TGC REPORT NO: 2605055
DATE: JULY 10, 2026

GEOTECHNICAL STUDY
PROPOSED COMMERCIAL BUILDINGS
7115 FAIRVIEW STREET
HOUSTON, TEXAS

PREPARED FOR:
MR. GEORGE SALEH
12519 FM 529
HOUSTON, TEXAS 77041

TEXAS GEOTECHNICAL CONSULTANTS, LLC
HOUSTON, TEXAS

Date: July 10, 2026

Job No: 2605055

Mr. George Saleh
12519 FM 529
Houston, Texas 77041

Reference: Geotechnical Study
Proposed Commercial Buildings
7115 Fairview Street
Houston, Texas

Dear Mr. Saleh:

Texas Geotechnical Consultants, LLC (TGC), is pleased to submit this report for the geotechnical investigation at the above referenced location. Our findings, analysis and recommendations are submitted herein.

It has been a pleasure working with you on this project and look forward to working with you on your future projects. Should you have any questions regarding this report, please call us at (281) 407-6335.

TEXAS GEOTECHNICAL CONSULTANTS, LLC.

TBPE FIRM NO. F-14495

Jay Vaghela, MSCE, P.E.

Project Manager

STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

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1.0 INTRODUCTION

This investigation was authorized by Mr. George Saleh, with the acceptance of TGC Proposal No. GP25-0904 dated September 3, 2025. It is planned to build 5 new warehouse buildings at 7115 Fairview Street in Houston, Texas. The buildings will be 1 storied and at grade. In addition, a detention pond is also planned. The pond will be approximately 5- to 10 feet deep. There will be associated parking and drives. Although the building column or wall loading information is not currently known to us, it is anticipated that the maximum column loads will be less than 100 kips and the maximum wall loads will be less than 2 kips/feet. This report includes results of the field investigation, laboratory testing, geotechnical engineering analysis and recommendations for the design and construction of proposed buildings, detention pond, parking and drives.

2.0 PROJECT SCOPE

The purpose of this geotechnical investigation was to explore the subsurface and ground water conditions at the site, perform laboratory tests on the sampled soils and develop geotechnical engineering recommendations for the design and construction of the proposed new buildings, detention pond and parking and drives.

Our scope of services included the following:

- Drilling a total of six (6) soil borings to a depth of 20 feet each for the buildings, one (1) soil boring to a depth of 15 feet for the detention pond and three (3) soil borings to a depth of 5 feet each for the parking and drives.
- Observation of ground water conditions in the borings at the time of drilling.
- Obtaining samples at select depths for performing laboratory tests.
- Performing select laboratory tests on selected soil samples for determining the soils moisture, strength and expansion potential.
- Develop a log of borings by incorporating the field and laboratory data.

- Performing geotechnical engineering analysis and developing foundation design and construction recommendations for the project.

Our scope of work did not include any chemical testing or environmental sampling of the soils. Any information regarding odors in soil samples, soil colors, textures, etc., on the logs of borings or in the report are given for informational purposes only. A geologic fault study to evaluate the potential of surface faulting at this site was also beyond the scope of this study.

3.0 SITE CONDITIONS

The site drainage appears to be fair. The project site is currently occupied by trailers. Unpaved gravel drives were observed at the site.

4.0 FIELD EXPLORATION

At the request of the client, the soil conditions were explored by six (6) soil borings drilled to a completion depth of twenty (20) feet each for the buildings, one (1) soil boring drilled to a completion depth of fifteen (15) feet for the detention pond and three (3) soil borings drilled to a completion depth of five (5) feet each for the parking and drives. Boring locations as drilled for this geotechnical exploration are approximately shown on Plate 1. Undisturbed samples were obtained continuously at the boring location to a depth of ten (10) feet and then at five (5) feet intervals thereafter.

Dry auger drilling methods were generally adopted to drill the soil borings to more accurately observe the depth of groundwater. In cohesive soils, undisturbed soil samples were collected using a conventional 3-inch O.D. Shelby tube in general accordance with ASTM D1587. Cohesionless soils (if encountered) were sampled using split spoon sampler in general accordance with ASTM D1586. Standard penetration test (SPT) were performed in the granular soils. All soil samples were examined, classified and logged in the field. Cohesive soil strengths were estimated in the field using a hand penetrometer.

5.0 LABORATORY TESTING

In addition to the field exploration, supplemental laboratory testing was performed to verify field information and obtain additional pertinent engineering characteristics of the soils. Samples obtained from the field were again examined and classified in the lab. Additional testing was performed on selected samples to determine the moisture, shear strength and atterberg limits of the soils. The results of laboratory tests are presented on the borings logs in Plates 2 through 11 of this report.

6.0 SOIL STRATIGRAPHY

Based on the soil boring and the results of the field and laboratory test data, a generalized soil profile is presented below.

Table 1: Generalized Soil Profile

Stratum No.	*Starting Depth, feet*	*Ending Depth, feet*	*Soil Description*
I	0	2 - 5	Fill: Lean Clay (CL), firm to very stiff, brown, with calcareous nodules, shell fragments, sand pockets and root organics.
II	2 - 6	8 - 20	Lean Clay (CL), firm to hard, tan and brown, with ferrous and calcareous nodules, sand pockets.
III	2 - 13	6 - 20	Fat Clay (CH), firm to very stiff, tan and brown, with ferrous and calcareous nodules, sand pockets.

It should be noted that it is often difficult to distinguish between fill soils and apparently similar natural soils in the absence of foreign matter. The fill lean clay (CL) soils of stratum I are non- to moderately expansive with plasticity indices (PI's) ranging from 10 to 22. The natural lean clay (CL) of stratum II are non- to moderately expansive with plasticity indices (PI's) ranging from 14 to 28. The natural fat clay (CH) of stratum III are expansive with plasticity indices (PI's) ranging from 29 to 38. These moderately expansive (PI >20) lean clay (CL) soils and expansive fat clay (CH) soils are expected to undergo a moderate to high shrink/swell potential with changes in moisture contents. These moderately expansive lean clay (CL) and expansive fat clay (CH) soils are not suitable for use as select fill in their present condition. These soils once lime stabilized using 5% and 6 % lime by dry weight should be suitable for use as select fill. However, these soils in their present condition (and free of any debris, organics or other deleterious materials) should be suitable for use as random fill material.

A more detailed stratigraphy is presented on log of borings B-1 through B-10 (Plates 2 through 11). Definition of terms and key to symbols used in the boring log is presented on Plate 12.

7.0 GROUNDWATER INFORMATION

The soil borings were dry augered to observe the presence of any perched water or ground water. The levels where perched or groundwater were encountered in the borings are shown on the respective boring logs. Groundwater was encountered in the borings at the time of drilling at depths below 17 feet which subsequently rose to a level of 13 feet at completion.

