Exhibit V. Foti – Highway 70 Geotechnical Report





# Foti - Highway 70 Geotechnical Report



# **Report of Geotechnical Exploration**

Proposed Tractor Supply Company LA Highway 70 Donaldsonville, Louisiana GeoCon Project No. DL 561-16

Prepared For: Hix Snedeker Companies, LLC Post Office Box 130 Daphne, Alabama 36526

Attn: Mr. Haymes Snedeker

Date: May 10, 2016

Prepared By: GeoCon Engineering & Materials Testing, Inc. 22885 McAuliffe Drive Robertsdale, Alabama 36567



May 10, 2016

Hix Snedeker Companies, LLC Post Office Box 130 Daphne, Alabama 36526

Attn: Mr. Haymes Snedeker

## RE: Report of Geotechnical Exploration Proposed Tractor Supply Company LA Highway 70 Donaldsonville, Louisiana GeoCon Project No. DL 561-16

Dear Mr. Snedeker:

GeoCon Engineering & Materials Testing, Inc. is pleased to submit this report of geotechnical exploration for the above referenced project. Included in this report is a summary of our understanding of the project, results of the field exploration, and our recommendations for site grading and foundation design. This testing has been performed in general accordance with our signed proposal and our earlier discussions with you.

Enclosed please find our report summary, evaluations, and recommendations followed by an Appendix which includes a Site Location Map, Test Location Plan, graphical logs of the soundings and borings, laboratory test data, a Unified Soil Classification Chart, and important notes about your Geotechnical Report.

We appreciate the opportunity to have provided you with our geotechnical engineering services. If you have any questions concerning this report, or if we can be of any further assistance, please contact our office.

Sincerely,

GeoCon. Inc.

JOI. CHRISTIAN License No. 38010 PROFESSIONAL ENGINEE Jason J. Christian, P.E. Geotechnical Engineer ENGINEERINIII

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#### 1.0 Report Summary

This report presents the results of our geotechnical exploration and engineering evaluation at the site of the proposed building and vehicular pavements for the new Tractor Supply Company retail development on LA Highway 70 in Donaldsonville, Louisiana. The objectives of this geotechnical exploration were to investigate the subsurface soil conditions at the site of the proposed building and pavement construction and to provide recommendations for site preparation and the design and construction of foundations, floor slabs and pavements. A summary of our findings and recommendations is provided in the following paragraphs. The details of our findings and recommendations are provided in subsequent sections of this report. Only the detailed recommendations should be used for evaluation and project design.

The borings and soundings initially encountered about 4 to 6 inches of organic topsoil. Below the topsoil material, the borings generally encountered lean clay and fat clay soils to boring termination at depths of 4 to 80 feet below the existing ground surface. The soundings encountered ground water at depths of about 6 to 10 feet below the existing ground surface.

The subsurface profile encountered across the project site consisted of very soft to soft clay soils that are compressible and susceptible to moderate long-term displacement (settlement) from loads imposed by soil fill required to grade the building pad coupled with the structural loadings of the proposed building. Based on the very soft soil conditions encountered at the site, we recommend that the Tractor Supply Company retail building be supported on timber piles embedded to depths of at least 40 feet below the existing ground surface. Supporting even relatively light-weight buildings on "friction" piles is common construction practice in the local site area and consistent with the projects constructed over similar soil profiles and soft clay strata as the project site. Section 8.0 of this report provides the detailed recommendations for pile design and installation along with a table that indicates pile depth and allowable capacity.

The initial phase of site grading should include the removal of surface vegetation, organic topsoil and debris. The near-surface clay soils encountered at the site are moisture sensitive and establishing positive drainage in the early stages of site grading will be critical for this project.

Following the removal of organic material and debris, and prior to the placement of fill material, the building and pavement construction areas should be proof-rolled with a static roller (min. 10 tons gross weight). The subgrade proof-roll test should be observed and documented by the project geotechnical consultant. Subgrade soils which fail to properly compact or subgrade soils that exhibit excessive rutting or pumping should be corrected as per the recommendations of the project geotechnical consultant. The structural fill used to establish final subgrade elevations should be placed in 8 inch loose lifts and compacted to at least 98% ASTM D-698 standard density.

The provided Site Plan indicates that the access drive will be subject to heavy-duty traffic conditions (delivery trucks) and the parking lot will be subject to standard-duty traffic conditions (passenger vehicles). Both asphalt and concrete pavement build-up recommendations for this project are provided in section 11.0 of this report.

