth (ft.)	Groundwater Depth (ft.)
B-1	1097	1097	1	NE	NE	20	NE
B-2	1095	1095	0.5	NE	NE	20	NE
B-3	1095	1093	NE	NE	NE	25	12
B-4	1091	1091.83 (FF)	3	NE	NE	20	NE
B-5	1091	1090	18	NE	NE	25	NE
B-6	1092	1092	8	NE	NE	25	NE
B-7	1091	1089	6	NE	NE	25	23
B-8	1091	1092.30 (FF)	3	NE	NE	20	NE
B-9	1096	1096	6	NE	NE	20	11.5

NE=Not Encountered. Ground surface elevations were interpolated from the existing topography survey provided on the *Tucker Town Green – Existing Site plan,* provided by your office, dated September 13, 2022. Boring locations and elevations were not field-surveyed and are very approximate.

7.0 DISCUSSION AND RECOMMENDATIONS

The following recommendations are based on our understanding of the proposed construction, the data obtained from the soil test borings, a site reconnaissance, and our experience with subsurface conditions similar to those encountered at the project site.

This exploration included nine (9) SPT borings. Preliminary site grading and structural loading were provided to us. Once site development plans have more fully progressed, United Consulting should review such documents. The recommendations herein will need to be reevaluated based on that review, and additional subsurface exploration could be needed to finalize our recommendations.

7.1 Existing Fill Consideration

Fill soils were encountered in all borings, except B-3, to depths ranging from approximately 6 inches to 18 feet. The fill was variable in consistency. Low consistency (N≤5 bpf) fill soils were encountered in borings B-5 and B-6 at depths ranging from approximately 3 to 18 feet. With any undocumented fill, it is possible that other areas of poor-quality fill, debris or other deleterious materials could be present intermediate of the boring locations. Hence, we recommend the fill be further evaluated by excavation of test pits prior to construction and proofrolling with a full-loaded tandem-axle dump truck at the time of construction.

The existing fill, provided it is free of deleterious and organic materials, generally appears to be suitable for reuse as engineered fill. However, some of the fill soils will be sensitive to changes in moisture content. If grading takes place during a period of wet weather, it may not be feasible to dry them using conventional aeration. If that is the case, they will need to be removed and replaced with drier soils or dried using chemical additives such as lime or cement.

It should be noted that in any case where the undocumented fill remains below the foundation and slab levels, there is an inherent risk of long-term settlement that can occur in the fill and the owner must be willing to accept the risk.

7.2 Low Consistency Fill, Alluvial, and Residual Soils

Low consistency fill, alluvial, and residual soils were encountered in all the borings at depths ranging from approximately 3 to 23 feet. It is possible that other areas of low consistency soils could be present intermediate of the boring locations. The low consistency soils are not suitable for direct support of shallow foundations, floor slabs, or pavements and where not excavated during mass grading they would need to be removed and recompacted or replaced; therefore, we recommend that contingency funds be included in the project budget for such remediation.

Remediation of the existing fill and low consistency soils to allow for the use of conventional shallow foundations for the proposed structures would include removal and re-compaction or replacement of these materials with new engineered fill, within and at least 4 feet beyond the building footprint, to the depth of firm residual or alluvial soils or to a maximum depth that allows for at least 4 feet of new engineered fill below the planned foundation bearing elevations. The viability of this option should be confirmed by the results of the recommended test pits.

Localized stabilization prior to fill placement and at pavement and floor slab subgrades using crushed stone, geosynthetics, or other methods may be required if low consistency soils are encountered near those grades, and funds for such remediation should also be included.

7.3 Site Preparation

Based on historical aerial images, it appears there were trees and some structures on the Site prior to 1988 when it was razed. At the time of this study the Site was grass and gravel covered with some trees. Existing utilities also traverse the Site. As such, topsoil, vegetation, trees, and any foundation remnants should be removed from the area of the proposed construction. Removal of trees should include removal of their root ball, which may extend to several feet below grade. Existing underground utilities should be relocated to at least 10 feet outside the perimeter of the proposed structure footprints. The abandoned lines should then be excavated and removed from the area of the proposed construction. All excavations should be subsequently backfilled with properly compacted engineered fill. We do not recommend active or non-active utility lines located below the area of the proposed structures be left in place. Any abandoned utility pipes, if left in place and outside of the proposed building footprint, should be filled-in under pressure with cement grout having a minimum 28-day compressive strength of 500 pounds per square inch (psi). This would prevent localized cave-in upon eventual deterioration and loss of structural integrity of the pipe. Also, septic tanks, septic fields, and associated underground structures, if present, should be properly removed. The excavated trenches and pits associated with the removal of the buried structures should be backfilled with engineered fill.

After lowering the site grade where planned and prior to placement of engineered fill or commencement of construction, areas to receive fill, foundations, slabs, and pavements, including the areas of the proposed structures, should be proofrolled with a fully loaded tandem-axle dump truck. Proofrolling should be performed under the observation of the Geotechnical Engineer or his representatives so that, areas, which exhibit “pumping” (wave type displacement) during proofrolling, may be treated by a method recommended by the Geotechnical Engineer. This method may consist of undercutting, and backfilling with suitable engineered fill, replacing with surge stone, and a layer of crusher run, or some other method that is deemed suitable.

As discussed above in report sections 7.1 and 7.2, because of the presence of undocumented existing fill and low consistency soils, greater than normal remediation of these materials should be expected during site preparation, and contingency funds should be included for such.

7.4 Caving Considerations

All excavations should be conducted in accordance with the Occupational Safety and Health Administration (OSHA) guidelines. Flattening of the excavation sidewalls and/or the use of bracing may be needed to maintain stability during construction.

7.5 Difficult Excavation

Partially weathered rock (PWR) was not encountered, and auger refusal did not occur in the borings at the termination depths ranging from approximately 20 to 25 feet. Difficult excavation conditions (ripping/blasting) associated with PWR and/or rock are not anticipated for the proposed construction. It is also important to note that depths to PWR and rock can vary over short horizontal distances in the Piedmont Physiographic Province, and PWR and rock could be encountered during construction at shallower depths outside the boring locations for this study.

7.6 Groundwater Considerations

Groundwater was encountered at the time of drilling in borings B-3, B-7, and B-9 at depths ranging from approximately 11.5 to 23 feet. Stabilized groundwater levels are typically several feet higher than those at the time of drilling. Groundwater-related difficulties are generally not anticipated to be encountered during construction; however, some of the site soils are susceptible to the formation of shallower perched water levels during periods of wet weather, especially within the fill layer. The contractor should be prepared to manage groundwater and perched water as needed.

7.7 Foundation Design and Construction

If the existing fill is removed and recompacted or replaced with new engineered fill, within and at least 4 feet beyond the building footprint, to the depth of firm residual or alluvial soils or to a maximum depth that allows for at least 4 feet of new engineered fill below the planned foundation bearing elevations, as discussed in report sections 7.1 and 7.2, then the proposed structures could be supported on conventional shallow foundations designed for a maximum net allowable bearing pressure of 2,500 psf. The viability of this option should be confirmed by the results of the recommended test pits.

The shallow foundations could consist of shallow strip and/or isolated column footings supported within and underlain by suitable bearing soils. We recommend minimum footing dimensions of 20 inches for strip footings and 24 inches for square footings. Footing should bear at least 12 inches below outside finished grades for frost protection. The Geotechnical Engineer must evaluate each footing excavation prior to steel reinforcement or concrete placement. Conditions that are observed should be compared to the boring data and design requirements. If unsuitable bearing material is encountered, it should be excavated and replaced or otherwise treated as recommended by the Geotechnical Engineer.

Surface water control should be maintained to prevent accumulation of water in footing excavations. Standing water in footing excavations should be removed promptly. Soil softened by the water should be removed, and the Geotechnical Engineer or his representative should reexamine the area.

7.8 Ground Floor Slabs

Based on the results of the recommended test pits and following site preparation as recommended in report sections 7.1 and 7.2, a slab-on-grade may be utilized for proposed structures. We recommend a subgrade modulus of 120 pounds per cubic inch (pci) be used for slab design. It has been our experience that the floor slab subgrade is often disturbed by weather, foundation and utility line installation, and other construction activities between completion of grading and slab construction. For this reason, our

Geotechnical Engineer should evaluate the subgrade immediately prior to placing the concrete. Areas judged by the Geotechnical Engineer to be unstable should be re-compacted or undercut and replaced with engineered fill compacted to at least 98 percent of its standard Proctor maximum dry density.

7.9 Earthwork and Fill Placement

The soils encountered at the Site, if free of organics and other deleterious materials, are generally expected to be suitable for re-use as engineered fill. However, some of the soils at the site will be particularly susceptible to changes in moisture content. If these soils become wet during construction, it may not be practical to adequately dry these soils without the use of chemical additives such as lime or cement, and they may need to be removed and replaced with drier soils.

