

# Exhibit AA.

## Girouard Site Preliminary Geotechnical Engineering Report





**Girouard Site Preliminary  
Geotechnical Engineering Report**

**ECS Southeast, LLP**

Geotechnical Engineering Report

**Proposed Girouard Site – Lafayette Parish, LA**

Highway 90E and North Girouard Road  
Broussard, LA  
70518

ECS Project Number 65-1076

April 9, 2021





# ECS SOUTHEAST, LLP

Geotechnical • Construction Materials • Environmental • Facilities

"Setting the Standard for Service"

April 9, 2021

Mr. Zach Hager  
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Lafayette, Louisiana 70503

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(337) 408-3669

ECS Project No. 65-1076

Reference: Preliminary Geotechnical Site Characterization Report  
**Proposed Girouard Site**  
Highway 90E and N Girouard Rd  
Broussard, LA 70518

Dear Mr. Hager:

ECS Southeast, LLP (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the referenced project. Our services were performed in general accordance with our Proposal No. 65-1122P dated October 21<sup>st</sup>, 2020. ***This report is not a comprehensive geotechnical engineering report but is solely designed to address specific preliminary issues posed in a October 13, 2020 document from CSRS relative to this site. It must be emphasized that additional borings and testing will be required prior to development of the site.*** This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration and laboratory testing conducted. The report also contains our findings and recommendations for design and construction.

It has been our pleasure to be of service to One Acadiana during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify the assumptions of subsurface conditions made for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully,  
ECS SOUTHEAST, LLP



Landon Meyer P.E.  
**Geotechnical Project Manager**

Mark J. Carlson, P.E., RPG, D.GE  
**Chief Engineer**

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## 1.0 INTRODUCTION

### 1.1 GENERAL

The purpose of this study was to conduct a *Preliminary* Geotechnical Characterization Investigation for the site that would generally characterize the site's soil, rock, and groundwater conditions to substantiate that unfavourable geotechnical conditions do not exist on the site. **This document specifically addresses preliminary design issues posed in the October 13, 2020 document from CSRS.**

The preliminary recommendations developed for this report are based on project information provided by the client. This report contains the results of our subsurface exploration and geotechnical laboratory testing program, site characterization, engineering analyses, and preliminary recommendations.

### 1.2 SCOPE OF SERVICES

In order to obtain the necessary geotechnical information required for evaluation of subsurface soil conditions, two (2) borings varying from 30 to 50 feet below existing site grades were performed. A laboratory-testing program was also implemented to characterize the physical and geotechnical engineering properties of the subsurface soils.

This report discusses our exploratory and testing procedures, presents our findings and evaluations and includes the following:

- A brief review and description of our field and laboratory test procedures and the results of testing conducted.
- A review of surface topographical features and site conditions.
- A review of subsurface soil stratigraphy with pertinent available physical properties.
- A final copy of our preliminary soil test borings.
- Preliminary recommendations for site preparation.
- Preliminary Recommended foundation types.

