Exhibit T. Foti - Highway 3120 N Geotechnical Report

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Foti - Highway 3120 N Geotechnical Report

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Proposed Foti Highway 3120 North – LED Investigation Donaldsonville, LA

Report of Subsurface Investigation and Geotechnical Evaluation

SESI Project No: B17-229
October 2, 2017

Baton Rouge Office

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SOUTHERN EARTH SCIENCES, INC.

Geotechnical, Environmental & Construction Materials Testing

October 2, 2017

Baton Rouge Area Chamber
564 Laurel Street
Baton Rouge, Louisiana 70801

Attn.: Mr. Jim Cavanaugh

Re: Geotechnical Engineering Services for
Foti Highway 3120 North - LED
Investigation
Donaldsonville, Louisiana
SESI File No.: B17-229

Dear Mr. Cavanaugh:

Southern Earth Sciences, Inc. (SESI) is pleased to submit our Geotechnical Engineering Study Report for the above referenced project. This report includes the results of field and laboratory testing, preliminary discussions and recommendations for the foundation design, and general site preparation as related to soils.

We appreciate the opportunity to perform this Geotechnical Engineering Study 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 our office.

Respectfully submitted,

SOUTHERN EARTH SCIENCES, INC.

Leigh Brister
Project Manager
Geotechnical Engineering Department

Sarah A. Finnegan, E.I.
Project Manager
Geotechnical Engineering Department

STATE OF LOUISIANA
MICHAEL J. JUNEAU, JR.
License No. 37242
PROFESSIONAL ENGINEER IN CIVIL ENGINEERING
10/6/2017

Mike Juneau, P.E., MBA
Baton Rouge Branch Manager

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PROJECT INFORMATION

Project Authorization

Southern Earth Sciences, Inc. (SESI) has completed a subsurface exploration for the proposed Foti Highway 3120 North preliminary site evaluation for marketing the project site in the Louisiana Economic Development Program (LEDP). Our geotechnical engineering services were performed in general accordance with SESI's Geotechnical Engineering Proposal No.: P17-256.08 dated August 21, 2017. Authorization to proceed with this investigation was received from Mr. Jim Cavanaugh through a signed *Work Authorization Sheet* dated August 29, 2017.

Project Description

It is understood that the project site will be marketed in the Louisiana Economic Development (LED) Certified Small Sites Program for future industrial or commercial development (which is unknown at this time). Based on the provided information, the proposed Foti Highway 3120 North site is a mostly undeveloped tract of land with a few existing structures spanning approximately 10 acres.

It is understood that in order to market the project site in the LED Program, the soil characteristics must be evaluated to ensure the suitability/compatibility for industrial development (i.e. warehouse buildings, roadways, etc.). In addition, LED requirements state that once the type of development is determined and a site plan is developed, additional subsurface investigations should be performed in order to provide project specific geotechnical engineering recommendations.

REPORT LIMITATIONS

The explorations and analyses for this preliminary study, as well as the discussions and preliminary recommendations in this report, were selected and developed based on our understanding of the project as described in this report. Furthermore, they are based on the assumption that the exploratory borings are a representation of the subsoil conditions throughout the site. Please note that variations in the subsoil conditions may occur between and beyond borings. If pertinent details of the project differ from the description provided in this report, we should be authorized to review the discrepancies, and if necessary, modify our preliminary discussions and recommendations.

We understand that we will be contracted to complete the additional geotechnical field exploration, laboratory testing, and analyses for actual features and locations, when the proposed future development is planned and ready to be implemented. This is will give us the opportunity to verify and supplement the preliminary discussions and recommendations included in herein and prepare a final report.

SESI had prepared this report for the exclusive use to Baton Rouge Area Chamber. The observations and preliminary recommendations provided in this report may not be applicable at

locations not explored by borings or in areas outside the project boundaries. This report should be made available for information only and not as a warranty of subsurface conditions.

PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to explore the subsurface conditions at the site to provide preliminary evaluation of subsurface characteristics for future industrial development. As proposed by the addressee and understood by SESI, two (2) locations across the site were tested for this project. Depths and locations were as proposed by the addressee and understood by SESI. All references to depth are based on the existing grade at the time of our field investigation.

The scope of services also included conducting laboratory tests on selected samples recovered from the test locations. These tests may have included visual description and classification, moisture content, liquid limit, and plastic limit. Both field and laboratory testing procedures are briefly discussed in Appendix A of this report.

