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CONSULTANTS, INC.

GEOTECHNICAL INVESTIGATION REPORT

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Amerikor Project No.: 23-0540

Build By Owner
8214 FM 517 West
Dickinson, Texas 77539

REPORT
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENCE
3006 MAPLE GROVE LANE
HOUSTON, TEXAS 77092

PREPARED FOR:

Build By Owner
8214 FM 517 West
Dickinson, Texas 77539

PREPARED BY:

AmeriKor Consultants, Inc.
3511 Pinemont Drive, No. B7
Houston, Texas 77018

Amerikor Project No.: 23-0540

June 29, 2023

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CONSULTANTS, INC.

June 29, 2023

Build By Owner
8214 FM 517 West
Dickinson, Texas 77539

Attn: Ms. Colleen O’Connor

Re: Report
Geotechnical Investigation
Proposed Residence
3006 Maple Grove Lane
Houston, Texas 77092

Amerikor Project No.: 23-0540

Dear Ms. O’Connor:

AmeriKor Consultants, Inc. is pleased to transmit our report of the geotechnical investigation for the above referenced project. This report includes the results of field and laboratory testing as well as geotechnical recommendations pertaining to the proposed project.

We appreciate the opportunity to perform this geotechnical investigation and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report or if we may be of further service, please contact me at your convenience.

Respectfully submitted,

AmeriKor Consultants, Inc.

Bonifacio F. Musngi, Jr., P.E.
Project Engineer

BONIFACIO F. MUSNGI, JR.
90666
6/29/2023

Amerikor Consultants, Inc.
F-20936

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3006 MAPLE GROVE LANE
HOUSTON, TEXAS 77092

1.0 INTRODUCTION AND SUMMARY

1.1 Introduction

This report presents the results of a geotechnical investigation pertaining to the design of foundations for the proposed residential building that will be constructed at 3006 Maple Grove Lane in Houston, Texas. The area for the proposed residential development project is relatively flat with presence of an existing building, scattered trees, and grasses that was relatively dry during our field investigation. The site location for the proposed residential development is shown on Figure 1.

The purpose of this geotechnical investigation was to define subsoil and groundwater conditions within the project area and provide recommendations concerning the design and construction of the proposed residential building.

This geotechnical investigation was performed by AmeriKor Consultants, Inc. (AmeriKor) for Build By Owner in accordance with verbal authorization by Ms. Colleen O’Connor on or about June 12, 2023.

The scope of work for this geotechnical investigation consisted of:

- drilling and sampling two (2) geotechnical borings to depths of 15 and 20 feet beneath the surface within the residential development area as shown on Figure 2,
- performing field tests and recovering relatively undisturbed soil samples,
- determining presence or absence of groundwater in the geotechnical borings during drilling and immediately after the completion of drilling,
- backfilling the borings with soil cuttings after drilling activities were complete,
- visually classifying samples obtained and conducting laboratory tests to determine the physical and mechanical properties of the soils,
- analyzing the field and laboratory test data,
- preparing boring logs based on visual soil classifications and the results of laboratory tests,

- performing potential vertical rise of the site soils as well as bearing capacity and settlement analyses for foundations which may be used to support the proposed residential building,

- performing engineering analyses as necessary to determine the design parameters for post-tensioned slab-on-grade in accordance with the Post Tensioning Institute (PTI) requirements as contained in PTI's 2004 (Third Edition) publication titled "Design and Construction of Post-Tensioned Slabs-On-Ground",

- performing engineering analyses for the purpose of developing and providing:
  a) site preparation recommendations for the proposed residential building, and
  b) recommendations pertaining to foundation and floor slab design and construction, and

- submitting an electronic file of the geotechnical investigation report.

1.2 Summary of Findings

The pertinent findings of this geotechnical investigation that pertains to the design and construction of the proposed residential building are provided below.

1.2.1 Subsurface Soil Strata

The subsurface soil conditions as determined from the drilling of the geotechnical borings are provided on the boring logs (Boring Nos. B-1 and B-2) as presented in the Appendix.

Data from the 2 geotechnical borings drilled for this study suggest that the upper 20 feet of subsurface soils within the project area are generally composed of two (2) separate soil layers as described below:

Layer	Depth * (ft)	Soil Description
I	0 – 2	Dark gray CLAYEY SAND (SC), very loose to loose.
II	2 - 20	Dark gray, gray, and tan SANDY LEAN CLAY (CL), firm to very stiff w/ calcareous nodules.