It should also be noted that fluctuations in groundwater levels generally occur as a function of seasonal rainfall variations, groundwater removal, temperatures, topography, surface and subdrainage features around the site.

It should also be noted that a detailed hydrogeological investigation of the proposed project area is beyond the scope of this investigation. An accurate evaluation of the groundwater in the low permeability clays and silt require long term observations in monitoring wells or piezometers. Their installation was not in our scope of work. Groundwater levels should be verified prior to starting any excavations that may be affected by it such as utilities, drilled piers, etc. TGC should be contacted if any significant change is observed in the groundwater then that mentioned in this report. We can then evaluate the effect of any groundwater changes on the design or construction recommendations given in this report.

8.0 POTENTIAL VERTICAL RISE

The upper stratum of soil at this site consists of non to moderately expansive lean clays and expansive fat clays (CH). These lean clay (CL) soils have a low to moderate potential for expansion and shrinkage with changes in moisture contents. The fat clay (CH) soils have a high potential for expansion and shrinkage with increases and decreases in moisture content. When these moderately expansive lean clay (CL) and expansive fat clay (CH) soils receive an increase in its moisture content, they swell or expand. When these soils dry up resulting in a decrease in its moisture content, they settle or shrink. This swelling or shrinking of these soils with changes in its moisture content will affect any building foundation placed on it. There are several methods used to calculate the potential vertical rise (PVR), which is the total amount that the soil is expected to swell or shrink. These methods have different assumptions. Some assume a linear change in moisture content with depth, assuming higher moisture changes at the top and lower moisture changes at deeper depths. Some methods are more conservative and assume constant moisture change throughout the active zone of soil. Here the active zone of soil is defined as the depth of soils up to which changes in moisture content is expected.

In most normal cases, a linear variation of moisture with depth is an appropriate assumption. However, in cases where very negative drainage will result in ponding of water adjoining the foundation at the site or for cases where there is a water leak, the more conservative assumption of constant change in moisture with depth would be more appropriate.

The test method known as TEX-124-E assumes a constant variation in moisture with depth, i.e it assumes that the soils down to the active zone gets saturated. The TEX-124-E method is generally preferred by designers in the area as it may offset risks associated with future unknowns with site drainage or pipe conditions.

Based on Test Method TEX-124-E by the Texas State Department of Highways and Public Transportation, Materials and Tests Division, the soil conditions at this site has a potential vertical rise (PVR) of about 1.0- to 1.5 inches.

The methods generally adopted to reduce the PVR of the soils typically consists of undercutting and replacement of surficial expansive soils with low plasticity fill materials or adding fill surcharge to the existing soils. Under buildings, the fill materials should consist of low plasticity select fill soils identified as lean clay (CL) and having plasticity indices (PI's) ranging from 10 to 20. The ability to use surcharge soils on top of existing soils will be controlled by the final grade of the building slab. A combination of cut and fill method may be used to determine the select fill thickness to reduce the PVR. Based on our calculations, the following measures will reduce the PVR at the site as shown in the Table 2 below.

Table 2- Potential Vertical Rise (PVR) for different options.

Option	PVR (inches)
Existing condition	1.0 to 1.5
Add 2 feet of select fill	0.9 to 1.1

9.0 FOUNDATION RECOMMENDATIONS

Foundations for the structures should satisfy three separate design requirements as mentioned here. 1) The maximum foundation loads should not exceed the allowable bearing pressures given in the report. 2) The total and differential settlements under sustained loads should not exceed the settlement tolerance limit of the structure. 3) The total and differential heaving should not exceed the movement tolerance limit of the structure.

The foundation for the proposed buildings may consist of a floor slab supported on drilled piers. Lightly loaded structures can also be supported on a floating slab foundation supported at grade. Our recommendations for these foundation types are given below.

9.1 DRILLED PIERS

Drilled piers with underreams (bell) may be used for the building foundation. Drilled piers founded at the depths of 12 feet may be designed for an allowable bearing pressure of 3000 psf for dead plus sustained live loads and 4500 psf for total loads. The given values include a factor of safety of 3 and 2, respectively.

An underream to shaft ratio of 3 to 1 may be used for the drilled piers. Seams, pockets or layers of silt or sands or the presence of slickensides in the clay stratum may cause the underream to slough. In the event of underream sloughing, the ratio should be reduced to 2 to 1 by increasing the shaft diameter. If sloughing still continues then straight sided shafts may have to be used. In this event the diameter of the straight shaft must be made equal to the diameter of the designed underream to obtain the same compressive capacity.

Based on the groundwater readings, groundwater is not likely to be encountered during shallow drilled pier excavations. However, it should be noted that fluctuations in groundwater level occurs as a result of seasonal rainfall variations, temperature, drainage changes, etc. In the event that groundwater is encountered, all standing water in the drilled pier excavations should be pumped out and the drilled pier concrete poured as soon as possible after the completion of the excavation. A casing or slurry method may be required for drilled pier installations below the groundwater depth.

The drilled piers may be subjected to uplift forces due to shrink/swell of the surrounding soils. An adhesion value of 0.5 tsf should be applied to the straight sided portion of the drilled piers in clay soils (top 8 ft) for computations of uplift loads. The calculated uplift force may be used to calculate the reinforcements required for resisting the uplift force due to swelling soils. At a minimum, the cross sectional area of reinforcing steel should not be less than 0.5% of the gross cross sectional area of the drilled pier. The reinforcement should extend the full depth of the pier.

The uplift capacity of drilled and underreamed piers may be taken as:

$$Qu = 0.785 * Nu * C * (D^2 - d^2)$$

Here: Qu = Ultimate Uplift Capacity in tons (or kips or pounds)

Nu = Dimensionless factor = 3.5 * (H/D) $\leq$ 9

C = Undrained cohesion in tsf (or ksf or psf) – use 0.5 tsf for design purposes

D = Diameter of underream, feet

d = Diameter of shaft, feet

H = Depth of pier, feet

A factor of safety of 2.0 for transient and wind loads and 3.0 for sustained loads is recommended for the uplift capacity.

The lateral capacity of drilled piers may be calculated using passive resistance of soils. An allowable passive resistance of 800 psf in clay soils may be taken for design purposes. The passive resistance in the top 2 feet should be neglected for design purposes. The lateral capacity may also be analyzed using computer programs such as LPile Plus. A horizontal modulus of subgrade reaction, k, of 200 pci may be taken in natural clay soils for design purposes.

The minimum clear spacing of 3 underreams diameters center to center is recommended. If the spacing between the two underreams is less than 3, then stress concentrations will occur between the two piers. Use of lower allowable bearing pressures may be required. TGC should be contacted if the spacing is significantly closer from that recommended above.