This report includes a site description, discusses the conditions of the existing subsurface materials at the site, and presents recommendations on the following:

- Soil boring logs including identification and physical and engineering characteristics of subsurface materials encountered during the sampling and testing
- General discussion on subsurface conditions and their engineering characteristics
- Discussion on the suitability of existing subsurface soils for future industrial development including a “typical” 100,000 square foot warehouse building and associated roadways

The scope of geotechnical services did not include an environmental site assessment for determining the presence or absence of wetlands, hazardous or toxic materials in the soil, surface water, groundwater, or air on, below, or around the site. Any statement in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

In addition, SESI did not provide any service to investigate or detect the presence of moisture, mold, or other biological contaminates in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence or amplification of the same. The client acknowledges that mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. The client further acknowledges that site conditions are outside of SESI’s control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, SESI cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

FIELD EXPLORATION

The field exploration, performed to evaluate the engineering characteristics of the foundation materials, included sampling the test locations and recovering soil samples.

As previously mentioned, two (2) soil borings, one (1) to a depth of about 50 feet and one (1) to a depth of about 25 feet, were drilled and sampled for this project. The depths and locations of the test sites were as proposed by the addressee and understood by SESI. The test locations were determined at the project site using a handheld GPS device. The *Test Location Plan* sheet, included in Appendix D, presents the approximate sites of the test locations.

Descriptions of soil and groundwater conditions encountered in the test locations are shown on their respective logs in Appendix D. The boring logs are labeled with their initial letter followed by boring number. For example, log "B-1" represents boring '1' drilled for this project.

SUBSURFACE CONDITIONS

Subsurface Materials

The general subsurface description presented in the table below is generalized in nature to highlight the major subsurface materials features and characteristics. The boring logs, included in Appendix D, present specific information at individual test location including: soil description, stratification, ground water level, tests' location, and laboratory tests results. This information represents the actual conditions at the test locations. Variations may occur and should be expected between and beyond test locations. The stratification represents the approximate boundary between surface materials and the actual transition may be gradual.

Boring Number	Depth (ft.)	General Classification
B-1	0-2	Very Stiff, Gray and Brown Fat Clay
	2-4	Gray Lean Clay
	4-6	Medium Dense, Gray and Brown Clayey Silt
	6-18	Gray and Brown Lean Clay
	18-25	Medium, Gray Fat Clay
B-2	0-2	Soft, Gray and Brown Lean Clay
	2-8	Loose to Medium Dense, Gray and Brown Clayey Silt
	8-13	Gray and Brown Lean Clay
	13-50	Soft to Medium, Gray Fat Clay

Groundwater

Free groundwater level was detected at a depth of about seven (7) feet at both test locations during the time of our field investigation. We caution that the clay soils present at this site will have a

tendency to retain moisture and to create perched water conditions after periods of wet weather. Fluctuations in the groundwater level will occur due to variances in rainfall, elevation, drainage, types of soil encountered and other factors not evident at the time measurements were made. Groundwater levels should be verified prior to construction. Groundwater levels encountered at each test location at the time of our investigation are shown on the appropriate *Field Boring Logs* sheets attached in Appendix D. Reference to depth has been made with respect to the existing ground surface.

DISCUSSION

Based on the laboratory tests results, the encountered subsurface soil provided fair strength parameters and the subsurface clay soil encountered at all locations are generally medium in nature. Please refer to the boring logs attached to this report for strength, consistency, and density characteristics of soils with respect to depth.

Based on our review of the existing subsoil conditions and analysis of laboratory and field test results, we consider the proposed project to be feasible from a geotechnical point of view for future commercial and industrial development.

However, it is recommended that based on the proposed future development and project requirements, the project site should be further explored to provide specific recommendations related to site preparation, foundation design, pavement design, and construction considerations. Please note that this report should be considered only for preliminary site evaluation and is not intended for design purposes.

We encourage contacting SESI to provide further geotechnical engineering and construction services, when the proposed development is planned and ready to be implemented.

RECOMMENDATIONS

"Typical" Commercial Structure Recommendations

Considering the subsurface materials encountered, construction of a "typical" 100,000 square foot warehouse building with associated parking and driveways is feasible and practical from a geotechnical standpoint. The foundation type to support a typical warehouse building depends on the anticipated structural loads and fill requirement to achieve the design grade.

Shallow Foundation System

The subsurface soils encountered were predominately lean/fat clay, and exhibit low to moderate swelling potential based partially on the moisture contents of the soil at the time of this investigation. Therefore, the use of a traditional shallow foundation system (i.e., square and strip footings) or a post tensioned slab with grade beams system to support a "typical" warehouse structure is suitable

assuming structural column and wall loads are less than 35 kips and 2.5 kips per foot, respectively, and less than two (2) feet of fill material is required to achieve design grade. However, if the structure(s) are sensitive to total and/or differential settlements and/or structural loads are beyond the capacity limits for shallow foundations, the use of a deep foundation system may be required.