The following sections of this report describe the site conditions, local geology, subsurface conditions and general design information. Sections 7.0, 8.0, 9.0 and 10.0 present our recommendations for site grading, foundation design, floor slab construction and pavements; followed by our general comments in Section 11.0.

## 2.0 Project Description

The subject site is located along the south side of LA Highway 70 in Donaldsonville, Louisiana. Specifically, the site is located just southwest of the intersection of LA Highway 70 and LA Highway 3120. The location of the site is shown on the attached Site Location Map (Figure 1) for reference. During our April 2016 field exploration, the site consisted of a vacant commercial lot that was clear and consisted of grass ground cover.

We understand that the project includes a new Tractor Supply Company retail development. Based on the provided information and Site Plan Drawing (provided by Jade Consulting, LLC) the retail building will consist of a pre-engineered metal building exhibiting a footprint of about 19,097 square feet. We anticipate that maximum column loads will be less than about 30 kips and wall loads will be less than about 3 kips per linear foot.

The project also includes a parking lot north of the building and an access drive that wraps around the east and south sides of the site. The access drive will be utilized by tractor trailer delivery trucks. We anticipate that the parking lot will be subject to mostly light-duty traffic (passenger vehicles).

Topographic information was not available at the time of this report; however, existing ground elevations across the site appeared to gently slope toward the south side of the site. The finished floor elevation of the building had not been established at the time of this report; however, we understand that up to about 3 feet of fill will be required in the building area to establish the Finished Floor Elevation (FFE). Between 1 and 3 feet of fill are anticipated in the pavement areas to establish final subgrade elevations.

Note: If our understanding of the above project information differs from the actual project plans and specifications or if revisions to the project plans are made after this report, we should be contacted for analysis and comment as needed. Actual fill heights in both the building and pavement areas could affect the pile capacities for the building and pavement build-ups. Recommendations in this report are based on up to 3 feet of fill in the building area and 1 to 3 feet of fill in the pavement areas.

## **3.0 Geotechnical Exploration**

Soil conditions were investigated by extending four (4) Cone Penetration Tests (CPT) to depths of about 15 to 80 feet below the ground surface in the proposed building area and five (5) manual hand auger borings to a depth of about 4 feet in the proposed pavement areas. The borings were located in the field by GeoCon engineering personnel using the provided Site Plan as reference. The general boring locations are shown on the attached Boring Location Plan (Figure 2).

CPT testing was performed in accordance with ASTM D-5778 using a Vertek S4 electronic CPT rig. CPT testing includes pushing an electronic cone on a series of rods into the ground at a constant rate. The electronic cone collects continuous measurements of the resistance to penetration of the cone tip and side friction sleeve. Correlations between Cone Resistance values and Standard Penetration (SPT) "N" values were performed using methods developed by Robertson, Campanella and Wightman. The CPT log attached in the appendix shows the cone tip friction, sleeve friction, pore pressure, correlated "N" value and the soil behavior type (SBT).

At each test sounding location, a manual hand auger boring was performed to collect soil samples in the upper 4 feet of the soil-profile. These samples were visually classified by GeoCon, Inc. personnel, placed in containers and transported to our laboratory for further testing and for further review by our engineering staff.

## 4.0 Soil Conditions Encountered

The soundings and borings initially encountered about 4 to 6 inches of organic topsoil. Below the topsoil material, the borings generally encountered lean clay and fat clay soils to boring termination at depths of 4 to 80 feet below the existing ground surface. The soil conditions encountered are described in more detail on the CPT Sounding Logs and Soil Boring Logs in the Appendix.

## 5.0 Ground Water Conditions Encountered

Ground water was encountered at depths of about 5 to 10 feet below the existing ground surface at the test locations. Ground water conditions are subject to seasonal variations and are expected to fluctuate in response to local variations in precipitation and drainage conditions. Considering the relatively short time frame of the field exploration, ground water levels may not have had sufficient time to stabilize. Therefore, actual depths to ground water may vary. It should be noted that the field exploration was performed immediately following a heavy rain event and the near-surface ground water levels encountered may be elevated by several feet. The cohesive near-surface soils are poorly drained and prone to creating and holding "perched ground water" following rain. This should be noted and accounted for by the contractor.

## 6.0 Laboratory Testing

The soil samples taken from the hand auger borings and from a down the hole sampler at the sounding locations were visually classified in general accordance with the guidelines of ASTM D-2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System). The quantity and type of laboratory tests performed for this geotechnical study were determined and adjusted by GeoCon engineering personnel based on the uniformity and characteristics of the subsurface soil conditions encountered and our experience and knowledge of local soil conditions.