9.1.1 Floor Slabs Supported on Drilled Piers

The building floor slabs used inconjunction with drilled piers may consist of either structurally supported slab with 4 inch void space or slab on grade supported on suitable thickness of select fill soils.

The structurally supported slab should be suspended above grade with a void space greater than the anticipated heave of the underlying soils. A minimum void space of 4 inches should be used for this site. The void space should have positive drainage to prevent water accumulation in that space.

Floor slabs supported at grade may be used provided a minimum compacted thickness of select fill is used so as to reduce the total PVR to less than the acceptable limit for the structural design. Table 2 in the "PVR" section shows the fill thickness versus the corresponding PVR values. A 2 feet thickness of select fill is recommended. Positive drainage must be developed and maintained all around the buildings at all times.

9.2 FLOATING SLAB FOUNDATION

Lightly loaded structures may also be supported on a floating slab type foundation. A floating slab foundation at this site may be an engineered post-tensioned slab (Ref. 1) or ribbed & reinforced (conventionally reinforced) slab (Ref. 2) with a perimeter footing and interior thickened sections. The fill soils (wherever and whatever depth encountered) must be excavated, reprocessed and recompacted (or replaced with select fill) inaccordance with the "site preparation" section.

Minimum Grade Beam Depth Below Final Grade: 12 inches

Grade Beam Allowable Bearing Pressure (in stiff compacted soils)

Total Loads	: 1800 psf			
Dead + Sustained Live Loads	: 1200 psf			
Atterberg Limits	: LL=50;		PL=20;	PI=30
Thornwaite Moisture Index	: Im	=	18	
Constant Suction Value	: PF	=	3.45	
Edge Moisture Variation	: em	=	9.0	ft.(Center lift)
	: em	=	5.7	ft. (Edge lift)
Estimated Differential Swell	: Ym	=	1.1	inch (Center lift)
	: Ym	=	0.9	inch (Edge lift)
Support Index	: C	=	0.75	

9.3 FOUNDATION SETTLEMENT

A detailed settlement analysis was not within the scope of our work. It is anticipated that foundations designed based on the allowable bearing pressures and other recommendations as given in this report will experience settlements which should be within the allowable limits of the proposed structure.

10.0 PAVEMENT

10.1 GENERAL

We understand that the pavement for parking areas and drives will consist of concrete or asphalt paving. The traffic likely to use the pavement will generally consist of light automobile vehicles and medium trucks. The heaviest vehicle will consist of a daily garbage truck. The paving will be supported on existing soils. The top 6 inches of onsite soils under the paving should be lime stabilized using 5% lime by dry weight. This will result in an application rate of 23 pounds per square yard for each 6 inches of compacted stabilized soil thickness. A more accurate percentage may be determined at the time of construction using lime series tests.

For the purpose of recommendations given below the light, medium and heavy vehicles should be considered based on the following weights.

Light Vehicle	up to 5,000 lbs
Medium Vehicle	5,000 lbs to 20,000 lbs
Heavy Vehicle	greater than 20,000 lbs

The concrete and asphalt paving section thickness are given below.

10.2 CONCRETE PAVEMENT

The concrete paving thickness for the different paving areas may be taken as given below.

Paving Area	Paving Thickness
Light and Medium Vehicle Parking	5 inches
Light and Medium Vehicle Drives	6 inches
Heavy Vehicle Drive	7 inches
Very Heavy Vehicle Drive (large trucks)	8 inches

The concrete for the garbage dumpster pad where the garbage trucks stops and moves back and forth should be 7 inches thick. The top 6 inches must be lime stabilized as given in section 10.1. The lime stabilization may be as per TxDOT Standard Item 260.

The 5 inch thick concrete pavement may be reinforced using No.4 bars spaced at 24 inches center in both directions. The 6, 7- and 8 inch thick concrete pavement may be reinforced using No. 4 bars spaced at 18 inches, 15 inches and 12 inches center, respectively, in both directions. Other suitable thicknesses and spacing acceptable to the designer may also be used.

10.3 ASPHALT PAVEMENT

The asphalt paving section thickness for the different parking areas may be taken as given below.

Paving Area	HMAC	Base	Stabilized Subbase
Light and Medium Vehicle Parking	2 inch	6 inch	6 inch
Light and Medium Vehicle Drives	2 inch	8 inch	6 inch
Heavy Vehicle Drive	3 inch	8 inch	8 inch
Very Heavy Vehicle Drive	Use Concrete Section		

The garbage dumpster pad where the garbage trucks stops and moves back and forth should be of concrete as given in section 10.2. The subbase/subgrade soils must be stabilized as given in section 10.1.

The base may consist of crushed limestone, gravel or crushed concrete. The HMAC should consist of TXDOT Type D, Standard Item 340.

11.0 SITE PREPARATION

The following system of construction procedures is recommended:

1. In general remove all surface organics, organic topsoil, roots, existing foundations and paving and all unsuitable materials from all structure and paving areas.
2. Proof roll the subgrade with a loaded dump truck, scraper or similar pneumatic-tired equipment to detect any wet, soft, or pumping areas. Soils deflecting excessively during proofrolling should be undercut to firm soils and recompacted. Treat the wet or pumping soils with drying or stabilizing agents as necessary or remove and replace them with a suitable fill material. Any existing fill material should have records of passing densities for all lifts or should be excavated, reprocessed and recompacted as below.
3. Scarify the subgrade, add moisture or dry as necessary and compact the subgrade to a minimum of ninety-five (95) percent of its maximum dry density as determined by the Standard Proctor Compaction Test (ASTM D 698). The moisture content should be plus or minus 2 percent of the optimum moisture.
4. Structural fill material within the structure area should be a lean clay (CL) having a plasticity index (P.I.) of ten (10) to twenty (20) and a liquid limit of 25 or more. Fill materials should be placed in six (6) to eight (8) inch loose lifts and compacted at plus or minus 2 percent of optimum moisture content to ninety-five (95) percent of their maximum dry density as determined by the Standard Proctor Compaction Test.
5. Establish positive site drainage. Install storm drainage structures if required.
6. The backfill soils in the utility trenches may consist of select fill mentioned in Item 4. In the event of compaction difficulties, cement sand may be used as backfill material. Due to the high permeability and potential for surface water intrusion from these soils to under the building slab, bank sand should not be used as backfill material for the utility trenches under the building and minimum 5 feet outside the building area.

7. The subgrade and fill moisture content and density must be maintained until the placement of floor slabs or pavement. Verification of this should be done prior to slab or pavement placement. Scheduling of the building slab pour as soon as possible after the subgrade and fill compaction would help in minimizing moisture and density changes due to drying, wetting or disturbance of these soils.