* Measured below ground surface

Laboratory testing was performed on selected samples of the subsurface materials obtained to classify the soils in accordance with ASTM D 2487 and to define the engineering properties of the soils. Portions of the test results indicating the high and low values of specific testing are provided in the table below:

LAYER	DEPTH (FT)	LIQUID LIMIT (%)		PLASTICITY INDEX (%)		MOISTURE CONTENT (%)		PASSING NO. 200 SIEVE (%)	
		HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW
I	0 - 2	31		15		16.2	15.4	47.1	
II	6 - 20	42	37	24	20	18.4	14.4	68.2	60.8

1.2.2 Groundwater Condition

Groundwater was not encountered during the drilling of the geotechnical borings. The bore holes were immediately backfilled with soil cuttings after the completion of the drilling activities.

1.2.3 Shrink/Swell Potential

The site soils within the project area exhibited medium to high plasticity with moderate to high potential for vertical movement (shrink/swell). The maximum potential vertical rise (PVR) of the upper 8 feet of the site soils, based on worst case soil moisture condition, is about **1.10 inches** under a 144 psf [1 pound per square inch (psi)] restraining load. The potential vertical rise analyses were performed by using the Texas Department of Transportation (TxDOT) Test Method Tex-124-E and the results of laboratory index tests.

1.3 Summary of Recommendations

Recommendations are provided below pertaining to the design and construction of the foundations for the proposed residential building.

1.3.1 Recommended Site and Subgrade Preparation Requirements

These recommendations pertain to site preparation in the area of the proposed building when a slab-on-grade floor will be used. It is recommended that site preparation be performed by:

- removing/stripping demolition debris, existing vegetation, organics, wet, soft, loose, and/or unstable/pumping soils to a depth of at least 2 feet (extending at least 5 feet beyond the building limits) and as necessary to achieve the desired grade,

- establishing site drainage and installing storm water drainage structures, if required,

- proofrolling the exposed subgrade soils with a 15-ton roller or heavier or other equivalent suitable equipment as approved by the engineer, observing the soils during proofrolling so as to detect any wet, soft, loose, or unstable/pumping soils and treating such soils with suitable drying or stabilizing agents, or removing the unsuitable/unstable soils and replacing with properly compacted select fill, or these soils may be dried by discing/aerating/remixing/recompacting, if time allows and

- placing properly compacted select fill (thickness depending on the type of foundation being considered) as necessary to achieve the desired grade elevation.

Select fill should consist of inactive lean clays and clayey sands with a maximum liquid limit of 35 and a plasticity index range of 8 to 20. The select fill should be placed in 8-inch thick loose lifts (6-inch compacted lifts) within the building area extending to at least 5 feet beyond the building area and compacted to an in-place dry density equal to at least 95% of the maximum standard dry density (ASTM D 698) at a moisture content within ± 2% of the optimum moisture content. Each lift of select fill should be tested by a representative of the geotechnical engineer or a qualified/experienced personnel for compliance with density requirement prior to placement of subsequent lifts.

1.3.2 Recommended Foundation Types and Allowable Loadings

After the site has been properly prepared as previously discussed, foundation systems provided below may be used to support the building loads.

Foundation System - Post-Tensioned Slabs

The loads of the proposed residential building may be supported on a post-tensioned slab founded on at least **1.00 foot** of properly compacted select fill soil prepared in accordance with Section 1.3.1 of this report. The select fill should be placed over the foundation area and to a distance of at least five (5) feet beyond the perimeters of the foundation. Provided below are the parameters for the design of post-tensioned slab-on-grade in accordance with the Post Tensioning Institute (PTI) requirements and guidelines as contained in the Third Edition of the PTI's 2004 publication titled "Design and Construction of Post-Tensioned Slabs-on-Ground".

DESIGN PARAMETERS	
Allowable Net Bearing Pressure (Total Load)	1,800 psf *
Percent Fine Clay	35 %**
Thornwaite Moisture Index (I_m)	+ 18

DESIGN PARAMETERS	
Depth of Constant Soil Suction	9 feet
Constant Soil Suction	3.45 pF
Edge Moisture Variation Distance (e_m) Center Lift Edge Lift	 9.0 feet 4.9 feet
Differential Soil Movement (y_m) Center Lift Edge Lift	 0.58 inch 0.43 inch
Slab-Subgrade Coefficient of Friction (μ)	0.6 to 0.7
Effective Plasticity Index	22

* Provided the recommendations in Section 1.3.1 of this report are followed and grade beams are founded at least 1.5 feet beneath finished grade.

** Estimated value.

The PTI methods for design of slab-on-grade foundations are essentially empirical design techniques and the parameters provided above are based on our interpretation of the soil borings, laboratory test results, and the criteria published in the PTI design manuals.