The Geotechnical Engineer must evaluate excavated soils to assess their suitability for reuse as engineered fill. Typical restrictions on suitable fill are no organics, plasticity index less than 30, and maximum particle size of four inches, with no more than 30 percent greater than 3/4-inch. These restrictions should also be applied to the imported borrow soils if needed.

Positive drainage should be maintained at all times to prevent saturation of exposed soils in case of sudden rains. Sealing the surface of disturbed soils with a smooth-drum roller will also improve runoff and reduce the potential for construction delays due to undercutting and/or stabilization of saturated soils. The degree of soil stability problems will also be dependent upon the precautions taken by the contractor to help protect these moisture sensitive soils.

Standard Proctor compaction tests (ASTM D 698) should be performed for each soil type used, to provide data necessary for quality assurance testing. The soil moisture content at the time of compaction should be within optimal moisture content limits, that will allow the required compaction to be obtained.

The fill should be placed in thin lifts that will allow for adequate compaction to be achieved and compacted. Maximum loose lift thickness should not exceed 8 inches. We recommend that fill be compacted to at least 98% of Standard Proctor (ASTM D 698) maximum dry density within two feet below pavement subgrade or floor slabs and at least 95% of the Standard Proctor maximum dry density elsewhere.

A Geotechnical Engineer on a full-time basis should observe grading operations. In-place density tests taken by that individual will assess the degree of compaction being obtained. The frequency of the testing should be determined by the Geotechnical Engineer.

7.10 Earth Slopes

We recommend that where fill is to be placed on existing slopes or gullies greater than 4(H):1(V), the slopes be benched to prevent sliding of the fill mass along the existing surface. This can be achieved by notching the slope face by at least about two feet horizontally with the compactor blade as each lift is compacted. A typical benching detail is provided in The Appendix.

Permanent slopes should be constructed no steeper than 2(H):1(V). Slopes of up to 20 feet in total height constructed to 2(H):1(V) should be acceptable for this project, assuming proper benching, and placement and compaction of engineered fill. Slopes greater than 20 feet must be evaluated for global stability and should be designed by a licensed Geotechnical Engineer. Slopes higher than 35 feet should include a terrace/break at the midpoint. If less than desirable soils, such as topsoil or wet soils are to be wasted on slopes, or if an appropriate level of quality control and compaction testing under the supervision of the Geotechnical Engineer is not planned during slope construction, 2(H):1(V) slopes will not likely be adequate, and flatter slopes should be considered.

All slopes should be protected from erosion during construction and provided with appropriate permanent vegetation or other cover after construction. Slopes should be protected from concentrated run-off flow by means of berms and drainage ditches to direct runoff around slopes or through concrete channels. Appropriate vegetative cover should consist of fast-growing grasses that will rapidly create a dense root mat over the entire slope. Landscaping consisting of isolated shrubs and pine straw will not provide adequate slope protection.

A minimum building or retaining wall setback (from the nearest edge of foundations) of at least 10 feet from the crest of slopes is recommended. A minimum setback of 5 feet is recommended for pavement and curbs.

7.11 Retaining Walls

The following retaining wall recommendations pertain to cast-in-place building and site retaining walls within the areas explored and are not intended for modular block or MSE walls. If modular block or MSE walls are planned on the site, United Consulting should be notified because additional evaluation will be required to provide recommendations specific to the planned wall types and locations.

The design of retaining walls must include the determination of the lateral pressure that will act on the wall. The lateral earth pressure is a function of the soil properties, surcharge loads behind the wall, and amount of deformation that the wall can undergo. This deformation is basically dependent upon the relative rigidity of the wall system.

The active earth pressure condition develops when the wall moves away from the soil over a sufficient distance, such as for a freestanding cantilever wall. The at-rest condition exists when there is no lateral strain on the soil, such as walls, which are rigidly restrained like a basement or sub-foundation wall. The passive condition occurs when the wall moves into the soil.

The following equivalent fluid pressures are recommended for three earth pressure conditions.

Table 2 - Lateral Earth Pressures

Earth Pressure Condition	Earth Pressure Coefficient	Recommended Equivalent Fluid Pressure
Active	$K_A = 0.36$	43 psf/foot
At-Rest	$K_O = 0.53$	64 psf/foot
Passive	$K_P = 2.77$	332 psf/foot

We note that considerable horizontal deflections are required to mobilize the passive pressure; therefore, the designer should consider a safety factor of 2 to the stated ultimate passive earth pressure in design.

The recommended equivalent fluid pressures are based on an assumed soil density of 120 pcf, an internal friction angle of 28 degrees and cohesion of zero. A coefficient of friction of 0.34 for sliding may be used for the retaining wall design.

The parameters listed above are based on a level of properly compacted backfill, no friction at the wall-soil interface, and no surcharge effects. For the design of retaining walls, which could be inundated, the buoyant unit weight of the inundated soil should be used to determine the lateral earth pressure. The hydrostatic pressure based on the maximum ponding elevation should be utilized in the analysis.

Heavy compaction equipment should not be used to compact backfill within 5 feet laterally behind any retaining wall unless the wall is designed for increased pressure or temporarily braced. Therefore, light compaction equipment may be required in this zone. Retaining wall backfill should be compacted to 95 percent of the Standard Proctor maximum dry density. A permanent drainage system such as a footing drain, or a fabric drain such as Enka drain, Mira drain, etc., is recommended for any retaining walls which are more than 5 feet in height.

The retaining walls should be designed by a professional engineer familiar with retaining wall design and registered in Georgia. The designer should consider sloping backfill, surcharges and other factors affecting wall loadings. The designer should also consider Global Stability.

7.12 Pavement Design Recommendations

Following site preparation as recommended in report sections 7.1 and 7.2, an estimated CBR value of 4 has been used in flexible pavement thickness design for the proposed parking and driveway areas. This value corresponds to a vertical subgrade modulus (k) value of approximately 120 pci for rigid pavement design. This assumed CBR value is based on our experience with similar soil types; no CBR tests were performed.

For pavement areas subjected to an assumed average daily traffic volume of up to 400 cars per day, and up to five (5) semi-tractor trailer (maximum wheel load of 9,000 lbs.) trucks per week, we recommend a minimum pavement section consisting of 1.5 inch of asphalt (9.5 mm Superpave) underlain by 2.0 inches of binder (19 mm Superpave) over 8 inches of graded aggregate base (GAB). This is the minimum section recommended in any area where a truck may have access, whether truck traffic is planned or not. If more trucks including garbage trucks, etc. are anticipated, this section should be increased to reflect the heavier loading.

For light duty areas restricted to passenger cars traffic only with an assumed average maximum daily traffic volume of approximately 400 cars and an occasional delivery truck per week, we recommend a minimum pavement section consisting of 1.0 inch of asphalt (9.5 mm Superpave Type 1) underlain by 1.5 inches of binder (12.5 mm Superpave) over 6.0 inches of graded aggregate base (GAB).

We recommend that the subgrade beneath all pavement areas be compacted to at least 98% of the Standard Proctor density in the upper two feet below subgrade, and to at least 95% of the Standard Proctor maximum dry density elsewhere. We recommend that the graded aggregate base course for each of the preceding pavement sections be compacted to 100% of the materials modified proctor value (ASTM D-1557). Also, all subgrades, base and asphalt materials, concrete, and construction procedures conform to Georgia DOT "Standard Specifications Construction of Transportation Systems", 2021 Edition.

We recommend that a rigid (concrete) slab at least 6-inches thick using 4,000 psi concrete over 12 inches of prepared subgrade be used for dumpster pad areas, if any. These pads should be large enough to accommodate the front wheels of the dumpster truck when the dumpster is being emptied. Concrete pavement is also recommended in any loading areas where heavy trucks will maneuver, or trailer jacks will be supported.

The pavement sections selected will require adequate drainage to provide long-term serviceability. Pavement areas should be sloped to drain, and ditches or underdrains should be incorporated to promote drainage away from the pavement areas. The most critical factor in providing long-term serviceability for a pavement is a well-prepared, uniform, subgrade. Areas which are not adequately prepared by thorough proofrolling and treating of soft or wet areas can result in potholes or cracking. Even though the potholes will affect only a small percentage of the pavement, the overall pavement serviceability will be significantly reduced.

Pavement should be installed late in construction when most heavy construction traffic will no longer come on-site. If desired, a layer of crushed stone or graded aggregate base can be placed earlier to provide a working surface. However, this is a convenience, and some loss of usable stone should be expected. Prior to paving, the site should be proofrolled again, new soft areas treated, the base leveled and thickened as required, and the site paved at the end of construction. This helps reduce pavement damage due to construction traffic.