12.0 VEGETATION CONTROL

12.1 Existing Trees

Existing trees roots absorb moisture from their surrounding soils. This results in formation of pockets of isolated dry soils around the tree roots with a moisture content significantly lower than the soil moisture contents away from these roots. When the trees are cut, the roots die and stop absorbing moisture from their surrounding soils. With time and seasonal rainfall as well as by capillary action, these dry pockets of soils will undergo increases in moisture content and as a result heave. If the tree is cut and a building or paving is immediately constructed on it, then these isolated areas of dry soils will heave more than the soils at other areas of the building/paving or site. This will result in differential heaving under the structure or pavement. Where large trees are cut and building built over it, the slab should be stiffened to resist the higher differential heave. Alternatively, a safer option would be to structurally support the building slab on deeper footings with a void space larger than the anticipated maximum heave of the drier soils. Positive drainage should be developed and maintained all around the building at all times.

12.2 New Trees

New trees should be avoided near the building slab especially larger trees. No tree should be planted closer than 20 feet or half the canopy diameter of fully matured trees. Alternatively, root barriers may be used to prevent the migration of tree roots underneath the buildings. Use of large shrubs should be avoided immediately adjacent to the building slab.

13.0 SITE DRAINAGE

Final site drainage is very critical for long term performance of the proposed structure and pavement.

1. In general, set top of concrete at least eight inches above final adjacent soil grade for damp proofing.
2. Provide adequate drainage away from foundations (minimum ten percent slope in the first five feet). The bottom of any drainage swale should not be located within four feet of the foundations. Pervious planting beds should slope away from the foundations at least two inches per foot. Planting bed edging shall allow water to drain out of the beds. Water must not be allowed to pond anywhere close to the building or pavement.
3. Gutters or extended roof eaves may be used, especially under all roofs valleys. All extended eaves or gutter down spouts should extend at least two feet away from the foundations and past any adjacent planting beds. Roof drains should preferably discharge to storm sewers by closed pipe or extended away from the structures by 5 feet or as far as possible.
4. Any plumbing leaks must be repaired immediately.
5. Sprinkler systems if used should be used all around the building to provide a uniform water application system. Sprinkler systems should be located a minimum of five feet from the building edge.
6. Moisture conditions should be maintained "constant" around the edge of the building or pavement. Ponding of water or excessive drying should not be allowed in planter beds or anywhere adjacent to the building or pavement edge.
7. Large trees and shrubs should not be planted closer than 20 feet or half the canopy diameter of mature trees or shrubs.

14.0 DETENTION POND

We understand that the new detention pond may be 5- to 10 feet deep. Boring B-7 was drilled for the proposed detention pond to a depth of 15 feet. The soil in this boring consists of relatively non expansive fill lean clays (CL) from the ground surface to the depth of 4 feet underlained by moderately expansive lean clay (CL) to a depth of 8 feet underlained by expansive fat clay (CH) soils to maximum depth of the boring to 15 feet. Groundwater was not encountered during drilling at this boring location. However, in the general area, groundwater has been encountered below 13 feet.

The detention pond side slopes should be sloped to a minimum of 4 horizontal to 1 vertical side slopes. This should make the slope stable for both short term as well as long term conditions. Any sand layers encountered during excavations of the side slopes and at the pond bottom should be topped with atleast 2 feet of lean clay (CL) or fat clay (CH) soils and compacted to a minimum of 95% of its maximum dry density at plus or minus 2 percent of optimum moisture as determined by ASTM D698. The permeability of the lean clay (CL) and fat clay (CH) soils are generally low. Sandy soils will have a relatively high permeability. Determining actual permeability values was not in the scope of this study.

Groundwater is not likely to be encountered during excavations to a depth of 10 feet. However, it should be noted that fluctuations in groundwater levels occurs due to seasonal rainfall variations, topographic changes, weather conditions, etc. In the event that groundwater is encountered, then groundwater control to a depth of 15 feet may be accomplished using a sump and pump methods. In the event that sandy soils are encountered or if the groundwater inflow is high, then dewatering using well points may be necessary. Groundwater level should be reconfirmed prior to excavations to enable smooth construction.

The onsite soils classify as OSHA Type "C" soils. Any excavations deeper than 5 feet must be sloped to stable slope, braced or retained as per OSHA rules and regulations.

Earth pressures in cohesive soils may be taken as 84 pcf above the groundwater and 104 pcf below the groundwater. The hydrostatic component is included in the earth pressure given below groundwater. Any surcharge pressures likely to act on the retaining wall must be added. The lateral pressures due to surcharge loading may be taken as 0.5q, wherein q is the surcharge pressure. Earth pressures acting on any braced excavations may be taken as given in Plate 13.

Proper erosion protection measures for the side slopes are recommended. Erosion protection measures may consist of vegetation cover, rip rap, geotextiles or concrete apron.

The surface lean clay (CL) soils to a depth of 8 feet are non- to moderately expansive and the fat clay (CH) soils are expansive. The moderately expansive lean clay (CL) and expansive fat clay (CH) soils and are expected to have a moderate to high potential for expansion and shrinkage with increases and decreases in moisture content. When these soils receive an increase in its moisture content, they swell or expand. When these soils dry up resulting in a decrease in its moisture content, they settle or shrink. These soils are generally not suitable for use as select structural fill. These soils once lime stabilized (5% and 6% by dry weight, respectively) should be suitable for use as select fill material. However, these soils in their present conditions and free of debris, organics and other unsuitable materials can be used as random fill material including for site grading purposes.

15.0 CONSTRUCTION OBSERVATIONS

Texas Geotechnical Consultants, LLC. (TGC) recommends implementation of a comprehensive quality control program under the supervision of a Professional Engineer. Structural integrity and stability is particularly dependent on quality foundation installation.

Construction inspection and quality control tests should be planned to verify materials and placement with accordance with the specifications. TGC should be retained to review the foundation drawings and specifications to verify that the recommendations outlined in this report have been properly interpreted and implemented. Proofrolling, subgrade compaction, fill placement, drilled footing construction and concrete strength should be monitored.