We recommend that the grade beams extend to a depth based on structural design and considerations. The grade beam width and depth should be properly evaluated by the structural engineer. Grade beams may be thickened and widened to serve as spread footings at concentrated load areas. Grade beam foundations should be properly prepared by excavating the overburden soils to the final foundation grade elevation and compacting the foundation subgrade soils to an in-place dry density equal to at least 95% of the maximum dry density as determined by ASTM D 698. Compaction may be performed using a tamping plate hand compactor or other suitable impact compactor to ensure stable foundation.

Foundation System - Drilled Underreamed Piers

The wall and column loads of the proposed residential building may also be supported on drilled underreamed piers. The drilled piers (maximum pier bell diameter of 5 feet) should be founded at a depth of at least 10.0 feet beneath the existing grade at the time of our field investigation or at least 10.0 feet beneath final grade. The drilled piers should be designed for maximum net allowable bearing pressures of 3,200 psf for axial compression dead loads plus sustained live loads and 4,800 psf for axial compression dead loads plus sustained and transient live loads, whichever results in a larger bearing area.

Allowable shaft friction in compression and tension for the portions of the drilled pier shafts below a depth of 5 feet beneath finished grade is 350 psf.

Drilled piers should be belled in order to provide resistance against pullout forces which may be exerted on the drilled pier shafts by swelling soils. Steel reinforcements for the pier shafts should be designed to resist the ultimate shaft friction of about 1,200 psf that could be exerted against the drilled pier shafts as a result of swelling soils (fat clays below 3.5 feet).

The uplift capacity of drilled and underreamed piers can be determined from the following semi-empirical relationships:

For H/D greater than 1.5:

$Qu = 5.8c\,(D^2 - d^2)$ *(Equation 1)*

For H/D less than 1.5:

$Qu = 2.1c^{0.5}\,(H/D)^2\,(D^2 - d^2)$ *(Equation 2)*

or Equation 1, whichever is less

Where: Qu = *ultimate uplift capacity, tons*
c = *cohesion, tsf (use 0.85 tsf)*
D = *diameter of underream or bell, ft.*
d = *diameter of shaft, ft.*
H = *depth to base of bell below ground surface, ft.*

Use a factor of safety of 2.0 to obtain the allowable uplift capacity of the drilled piers. Uplift loads could be resisted by the uplift capacity of the drilled piers plus the dead weight of the drilled piers.

The center-to-center spacing of the drilled piers should be equal to a minimum of 1.5 times the average drilled pier bell diameter of adjacent drilled piers. Should piers be located closer than 1.5 bell diameters, measured center-to-center, a reduction in the allowable net bearing pressures may be required. AmeriKor should be notified for further evaluation in order to determine the appropriate reduction values.

Caving of pier bell excavations may occur during construction of drilled piers due to the presence of calcareous nodules within the overburden. The adverse effects of pier bell excavation caving can be limited by:

- the designer using a maximum bell-to-shaft diameter ratio of 3,

- the designer minimizing pier bell diameters, and

- the construction contractor minimizing the time between the completion of pier bell under-reaming and concrete placement.

We recommend that the drilled pier excavations be observed by a representative of the geotechnical engineer or a qualified personnel to verify that the strength properties of the foundation materials are consistent with the properties of the materials discussed and used as basis for the provided bearing capacity recommendations in this report, to ensure that the piers are installed in accordance with the specifications, and to verify that the excavation is free from excess water and loose cuttings. Placement of concrete in the excavations should commence immediately after the excavation is completed.

For cases where drilled pier excavations cave so rapidly that concrete cannot be placed quickly enough to allow construction of the piers, it will be necessary to use casing to maintain an open drilled pier excavation or consider the use of straight drilled shafts.

Use of the above recommended allowable net foundation bearing pressures provide for:

- a safety factor of at least 3.0 against a drilled pier bearing failure under axial compression dead loads plus sustained live loads,

- a safety factor of at least 2.0 against a drilled pier bearing failure under axial compression dead loads plus sustained and transient live loads, and

- a maximum total settlement of the drilled piers of less than 1 inch and a maximum differential settlement of the drilled piers of 0.5 inch, assuming a maximum pier bell diameter of 5 feet.

Grade beams should extend to a depth based on structural design and considerations. The grade beam width and depth should be properly evaluated by the structural engineer. Grade beams may be formed directly on the subgrade soils.