Deep Foundation System

The use of a deep foundation system is feasible to support a 'typical' warehouse structure if structural column and wall loads exceed 35 kips and 2.5 kips per foot, respectively, or is the proposed structure is sensitive to total and/or differential settlements in excess of one (1) inch.

Based on the subsurface soil encountered and the free groundwater table recorded, a driven pile foundation system, consisting of, but not limited to, timber piles, steel pipe piles and/or concrete piles, appears to be best suited for this site. An auger cast-in-place (ACIP) pile foundation system may be a viable option based on the required design requirements, but additional design information is needed to determine. Due to the relatively shallow groundwater table, the use of a drilled shaft foundation system may not be the most economical option for this project site.

Final recommendations and construction considerations for shallow and/or deep foundation systems will require further field exploration based on the site and project specific requirements. SESI should be contacted to provide these recommendations when deemed necessary by the design team.

SOUTHERN EARTH SCIENCES, INC.
Geotechnical, Environmental & Construction Materials Testing

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CONSTRUCTION MATERIALS TESTING

Full Range of Services and Unparalleled Response

Southern Earth Sciences, Inc. laboratories are **certified** by **AASHTO, AMRL, CMEC** and the **U.S. Army Corps of Engineers** to perform soil, concrete, asphalt and materials testing. Our professional inspectors and technicians continually participate in proficiency testing programs to ensure internal quality control.

FIELD TESTING AND INSPECTION

2016 EMR = 0.97

In addition to our laboratory testing facilities, SESI maintains a fully outfitted mobile field laboratory available for on-site testing. This allows our OSHA safety certified technicians to perform both call-out services on small projects or full-time quality control testing and inspection on major projects. The on-site testing lab offers a full range of services.

Services

- Dipstick technology for flatness testing of concrete slabs
- Soil testing—compaction, pile load testing, pile and caisson inspection, plate load bearing tests
- Asphaltic concrete testing—core density and thickness, evaluation of aggregates, mix designs, plant and field control
- Portland cement concrete—batch plant and field control, core drilling, molding, curing and testing cylinders
- Slump testing, air content and unit weight
- Pipe and block inspection
- Soundness and abrasion of aggregates
- Bridge inspection
- Pile integrity testing
- Pile dynamic analysis (PDA)
- Vibration monitoring
- Rebar location/depth of cover
- Post tensioning inspection
- Welding and steel framing inspections
- Vacuum and pressure testing

LABORATORY TESTING OF MATERIALS

Strategically located laboratories make testing of soils, concrete, asphalt and metals quick and convenient. Branch managers supervise all lab operations in accordance with ASTM Specifications E-329 and E-699. All equipment is calibrated annually to ensure accurate data. SESI technicians are certified by appropriate accrediting agencies on a routine basis.

Services

- Consolidation testing
- Flexible wall permeability testing
- Triaxial testing
- Soil classification testing
- Concrete strength testing
- Steel strength testing

Affiliate Member PEDESTAL AIA Baton Rouge

APPENDIX

APPENDIX A
FIELD AND LABORATORY PROCEDURES

Drilling Methods and Sampling Procedures

The borings were drilled with an ATV (all-terrain vehicle) mounted drill rig using hollow-stem auger or wet rotary drilling techniques to advance the borehole. Undisturbed samples were obtained using three (3) inch diameter thin-walled Shelby tube sampling procedures in general accordance with ASTM D-1587 *Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes*. These samples were extruded in the field with a hydraulic ram, and were identified according to project number, boring number and depth, wrapped in aluminum foil and placed in plastic bags to preserve the natural moisture condition; then, they were transported to the laboratory in containers to minimize disturbance.

When undisturbed samples could not be recovered, disturbed samples were obtained in accordance to the procedures of ASTM D-1586 *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils*. These samples were also identified according to project number, boring number and depth, and were placed in plastic bags and transported to the laboratory for testing. The depths at which undisturbed and/or disturbed samples were obtained are shown on the attached boring logs in Appendix E of this report.

Laboratory Testing Program

A supplemental laboratory testing program was conducted to determine additional pertinent engineering characteristics of the subsurface materials. This program may have included the following procedures:

- Visual description and classification and determination of the moisture content on all samples.