Laboratory soil tests were performed to aid in the classification of the soils and to help in the evaluation of engineering characteristics of the soils. Representative soil samples recovered from the soil test borings were selected for in-situ soil moisture tests (4 tests), grain-size analysis (4 tests) and Atterberg limit determination (4 tests). Results of the laboratory testing are presented on the lab data sheets in the Appendix.

## 7.0 Site Preparation Recommendations

## 7.1 Site Drainage

We recommend that the areas beneath and 10 feet beyond the building area and 3 feet beyond pavement areas be designated as "controlled areas". The near-surface clay soils at this site are moisture sensitive and when in a wet or saturated condition, lose strength and load/bearing capacity. Considering that these clay soils are poorly drained and coupled with the relatively flat site, establishing positive drainage will be critical for this project. Therefore, the initial phase in site grading should include establishing and maintaining positive drainage.

During construction (both site grading and building), the contractor should exercise caution during inclement weather to ensure the subgrade and structural fill courses are not degraded by construction traffic.

## 7.2 Site Grading

The initial phase of site grading should also include the removal of surface vegetation, organic topsoil and debris. Following the removal of organic material and debris, and prior to the placement of fill material, the exposed subgrade should also be proof-rolled with a static roller. The processed subgrade and proof-roll test should be reviewed by the project geotechnical consultant. Subgrade soils which fail to properly compact or subgrade soils that exhibit excessive rutting or pumping should be undercut as per the recommendation of the project geotechnical consultant. The resulting excavation should be backfilled with structural fill compacted to 95% ASTM D-698 standard density.

## 7.3 Placement of Structural Fill

Structural fill placed to establish final subgrade elevations should consist of non-expansive lean clay (CL) or sandy clay (SC) material that is free of organic material or debris. Structural fill should be placed in 6 inch loose lifts and compacted to 98% ASTM D-698 standard density within 2% of the material's optimal moisture content. Prior to placement of structural fill at the project site, a sample of the proposed material should be provided to the project geotechnical consultant for testing and approval.

Once the surface of each lift of fill is ready for the next lift, or the on-site processed soil is complete and ready for fill placement, the exposed subgrade should be maintained at the placed moisture content until the next lift of on-site fill or structural fill is placed. If the surface of the fill area is allowed to become excessively dry or wet (+/- 3% of the material's optimum moisture content) prior to placement of the next layer, the layer should be reprocessed to obtain the required moisture and density prior to further fill placement.

## 7.4 Weather Considerations

Weather conditions at the time of site preparation will directly impact earthmoving activities. Exposed subgrade soils and structural fill soils can be expected to degrade during wet weather conditions. Additional soil processing and drying efforts are typically required during wet weather conditions.

#### 7.5 Testing Requirements

The geotechnical consultant should monitor and document the results of the topsoil stripping, soil proof-rolling, correction of weak soil conditions and the conditions of the final subgrades, foundation construction, and floor slab bearing soils.

During fill placement, field density testing should be performed to confirm that the specified compaction criteria is being achieved. We recommend that one density test be performed for every 3,000 square feet of fill on each lift in the building area and 5,000 square feet in pavement areas. Sufficient samples of on-site soils should be collected for Proctor compaction tests to provide the moisture-density relationships needed for compaction control. Sufficient samples of structural fill materials should be submitted by the contractor for classification and Proctor density tests to show substantial compliance with the specifications and to provide the moisture-density relationships needed for compaction control. It is important that proper quality assurance testing be performed during site grading.

A minimum of one field density test should be performed per each 150 linear feet (per each 2 ft. of vertical thickness) of fill placed at utility trenches extending through the "controlled areas".

Current OSHA regulations should be followed with respect to excavations for this project. Heavy construction traffic and stockpiling of excavated earth should not be permitted near the top of open unsupported excavations.

## 7.6 Unit Costs

Considering the very soft subgrade soils encountered across this site, we recommend that the contract documents establish a unit cost (per cubic yard) for undercutting unsuitable soils and replacing with compacted structural fill. We also recommend that a unit cost be established for Geotextile stabilization fabric.

## 8.0 Building Foundation Recommendations

The sounding data indicates that the soil-profile below the proposed building consist of very soft to soft clay soils that are compressible and subject to consolidation under loads imposed by fill placed over the site and the structural loading of the building. Typical slab-on-grade structures constructed over these compressible soils would be subject to excessive settlements and related cracking and distress.