16.0 LIMITATIONS OF STUDY

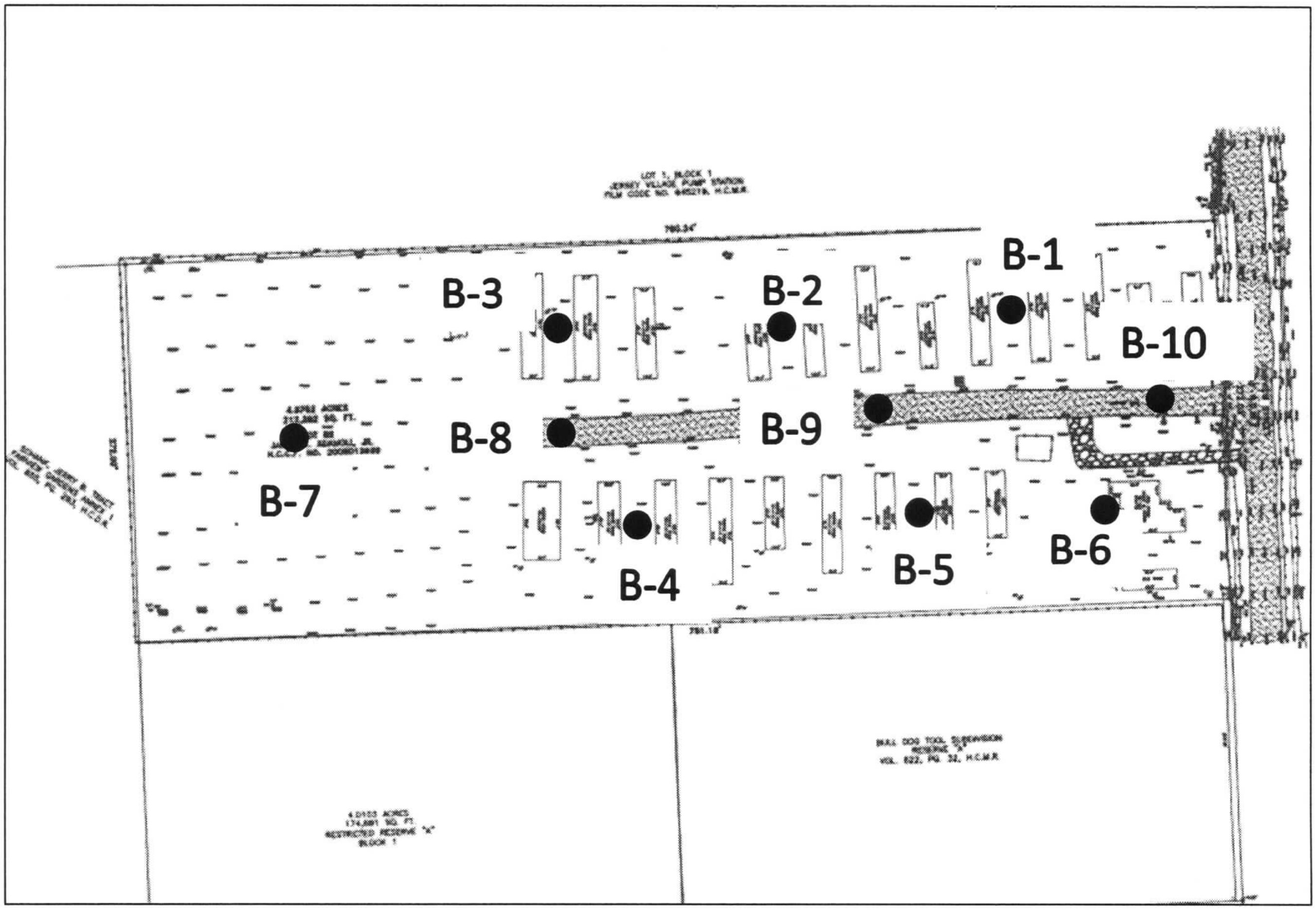
The analysis and recommendations submitted in this report are based upon the data obtained from the ten (10) borings drilled at the site. Soil conditions may vary across the site. If significant variations are noted during construction, TGC should be contacted to evaluate the effect of these variations on the recommendations given in this report.

TGC states that the findings, recommendations or professional opinions or advice contained in this report (and that may be given henceforth in connection with this project) have been made and this report prepared in general accordance with generally accepted professional engineering practice in the field of geotechnical engineering as based on the location, size and type of project. No other warranties, either written or verbal, are implied or expressed.

This report has been prepared for the exclusive use of the owner, the project architect, the project structural engineer and contractors for the specific application to the project at 7115 Fairview Street, Houston, Texas.

17.0 REFERENCES

1. "Design and Construction of a Post-Tensioned Slab-On-Ground", 3rd Edition, Post-Tensioning Institute, Phoenix, Arizona, 2004 (with 2008 supplement).
2. Snowden, Walter L (1981), Design of Slab-On-Ground Foundation, Snowden, Inc., Austin, Texas.
3. Joseph E. Bowles (1982), Foundation Analysis and Design, 3rd ed., McGraw-Hill Book Company.



Note: Boring Locations shown are Approximate.

PROJECT NUMBER :	Proposed Commercial Buildings at 7115 Fairview Street, Houston, Texas
TGC REPORT NO. :	2605055
DATE :	05/18/2026
SCALE :	Not to Scale

BORING LOCATION PLAN

TEXAS GEOTECHNICAL CONSULTANTS, LLC.	**LOG OF BORING B-1**
Project: Proposed Commercial Buildings 7115 Fairview Street Houston, Texas 77041 **Client:** Mr. George Saleh	**Date:** 5/18/2026 **Job Number** 2605055 **Boring Method:** Dry Auger **Elevation:** Existing **Driller:** Acegeo Drilling

FIELD DATA					LABORATORY DATA							
Depth (Feet)	Samples	Soil Types	SPT (Blows Per Feet)	SOIL DESCRIPTION	Moisture Content, %	Plasticity Index	Liquid Limit	UC Shear Strength, tsf	TV Shear Strength, tsf	Hand Penetrometer, tsf	200 Sieve, %	Unit Dry Weight, pcf
1		CL		Fill: Lean Clay (CL), firm, brown,with sand pockets and root organics	23	22	39			1.3		
2												
3		CH		Fat Clay (CH), firm, brown, with calcareous nodules and sand pockets	23			0.3		1.3		89
4												
5					23	34	54			1.0		
6												
7		CL		Lean Clay (CL), firm, tan and brown, with ferrous and calcareous nodules	24	26	44			1.0		
8												
9					17			0.4		1.3		106
10												
11												
12												
13				stiff below 13 feet								
14					18	18	34			2.3		
15												
16												
17												
18												
19					20					2.5		
20												
				Boring terminated at 20 feet								

REMARKS:
UC Shear Strength = Unconfined Compression Shear Strength
TV Shear Strength = Torvane Shear Strength

GROUNDWATER: 17 feet
GW rose to 13 feet at completion

TEXAS GEOTECHNICAL CONSULTANTS, LLC. — LOG OF BORING B-2

Project: Proposed Commercial Buildings
7115 Fairview Street
Houston, Texas 77041

Client: Mr. George Saleh

Date: 5/18/2026
Job Number 2605055
Boring Method: Dry Auger
Elevation: Existing
Driller: Acegeo Drilling