- ASTM D2216 *Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass*: This test is performed to determine the water (moisture) content of soils obtained from the field exploration. The water content is the ratio, expressed as a percentage, of the mass of “free” water in a given mass of soil to the mass of the dry soil solids.

- ASTM D4318 *Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils:* These test methods cover the determination of the liquid limit, plastic limit, and the plasticity index of soils which are used to classify the soil and evaluate index properties and residual strength characteristics of the soils.

- ASTM D2166 *Standard Test Method for Unconfined Compressive Strength of Cohesive Soils*: Unconfined Compressive Strength (UC) tests are used to evaluate the shear strength characteristics of soils.

- ASTM D-422 *Standard Test Method for Particle-Size Analysis of Soils:* This test method covers the quantitative determination of the distribution of particle sizes in soils. The distribution of larger particles is determined by sieving (No. 200 sieve), while the distribution of smaller particles is determined by a sedimentation process, using a hydrometer.

The results of these tests are found in the accompanying boring logs located in the Appendix. Please note that the samples obtained and not tested will be retained for a period of thirty (30) days; if further instructions are not received, SESI will dispose the samples at that time.

APPENDIX B
STRUCTURAL FILL SPECIFICATIONS AND CONSIDERATIONS

Structural Fill Materials

After subgrade preparation and observation has been completed, structural fill placement, if necessary, may begin. The structural fill should consist of lean clays and sandy lean clays (CL) or clayey sands (SC) having the following recommended material properties:

a. Liquid Limit: 40 maximum
b. Plasticity Index: 12 to 22 maximum
c. Inert Material (Non-Expansive)
d. Free of Organics
e. Maximum Particle Size: 2-in

This material must be certified and approved by the Geotechnical Engineer prior to its use.

Structural Fill Deposit Construction

After all surface preparation and observation has been completed, the structural fill activities may begin. These activities must be performed in a sequential order where lower elevations must be worked before higher ones. The structural fill shall be deposited in lifts of eight (8) inches of loose material. Each lift shall be compacted and certified by the Geotechnical Engineer or a representative prior to placement of other lifts. The passing criteria shall be a 95% of the maximum dry density as determined by ASTM D-698, *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))*, and a moisture content between one (1) below and three (3) above percentages of the optimum moisture content. If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying. As a guideline, it is recommended that field density tests be performed at a frequency of not less than one test per 2,500 square feet.

It is important to maintain the structural fill thickness as uniform as possible. Uneven fill thicknesses under a structure may cause differential soil responses to the applied loads which can produce cracking, settling, or tilting of the structure. Uniform fill areas shall consider the footprint of the structure plus a five (5) feet strip around its perimeter.

Fill slopes shall be maintained at a maximum 2 Horizontal: 1 Vertical steepness. The runoff of water across the faces of the slopes shall be avoided by appropriate drainage ways. In addition, appropriate drainage ways shall be maintained at all earthwork surface areas in order to not affect compaction.

Proof Rolling

Upon completion of the stripping activities, the exposed areas shall be properly proof rolled in order to prepare the natural terrain to receive the design structural fill and traffic loads. The proof roll consists of compacting the exposed surface with a 20- to 25-ton loaded dump truck. Surface soils that are observed to rut or deflect under the truck load should be undercut and replaced with the proper structural fill. These activities should be performed during a period of dry weather and should be supervised by a Geotechnical Engineer or a representative.

APPENDIX C
CONSTRUCTION CONSIDERATIONS

Observation and Testing

The preceding recommendations require a close supervision of the Geotechnical Engineer or representative; therefore, it is recommended that SESI be retained to provide observation and testing for the complete duration of all earthwork and foundation activities for this project. SESI cannot accept responsibility for any conditions deviated from those described in this report, nor for the performance of the foundation if not engaged to provide construction observation and testing.

Moisture Sensitive Soils/Weather Related Concerns

Most of the subsurface materials encountered at this site are expected to be sensitive to disturbances caused by changes in moisture content. During wet weather periods, the increment of the moisture content of the soil may cause a significant reduction of the soil strength and support capabilities. Furthermore, soils that become wet may be slow to dry, thus significantly retarding the progress of grading and compaction activities. For these reasons, it will be advantageous to perform earthwork and foundation construction activities during dry weather.

Foundation Maintenance

Water shall be kept from ponding adjacent to the structure at all times in order to prevent reductions of the soil strength and support capabilities. For this, the following measures shall be implemented:

a) Surface Drainage – always drain away from the foundation; on vegetated ground, a minimum slope of 5% is required. Never allow water to accumulate close to or around the foundation.

b) Landscaping:

- Avoid placing plants immediately adjacent to the foundation.
- Avoid placing sprinkler system pipes near the foundation (they could leak).
- Direct sprinkler heads away from the foundation.