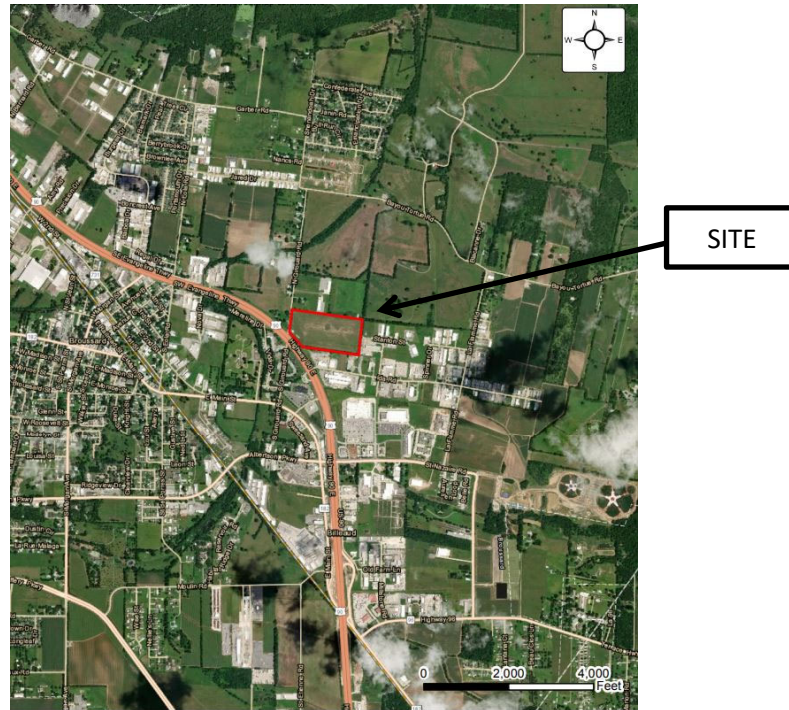
### 1.3 AUTHORIZATION

Our services were provided in accordance with our Proposal No. 65-1122P dated October 21<sup>st</sup>, 2020 and authorized by the client on January 4<sup>th</sup>, 2021.

## 2.0 PROJECT INFORMATION

### 2.1 PROJECT LOCATION

The project is located on the corner of Highway 90E and N Girouard Road in Broussard, Louisiana. The location is depicted in the Figure shown below:



Site Location Plan

### 2.2 CURRENT SITE CONDITIONS

The site is currently undeveloped and has been cleared of trees and vegetation for agricultural use. The topography of the site is relatively flat with surface elevations ranging from +36 feet to +39 feet MSL. The elevations and topographic variations were obtained from Google Earth Pro.

### 2.3 PROPOSED CONSTRUCTION

ECS understands that the Louisiana Economic Development (LED) Site Certification requires preliminary confirmation that the site is compatible with industrial development and that it could support the construction of a 'typical' manufacturing building encompassing 100,000 square feet and appurtenant on-site roadways and infrastructure. Detailed loadings were not provided to ECS at the time of this report. Any soil augmentation that may be required for the construction of the foundations, buildings and roadways will be addressed in this report.

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## 3.0 FIELD EXPLORATION

### 3.1 FIELD EXPLORATION PROGRAM

The field exploration was planned with the objective of characterizing the project site in general geotechnical and geological terms and to evaluate subsequent field and laboratory data to assist in the determination of geotechnical recommendations consistent with the aforementioned CSRS criterion.

#### 3.1.1 Test Borings

The subsurface conditions were explored by drilling a total of two (2) soil test borings. One (1) boring was drilled to a terminal depth of approximately 30 feet below the existing site grade, whereas another boring was drilled to a depth of approximately 50 feet below the existing site grades.

A track-mounted rig was utilized to drill the borings with continuous flight auger and wet rotary drilling techniques. The subsurface exploration was completed under the general supervision of an ECS representative.

The boring locations were selected by representatives of ECS based on the site plan provide by the client and identified in the field by ECS personnel using the supplied diagram and handheld GPS unit. The approximate as-drilled boring locations are shown on the Boring Location Diagram in Appendix A. The approximate ground surface elevations noted in this report were obtained from Google Earth.

Representative soil samples were obtained by means of Standard Penetration Test (SPT) procedures in accordance with ASTM Specifications D-1586 in granular soils and by means of Shelby tube sampling procedures in accordance with ASTM Specifications D-1587 in cohesive soils. SPT sampling is performed by driving a split-barrel sampler into the soil in 1.5-foot intervals with a 140-lb hammer and measures the resistance of the soil to penetration of the 2-inch diameter sampler. In the Shelby tube sampling procedure, a thin walled, steel, seamless tube with sharp cutting edges is pushed hydraulically into the soil, and a relatively undisturbed sample is obtained.

Field logs of the soils encountered in the borings were maintained by the drill crew. After recovery, each geotechnical soil sample was removed for the sampler and visually classified. Representative portions of each soil sample were then wrapped in plastic and transported to our laboratory for further visual examination and laboratory testing. After completion of the drilling operations, the boreholes were backfilled with cuttings to the existing ground surface.

### 3.2 SUBSURFACE CHARACTERIZATION

The following Table provides generalized characterizations of the soil strata encountered during our subsurface exploration. For subsurface information specific information, please refer to the Boring Logs in Appendix B.