The recommended flexible pavement sections should also allow for placement of the base early in construction, repairs to be made as needed, and then for the top layer placed near the end of construction activities.

8.0 LIMITATIONS

This report is for the exclusive use of **City of Tucker** and the designers of the project described herein and may only be applied to this specific project. Our conclusions and recommendations have been prepared using generally accepted standards of Geotechnical Engineering practice in the State of Georgia. No other warranty is expressed or implied. Our firm is not responsible for the conclusions, opinions or recommendations of others.

The right to rely upon this report and the data within may not be assigned without UNITED CONSULTING'S written permission.

The scope of this evaluation was limited to an evaluation of the load-carrying capabilities and stability of the subsoils. Oil, hazardous waste, radioactivity, irritants, pollutants, molds, or other dangerous substances and conditions were not the subject of this study. Their presence and/or absence are not implied or suggested by this report and should not be inferred.

Our conclusions and recommendations are based upon design information furnished to us, data obtained from the previously described exploration and testing program and our past experience. They do not reflect variations in subsurface conditions that may exist intermediate of our borings, and in unexplored areas of the site. Should such variations become apparent during construction, it will be necessary to re-evaluate our conclusions and recommendations based upon "on-site" observations of the conditions.

If the design or location of the project is changed, the recommendations contained herein must be considered invalid, unless our firm reviews the changes, and our recommendations are either verified or modified in writing. When design is complete, we should be given the opportunity to review the foundation plan, grading plan, and applicable portions of the specifications to confirm that they are consistent with the intent of our recommendations.

UNITED CONSULTING

APPENDIX

GENERAL NOTES

The soil classifications noted on the Boring Logs are visual classifications unless otherwise noted. Minor constituents of a soil sample are termed as follows:

Trace	0 - 10%
Some	11 - 35%
Suffix "y" or "ey"	36 - 49%

LEGEND

◩	Split Spoon Sample obtained during Standard Penetration Testing	
☒	Relatively Undisturbed Shelby Tube Sample	
▽	Groundwater Level at Time of Boring Completion	
▼	Groundwater Level at 24 hours (or as noted) after Termination of Boring	
w	Natural Moisture Content	
LL	Liquid Limit	Atterberg Limits
PL	Plastic Limit	
PI	Plasticity Index	
PF	Percent Fines (Percent Passing #200 Sieve)	
γ_d	Dry Unit Weight (Pounds per Cubic Foot or PCF	
γ_m	Moist or In-Situ Unit Weight (PCF)	
γ_{sat}	Saturated Unit Weight (PCF)	

BORING LOG DATA NARRATIVE OF DRILLING OPERATION

The test borings were made by mechanically advancing helical hollow stem augers into the ground. Samples were collected at regular intervals in each of the borings following established procedures for performing the Standard Penetration Test in accordance with ASTM Specification D 1586. Soil samples were obtained with a standard 1.4" I.D. x 2.0" O.D. split barrel sampler. The sampler is first seated 6" to penetrate any loose cuttings and then driven an additional foot with the blows required of a 140-pound hammer freely falling a distance of 30 inches. The number of blows required to drive the sampler the final foot is designated the "standard penetration resistance." The driving resistance, known as the "N" value, can be correlated with the relative density of granular soils and the consistency of cohesive deposits.

The following table describes soil consistency and relative densities based on standard penetration resistance values (N) determined by the Standard Penetration Test (SPT).

	"N"	Consistency
Clay and Silt	0-2	Very Soft
	3-4	Soft
	5-8	Firm
	9-15	Stiff
	16-30	Very Stiff
	Over 31	Hard

	"N"	Relative Density
Sand	0-4	Very Loose
	5-10	Loose
	11-19	Firm
	20-29	Medium Dense
	30-49	Dense
	50+	Very Dense

FIG 1

TUCKER TOWN GREEN
EXISTING SITE
SEPTEMBER 13, 2022

SCALE: 1"=20'
0 10 20 40 80

Title:	Boring Location Plan
Project:	Tucker Town Green
Project No.:	TUCKE-23-GA-07852-01
Client:	City of Tucker
Prepared:	EDC
Checked:	NYD
Date:	09/22/2023
Scale:	NTS

UNITED CONSULTING

Custom Soil Resource Report
Soil Map

Map Unit Symbol	Map Unit Name
AuC	Appling-Urban land complex, 2 to 10 percent slopes
CuC	Cecil-Urban land complex, 2 to 10 percent slopes
Ud	Urban land
WeB	Wedowee sandy loam, 2 to 6 percent slopes

UNITED
CONSULTING

N

Prepared:	EDC	**Title:**	NRCS Soil Map
Checked:	NYD	**Project:**	Tucker Town Green
Date:	09/22/2023	**Project No.**	TUCKE-23-GA-07852-01
Scale:	NTS	**Client:**	City of Tucker

FIG 2

EXPLORATION PROCEDURES

Nine (9) SPT borings (designated B-1 through B-9) were performed at the approximate locations indicated on the attached Boring Location Plan (Figure 1). The ground surface elevations at the boring locations were interpolated from the topographic survey. The SPT borings were performed in general accordance with ASTM D 1586. Soil samples obtained during testing were visually evaluated by the Project Engineer and classified according to the visual-manual procedure described in ASTM D 2488. A narrative of field operations is included in The Appendix.

The test locations shown on the provided plan were overlaid onto Google Earth to create a KMZ file. The tests were located on site by using the KMZ file, a hand-held GPS unit, and existing site features. The test locations shown on the Boring Location Plan and the ground surface elevations shown on the boring logs should be considered *approximate*.

We're here for you
UNITED CONSULTING

Tucker Town Green

Railroad Ave & 2nd Street, Tucker, GA

B-1

Page 1 of 1

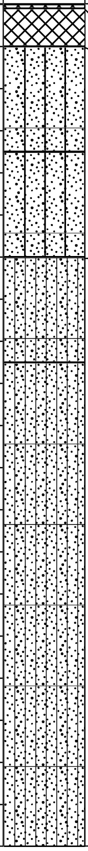
Drilling Co.:	Arc One	Project No.:	TUCKE-23-GA-07852-01
Driller:	Joel Nelms	Date Drilled:	10/03/2023
Logged by:	Emily Casey	Boring Depth:	20 feet
Equipment:	Geoprobe 7822DT	Boring Elevation:	~1097'
Hammer Type:	Auto - 90% Efficiency	Coordinates:	Longitude: -84.21662 Latitude: 33.85235
Drilling Method:	2-1/4" Hollow Stem Auger	▽ Water Level at Time of Drilling:	N/A
		Cave-In at Time of Drilling:	6 feet

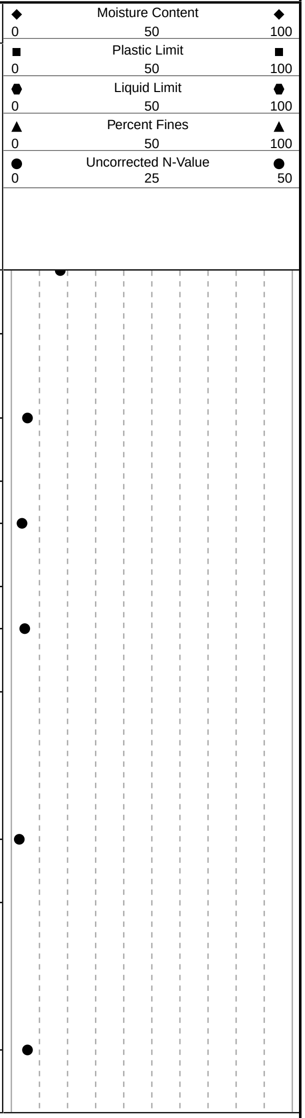
Remarks:
Borehole size: 6.25". Boring locations and elevations were not field surveyed and are very approximate. Backfilled with drill cuttings

▼ Delayed Water Level: N/A
Delayed Water Observation Date: N/A

Rig Type	Geoprobe 7822DT
Tooling	2-1/4" Hollow Stem Auger
Surface Elevation	~1097'

Depth (ft)	Elevation (ft)	Visual Classification and Remarks		Sample Type	Sample Number	Blow Counts (N-Value)
		Grass and gravel	0.1	☒	1	9-11-7 (18)
		Sand - silty, trace rock fragments, firm, dark reddish brown (fill)	1.0			
	1095	Silt - sandy, trace mica, very stiff, orangeish brown (residuum)				
		Firm		☒	2	13-3-3 (6)
5						
			6.0			
	1090	Sand - silty, trace mica, very loose, damp, purplish brown		☒	3	5-2-2 (4)
		Trace mica, loose, moist, grayish brown		☒	4	2-2-3 (5)
10						
	1085					
		Trace mica, very loose, moist, grayish brown with pink		☒	5	1-1-2 (3)
15						
	1080					
		Loose, damp to moist, orangeish brown with white		☒	6	1-2-4 (6)
20						