Trees shall be planted at a minimum distance of half the anticipated canopy diameter or twenty (20) feet, whichever is larger, from the foundation edge. If existing trees are closer than this, they should be thoroughly soaked at least twice a week during dry periods and once a week during moderate rainfall periods.

Excavations Regulations

In the Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better

insure the safety of workmen entering trenches or excavations. It is mandated, by this federal regulation, that excavations, whether they be utility trenches, basement excavations or footing excavations, be constructed in accordance with the new OSHA guidelines.

The contractor is solely responsible for designing and constructing stable, temporary excavations and shall shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. SESI does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations.

APPENDIX D

SUPPORTING DOCUMENTS

SOUTHERN EARTH SCIENCES, INC.

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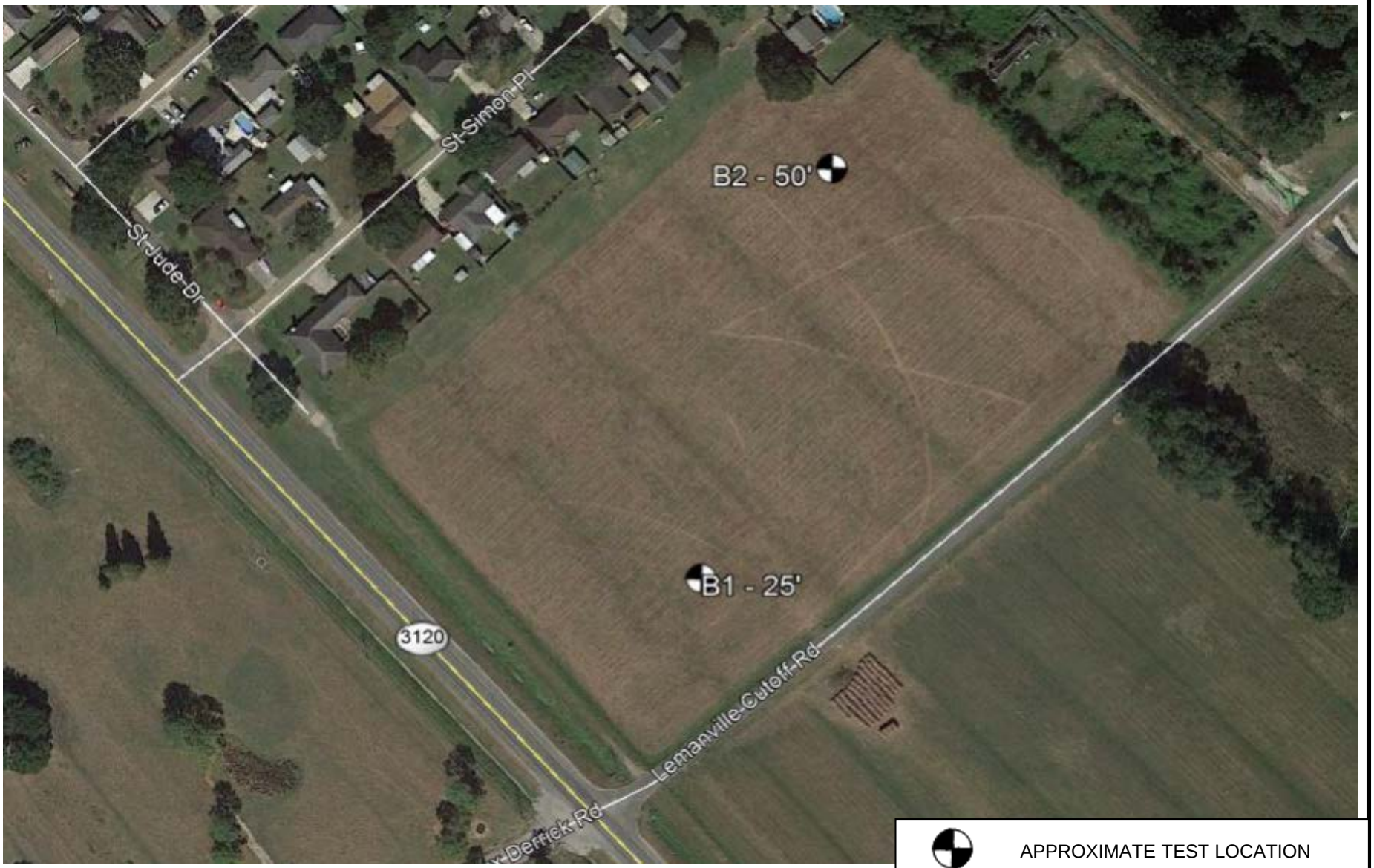