The floor for the proposed building may consist of a slab-on-grade floor placed over at least **1.50 feet** of properly compacted select fill prepared in accordance with site preparation as described in Section 1.3.1 of this report. An allowable net bearing pressure of 600 psf can be used for slab-on-grade bearing on properly compacted select fill. The select fill soils should be placed and extend at least five (5) feet beyond the perimeters of the foundation.

Foundation System - Shallow Spread Footings

Provided the site and subgrade preparation recommendations provided in Section 1.3.1 of this report are followed and at least **1.50 feet** of properly compacted select fill is placed over the foundation area and to a distance of at least five (5) feet beyond the perimeters of the foundation, it is our opinion that the wall and column loads of the planned building construction can also be supported by shallow spread footings. The shallow spread footings should have a maximum width of 5 feet (length no more than 2x the design width), be founded at a depth of at least three (3) feet below the desired finished grade, and be designed for maximum allowable net bearing pressures of 1,600 psf for axial compression dead loads plus sustained loads and 2,400 psf for axial compression dead loads plus sustained and transient live loads, whichever results in a larger bearing area. These values consider a safety factor of at least 3 and 2, respectively, against a bearing capacity failure.

If a cluster of closely spaced footings (i.e., if the center to center spacing of the footings is less than two times the width of the footing) are planned, AmeriKor should be contacted to evaluate the amount of settlement.

Footing foundations should be prepared by excavating the overburden soils to the final foundation grade elevation, compacting the foundation subgrade soils to an in-place dry density equal to at least 95% of the maximum dry density as determined by ASTM D 698. A tamping plate hand compactor or other suitable impact compactor should be used to perform the compaction. Without proper compaction of the spread footing foundation soils, settlement of the footings could exceed 1 inch.

The foundation excavations should be observed by a representative of AmeriKor or qualified/experienced personnel prior to steel or concrete placement to assess that the foundation materials are capable of supporting the design loads and are consistent with the materials discussed in this report. Soft, loose, or unstable soil zones encountered at the bottom of the footing excavations should be removed and replaced with properly compacted select fill as directed by the geotechnical engineer or the owner's/engineer's qualified/experienced personnel.

After opening, footing excavations should be observed and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond. The foundation concrete should be placed during the same day the excavation is made. If it is required that footing excavations be left open for more than one day, they should be protected to minimize evaporation or entry of moisture.

Grade beams should extend to a depth based on structural design and considerations. The grade beam width and depth should be properly evaluated by the structural engineer. Grade beams may be formed directly on the subgrade soils.

The floor for the proposed building may consist of a slab-on-grade floor with site preparation performed as described above in Section 1.3.1 of this report. An allowable net bearing pressure of 600 psf can be used for slab-on-grade bearing on properly compacted select fill. If needed for the design of floor slab, a soil subgrade modulus of reaction value of about 125 pci may be used.

Foundation System - Continuous Footings/Grade Beams

Provided the site and subgrade preparation recommendations provided in Section 1.3.1 of this report are followed and at least **1.50 feet** of properly compacted select fill is placed over the foundation area and to a distance of at least five (5) feet beyond the perimeters of the foundation, it is our opinion that the planned building construction can also be supported on a conventional continuous footing and/or grade beam foundation system. Foundations should be placed at least two (2) feet below finished grade and be designed for net allowable bearing pressures of 1,200 psf for dead load plus sustained live loads and 1,800 psf for dead loads plus sustained and transient live loads, whichever results in a larger bearing area. These values consider a safety factor of at least 3 and 2, respectively, against a bearing capacity failure.

Footing foundations should be prepared by excavating the overburden soils to the final foundation grade elevation, compacting the foundation subgrade soils to an in-place dry density equal to at least 95% of the maximum dry density as determined by ASTM D 698. A tamping plate hand compactor or other suitable impact compactor should be used to perform the compaction. Without proper compaction of the continuous footing/grade beam foundation soils, settlement of the footings could exceed 1 inch.

The foundation excavations should be observed by a representative of AmeriKor or qualified/experienced personnel prior to steel or concrete placement to assess that the foundation materials are capable of supporting the design loads and are consistent with the materials discussed in this report. Soft, loose, or unstable soil zones encountered at the bottom of the footing excavations should be removed and replaced with properly compacted structural fill as directed by the geotechnical engineer or the owner's/engineer's qualified/experienced personnel.

After opening, footing excavations should be observed and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond. The foundation concrete should be placed during the same day the excavation is made. If it is required that footing excavations be left open for more than one day, they should be protected to minimize evaporation or entry of moisture.