We understand that up to 3 feet of fill will be placed in the building area to establish the Finished Floor Elevation (FFE). Gross loading for settlement calculations were based on 360 pcf for structural fill, 300 psf for slab loads and 1,000 psf for foundation loads. Based on the sounding data and anticipated loading, long-term settlements in the order of 2 to 4 inches are expected. Limiting settlements would require that deep foundations be used to support structures. We recommend that "friction" timber piles be installed to support both the building foundation and concrete floor slab.

We anticipate some differential settlement between the pile supported building and the adjacent non-pile supported hardscapes (concrete outdoor display area, sidewalks, pavement, etc.) and utilities. We anticipate about 1 inch of long-term settlement per foot of fill placed above the original ground surface. This potential differential settlement should be considered in the design of hardscapes and utilities. We recommend that flexible connections or stainless steel hangers be used on all below ground utilities.

## 8.1 Timber Piles

Based on the sounding data, timber piles should be embedded to a depth of at least 40 feet below the <u>existing ground surface</u>. Piles should meet the American Wood Preservers' Association standards for treatment and quality assurance and conform to ASTM D 25-99 specifications.

An allowable single pile compression capacity was determined using conventional static analysis and includes a factor of safety of 2.0 against failure at the pile/soil interface. The AllPile computer software was also utilized to help determine embedment depths and compression capacities.

	Allowable Single Timber Pile Capacity						
Pile Size	Pile Tip Embedment Depth (ft)						
(in.)	40	45	50				
6-Tip 10-Butt	5 tons	6 tons	6.5 tons				
8-Tip 12-Butt	8 tons	9 tons	10 tons				

Note - Pile tip embedment depths are based on existing ground elevations at the time of our field exploration.

Timber pile installation should be performed in general accordance with the Timber Piling Council's, Timber Pile Design and Construction Manual. It is recommended that the piles be installed to the recommended minimum depth indicated to achieve the desired capacity, and that no attempt be made to adjust length to accommodate changes in soil conditions or driving resistance without consulting with GeoCon.

Piles should be installed at a spacing no closer than 2½ butt diameters on center. Piles should be installed with a drop or air hammer with a rated energy of 7,500 ft-lbs per blow. Pilot holes can be pre-drilled and the pre-drilled depth should be approved by GeoCon based on the pile contractor's actual installation equipment and pile size. Improper pile installation can drastically decrease a pile's axial, uplift and lateral loading capacity. GeoCon should be retained to observe the installation of the piles and perform a pile driving analysis.

## 8.3 Static Pile Load Test

A static pile load test on a non-production pile is recommended to confirm the design axial load capacity. We recommend the use of the ASTM D-1143 quick loading method. It is generally recommended that at least seven (7) days elapse between the installation of the test pile and static load testing. A clear space of at least 7 feet is recommended between the test and reaction piles. The project geotechnical engineer should monitor the load test performed by the contractor.

## 8.4 Estimated Pile Settlements

Settlements for timber pile foundations embedded to a minimum depth of 40 feet are expected to be within acceptable limits. Total settlements of less than 1 inch and differential settlements of less than about 3/4 of an inch could be expected. A better evaluation of potential settlements could be made once foundation loads are established.

The uplift capacity may be taken as 40% of the capacity indicated above, plus the dead weight of the pile. The structural capacity of the individual piles is beyond the scope of our services and should be verified by the project Structural Engineer.

## 9.0 Ground Floor Slabs

Although the floor should be design to be structurally supported by the pile caps and grade beams, the subgrade below all floor slabs should consist of properly compacted structural fill as described in the Grading Section of this report. A 10 mil plastic vapor barrier should be installed over the subgrade prior to installation of the floor slabs. The plastic vapor barrier should be properly lapped and all joints and intrusions properly taped and sealed.

## 10.0 Pavements

## 10.1 Pavement Subgrade

The site grading section of this report has described the grading of pavement areas to finished subgrade levels. We understand that the project includes typical standard-duty parking areas (passenger vehicles) and heavy-duty driveways. Heavy-duty traffic for this project would include tractor-trailers or other delivery trucks. The pavement recommendations provided below are based on a low volume of passenger vehicles (standard-duty traffic) and low volume tractor trailer and delivery trucks (heavy-duty). Paving materials for this project should conform to the LSSRB.