Boring terminated at 20 feet

We're here for you
UNITED CONSULTING

Tucker Town Green

Railroad Ave & 2nd Street, Tucker, GA

B-2

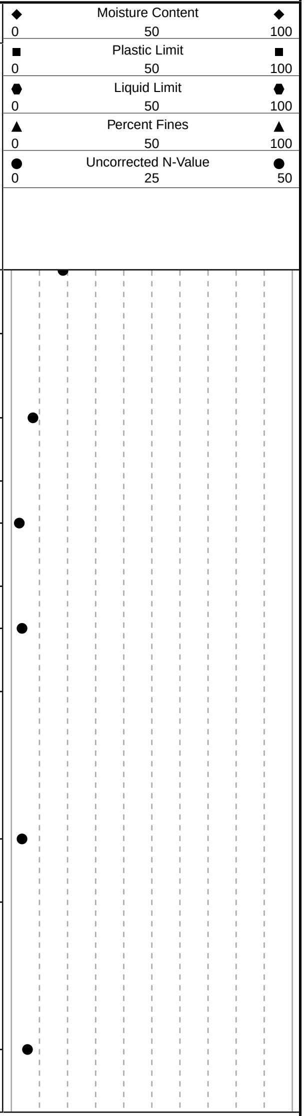
Page 1 of 1

Drilling Co.:	Arc One	Project No.:	TUCKE-23-GA-07852-01	Remarks: Borehole size: 6.25". Boring locations and elevations were not field surveyed and are very approximate. Backfilled with drill cuttings
Driller:	Joel Nelms	Date Drilled:	10/03/2023	
Logged by:	Emily Casey	Boring Depth:	20 feet	
Equipment:	Geoprobe 7822DT	Boring Elevation:	~1095'	
Hammer Type:	Auto - 90% Efficiency	Coordinates:	Longitude: -84.21633	Latitude: 33.85211
Drilling Method:	2-1/4" Hollow Stem Auger	▽ Water Level at Time of Drilling: Cave-In at Time of Drilling:	N/A 11 feet	▼ Delayed Water Level: N/A Delayed Water Observation Date: N/A

Rig Type: Geoprobe 7822DT
Tooling: 2-1/4" Hollow Stem Auger
Surface Elevation: ~1095'

Depth (ft)	Elevation (ft)	Visual Classification and Remarks	Sample Type	Sample Number	Blow Counts (N-Value)
		Gravel (fill) 0.1	☒	1	14-10-9 (19)
		Sand, some gravel, firm, grayish brown 0.5			
		Clay, trace sand, very stiff, orangish brown and gray (residuum) 3.0			
		Sand - silty, trace mica, loose, grayish tan	☒	2	4-4-4 (8)
5	1090				
		Trace mica, very loose, orangeish brown	☒	3	2-1-2 (3)
		Trace mica, very loose, orangeish brown with pink	☒	4	1-2-2 (4)
10	1085				
		Trace mica, very loose, damp to moist, orangeish brown	☒	5	1-2-2 (4)
15	1080				
		Some mica, loose, brown	☒	6	2-3-3 (6)
20	1075				

Boring terminated at 20 feet



We're here for you
UNITED CONSULTING

Tucker Town Green

Railroad Ave & 2nd Street, Tucker, GA

B-3

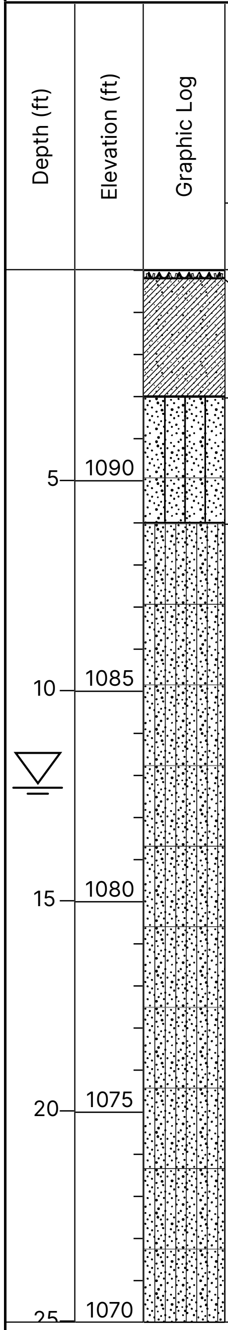
Page 1 of 1

Drilling Co.:	Arc One	Project No.:	TUCKE-23-GA-07852-01
Driller:	Joel Nelms	Date Drilled:	10/03/2023
Logged by:	Emily Casey	Boring Depth:	25 feet
Equipment:	Geoprobe 7822DT	Boring Elevation:	~1095'
Hammer Type:	Auto - 90% Efficiency	Coordinates:	Longitude: -84.21620 Latitude: 33.85232
Drilling Method:	2-1/4" Hollow Stem Auger	▽ Water Level at Time of Drilling:	12 feet
		Cave-In at Time of Drilling:	15 feet

Remarks:
Borehole size: 6.25". Boring locations and elevations were not field surveyed and are very approximate. Backfilled with drill cuttings

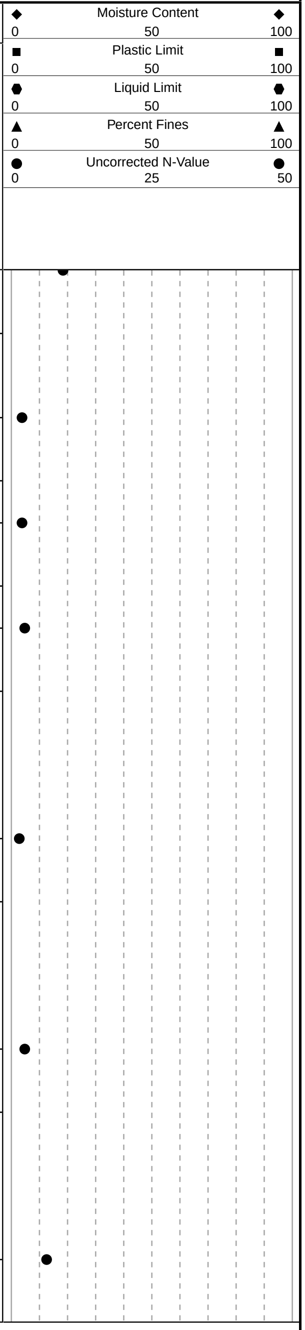
▼ Delayed Water Level: N/A
Delayed Water Observation Date: N/A

Rig Type	Geoprobe 7822DT
Tooling	2-1/4" Hollow Stem Auger
Surface Elevation	~1095'



Visual Classification and Remarks	Depth	Sample Type	Sample Number	Blow Counts (N-Value)
Grass	0.2			
Clay - sandy, trace rock fragments, very stiff, orangeish tan (residuum)	3.0	☒	1	15-14-5 (19)
Silt - sandy, trace mica, soft, grayish brown	6.0	☒	2	3-2-2 (4)
Sand - silty, trace mica, very loose, damp, grayish brown		☒	3	1-2-2 (4)
Trace rock fragments, loose, damp, brown and grayish brown		☒	4	1-2-3 (5)
Loose, moist, grayish brown with white		☒	5	2-1-2 (3)
Trace mica, loose, damp, orangeish brown		☒	6	1-2-3 (5)
Some mica, firm, damp, orangeish brown		☒	7	4-5-8 (13)

Boring terminated at 25 feet



UNITED CONSULTING
We're here for you

Tucker Town Green

Railroad Ave & 2nd Street, Tucker, GA

B-4

Page 1 of 1

Drilling Co.: Arc One
Driller: Joel Nelms
Logged by: Emily Casey
Equipment: Geoprobe 7822DT
Hammer Type: Auto - 90% Efficiency
Drilling Method: 2-1/4" Hollow Stem Auger

Project No.: TUCKE-23-GA-07852-01
Date Drilled: 10/03/2023
Boring Depth: 20 feet
Boring Elevation: ~1091'
Coordinates: Longitude: -84.21587 Latitude: 33.85224

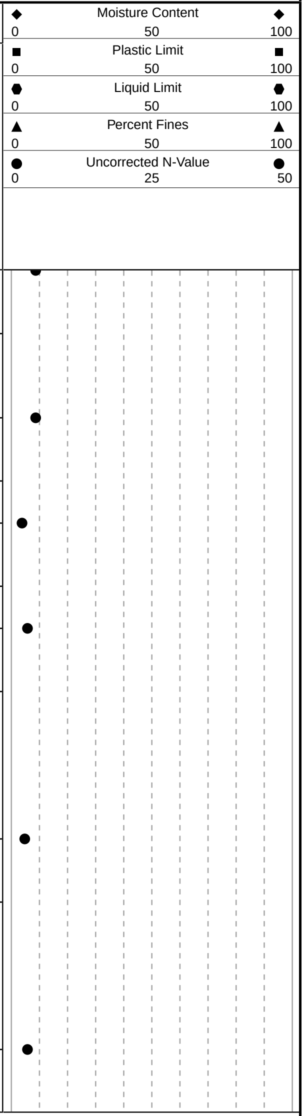
Remarks:
Borehole size: 6.25". Boring locations and elevations were not field surveyed and are very approximate. Backfilled with drill cuttings