The floor for the proposed building may consist of a slab-on-grade floor with site preparation performed as described above in Section 1.3.1 of this report. An allowable net bearing pressure of 600 psf can be used for slab-on-grade bearing on properly compacted select fill. If needed for the design of floor slab, a soil subgrade modulus of reaction value of about 125 pci may be used.

2.0 FIELD INVESTIGATION

For this geotechnical study, two (2) geotechnical borings (Boring Nos. B-1 and B-2) were drilled and sampled on June 19, 2023 at the locations as shown in Figure 2. The boring locations were selected/staked in the field by a representative of AmeriKor. GPS coordinates of the drilled boring locations were obtained and included in the boring logs. Drilling, sampling, and testing were performed in accordance with applicable ASTM standards and methods by using a truck-mounted drill rig and conventional auger drilling methods.

Soil sampling during the drilling of the geotechnical boring consisted of continuous sampling to 12 feet and intermittent sampling thereafter, with relatively undisturbed samples being obtained.

Relatively undisturbed samples were obtained by hydraulically forcing sections of 3-inch outside diameter (O.D.) tubing (Shelby tube) into the subsoils. The tube samples were extruded in the field, sealed with foil, visually classified, and placed into airtight plastic bags. Estimates of the unconfined compressive strengths and undrained shear strengths of the cohesive soils were obtained with pocket penetrometer readings being taken on the tube samples.

All samples were transported to Amerikor's laboratory for purposes of performing laboratory tests on selected samples.

3.0 LABORATORY TESTING

For the current geotechnical study, a laboratory testing program was conducted to obtain engineering properties for use in performing engineering analyses and to adjust field soil classifications. The following laboratory tests were performed:

LABORATORY TEST	TEST STANDARD
Moisture Content of Soils	ASTM D 2216
Percent Soil Particles Passing a No. 200 Sieve	ASTM D 1140
Liquid Limit, Plastic Limit, and Plasticity Index of Soils	ASTM D 4318

The number of tests and the test results are presented on the boring logs provided in the Appendix. All tests were performed in accordance with applicable ASTM procedures and methods and soil classifications were completed in accordance with the procedures and guidelines of ASTM D 2487 and ASTM D 2488.

4.0 SUBSURFACE CONDITIONS

4.1 Subsoils

The subsurface soil conditions as determined from the drilling of the geotechnical borings are provided in Section 1.2.1 of this report and on the boring logs in the Appendix.

The boring logs were prepared by using both field visual classifications and the results of laboratory testing. The stratification lines shown on the boring logs represent the approximate boundaries between soil types and the transitions between soil types may be gradual.

4.2 Groundwater

Groundwater conditions are described in Section 1.2.2 of this report and on the boring logs provided in the Appendix. The depth to groundwater was obtained by observing the drilling operations and the free moisture contained in the samples recovered during drilling and determining presence or absence of water in the borings during drilling and after the completion of drilling.

Groundwater was not encountered during the drilling of the geotechnical borings. However, it is possible that seasonal variations may cause fluctuations in the water level data obtained during our field investigation. If necessary, we recommend that the contractor determine the actual groundwater level at the time of construction in order to determine the impact, if any, of the groundwater on the construction procedures. It should be noted that the recommendations contained in this report are based on groundwater information at the time of this geotechnical investigation and that an accurate determination of the true groundwater level may require several days or even months of observations

5.0 CONSTRUCTION CONSIDERATIONS

The following recommendations should be followed with regard to construction of the proposed residential building.

5.1 Foundation Construction

- Excavations for foundations should be clean and free of all loose materials prior to the placement of concrete. Concrete should be placed at the foundation areas immediately upon forming, reinforcing steel placement, cleaning, and inspection.
- Fill material and fill compaction should comply with the recommendations provided in Section 1.3 of this report.
- Concrete should have a 4 to 6-inch slump and be placed in 1 continuous placement.
- Concrete may be allowed to drop freely in dry drilled pier excavations containing 1 inch or less of water.
- Construction operations should be monitored by a qualified representative of the soil engineer or the owner's/designer's representative.
- Materials testing should be performed so as to assure that acceptable materials and construction methods are provided by the contractor.

5.2 Surface Drainage

The following drainage precautions should be observed during construction and maintained at all times after construction has been completed:

- The ground surface surrounding the exterior of the structures should be provided with erosion protection and sloped to drain away from the structures in all directions. We recommend a minimum slope of 6 inches in the first 10 feet.
- Roof downspouts and drains should discharge beyond the limits of the edges of the foundations and be channeled to drain immediately away from the foundations.
- Excessive wetting or drying of foundations should be avoided. Trees and other vegetation capable of withdrawing significant amounts of moisture from the subsoils should be located a distance from the nearest foundation equal to at least the expected ultimate extent of the vegetation root system, or appropriate moisture barriers should be provided.