APPROXIMATE TEST LOCATION

N

PROPOSED FOTI HIGHWAY 3120 NORTH SITE
DONALDSONVILLE, LOUISIANA
SESI FILE NO.: B17-229

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FIGURE 1
TEST LOCATION PLAN

BORING LOG

BORING NO.: **PROJECT NO.:**
PROJECT: **DATE DRILLED:**
PROJECT LOCATION: **DATE COMPLETED:**
BORING LOCATION: **WATER LEVEL:**
BORING ELEVATION: **WATER LEVEL DATE:**
GEOL/ENGR: **LOGGED BY:**
METHOD: **DRILLER:**

DEPTH (FEET)	SAMPLE	Standard Penetration (Blows/Ft.) or Penetrometer (TSF)	Unconfined Compressive Strength (TSF)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	Symbol	MATERIAL CLASSIFICATION

Description of strata as follows:
Strength (or Consistency), Color, Minor Constituent, Major Constituent, additional observations, etc.

Field evaluation of shear strength/relative density:
Standard Penetration Test (ASTM D-1586) in Blows/Ft.
Pocket penetrometer readings in Tons/Sq. Ft.

Groundwater second reading

Groundwater first encountered

Graphical presentation of material type:

Fat CLAY	SILT	SAND	FILL
Lean CLAY	CLAYEY SILT	CLAYEY SAND	GRAVEL
ORGANIC CLAY	SANDY SILT	SILTY SAND	GRAVELLY SAND
PEAT	ORGANIC SILT	SANDY CLAY	

Laboratory Information

As determined by Unconfined Compression (ASTM D-2166) or Unconsolidated Undrained Triaxial (ASTM D-2850), if noted.

Determined using applicable portions of ASTM D-2166 and ASTM D-2216.

Determined using ASTM D-2216 or D-4959.

Determined using ASTM D-4318. Provides data for application of Unified Classification System (UCS).

COMMENTS:

Shelby Tube Sample
Auger Sample
Split-spoon Sample
No Recovery

Sample recovery method.

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GENERAL NOTES FROM LITERATURE

Unified Soil Classification System

Coarse-grained soils. More than 50% retained on US # 200 Sieve	***Gravels: More than 50% retained on US # 4 Sieve***	*Clean Gravel (little or no fines)*	*GW*	*Well graded gravels and gravel-sand mixtures with little or no fines*
			GP	*Poorly graded gravels and gravel-sand mixtures with little or no fines*
		Gravels with fines	*GM*	*Silty gravels, gravel-sand-silt mixtures*
			GC	*Clayey gravels, gravel-sand-clay mixtures*
	Gravels: More than 50% passing through US # 4 Sieve	*Clean sand (little or no fines)*	*SW*	*Well graded sands and gravelly sands, little or no fines*
			SP	*Poorly graded sands and gravelly sands, little or no fines*
		Sands with fines	*SM*	*Silty sands, sand-silt mixtures*
			SC	*Clayey sands, sand-clay mixtures*
Fine-grained soils. More than 50% passed through US Sieve # 200	***Silts and Clays with liquid limit (LL) less than 50***		*ML*	*Inorganic silts, very fine sands, rock flour, silty or clayey fine sands*
			CL	*Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays*
			OL	*Organic silts and organic silty clays of low plasticity*
	Silts and Clays with liquid limit (LL) greater than 50		*MH*	*Inorganic silts, micaceous diatomaceous fine sand or silty soil, elastic silts*
			CH	*Inorganic clays of high plasticity, fat clays*
			OH	*Organic clays of medium to high plasticity*
High organic soils			*PT*	*Peat, muck and other highly organic soils*

Classification of Granular Soils as per U.S. Standard Sieve Analysis

Description	*Boulders*	*Cobbles*	*Gravel*		*Sand*			*Silt or Clay*
			Coarse	*Fine*	*Coarse*	*Medium*	*Fine*	
Sieve Size	***>12 inches***	***3-12 inches***	***0.75 to 3inches***	***#4 to 0.75 iches***	***#10-#4***	***#40-#10***	***#200-#40***	***<#200***