FIELD DATA					LABORATORY DATA							
Depth (Feet)	Samples	Soil Types	SPT (Blows Per Feet)	SOIL DESCRIPTION	Moisture Content, %	Plasticity Index	Liquid Limit	UC Shear Strength, tsf	TV Shear Strength, tsf	Hand Penetrometer, tsf	200 Sieve, %	Unit Dry Weight, pcf
1		CL		Fill: Lean Clay (CL), firm, brown, with shell fragments, calcareous nodules and root organics	14					0.3		
2												
3		CH		Fat Clay (CH), firm, brown, with sand pockets and calcareous nodules	25	30	50			1.0		
4												
5					26			0.3		1.0		93
6												
7		CL		Lean Clay (CL), firm, tan and brown, with ferrous and calcareous nodules	16					1.0		
8												
9				stiff below 8 feet	19	28	48	0.6		2.5		102
10												
11												
12												
13												
14				very stiff below 13 feet	19					3.0		
15												
16												
17												
18												
19				hard below 18 feet	18					4.5		
20												
				Boring terminated at 20 feet								

REMARKS:
UC Shear Strength = Unconfined Compression Shear Strength
TV Shear Strength = Torvane Shear Strength

GROUNDWATER: 17 feet
GW rose to 13 feet at completion

TEXAS GEOTECHNICAL CONSULTANTS, LLC. — LOG OF BORING B-3

Project: Proposed Commercial Buildings
7115 Fairview Street
Houston, Texas 77041

Client: Mr. George Saleh

Date: 5/18/2026
Job Number 2605055
Boring Method: Dry Auger
Elevation: Existing
Driller: Acegeo Drilling

Depth (Feet)	Samples	Soil Types	SPT (Blows Per Feet)	SOIL DESCRIPTION	Moisture Content, %	Plasticity Index	Liquid Limit	UC Shear Strength, tsf	TV Shear Strength, tsf	Hand Penetrometer, tsf	200 Sieve, %	Unit Dry Weight, pcf
0–2	Sample	CL		Fill: Lean Clay (CL), firm, brown, with calcareous nodules and root organics	22	15	31			0.3		
3	Sample	CL		Lean Clay (CL), firm, brown, with calcareous nodules	21			0.3		0.8		100
5	Sample				25					1.0		
7	Sample				22	20	37			1.0		
9	Sample	CH		Fat Clay (CH), stiff, tan and brown, with ferrous and calcareous nodules and sand pockets	22	31	51	0.6		1.8		97
14	Sample				26	35	55			1.5		
19	Sample	CL		Lean Clay (CL), stiff, tan and brown, with ferrous nodules	20					1.5		
20				Boring terminated at 20 feet								

REMARKS:
UC Shear Strength = Unconfined Compression Shear Strength
TV Shear Strength = Torvane Shear Strength

GROUNDWATER: 17 feet
GW rose to 13 feet at completion

TEXAS GEOTECHNICAL CONSULTANTS, LLC. — LOG OF BORING B-4

Project:	Proposed Commercial Buildings 7115 Fairview Street Houston, Texas 77041	**Date:**	5/18/2026
		Job Number	2605055
		Boring Method:	Dry Auger
Client:	Mr. George Saleh	**Elevation:**	Existing
		Driller:	Acegeo Drilling

FIELD DATA					LABORATORY DATA							
Depth (Feet)	Samples	Soil Types	SPT (Blows Per Feet)	SOIL DESCRIPTION	Moisture Content, %	Plasticity Index	Liquid Limit	UC Shear Strength, tsf	TV Shear Strength, tsf	Hand Penetrometer, tsf	200 Sieve, %	Unit Dry Weight, pcf
1		CL		Fill: Lean Clay (CL), firm, brown, with sand pockets and root organics	17					1.3		
2												
3		CL		Lean Clay (CL), firm, brown, with calcareous nodules and sand pockets	19	16	32			1.0		
4												
5				tan and brown, with ferrous nodules below 4 feet	19			0.4		1.0		102
6												
7					18					1.3		
8												
9		CH		Fat Clay (CH), stiff, tan and brown, with ferrous and calcareous nodules and sand pockets	20	29	49			1.5		
10												
11												
12												
13												
14					18			0.6		1.5		108
15												
16												
17												
18												
19					20	38	59			1.8		
20												
				Boring terminated at 20 feet								

REMARKS:
UC Shear Strength = Unconfined Compression Shear Strength
TV Shear Strength = Torvane Shear Strength

GROUNDWATER: 17 feet
GW rose to 13 feet at completion

TEXAS GEOTECHNICAL CONSULTANTS, LLC.

LOG OF BORING B-5

Project:	Proposed Commercial Buildings 7115 Fairview Street Houston, Texas 77041	**Date:** 5/18/2026 **Job Number** 2605055 **Boring Method:** Dry Auger	
Client:	Mr. George Saleh	**Elevation:** Existing **Driller:** Acegeo Drilling	

FIELD DATA					LABORATORY DATA							
Depth (Feet)	Samples	Soil Types	SPT (Blows Per Feet)	SOIL DESCRIPTION	Moisture Content, %	Plasticity Index	Liquid Limit	UC Shear Strength, tsf	TV Shear Strength, tsf	Hand Penetrometer, tsf	200 Sieve, %	Unit Dry Weight, pcf
1		CL		Fill: Lean Clay (CL), stiff, brown, with sand pockets and root organics	16	10	25			2.3		
2												
3		CL		Lean Clay (CL), firm, brown, with ferrous nodules and sand pockets	21			0.3		0.8		100
4												
5				tan and brown, with calcareous nodules below 4 feet	19					1.0		
6												
7				stiff below 6 feet	17	18	35			2.0		
8												
9					18			0.9		2.0		109
10												
11												
12												
13												
14		CH		Fat Clay (CH), very stiff, tan and brown, with sand pockets	19	29	49			3.0		
15												
16												
17												
18												
19					19					3.0		
20												
				Boring terminated at 20 feet								

REMARKS:
UC Shear Strength = Unconfined Compression Shear Strength
TV Shear Strength = Torvane Shear Strength

GROUNDWATER: 17 feet
GW rose to 13 feet at completion

TEXAS GEOTECHNICAL CONSULTANTS, LLC.	LOG OF BORING B-6
Project: Proposed Commercial Buildings 7115 Fairview Street Houston, Texas 77041	**Date:** 5/18/2026 **Job Number** 2605055 **Boring Method:** Dry Auger **Elevation:** Existing **Driller:** Acegeo Drilling
Client: Mr. George Saleh	

FIELD DATA					LABORATORY DATA							
Depth (Feet)	Samples	Soil Types	SPT (Blows Per Feet)	SOIL DESCRIPTION	Moisture Content, %	Plasticity Index	Liquid Limit	UC Shear Strength, tsf	TV Shear Strength, tsf	Hand Penetrometer, tsf	200 Sieve, %	Unit Dry Weight, pcf
1		CL		Fill: Lean Clay (CL), firm, brown, with calcareous nodules, sand pockets and root organics	19					0.3		
2												
3		CL		Lean Clay (CL), firm, brown, with sand pockets and root organics	20	13	29	0.3		0.8		104
4												
5				tan and brown, with ferrous and calcareous nodules below 4 feet	14					1.0		
6												
7				stiff below 6 feet	14					2.0		
8												
9		CH		Fat Clay (CH), stiff, tan and brown, with ferrous and calcareous nodules and sand pockets	27	37	56			2.0		
10												
11												
12												
13												
14					18			0.5		2.0		99
15												
16												
17												
18												
19		CL		Lean Clay (CL), hard, tan and brown, with ferrous nodules	14					4.0		
20												
				Boring terminated at 20 feet								

REMARKS:
UC Shear Strength = Unconfined Compression Shear Strength
TV Shear Strength = Torvane Shear Strength

GROUNDWATER: 17 feet
GW rose to 13 feet at completion

TEXAS GEOTECHNICAL CONSULTANTS, LLC.