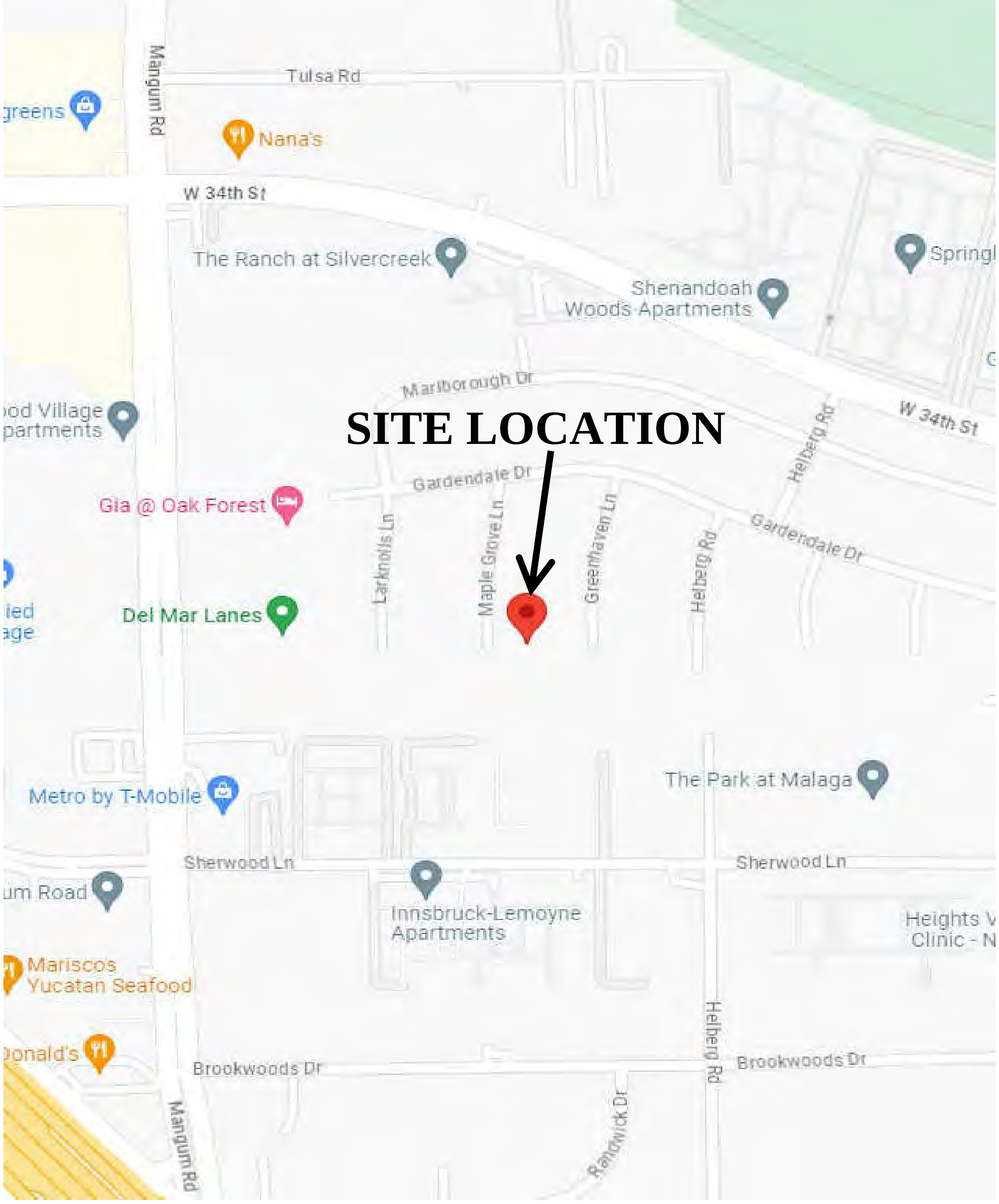
6.0 CLOSING REMARKS

AmeriKor has performed a geotechnical investigation and provided recommendations pertaining to the design of foundations for the proposed residential building that will be constructed at 3006 Maple Grove Lane in Houston, Texas. This report has been prepared for the exclusive use of Build By Owner and its authorized representatives in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

In the event that changes are made in the nature, design, or location of the proposed project, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the findings/recommendations of this report are modified or verified in writing. The analyses and recommendations presented in this report are based upon data obtained from 2 geotechnical borings drilled on June 19, 2023. The nature and extent of variations within the subsurface materials may not become evident until after construction is initiated. If significant variations in the subsurface materials are encountered during construction, it may be necessary to re-evaluate the recommendations provided in this report.