**General Subsurface Stratigraphy**

Approximate Depth (ft)	Elevation <sup>(1)</sup> (ft, MSL)	Stratum No.	Soil Description
0-0.5 ft	EL. + 38 to + 37.5	-	<b>Topsoil</b>
0.5-6 ft	EL. +37.5 to + 32	I	<b>B-1(Only): FAT CLAY (CH)</b> , Medium Stiff to Hard, Moist <b>B-2: CLAYEY SILT (ML)</b> , Stiff to Very Stiff, Moist
6- 18 ft	EL. + 32 to + 20	II	<b>LEAN CLAY (CL)</b> , Firm to Stiff, Moist
18- 23 ft	EL. + 20 to + 15	III	<b>FAT CLAY (CH)</b> , Stiff to Hard, Moist
23- 28 ft	EL. + 15 to + 10	IV	<b>SANDY LEAN CLAY to LEAN CLAY WITH SAND (CL)</b> , Stiff, Moist
28- 50 ft	EL. + 10 to -12	V	<b>CLAYEY SAND (SC)</b> , Medium Dense to Dense, Moist

Please refer to the attached boring logs and laboratory data summary for this field exploration for a more detailed description of the subsurface conditions encountered in the borings as the stratification descriptions above are generalized for presentation purposes.

**3.3 GROUNDWATER OBSERVATIONS**

Groundwater level observations were made in the borings during drilling operations. In auger drilling operations, water is not introduced into the borehole and the groundwater position can often be determined by observing water flowing into and out of the excavation. Furthermore, visual observation of soil samples retrieved can often be used in evaluating the groundwater conditions. Free groundwater was observed at the time of drilling in boring B-1 at 10 feet below existing grade. Free ground water was not observed in B-2.

The highest groundwater observations are normally encountered in the late winter or early spring, or following seasonal heavy rainfall events. Fluctuation in the location of the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff and other factors not immediately apparent at the time of his investigation. Therefore, the groundwater conditions at this site are expected to be significantly influenced by surface water runoff and rainfall.



#### **4.0 LABORATORY TESTING**

The laboratory testing was performed by ECS on selected samples obtained during our field exploration operations. Classification and index property tests were performed on representative soil samples obtained from the test borings in order to aid in classifying soils according to the Unified Soil Classification System and to quantify and correlate engineering properties. The soil samples were tested for moisture content, Atterberg Limits, percent passing the US Standard No. 200 sieve, and unconfined compressive strength.

An experienced geotechnical professional visually classified each soil sample from the test borings on the basis of texture and plasticity in accordance with the Unified Soil Classification System (USCS) and ASTM D-2488 (Description and Identification of Soils-Visual/Manual Procedures). After classification, the geotechnical professional grouped the various soil types into the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses following the soil descriptions on the boring logs. The stratification lines designating the interfaces between earth materials on the boring logs are approximate; in situ, the transitions may be gradual.

The soil samples will be retained in our laboratory for a period of 60 days, after which, they will be discarded unless other instructions are received as to their disposition.

## 5.0 GEOTECHNICAL RECOMMENDATIONS

The following *preliminary* recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions. These recommendations are preliminary in nature and are for planning purposes only. The recommendations are based on a very limited geotechnical exploration. They should not be used for design or construction. Design and construction recommendations for planned structures will require a thorough geotechnical investigation and engineering analysis.

**The proposed site is generally compatible with industrial development depending on the type and anticipated loads of the proposed structures.** The following Sections of this document present our general recommendations with regard to the proposed site:

### 5.1 SITE PREPARATION

In a dry and undisturbed state, the near surface soils will provide good subgrade support for engineered fill placement and construction operations. However, when wet, this soil will degrade quickly with disturbance from contractor operations. Chemical stabilization of the insitu with lime, LKD or Portland cement may be necessary depending on seasonal conditions. Therefore, good site drainage should be maintained during earthwork operations, which would help maintain the integrity of the soil.

The surface of the site should be kept properly graded in order to enhance drainage of the surface water away from the proposed building areas during the construction phase. We recommend that an attempt be made to enhance the natural drainage without interrupting its pattern.

The soils at the site are moisture and disturbance sensitive and contain fines which are considered moderately erodible. Therefore, the contractor should carefully plan his operation to minimize exposure of the subgrade to weather and construction equipment traffic and provide and maintain good site drainage during earthwork operations to help maintain the integrity of the surficial soils. All erosion and sedimentation shall be controlled in accordance with sound engineering practice and current jurisdictional requirements.

In preparing the site for construction, all loose, poorly compacted existing soils, vegetation, organic soil, existing pavements, foundations or utilities, existing fill material, or other unsuitable materials should be removed from all proposed building and paving areas, and any areas receiving new fill.