Water Level at Time of Drilling: N/A
Cave-In at Time of Drilling: 4 feet
Delayed Water Level: N/A
Delayed Water Observation Date: N/A

Rig Type Geoprobe 7822DT
Tooling 2-1/4" Hollow Stem Auger
Surface Elevation ~1091'

Depth (ft)	Elevation (ft)	Visual Classification and Remarks	Sample Type	Sample Number	Blow Counts (N-Value)
		Grass and possible topsoil 0.1			
	1090	Sand - clayey, trace rock fragments, loose, tannish brown (fill) 3.0	☒	1	7-5-4 (9)
5	1085	Clay - sandy, trace organics, stiff, dark gray (alluvium) 6.0	☒	2	8-7-2 (9)
		Sand - clayey, very loose, light gray	☒	3	3-2-2 (4)
10	1080	Loose 13.0	☒	4	2-3-3 (6)
15	1075	Silt - sandy, trace mica, trace rock fragments, firm, moist, orangeish brown with gray (residuum) 18.0	☒	5	1-1-4 (5)
20		Sand - silty, some mica, trace rock fragments, loose, damp, dark brown and tan	☒	6	2-3-3 (6)

Boring terminated at 20 feet



We're here for you
UNITED CONSULTING

Tucker Town Green

Railroad Ave & 2nd Street, Tucker, GA

B-5

Page 1 of 1

Drilling Co.: Arc One
Driller: Joel Nelms
Logged by: Emily Casey
Equipment: Geoprobe 7822DT
Hammer Type: Auto - 90% Efficiency
Drilling Method: 2-1/4" Hollow Stem Auger

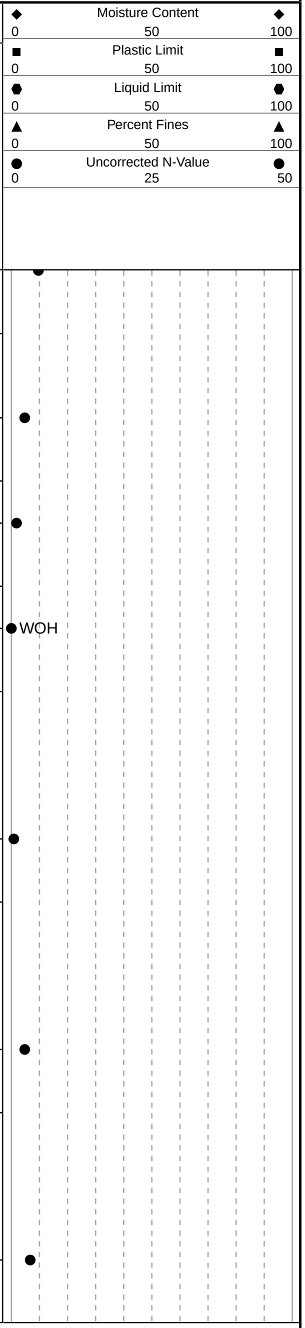
Project No.: TUCKE-23-GA-07852-01
Date Drilled: 10/03/2023
Boring Depth: 25 feet
Boring Elevation: ~1091'
Coordinates: Longitude: -84.21562 Latitude: 33.85235
Water Level at Time of Drilling: N/A
Cave-In at Time of Drilling: N/A

Remarks:
Borehole size: 6.25". Boring locations and elevations were not field surveyed and are very approximate. Backfilled with drill cuttings

Delayed Water Level: N/A
Delayed Water Observation Date: N/A

Rig Type	Geoprobe 7822DT
Tooling	2-1/4" Hollow Stem Auger
Surface Elevation	~1091'

Depth (ft)	Elevation (ft)	Visual Classification and Remarks	Samples		
			Sample Type	Sample Number	Blow Counts (N-Value)
	1090	Grass and possible topsoil 0.2			
		Clay, some sand, trace mica, stiff, orangeish brown (fill)	☒	1	6-6-4 (10)
		Some sand, trace mica, trace rock fragments, firm, reddish brown with black	☒	2	4-3-2 (5)
5	1085				
		Trace sand, trace roots, very soft, moist, reddish brown	☒	3	1-1-1 (2)
		Trace sand, trace roots and other organics, organic stain, very soft, damp to moist, dark gray	☒	4	WOH-WOH-WOH
10	1080				
		Trace sand, trace roots, trace rock fragments, very soft, moist, reddish brown and black	☒	5	1-WOH-1 (1)
15	1075				
		18.0			
		Silt, some sand, trace mica, trace rock fragments, firm, damp, orangeish tan (residuum)	☒	6	2-2-3 (5)
20	1070				
		Silt - sandy, trace mica, firm, moist, orangeish brown	☒	7	2-3-4 (7)
25					



Boring terminated at 25 feet

UNITED CONSULTING
We're here for you

Tucker Town Green

Railroad Ave & 2nd Street, Tucker, GA

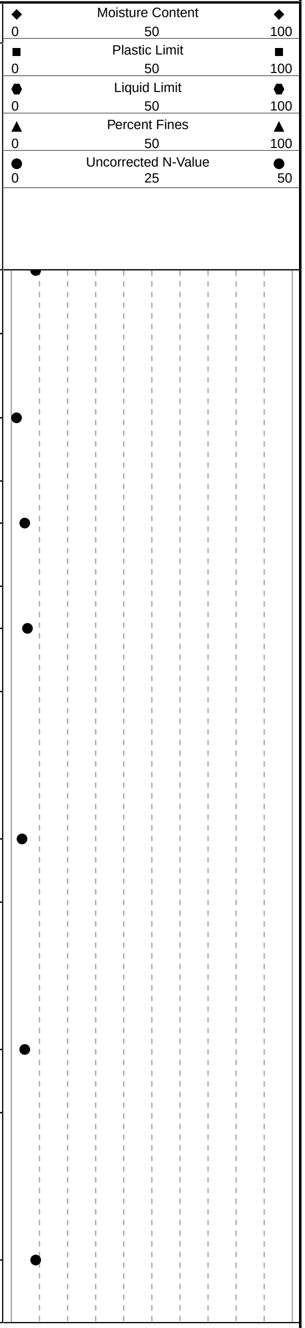
B-6

Page 1 of 1

Drilling Co.:	Arc One	Project No.:	TUCKE-23-GA-07852-01	Remarks: Borehole size: 6.25". Boring locations and elevations were not field surveyed and are very approximate. Backfilled with drill cuttings
Driller:	Joel Nelms	Date Drilled:	10/03/2023	
Logged by:	Emily Casey	Boring Depth:	25 feet	
Equipment:	Geoprobe 7822DT	Boring Elevation:	~1092'	
Hammer Type:	Auto - 90% Efficiency	Coordinates:	Longitude: -84.21548	Latitude: 33.85252
Drilling Method:	2-1/4" Hollow Stem Auger	▽ Water Level at Time of Drilling: N/A Cave-In at Time of Drilling: 2.5 feet		▼ Delayed Water Level: N/A Delayed Water Observation Date: N/A

Rig Type: Geoprobe 7822DT
Tooling: 2-1/4" Hollow Stem Auger
Surface Elevation: ~1092'

Depth (ft)	Elevation (ft)	Visual Classification and Remarks	Sample Type	Sample Number	Blow Counts (N-Value)
0.1		Grass	☒	1	10-4-5 (9)
3.0	1090	Silt, some clay, trace sand, trace rock fragments, stiff, orangeish tan (fill)			
		Clay - sandy, trace roots, very soft, moist to wet, tannish gray	☒	2	1-1-1 (2)
5					
8.0	1085	Trace roots, firm, dark gray	☒	3	1-2-3 (5)
		Sand - clayey, loose, moist, light gray (alluvium)	☒	4	2-2-4 (6)
10					
13.0	1080				
		Sand - silty, micaceous, very loose, damp, purpleish brown (residuum)	☒	5	1-1-3 (4)
15	1075				
		Some mica, loose, moist, orangeish brown	☒	6	2-2-3 (5)
20	1070				
		Trace mica, loose, damp, grayish brown	☒	7	3-4-5 (9)
25					