Note:#4=5mm, #10=5mm, #40=0.4mm,#200=0.8mm

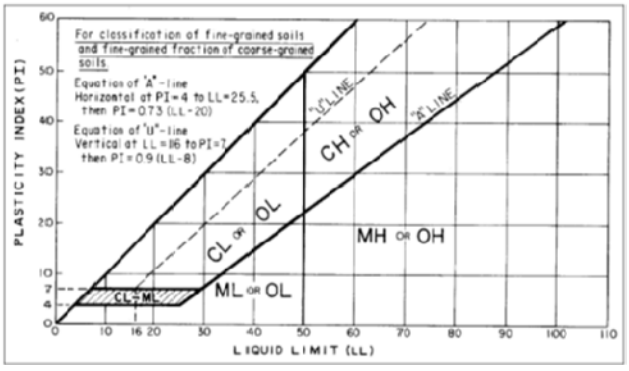
Consistency of Cohesive Soils

Consistency	Unconfined Compressive Strength, (tsf)	SPT* (N)
Very Soft	<0.25	<2
Soft	0.25 to 0.50	2 to 4
Medium Stiff	0.50 to 1.0	5 to 8
Stiff	1.0 to 2.0	9 to 15
Very Stiff	2.0 to 4.0	16 to 30
Hard	>4.0	>30

Relative Density of Granular Soils

Relative Density	SPT* (N)
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 24
Dense	25 to 50
Very Dense	>50

**Standard Penetration test (SPT) value (N-value) is a number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18 inches penetration with a 140-pound hammer falling from 30 in. height.*



Plasticity Characteristics

Plasticity	Plasticity Index (PI)
Non-Plastic	0
Slight	1 to 5
Low	5 to 10
Medium	11 to 20
High	21 to 40
Very high	> 40

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Geotechnical, Environmental & Construction Materials Testing

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CONSTRUCTION MATERIALS TESTING

Full Range of Services and Unparalleled Response

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Affiliate Member PEDESTAL AIA Baton Rouge

BORING LOG

BORING NO.: B-1
PROJECT: FOTI HWY. 2130 NORTH
PROJECT LOCATION: DONALDSONVILLE, LA
BORING LOCATION: 30° 5'49.61"N; 90°56'32.97"W
BORING ELEVATION: EXISTING GRADE
GEOL/ENGR: MJ
METHOD: AUGER / WET

PROJECT NO.: B17-229
DATE DRILLED: 09/13/17
DATE COMPLETED: 09/13/17
DEPTH TO WATER LEVEL: 7 ft
WATER LEVEL DATE: 09/13/17
LOGGED BY: WW
DRILLER: SESI

DEPTH (FEET)	SAMPLE	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	SYMBOL	MATERIAL CLASSIFICATION
0	D	2.02 (1)	32	77	70	48		Very Stiff, Gray and Brown Fat CLAY with silt and grass roots (CH)
			33					Gray Lean CLAY with trace fine sand (CL)
5		0.85 (2)	33	89				Medium Dense, Gray and Brown Clayey SILT with fine sand (ML)
	▽		45					Gray and Brown Lean CLAY with organic pockets (CL)
		0.45 (3)	48	77	48	23		-- soft
10								
			31					
15								
		0.75 (4)	46	75	85	59		Medium, Gray Fat CLAY with trace organics (CH)
20								
			50					
25								Bottom at 25 Feet
30								(1) UU Triaxial Test at 0.4 psi (2) UU Triaxial Test at 1.7 psi (3) UU Triaxial Test at 3.0 psi (4) UU Triaxial Test at 6.3 psi

COMMENTS:

D DISTURBED SAMPLE ■ SHELBY TUBE

BORING LOG

BORING NO.: B-2
PROJECT: FOTI HWY. 2130 NORTH
PROJECT LOCATION: DONALDSONVILLE, LA
BORING LOCATION: 30° 5'54.23"N; 90°56'31.36"W
BORING ELEVATION: EXISTING GRADE
GEOL/ENGR: MJ
METHOD: AUGER / WET

PROJECT NO.: B17-229
DATE DRILLED: 09/13/17
DATE COMPLETED: 09/13/17
DEPTH TO WATER LEVEL: 7 ft
WATER LEVEL DATE: 09/13/17
LOGGED BY: WW
DRILLER: SESI