FIGURES

Amerikor Project No. 23-0540
June 29, 2023



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PROPOSED RESIDENCE
3006 MAPLE GROVE LANE
HOUSTON, TEXAS 77092

SITE LOCATION

Date: 06/28/23 | Project No: 23-0540 | **Figure 1**

⊕ - --- **Geotechnical borings included in the study**

PROPOSED RESIDENCE
3006 MAPLE GROVE LANE
HOUSTON, TEXAS 77092

LOCATIONS OF BORINGS

Date: 06/28/23 | Project No: 23-0540 | **Figure 2**

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APPENDIX

BORING LOGS

(Boring Nos. B-1 and B-2)

Key to Logs Used in Boring Logs

LOG OF BORING

Page **1** of **1**

PROJECT:	**Proposed Residence**	BORING NO.:	**B-1**
		BORING LOCATION:	**See Figure 2**
PROJECT LOCATION:	**3006 Maple Grove Lane** **Houston, Texas 77092**	BORING TYPE:	**Auger**
		APPROX. ELEVATION:	**NA** ft-MSL
		PROJECT NO.:	**23-0540**
CLIENT:	**Build By Owner**	DATE:	**June 19, 2023**

DEPTH, FT.	SAMPLE	GROUNDWATER	SOIL TYPE	DESCRIPTION OF STRATUM	HAND PEN. READING (TSF)	SPT BLOWS (PER 6")	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			PASS #200 SIEVE, %	DRY DENSITY (PCF)	COMPRESSIVE STRENGTH (TSF)
								LL	PL	PI			
1				CLAYEY SAND (SC), loose, dark gray	1.00		16.2	31	16	15	47.1		
2				2'									
3				SANDY LEAN CLAY (CL), stiff to very stiff,	1.50		18.4						
4				dark gray									
5				- gray and tan at 4'	2.00		15.0	41	18	23	68.2		
6													
7				- w/ calcareous nodules at 6'	2.50		15.1						
8													
9					2.00		15.5						
10													
11					2.50		16.7						
12													
13				- tan at 12'									
14					3.00		17.3	42	18	24	65.6		
15													
16													
17													
18													
19					2.50		16.9						
20				20'									

(Boring terminated at 20')

GPS Location of Boring: **N 29.81606° at W -95.45640°**

DRILLING CONTRACTOR: **Amerikor**

LOGGER: **Jose Recinos**

Groundwater was not encountered during drilling and the boring was dry after drilling completion. The boring was backfilled w/ soil cuttings after the completion of the drilling activities.

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LOG OF BORING

Page **1** of **1**

PROJECT: **Proposed Residence**

PROJECT LOCATION: **3006 Maple Grove Lane**
Houston, Texas 77092

CLIENT: **Build By Owner**

BORING NO.: **B-2**
BORING LOCATION: **See Figure 2**
BORING TYPE: **Auger**
APPROX. ELEVATION: **NA** ft-MSL
PROJECT NO.: **23-0540**
DATE: **June 19, 2023**

DEPTH, FT.	SAMPLE	GROUNDWATER	SOIL TYPE	DESCRIPTION OF STRATUM	HAND PEN. READING (TSF)	SPT BLOWS (PER 6")	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			PASS #200 SIEVE, %	DRY DENSITY (PCF)	COMPRESSIVE STRENGTH (TSF)
								LL	PL	PI			
1				CLAYEY SAND (SC), very loose to loose, dark gray	0.50		15.4						
2			2'										
3				SANDY LEAN CLAY (CL), firm to very stiff, dark gray	1.00		15.8	37	17	20	60.8		
4													
5				- gray and tan at 4'	1.50		14.4						
6													
7					2.00		14.6	39	18	21	66.9		
8													
9					2.00		15.5						
10													
11					2.50		17.4						
12													
13				- tan at 12'									
14					3.00		16.7						
15			15'										

(Boring terminated at 15')

GPS Location of Boring: **N 29.81592° at W -95.45625°**

DRILLING CONTRACTOR: **Amerikor**

LOGGER: **Jose Recinos**

Groundwater was not encountered during drilling and the boring was dry after drilling completion. The boring was backfilled w/ soil cuttings after the completion of the drilling activities.