Boring terminated at 25 feet

We're here for you
UNITED CONSULTING

Tucker Town Green

Railroad Ave & 2nd Street, Tucker, GA

B-7

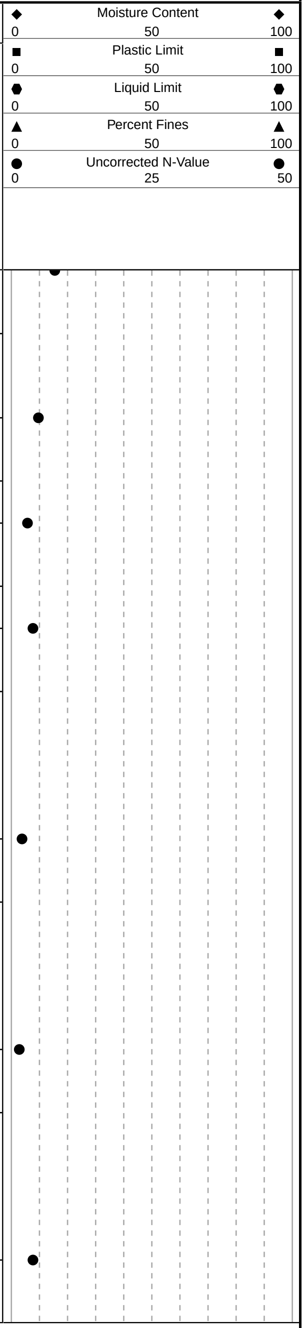
Page 1 of 1

Drilling Co.:	Arc One	Project No.:	TUCKE-23-GA-07852-01
Driller:	Joel Nelms	Date Drilled:	10/03/2023
Logged by:	Emily Casey	Boring Depth:	25 feet
Equipment:	Geoprobe 7822DT	Boring Elevation:	~1091'
Hammer Type:	Auto - 90% Efficiency	Coordinates:	Longitude: -84.21528 Latitude: 33.85240
Drilling Method:	2-1/4" Hollow Stem Auger	▽ Water Level at Time of Drilling:	23 feet
		Cave-In at Time of Drilling:	3.5 feet
		▼ Delayed Water Level:	N/A
		Delayed Water Observation Date:	N/A

Remarks:
Borehole size: 6.25". Boring locations and elevations were not field surveyed and are very approximate. Backfilled with drill cuttings

Rig Type	Geoprobe 7822DT
Tooling	2-1/4" Hollow Stem Auger
Surface Elevation	~1091'

Depth (ft)	Elevation (ft)	Visual Classification and Remarks		Samples: Sample Type	Sample Number	Blow Counts (N-Value)
	1090	Grass and possible topsoil	0.2	☒	1	4-7-9 (16)
		Sand - silty, trace clay, firm, tannish brown (fill)				
		Trace roots, firm, dark gray		☒	2	4-4-6 (10)
5						
	1085		6.0			
		Clay - sandy, trace organics, firm, tannish gray (alluvium)		☒	3	2-2-4 (6)
		Firm, light gray		☒	4	3-3-5 (8)
10						
	1080					
			13.0			
		Sand - silty, some mica, very loose, moist, dark pinkish gray (residuum)				
				☒	5	1-2-2 (4)
15	1075					
		Trace mica, very loose, damp to moist, orangeish brown		☒	6	2-1-2 (3)
20	1070					
▽						
		Trace mica, loose, moist, orangeish brown		☒	7	2-4-4 (8)
25						



Boring terminated at 25 feet

UNITED CONSULTING
We're here for you

Tucker Town Green

Railroad Ave & 2nd Street, Tucker, GA

B-8

Page 1 of 1

Drilling Co.:	Arc One	Project No.:	TUCKE-23-GA-07852-01
Driller:	Joel Nelms	Date Drilled:	10/03/2023
Logged by:	Emily Casey	Boring Depth:	20 feet
Equipment:	Geoprobe 7822DT	Boring Elevation:	~1091'
Hammer Type:	Auto - 90% Efficiency	Coordinates:	Longitude: -84.21512 Latitude: 33.85247
Drilling Method:	2-1/4" Hollow Stem Auger	▽ Water Level at Time of Drilling:	N/A
		Cave-In at Time of Drilling:	5.5 feet

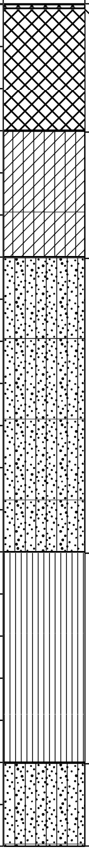
Remarks:
Borehole size: 6.25". Boring locations and elevations were not field surveyed and are very approximate. Backfilled with drill cuttings

▼ Delayed Water Level: N/A

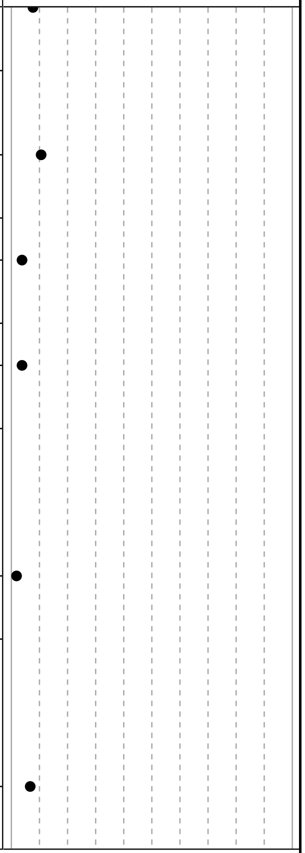
Delayed Water Observation Date: N/A

Rig Type	Geoprobe 7822DT
Tooling	2-1/4" Hollow Stem Auger
Surface Elevation	~1091'

Depth (ft)	Elevation (ft)	Visual Classification and Remarks	Sample Type	Sample Number	Blow Counts (N-Value)
0.1		Grass			
3.0	1090	Sand, some clay, loose, dark brown (fill)	☒	1	8-4-4 (8)
6.0	1085	Silt, some clay, trace sand, trace mica, stiff, reddish brown and yellowish brown (residuum)	☒	2	15-6-5 (11)
		Sand - silty, some mica, very loose, damp, grayish brown	☒	3	2-1-3 (4)
13.0	1080	Some mica, very loose, grayish brown	☒	4	1-2-2 (4)
18.0	1075	Silt, trace sand, trace mica, very soft, moist, orangeish tan	☒	5	WOH-1-1 (2)
20		Sand - silty, some mica, loose, moist, gray	☒	6	3-3-4 (7)



◆	Moisture Content 0 50 100	■	Plastic Limit 0 50 100
⬢	Liquid Limit 0 50 100	▲	Percent Fines 0 50 100
●	Uncorrected N-Value 0 25 50		



Boring terminated at 20 feet

UNITED CONSULTING
We're here for you

Tucker Town Green

Railroad Ave & 2nd Street, Tucker, GA

B-9

Page 1 of 1

Drilling Co.:	Arc One	Project No.:	TUCKE-23-GA-07852-01
Driller:	Joel Nelms	Date Drilled:	10/03/2023
Logged by:	Emily Casey	Boring Depth:	20 feet
Equipment:	Geoprobe 7822DT	Boring Elevation:	~1096'
Hammer Type:	Auto - 90% Efficiency	Coordinates:	Longitude: -84.21524 Latitude: 33.85281
Drilling Method:	2-1/4" Hollow Stem Auger	▽ Water Level at Time of Drilling:	11.5 feet
		Cave-In at Time of Drilling:	13.5 feet

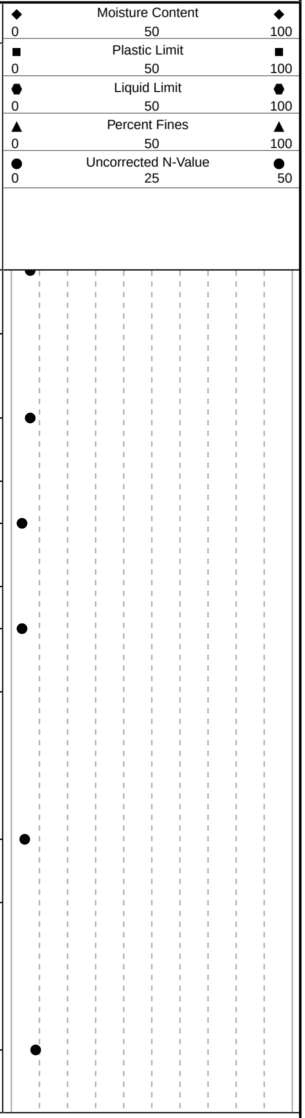
Remarks:
Borehole size: 6.25". Boring locations and elevations were not field surveyed and are very approximate. Backfilled with drill cuttings