We anticipate at least 18 inches of structural fill between the native subgrade and the base layer. Immediately prior to placement of the base layer, pavement improvements should include thoroughly mixing the top 6 inches of structural fill soil throughout and 3 feet beyond the pavement areas to form a relatively uniform layer. This mixed soil layer should be moisture conditioned to within 3% optimal moisture content and compacted to 100% ASTM D-698 standard density immediately prior to the placement of the base course layer. Drainage improvements at subgrade levels should include slopes, 2% minimum, which are designed to discharge water (which may otherwise tend to pond over the subgrade) toward low collection points which are provided with positive relief to storm drainage features. Areas which exhibit unsuitable materials or which fail to compact properly should be corrected as per the geotechnical consultant's recommendations.

## 10.2 Asphalt Pavement

Asphalt pavement design has been based on an estimated CBR value of 8 for properly compacted structural fill soils. Based on a standard-duty traffic classification (passenger vehicles only) and heavy-duty classification (delivery trucks), pavements which bear over at least 18 inches of compacted structural fill soils could be constructed as follows:

## Standard-Duty Pavement Section- Aggregate Base

- 1" Type 3 Asphaltic Concrete Wearing Course
- 1<sup>1</sup>/<sub>2</sub>" Type 3 Asphaltic Concrete Binder Course
- 6" Dense Graded Crushed Aggregate Base Material (compacted to 100% standard density)
- 18" Structural Fill (Compacted to 100% standard density)

## Heavy-Duty Pavement Section – Aggregate Base

- 2" Type 3 Asphaltic Concrete Wearing Course
- 2" Type 3 Asphaltic Concrete Binder Course
- 6" Dense Graded Crushed Aggregate Base Material (compacted to 100% standard density)
- 18" Structural Fill (Compacted to 100% standard density

The crushed aggregate base should meet the requirements of Section 1003.03(d) of the LSSRB. Provided the moisture content of the base layer is at or within 2% above the crushed aggregate's optimal moisture content at the time of paving, a prime coat over the base is not required.

A soil-cement treated subgrade could be considered as an alternate to the crushed aggregate base course (for both the above asphalt pavement sections and below concrete pavement sections). Design of the soil-cement layer should be done based on the actual structural fill consistency used to establish the final subgrade elevation. Therefore, we recommend that the soil-cement design be done by the site grading contractor and provided to GeoCon for approval. GeoCon could provide the soil-cement design at the request of the client. Sufficient samples of the soil layer would need to be provided at that time.

## 10.3 Concrete Pavement

Heavy-duty Portland Cement Concrete (PCC) pavement could be used in the truck access drives and <u>should be used</u> in truck unloading areas, dumpster pad locations or other areas subject to maneuvering or parking of garbage trucks or delivery trucks. Final PCC pavement grades should be adequately sloped for positive drainage. We understand that standard-duty PCC pavement will be used in the outdoor display area. Standard-duty PCC pavement could also be used in the parking lot area that will be subjected only to passenger vehicles. Subgrade below concrete pavement areas should be prepared in accordance with the grading section of this report and the top 6 inches of the structural fill layer should be compacted to 100% standard Proctor density.

## Standard-Duty Concrete Pavement Section

- 5" Portland Cement Concrete 4,000 psi minimum compression strength Minimal 500 psi flexural strength
- 6" Dense Graded Crushed Aggregate Base Material (compacted to 100% standard density)
- 18" Structural Fill (Compacted to 100% standard density

## Heavy-Duty Concrete Pavement Section

- 7" Portland Cement Concrete 4,000 psi minimum compression strength Minimal 500 psi flexural strength
- 6" Dense Graded Crushed Aggregate Base Material (compacted to 100% standard density)
- 18" Structural Fill (Compacted to 100% standard density

At a minimum, both standard-duty and heavy-duty concrete pavement sections should include 6x6 No. 6 welded wire mesh reinforcement. Joints should be installed in the PCC pavements to limit stresses resulting from expansion and contraction. Contraction joints should be formed by sawing as soon as the concrete has hardened enough to prevent raveling. These joints should extend to a depth of at least ¼ of the pavement thickness and be placed on a 12 to 15 foot spacing. The design and location of all pavement joints should

be in accordance with recommendations of the *Portland Cement Association (PCA)* and ACI 330.

Isolation joint material should comply with ASTM D-1571 or D-1752. The upper one inch of the joint material should be removed and the joint sealed with a self-leveling elastomeric joint sealant immediately after the curing period and prior to opening to traffic. Construction joints should be properly cleaned and sealed with the same type of joint sealant. Dowel sizing and spacing for construction joints should conform to the recommendations of ACI 330.

## 11.0 Closure

This report has been prepared for the exclusive use of Hix Snedeker Companies, LLC and the project design professionals for specific application to the above referenced project in accordance with generally accepted current standards of geotechnical engineering practice common to the local area.