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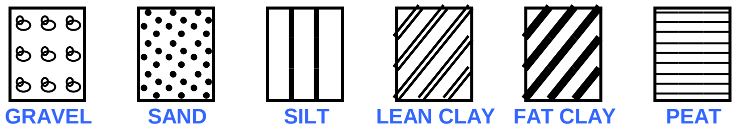
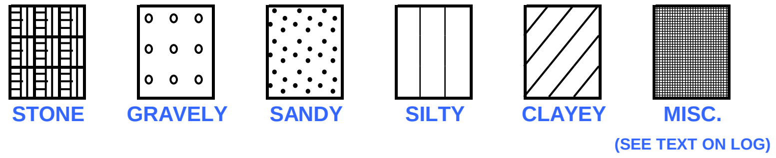
KEY TO TERMS AND SYMBOLS USED ON BORING LOGS

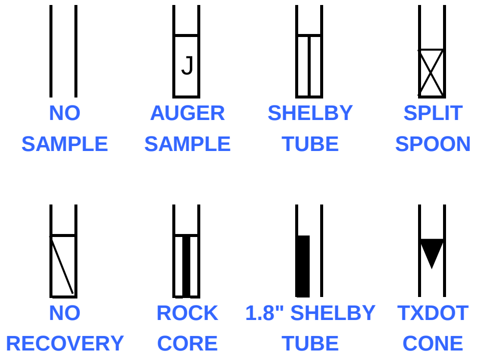
SOIL TYPE



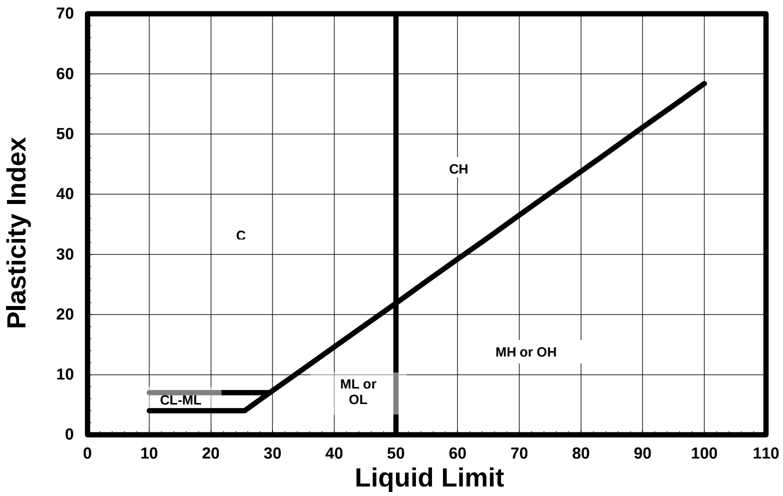
MODIFIERS



SAMPLER TYPE



UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D 2487



CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	SHEAR STRENGTH (Tons/ft^2)
Very Soft	0 - 0.125
Soft	0.125 - 0.25
Firm	0.25 - 0.5
Stiff	0.5 - 1.0
Very Stiff	1.0 - 2.0
Hard	> 2.0 or 2.0+

RELATIVE DENSITY - GRANULAR SOILS

CONSISTENCY	N-VALUE (Blows/Foot)
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50 or 50+

DEGREE OF PLASTICITY OF FINE-GRAINED SOILS

DEGREE OF PLASTICITY	PLASTICITY INDEX	SWELL POTENTIAL
None	0 - 4	None to Low
Slight	5 - 10	Low
Medium	11 - 20	Moderate
High	21 - 40	High
Very High	> 40	Very High

MOISTURE CONDITION COHESIVE SOILS

DESCRIPTION	CONDITION
Absence of moisture, dusty, dry to touch	DRY
Damp but no visible water	MOIST
Visible free water	WET

CONSISTENCY OF COHESIVE SOILS AFTER TERZAGHI (1948)

CONSISTENCY	N-VALUE (Blows/Foot)
Very Soft	< 2
Soft	2 - 4
Firm	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	> 30

ABBREVIATIONS

HP - Hand Penetrometer
TV - Torvane
MV - Miniature Vane

UC - Unconfined Compression Test
UU - Unconsolidated Undrained Triaxial Test
CU - Consolidated Undrained Triaxial Test

NOTE: Plot indicates shear strength as obtained by above tests.

▼ Final Groundwater Level

▽ Initial Groundwater Level

CLASSIFICATION OF GRANULAR SOILS

U.S. STANDARD SIEVE SIZE(S)

6" 3" 3/4" 4 10 40 200

BOUL- -DERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

152 76.2 19.1 4.76 2.0 0.42 0.074 0.005 0.001

GRAIN SIZE IN MM

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