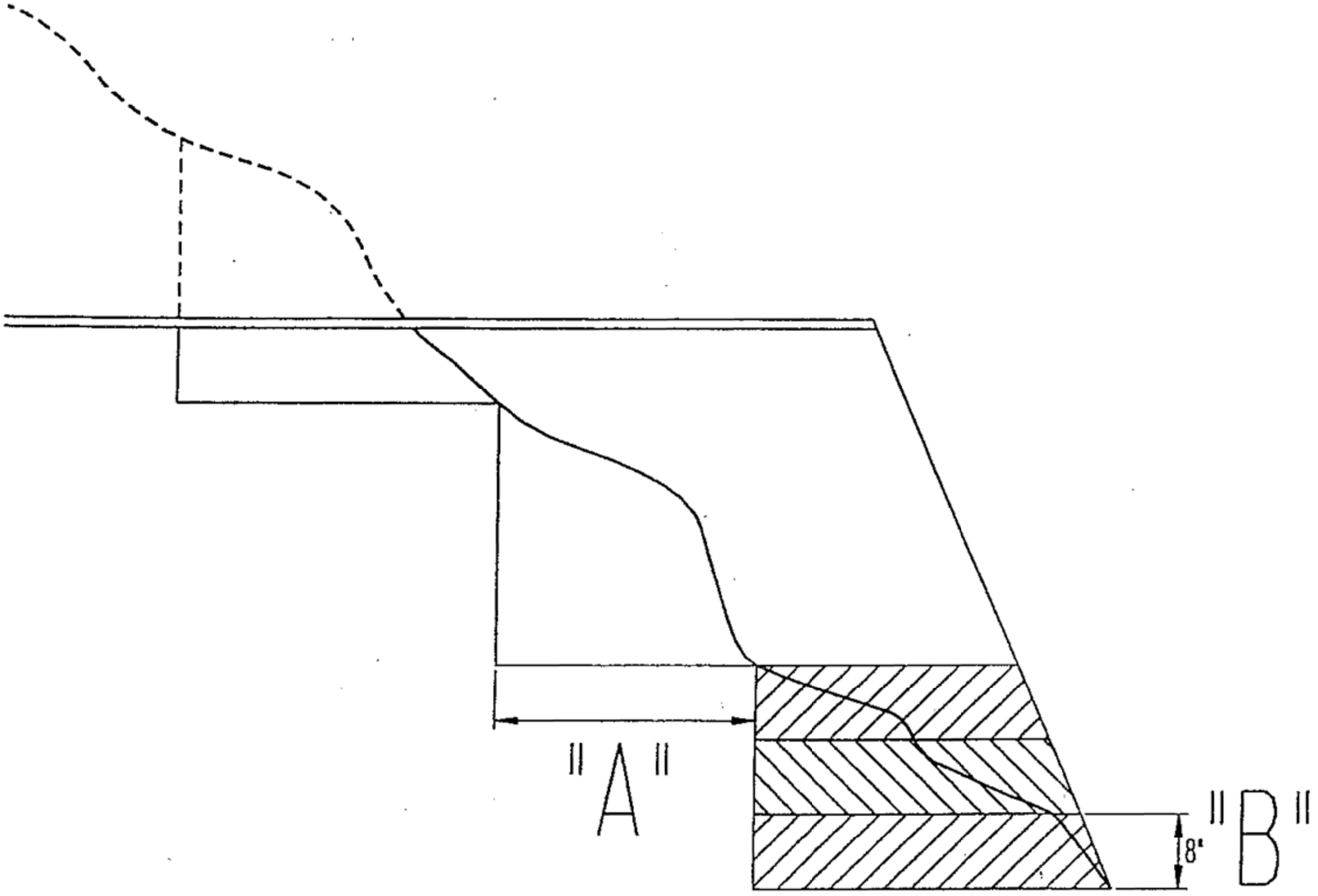
▼ Delayed Water Level: N/A
Delayed Water Observation Date: N/A

Rig Type	Geoprobe 7822DT
Tooling	2-1/4" Hollow Stem Auger
Surface Elevation	~1096'

Depth (ft)	Elevation (ft)	Visual Classification and Remarks		Sample Type	Sample Number	Blow Counts (N-Value)
		Grass	0.1			
	1095	Sand - clayey, trace roots, trace rock fragments, loose, dark reddish brown (fill)		☒	1	4-5-2 (7)
5	1090	Sand, some clay, some rock fragments (1.5"), loose, dark reddish brown	6.0	☒	2	23-4-3 (7)
		Sand - silty, micaceous, very loose, moist, grayish brown (residuum)		☒	3	2-1-3 (4)
10 ▽	1085	Some mica, very loose, damp to moist, light gray		☒	4	2-1-3 (4)
15	1080	Some mica, loose, damp, orangeish brown		☒	5	1-1-4 (5)
20		Some mica, loose, damp to moist, orangeish brown and gray		☒	6	2-3-6 (9)

Boring terminated at 20 feet





1. THE ABOVE DIAGRAM ILLUSTRATES A TYPICAL BENCHING FOR PLACEMENT OF FILL ON A SLOPING SURFACE.

2. THE DIAGRAM SHOWS THAT BEFORE FILL IS PLACED, THE FIRST STEP IS CUT INTO THE SLOPE A MAXIMUM DISTANCE OF ABOUT 8 FEET 'A' (ABOUT ¾ THE WIDTH OF USUAL D-8 BULLDOZER BLADE). SUCCESSIVE LAYERS OF FILL ARE THEN PLACED. BEFORE FINAL LAYER IS PLACED, THE SECOND STEP IS CUT 8 FEET INTO THE SLOPE AND SUCCESSIVE LAYERS ARE AGAIN PLACED.

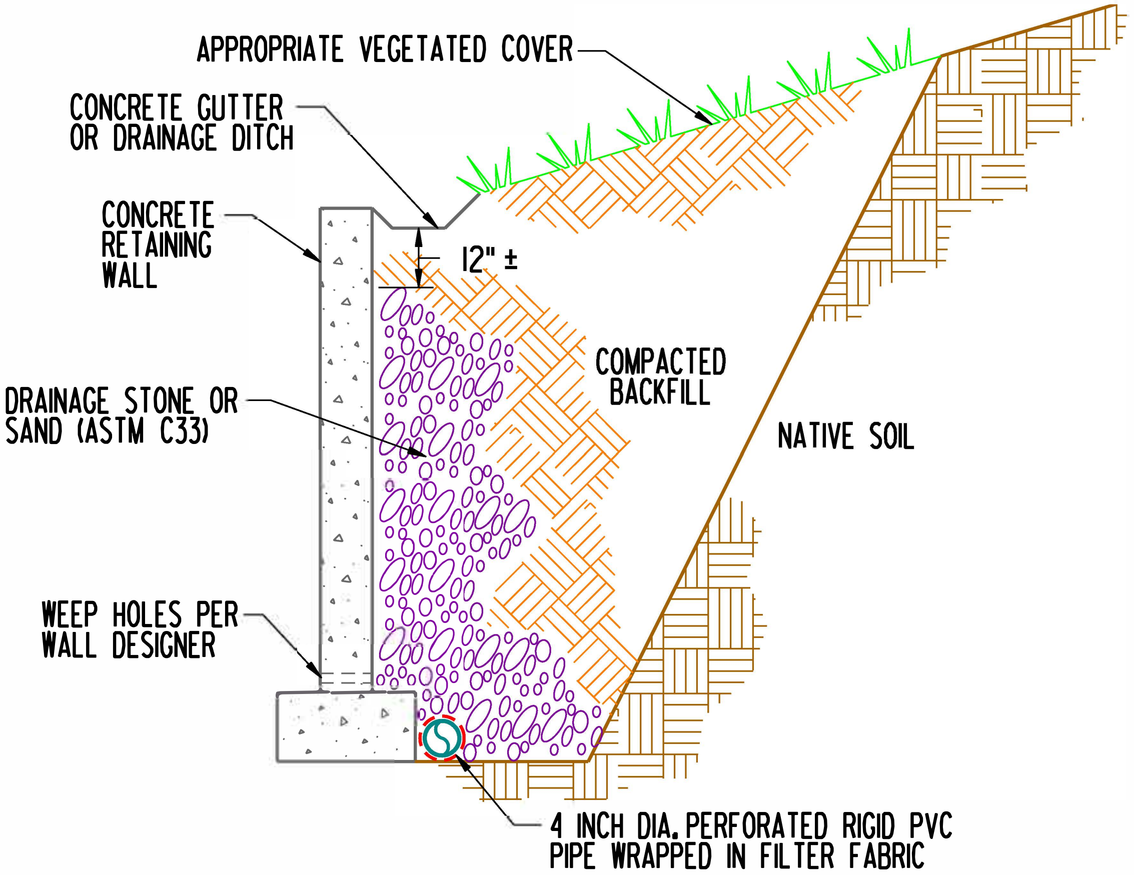
3. SELECT FILL MATERIAL SHOULD BE PLACED IN 8 INCH LIFTS AND COMPACTED TO THE SPECIFIED DENSITY ('B').