The evaluations and recommendations contained in this report are based on the information gathered from the four (4) CPT soundings and five (5) hand auger borings at the referenced site. This report does not incorporate potential variations in soil conditions that may exist between the boring locations. Variations in soil conditions beyond the test boring locations may not become evident until construction has begun. Should variations become evident during construction, we should be contacted in order to observe the site conditions and re-evaluate the recommendations of this report.

We have not intended to reflect specific volumes of subsurface conditions at the site. Volumetric estimates often require a large number of borings placed on a close grid with the collected data associated with civil engineering cross-sections. If volume estimates are required of us for the design/development of this project to advance, please contact us for further comment.

Again, we appreciate the opportunity to provide our geotechnical engineering services for this project. To ensure that our recommendations are correctly interpreted and followed during construction, we recommend that the owner retain GeoCon, Inc. to provide construction observation and construction materials testing for the project.

## **APPENDIX**

- A-1 Site Location Plan
- A-2 Test Location Plan
- A-3 CPT Sounding Logs
- A-4 Hand Auger Boring Logs
- A-5 Soil Laboratory Data
- A-6 Soil Classification Chart
- A-7 Important Information about Your Geotechnical Report
- A-8 Terms & Conditions Sheet













PROJECT: Proposed TSC CLIENT: HSC LOCATION: Donaldsonville, LA DRILLER: CR/JJC DRILL RIG: DEPTH TO WATER> INITIAL \\vec{a} :

#### PROJECT NO.: DL 561-16 DATE: ELEVATION: LOGGED BY: Jason Christian

AT COMPLETION :

STANDARD PENETRATION TEST ELEVATION/ WELL SOIL SYMBOLS, NM DD SAMPLERS USCS Description CURVE DEPTH N DEPTH DETAIL AND TEST DATA 10 30 50 5 Inches of Organic Topsoil 0 2 CH Gray Fat Clay, Very Soft 1 2 3 4 CL Gray Clay, Soft 4 Boring Terminated at 4 ft 5 6 "N-Values" = DCP Soundings This information pertains only to this boring and should not be interpreted as being indicitive of the site.

PROJECT: Proposed TSC CLIENT: HSC LOCATION: Donaldsonville, LA DRILLER: CR/JJC DRILL RIG: DEPTH TO WATER> INITIAL \\frac{\vee}{2} :

#### PROJECT NO.: DL 561-16 DATE: ELEVATION: LOGGED BY: Jason Christian

AT COMPLETION 🐺 :

STANDARD PENETRATION TEST ELEVATION/ WELL SOIL SYMBOLS, NM DD SAMPLERS USCS Description CURVE DEPTH Ν DEPTH DETAIL AND TEST DATA 10 30 50 5 Inches of Organic Topsoil 0 3 CH Gray Fat Clay, Very Soft 1 2 3 5 CL Gray Clay, Soft 4 Boring Terminated at 4 ft 5 6 "N-Values" = DCP Soundings This information pertains only to this boring and should not be interpreted as being indicitive of the site.

PROJECT: Proposed TSC CLIENT: HSC LOCATION: Donaldsonville, LA DRILLER: CR/JJC DRILL RIG: DEPTH TO WATER> INITIAL \vec{a} :

#### PROJECT NO.: DL 561-16 DATE: ELEVATION: LOGGED BY: Jason Christian

AT COMPLETION 🐺 :

ELEVATION/	WELL	SOIL SYMBOLS,			NM		STANDARD	PENE			
DEPTH	DETAIL	SAMPLERS AND TEST DATA	USCS Description			DD	DEPTH	N			
DEPTH	DETAIL	AND TEST DATA	CL	6 Inches of Organic Topsoil Gray, Brown Clay, Very Soft			DEFTH	2		30	50
- 3 4 			CL	Gray Clay, Soft Boring Terminated at 4 ft				4	•		
- 5 - 6 											
"N-Values"	d = DCP S	Soundings									

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

PROJECT: Proposed TSC CLIENT: HSC LOCATION: Donaldsonville, LA DRILLER: CR/JJC DRILL RIG: DEPTH TO WATER> INITIAL \\vec{a} :

#### PROJECT NO.: DL 561-16 DATE: ELEVATION: LOGGED BY: Jason Christian

LUGGED DT. Jason Chin

AT COMPLETION 🐺 :

STANDARD PENETRATION TEST ELEVATION/ WELL SOIL SYMBOLS, NM DD SAMPLERS USCS Description CURVE DEPTH Ν DEPTH DETAIL AND TEST DATA 30 10 50 6 Inches of Organic Topsoil 0 1 CL Gray, Brown Clay, Very Soft 1 2 3 CL 5 Gray Clay, Soft 4 Boring Terminated at 4 ft 5 6 "N-Values" = DCP Soundings This information pertains only to this boring and should not be interpreted as being indicitive of the site.