DEPTH (FEET)	SAMPLE	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	SYMBOL	MATERIAL CLASSIFICATION
	D		25					Soft, Gray and Brown Lean CLAY (CL)
		0.40 (1)	31	91	39	16		
			31					Loose to Medium Dense, Gray and Brown Clayey SILT (ML)
▽		0.52 (2)	32	92	32	5		
			34					Gray and Brown Lean CLAY (CL)
10								
		0.44 (3)	68	61	120	91		Soft to Medium, Gray Fat CLAY with calcareous nodules, organic pockets, silty sand lenses, and trace silt (CH)
			43					
20								
		0.68 (4)	50	72				
			65					
30								
		0.99 (5)	41	78				
			67					
40								
		0.75 (6)	38	80				
			40					
50								Bottom at 50 Feet
60								

(1) UU Triaxial Test at 1.0 psi
(2) UU Triaxial Test at 2.3 psi
(3) UU Triaxial Test at 4.6 psi
(4) UU Triaxial Test at 7.9 psi
(5) UU Triaxial Test at 11.2 psi
(6) UU Triaxial Test at 14.5 psi

COMMENTS:

D DISTURBED SAMPLE ■ SHELBY TUBE

SOUTHERN EARTH SCIENCES, INC.

Geotechnical, Environmental & Construction Materials Testing

Laboratory Test Results

Foti Hwy. 2130 North, Donaldsonville, LA | **Technical Responsibility:** MJ | **Quality Assurance Officer:** RLJ

Client: BRAC | Project No.: **B17-229** | PM: MJ | Date of Issue: 9/19/2017

			ASTM DESIGNATION																
			D2216	D4318			D2166		D2166	D2850		D422, C136 or C117							
				Atterberg Limits					Cohesion			Grain Size (%)							
Boring No.	Depth (ft)	Classification	ω %	LL	PL	PI	γ_{wet} pcf	γ_{dry} pcf	U psf	UU psf	Confining Pressure psi	Gravel	Sand	Silt	Clay	% Passing #200	USCS	Remarks
B-1	0-2	Very Stiff, Gray and Brown Fat CLAY with silt and grass roots	31.5	70	22	48	101.0	76.8		2021.8	0.4						(CH)	Disturbed Sample
B-1	2-4	Gray Lean CLAY with trace fine sand	32.7														(CL)	30° 5'49.61"N; 90°56'32.97"W
B-1	4-6	Medium Dense, Gray and Brown Clayey SILT with fine sand	32.6	NP	NP	NP	117.9	88.9		846.2	1.7						(ML)	
B-1	6-8	Gray and Brown Lean CLAY	44.9														(CL)	Water Level = 7'
B-1	8-10	Soft, Gray Lean CLAY with organic pockets	47.5	48	25	23	114.0	77.3		453.3	3.0						(CL)	
B-1	13-15	Gray Lean CLAY with organic pockets	31.1														(CL)	
B-1	18-20	Medium, Gray Fat CLAY with trace organics	46.2	85	26	59	108.9	74.5		751.5	6.3						(CH)	
B-1	23-25	Gray Fat CLAY with trace organics	50.2														(CH)	
B-2	0-2	Gray and Brown Lean CLAY	25.4														(CL)	30° 5'54.23"N; 90°56'31.36"W
B-2	2-4	Soft, Gray and Brown Lean CLAY becoming Loose, Gray and Brown Clayey SILT	31.0	39	23	16	119.3	91.1		401.9	1.0						(CL)(ML)	
B-2	4-6	Brown and Gray Clayey SILT	31.0														(ML)	
B-2	6-8	Medium Dense, Gray and Brown SILT with trace clay	31.5	32	27	5	121.7	92.4		516.0	2.3						(ML)	Water Level = 7'
B-2	8-10	Gray and Brown Lean CLAY	33.7														(CL)	
B-2	13-15	Soft, Gray Fat CLAY with organic pockets	67.7	120	29	91	101.6	60.6		444.4	4.6						(CH)	
B-2	18-20	Gray Fat CLAY	42.8														(CH)	
B-2	23-25	Medium, Gray Fat CLAY with calcareous nodules	50.0				108.0	71.9		684.6	7.9						(CH)	
B-2	28-30	Gray Fat CLAY with organics	65.0														(CH)	
B-2	33-35	Medium, Greenish Gray Fat CLAY	40.6				110.2	78.4		994.7	11.2						(CH)	
B-2	38-40	Gray Fat CLAY with silty sand lenses	66.6														(CH)	
B-2	43-45	Medium, Gray Fat CLAY with calcareous nodules and trace silt	37.6				109.8	79.8		750.3	14.5						(CH)	
B-2	48-50	Gray Fat CLAY	40.1														(CH)	

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 engineering report. Reduce that risk by having your 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 *geoenvironmental* 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 Geotechnical Engineer for Additional Assistance

Membership in ASFE/The Geoprofessional Business Association 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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