LOG OF BORING B-7

Project: Proposed Commercial Buildings
7115 Fairview Street
Houston, Texas 77041

Client: Mr. George Saleh

Date: 5/18/2026
Job Number 2605055
Boring Method: Dry Auger
Elevation: Existing
Driller: Acegeo Drilling

FIELD DATA					LABORATORY DATA							
Depth (Feet)	Samples	Soil Types	SPT (Blows Per Feet)	SOIL DESCRIPTION	Moisture Content, %	Plasticity Index	Liquid Limit	UC Shear Strength, tsf	TV Shear Strength, tsf	Hand Penetrometer, tsf	200 Sieve, %	Unit Dry Weight, pcf
1		CL		Fill: Lean Clay (CL), stiff, brown, with sand pockets and root organics	16					2.0		
2												
3				firm, with shell fragments below 2 feet	16	11	26			1.3		
4												
5		CL		Lean Clay (CL), stiff, brown, with sand pockets	15			0.4		1.8		98
6												
7				with calcareous nodules below 6 feet	18					1.5		
8												
9		CH		Fat Clay (CH), stiff, tan and brown, with ferrous and calcareous nodules and sand pockets	21	30	50			1.5		
10												
11												
12												
13												
14					21			0.5		1.5		102
15												
				Boring terminated at 15 feet								

REMARKS:
UC Shear Strength = Unconfined Compression Shear Strength
TV Shear Strength = Torvane Shear Strength

GROUNDWATER: dry

TEXAS GEOTECHNICAL CONSULTANTS, LLC.

LOG OF BORING B-8

Project:	Proposed Commercial Buildings 7115 Fairview Street Houston, Texas 77041	**Date:**	5/18/2026
		Job Number	2605055
		Boring Method:	Dry Auger
Client:	Mr. George Saleh	**Elevation:**	Existing
		Driller:	Acegeo Drilling

FIELD DATA					LABORATORY DATA								
Depth (Feet)	Samples	Soil Types	SPT (Blows Per Feet)	SOIL DESCRIPTION	Moisture Content, %	Plasticity Index	Liquid Limit	UC Shear Strength, tsf	TV Shear Strength, tsf	Hand Penetrometer, tsf	200 Sieve, %	Unit Dry Weight, pcf
1 2		CL		(2 inch asphalt over 4 inch base) Fill: Lean Clay (CL), stiff, brown, with calcareous nodules and sand pockets	12					2.5		
3 4		CL		Lean Clay (CL), firm, brown, with calcareous nodules	19	14	30			1.0		
5		CH		Fat Clay (CH), stiff, tan and brown, with sand pockets	23					1.5		
				Boring terminated at 5 feet								

REMARKS:
UC Shear Strength = Unconfined Compression Shear Strength
TV Shear Strength = Torvane Shear Strength

GROUNDWATER: dry

TEXAS GEOTECHNICAL CONSULTANTS, LLC.		LOG OF BORING B-9
Project:	Proposed Commercial Buildings 7115 Fairview Street Houston, Texas 77041	**Date:** 5/18/2026 **Job Number** 2605055 **Boring Method:** Dry Auger
Client:	Mr. George Saleh	**Elevation:** Existing **Driller:** Acegeo Drilling

FIELD DATA					LABORATORY DATA							
Depth (Feet)	Samples	Soil Types	SPT (Blows Per Feet)	SOIL DESCRIPTION	Moisture Content, %	Plasticity Index	Liquid Limit	UC Shear Strength, tsf	TV Shear Strength, tsf	Hand Penetrometer, tsf	200 Sieve, %	Unit Dry Weight, pcf
		CL		(2 inch asphalt over 4 inch base)								
1				Fill: Lean Clay (CL), very stiff, brown, with calcareous nodules, and sand pockets	16	10	25			3.3		
2				stiff below 2 feet								
3					17					1.5		
4												
					17					1.5		
5												
				Boring terminated at 5 feet								

REMARKS:
UC Shear Strength = Unconfined Compression Shear Strength
TV Shear Strength = Torvane Shear Strength

GROUNDWATER: dry

TEXAS GEOTECHNICAL CONSULTANTS, LLC.		LOG OF BORING B-10
Project:	Proposed Commercial Buildings 7115 Fairview Street Houston, Texas 77041	**Date:** 5/18/2026 **Job Number** 2605055 **Boring Method:** Dry Auger
Client:	Mr. George Saleh	**Elevation:** Existing **Driller:** Acegeo Drilling

FIELD DATA | **LABORATORY DATA**

Depth (Feet)	Samples	Soil Types	SPT (Blows Per Feet)	SOIL DESCRIPTION	Moisture Content, %	Plasticity Index	Liquid Limit	UC Shear Strength, tsf	TV Shear Strength, tsf	Hand Penetrometer, tsf	200 Sieve, %	Unit Dry Weight, pcf
1 2		CL		(2 inch asphalt over 4 inch base) Fill: Lean Clay (CL), stiff, brown, with ferrous and calcareous nodules and sand pockets	20					1.8		
3		CL		Lean Clay (CL), firm, brown, with sand pockets	20	16	33			1.3		
4 5				stiff, tan and brown, with calcareous nodules below 4 feet	15					2.5		
				Boring terminated at 5 feet								

REMARKS:
UC Shear Strength = Unconfined Compression Shear Strength
TV Shear Strength = Torvane Shear Strength

GROUNDWATER: dry

TERMS USED ON BORING LOGS

SOIL GRAIN SIZE

U.S.STANDARD SIEVE

6"	3"	¾"	#4	#10	#40	#200		
BOULDER	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		
152	76.2	19.1	4.76	1.00	0.420	0.074	0.002	

SOIL GRAIN SIZE IN MILLIMETERS

STRENGTH OF COHESIVE SOILS

Consistency	Undrained Shear Strength, Kips Per Sq. ft	SPT Blow Counts, N
Very Soft	less than 0.25	<2
Soft	0.25 to 0.50	2-3
Firm	0.50 to 1.00	4-6
Stiff	1.00 to 2.00	7-12
Very Stiff	2.00 to 4.00	13-26
Hard	greater than 4.00	26+

RELATIVE DENSITY OF COHESIONLESS SOILS

(From Standard Penetration Tests)

Very Loose	< 4 bpf
Loose	5-10 bpf
Medium Dense	11-30 bpf
Dense	31-50 bpf
Very Dense	>50 bpf

(bpf= blow per foot, ASTM D 1586)

SPLIT BARREL SAMPLER DRIVING RECORD

Blows per Foot	Description
25	25 blows driving sampler 12 inches after initial 6 inches of seating.
50/7"	50 blows driving sampler 7 inches after initial 6 inches of seating.
50/3"	50 blows driving sampler 3 inches after initial 6 inches of seating.