PROJECT: Proposed TSC CLIENT: HSC LOCATION: Donaldsonville, LA DRILLER: CR/JJC DRILL RIG: DEPTH TO WATER> INITIAL \\frac{\vee}{2}: \text{i}

## PROJECT NO.: DL 561-16 DATE: ELEVATION:

LOGGED BY: Jason Christian

AT COMPLETION 🐺 : STANDARD PENETRATION TEST ELEVATION/ WELL SOIL SYMBOLS, SAMPLERS USCS Description NM DD CURVE DEPTH Ν DEPTH DETAIL AND TEST DATA 30 50 10 4 Inches of Organic Topsoil 0 2 CH Gray Fat Clay, Very Soft 1 2 3 4 CL Gray Clay, Soft 4 Boring Terminated at 4 ft 5 6 "N-Values" = DCP Soundings

This information pertains only to this boring and should not be interpreted as being indicitive of the site.



#### REPORT OF SOIL CLASSIFICATION TESTING

Project: Job No.: Client:	Proposed Donaldso DL 561-10 HSC	-			
Sampled By:	GeoCon		Submitted By:	GeoCon	
Sample No. Location Depth		1 CPT-2 10 ft	2 CPT-2 2 ft	2 HA-1 1 ft	2 HA-5 1 ft
Description of Materials		Gray Clay	Gray, Brown Clay	Gray Clay	Gray Clay
SCREEN SIZES		% PASSING	% PASSING	% PASSING	% PASSING
No. 40 No. 60 No. 200	screen screen screen	99 99 98.9	99 98 90.8	100 98 95.4	100 98 93.9
Liquid Limit Plastic Limit Plasticity Index USCS Class.		42 21 21 CL	41 21 20 CL	50 25 25 CH	49 26 23 CL

Remarks:

Jason J. Christian, P.E. Geotechnical Engineer

GeoCon, Inc. 21883 Highway 181 Fairhope, AL 36532 (251) 210-6252

# SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYM	BOLS	TYPICAL		
I IVI	ONS	GRAPH	LETTER	DESCRIPTIONS			
	GRAVEL AND	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES		
	GRAVELLY SOILS	(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES		
COARSE GRAINED SOILS	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES		
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES		
MORE THAN 50% OF MATERIAL IS	SAND AND	CLEAN SANDS		sw	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES		
LARGER THAN NO. 200 SIEVE SIZE	SANDY SOILS	(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES		
	MORE THAN 50% OF COARSE FRACTION	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES		
	PASSING ON NO. 4 SIEVE	(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES		
				ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY		
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS		
GOILO				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY		
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE				МН	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS		
SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		СН	INORGANIC CLAYS OF HIGH PLASTICITY		
				ОН	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS		
HI	HIGHLY ORGANIC SOILS				PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS		

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

# Important Information about Your 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 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 your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one* — *not even you* — should apply the 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.

## A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of 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,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- 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 study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the 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 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 construction recommendations included in your report. *Those 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 recommendations if that engineer does not perform construction observation.

## A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower 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. Contractors can also misinterpret a geotechnical engineer participate in prebid and preconstruction conferences, and by providing 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 Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface-it with a clearly written letter of transmittal. In that letter, advise contractors 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 contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors 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 contractors do not 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.

## **Geoenvironmental Concerns Are Not Covered**

The equipment, techniques, and personnel used to perform a *geoenviron-mental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental 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 geoenvironmental 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, a number of 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 ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/THE BEST PEOPLE ON EARTH exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

## ASFE THE GEOPROFESSIONAL BUSINESS ASSOCIATION

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SERVICES TO BE PROVIDED. GeoCon Engineering & Material Testing, Inc. (hereinafter GeoCon) is an independent consultant and agrees to provide Client, for its sole benefit and exclusive use, consulting services set forth in our proposal.

PAYMENT TERMS. Client agrees to pay our invoice upon receipt. If payment is not received within 30 days from the invoice date, Client agrees to pay a service charge on the past due amount at a rate of 1.5% per month, and GeoCon reserves the right to suspend all work until payment is received. No deduction shall be made from our invoice on account of liquidated damages or other sums withheld from payments to contractors or others.