TYPICAL BENCHING DETAIL
NOT TO SCALE

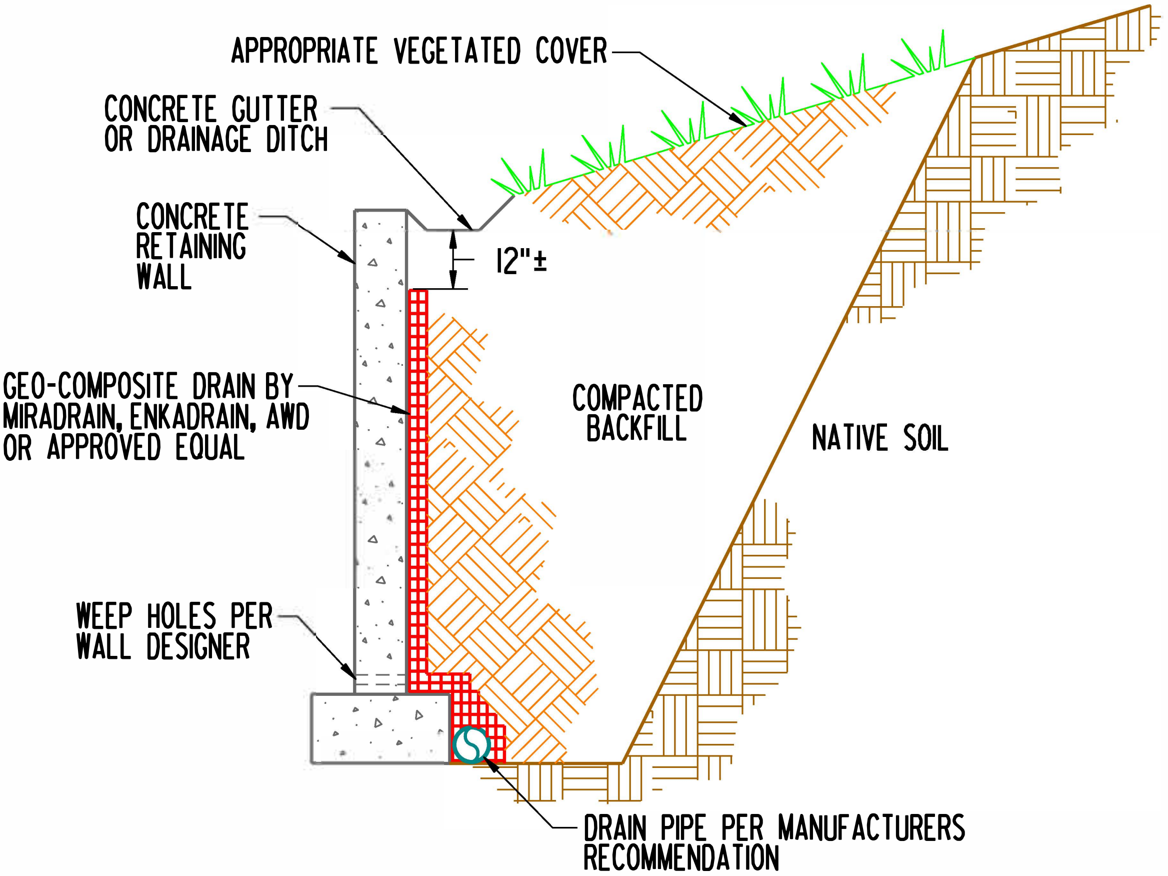
2015/DETAILS/TYPBENCH.DGN

We're here for you
UNITED CONSULTING

625 Holcomb Bridge Road
Norcross, Georgia 30071
770–209–0029 Fax 582–2900
www.unitedconsulting.com



STONE/SAND SYSTEM



COMPOSITE DRAIN SYSTEM

2023/DETAILS/RETWALLDRN.DGN

RETAINING WALL DRAIN DETAIL

NOT TO SCALE

We're here for you

UNITED CONSULTING

625 Holcomb Bridge Road
Norcross, Georgia 30071
770–209–0029 Fax 582–2900
www.unitedconsulting.com

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.

GBC 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

CORPORATE OVERVIEW

United Consulting is an engineering consulting firm headquartered in Georgia, specializing in environmental services, geotechnical engineering, geophysical services, automated instrumentation, special inspections, and construction materials testing since 1990. With over 180 employees, including 30 professionally registered engineers and geologists the firm has undertaken some of the most challenging projects in the country.

GEOTECHNICAL SERVICES

- Subsurface Soil Investigations
- Geologic Investigations
- Foundation Investigations
- Rock Stability Analysis
- Rock Anchor/Bolt Design
- Dam Investigations/ Design
- Dam Breach Analysis
- Pile/Caisson/ Foundation Load
- Slope Stability Analysis
- Tunnel Design
- Soil Nailing Design
- Value Engineering
- Failure Investigations
- Pavement Evaluation/ Design
- Bridge Foundation Investigations
- Retaining Wall Foundation Investigations

ENVIRONMENTAL SERVICES

- Phase I Site Assessments
- Phase II Contamination Assessments
- Brownfield Assessment & Remediation Services
- Corrective Action Plans
- Asbestos, Lead-Based Paint, & Mold Consulting Services
- Indoor/Outdoor Air Quality Assessment & Analysis
- Groundwater/Surface Water Modeling & Analysis
- Landfill Services
- Health & Safety Services
- Soil and Groundwater Remedial Design & Implementation
- Hazardous Waste Site Assessment & Remediation Services
- Regulatory Liaison Services

SUBSURFACE UTILITY ENGINEERING

- Quality Levels A, B, C, D
- Ground Penetrating Radar
- SUE Surveying/Surface Geophysics

AUTOMATED INSTRUMENTATION

- Vibration Monitoring
- Robotic Total Stations
- Inclinometers and SAAs
- Tiltmeters
- Piezometers
- Real-Time Website Monitoring & Alarming
- Pre-Post Construction Photographic Survey

GEOPHYSICAL SERVICES

- Geologic Mapping
- Earth Resistivity
- Geophysical Instrumentation
- Review of Blasting Programs
- Earthquake Risk Assessment
- Shear Wave Analysis

INSPECTION SERVICES

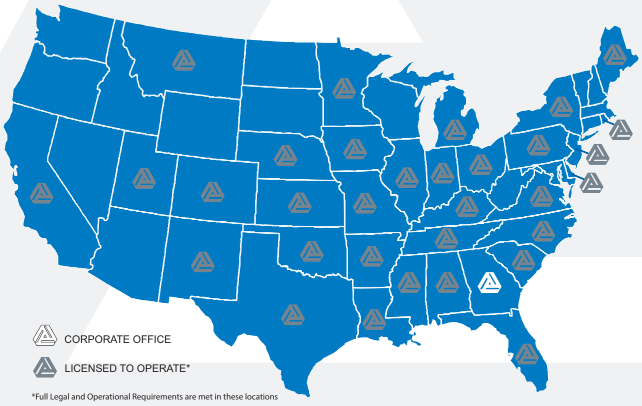
- Property Condition Survey
- Replacement & Reserve Analysis
- Repair Cost Estimates
- Visual Documentation
- Plan & Spec Review
- Construction Draw Inspections
- Contract Administration
- Pre-acquisition Survey
- Construction Monitoring

MATERIALS TESTING

- Complete Mortar & Masonry Testing
- In-place Density Testing
- Foundation Testing
- Asphalt/Concrete Testing & Batch Plant Inspections
- Magnetic Particle & Radiographic Testing
- Special Inspections
- Failure Investigations
- Monitoring Post-Tension Operations
- Floor Flatness & Levelness Determinations
- Moisture Testing
- Fire Proofing Testing
  - Portland Based Cement
  - Gypsum Based Cementitous Spray
  - Cellulose Insulation

ECOLOGICAL SERVICES

- Aquatic Resource Delineation
- Wetland/Stream Permitting Services
- Wildlife & Protected Species Surveys
- Mitigation Design, Implementation/ Monitoring
- NEPA Assessments



UNITED CONSULTING LABORATORY

United Consulting's Geotechnical and Materials Testing Laboratory occupies approximately 10,000 SF of space in our 60,000 SF, Norcross, Georgia headquarters. Our laboratory's work and facilities meet or exceed the requirements set forth in ASTM E 329, C 1077, and D 3740. Additionally, our laboratory has been a validated U.S. Army Corp of Engineers laboratory, since 2010.

LICENSED AND REGISTERED NATIONWIDE

United Consulting licensed and registered in 35 states and continues to grow, with offices in Georgia, Alabama, Florida, Texas, and California.

UNITED
CONSULTING

625 Holcomb Bridge Road, Norcross, GA 30071 • 770-209-0029 • unitedconsulting.com

We're here for you.