Note: To avoid damage to sampling tool, driving is limited to 50 blows during or after seating interval.

DRY STRENGTH ASTM D2488

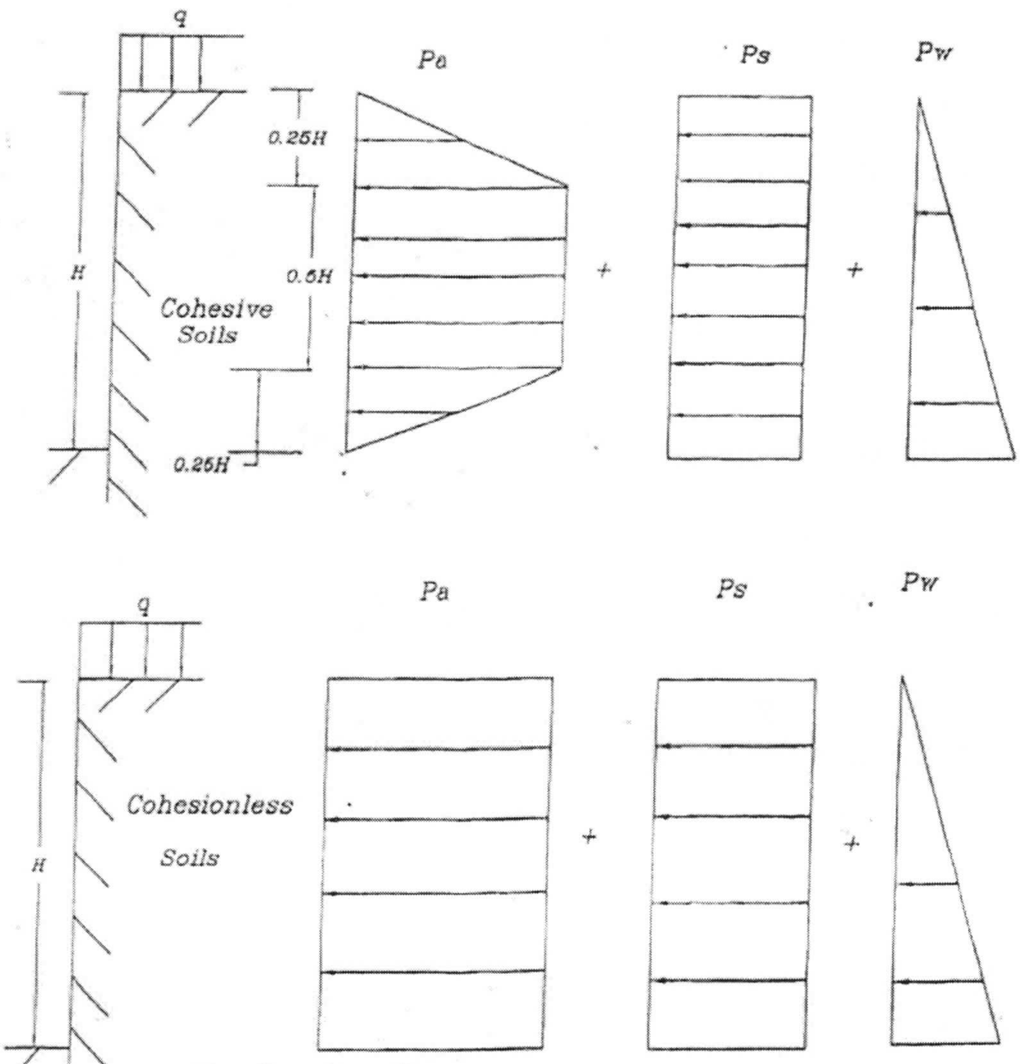
None	Dry Specimen crumbles into powder with mere pressure of handling
Low	Dry Specimen crumbles into powder with some finger pressure
Medium	Dry Specimen breaks into pieces or crumbles with considerable pressure
High	Dry Specimen cannot be broken with finger pressure, can be broken between Thumb and hard surface
Very High	Dry Specimen cannot be broken between the thumb and hard surface

MOISTURE CONDITION ASTM D2488

Dry	Absence of Moisture
Moist	Damp but no visible water
Wet	Visible free water

SOIL STRUCTURE

Slickensided	Having planes of weakness that appear slick and glossy. The degree of slickensidedness depends upon the spacing of slickensides and the easiness of breaking along these planes.
Fissured	Containing shrinkage or relief cracks, often filled with fine sand or silt usually more or less vertical
Pocket	Inclusion of material of different texture that is smaller than the diameter of the sample
Paring	Inclusion of less than 1/8 inch thick extending through the sample
Seam	Inclusion of 1/8 inch to 3 inches thick extending through the sample
Layer	Inclusion of greater than 3 inches thick extending through the sample
Laminated	Soil sample composed of alternating partings or seams of different soil types
Calcareous	Having appreciable quantities of calcium material
Ferrous	Having appreciable quantities of ferrous or iron nodules



$P = Pa + Ps + Pw$

EARTH PRESSURE DIAGRAM

Where P = Total lateral pressure (psf)

Pa = Active earth pressure(psf) = $K_A \gamma H = 0.4 \gamma H$ for Stiff Clays

= $0.65\ K_A \gamma H = 0.25 \gamma H$ for cohesionless Sands ($0.33\ \gamma H$ - for loose sand)

Ps = Lateral pressure due to surcharge load (psf) = 0.5q for Clays

= 0.4q for Sands

(0.5q for loose Sands)

Pw = Hydrostatic pressure (psf) = 62.4* water depth

H = Depth of braced excavation (ft)

q = Surcharge load (psf) usually taken as 500 psf

γ = Submerged density of soils (pcf) = use 60 pcf (use 50 pcf for loose Sands)

TYPICAL EARTH PRESSURE DIAGRAM FOR BRACED EXCAVATIONS