TERMINATION. Either party may terminate this Agreement without cause upon 20 days advance notice in writing. In the event Client requests termination prior to completion of the proposed services, Client agrees to pay GeoCon for all costs incurred plus reasonable charges associated with termination of the work.

PROFESSIONAL LIABILITY. Notwithstanding any other provision of this Agreement, the Engineer's and GeoCon's total liability to the Owner for any loss or damages from claims arising out of or in connection with this Agreement from any cause including the Engineer's strict liability, breach of contract, or professional negligence, errors and omissions (whether claimed in tort, contract, strict liability, nuisance, by statute or otherwise) shall not exceed the lesser of the total contract price of this Agreement or the proceeds paid under Engineer's liability insurance in effect at the time such claims are made. The Owner hereby releases the Engineer from any liability exceeding such amount. In no event shall either party to this Agreement be liable to the other for special, indirect, incidental or consequential damages, whether or not such damages were foreseeable at the time of the commencement of the work under this Agreement.

SITE OPERATIONS. Client will arrange for right-of-entry to all applicable properties for the purpose of performing studies, tests and evaluations pursuant to the agreed services. Client represents that it possesses necessary permits and licenses required for its activities at the site.

OWNERSHIP AND USE OF PROJECT DOCUMENTS. All documents are instruments of service in respect to the Services, and Engineer shall retain an ownership and proprietary property interest therein {including the right of reuse at the discretion of the Engineer) whether or not the Services are completed. Client may make and retain copies of documents for information and reference in connection with the services by Client. Such documents are not intended or represented to be suitable for reuse by Client or others on extensions of the services or on any other project. Any such reuse or modification without written verification or adaptation by Engineer, as appropriate for the spedific purpose intended, will be at Client's sole risk and without liability or legal exposure to Engineer or to Engineer's consultants. Client shall indemnify and hold harmless Engineer and Engineer's consultants from all claims, damages, and expenses including attorneys' fees arising out of or resulting therefrom.

ADDITIONAL SERVICES OF CONSULTANT. If authorized in writing by the Client, GeoCon shall furnish additional services that are not considered as an integral part of the Scope of Services outlined in the Proposal Acceptance Sheet. Under this Agreement, all costs for additional services will be negotiated as to activities and compensation. In addition, it is possible that unforeseen conditions may be encountered that could substantially alter the original scope of services. If this occurs, GeoCon will promptly notify and consult with Client and any additional services will be negotiated.

ASSIGNABLLITY, GeoCon shall not assign any interest on this Agreement, and shall not transfer any interest in the same (whether by assignment or novation), without the prior written consent of the Client; provided, however, that claims for money by GeoCon against Client under this Agreement may be assigned to a bank, trust company, or other financial institution without such approval. Written notice of any such assignment or transfer shall be promptly furnished to the Client.

SERVICES TO BE CONFIDENTIAL. All services, including opinions, designs, drawings, plans, specifications, reports and other services and information, to be furnished by GeoCon under this Agreement are confidential and shall not be divulged, in whole or in part, to any person, other than to duly authorized representatives of the client, without prior written approval of the Client, except by testimony under oath in a judicial proceeding or as otherwise required by law. GeoCon shall take all necessary steps to ensure that no member of its organization divulges any such information except as may be required by Jaw.

CLAIMS. The parties agree to attempt to resolve any dispute without resort to litigation. However, in the event a claim is made that results in litigation, and the claimant does not prevail at trial, then the claimant shall pay all costs incurred in defending the claim, including reasonable attorney's fees. The claim will be considered proven if the judgment obtained and retained through any applicable appeal is at least ten percent greater than the sum offered to resolve the matter prior to the commencement of trial.

SEVERABILITY. It is understood and agreed by the parties hereto, that if any part, term or provision of this Agreement is held by any court of competent jurisdiction to be illegal or in conflict with any applicable law, the validity of the remaining portion or portions of this Agreement shall not be affected and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term or provision held to be invalid.

SURVIVAL. All obligations arising prior to the termination of this Agreement and all provisions of this Agreement allocating responsibility or liability between Client and GEOCON shall survive the completion of the services and the termination of this Agreement.

INTEGRATION. This Agreement, the attached documents and those incorporated herein constitute the entire Agreement between the parties and cannot be changed except by a written instrument signed by both parties.

GOVERNING LAW. This Agreement shall be governed in all respects by the laws of the State of Alabama and venue shall be in Baldwin County, Alabama.