### 5.2 SHALLOW FOUNDATIONS

Given that subgrades and structural fills are prepared properly, the proposed structure can be supported by conventional shallow spread footings. A net allowable soil bearing pressure of 2,500 psf may be used for footings bearing on compacted in-situ clayey silt or on compacted select fill. Footings should extend at least 24 inches below grade in order to utilize this bearing pressure.

**Boring B-1 indicated the presence of fat clay in near-surface soils. These soils are considered to**

**be expansive and will be required to be excavated and replaced with engineered compacted fill material.** The Table (below) provides estimated size for square footing dimensions based on assumed column loads as required by the CSRS document:

<b>ESTIMATED SQUARE SHALLOW FOOTING SIZE</b> <b>Net Allowable Bearing Capacity = 2,500 psf</b> <b>F.S.=3</b>		
<b>Assumed Column Load (Kips)</b>	<b>Spread Footing Plan Dimensions</b>	
	<b>Depth (ft.)</b>	<b>Width (ft.)</b>
25	2	3.5
50	2	5
100	2	6.5

These design parameters assume that positive drainage will be provided away from structures and with no excessive wetting or drying of soils adjacent to the foundations. Greater potential movements could occur with extreme wetting or drying of the soils due to ponding of water, plumbing leaks or lack of irrigation.

The net allowable soil bearing pressure refers to that pressure which may be transmitted to the foundation bearing soils in excess of the final minimum surrounding overburden pressure. The final footing and/or grade beam elevation should be evaluated by competent geotechnical engineering personnel to verify that the bearing soils are capable of supporting the recommended net allowable bearing pressure and suitable for foundation construction.

## **5.2 DEEP FOUNDATIONS**

The recommended pile length and the estimated corresponding allowable capacities for 14-inch square precast prestressed concrete piles are presented in the following Table for use in feasibility studies, planning, and cost estimating purposes per the CSRS document:

<b>PRELIMINARY ESTIMATED ALLOWABLE SINGLE PILE CAPACITIES (TONS)</b>		
<b>Pile Length (feet)</b>	<b>14-inch Square PPC Pile</b>	
	<b>Compression (TONS)</b>	<b>Tension (TONS)</b>
35	65	25
40	80	32.5
45	102.5	40
50	122.5	50

The estimated pile capacities include a factor of safety of two (2) in compression and three (3) in tension which requires that a static load test will be performed. If a field load test is not performed, ECS recommends using a factor of safety of 2.5 for compression to determine the allowable capacities. The recommended pile lengths are referenced from the existing ground surface at the time of drilling. The allowable capacity estimates provided in the Table are based on field and laboratory testing and assume proper design and installation. Please note that these estimated capacities do not account for negative skin friction effects that may reduce total capacity if fill is placed on site.

## 6.0 REPORT LIMITATIONS AND CLOSING

ECS has prepared this report of findings, evaluations, and *preliminary* recommendations to generally characterize the sites soil and groundwater conditions to substantiate that unfavorable geotechnical conditions do not exist at the site.

The preliminary recommendations provided in this report are based on the data obtained from the limited field exploration and laboratory testing at the specified boring locations for the purpose of a general site characterization. The recommendations are not intended for use in final design or construction. Final design and construction recommendations for any structure proposed on the site will require a more detailed investigation and engineering analysis.

The description of the proposed site is based on information provided to ECS by the client. If any of this information is inaccurate, either due to our interpretation of the documents provided or site that may occur later, ECS should be contacted immediately in order that we can review the report in light of the changes and provide additional or alternate recommendations as may be required to reflect the proposed site.

We recommend that ECS be allowed to review the project's plans and specifications pertaining to our work so that we may ascertain consistency of those plans/specifications with the intent of the geotechnical report.

## **APPENDIX A – Figures**

Site Location Map  
Boring Location Diagram  
Subsurface Cross-Section





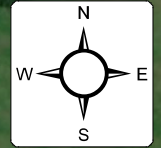
## SITE LOCATION DIAGRAM GIROUARD SITE

**N GIROUARD RD & HWY 90 E, BROUSSARD, LOUISIANA  
ONEACADIANA**




ENGINEER DM01
SCALE AS NOTED
PROJECT NO. 65:1076
SHEET 1 OF 1
DATE 4/9/2021





**Legend**

 Approximate boring locations -



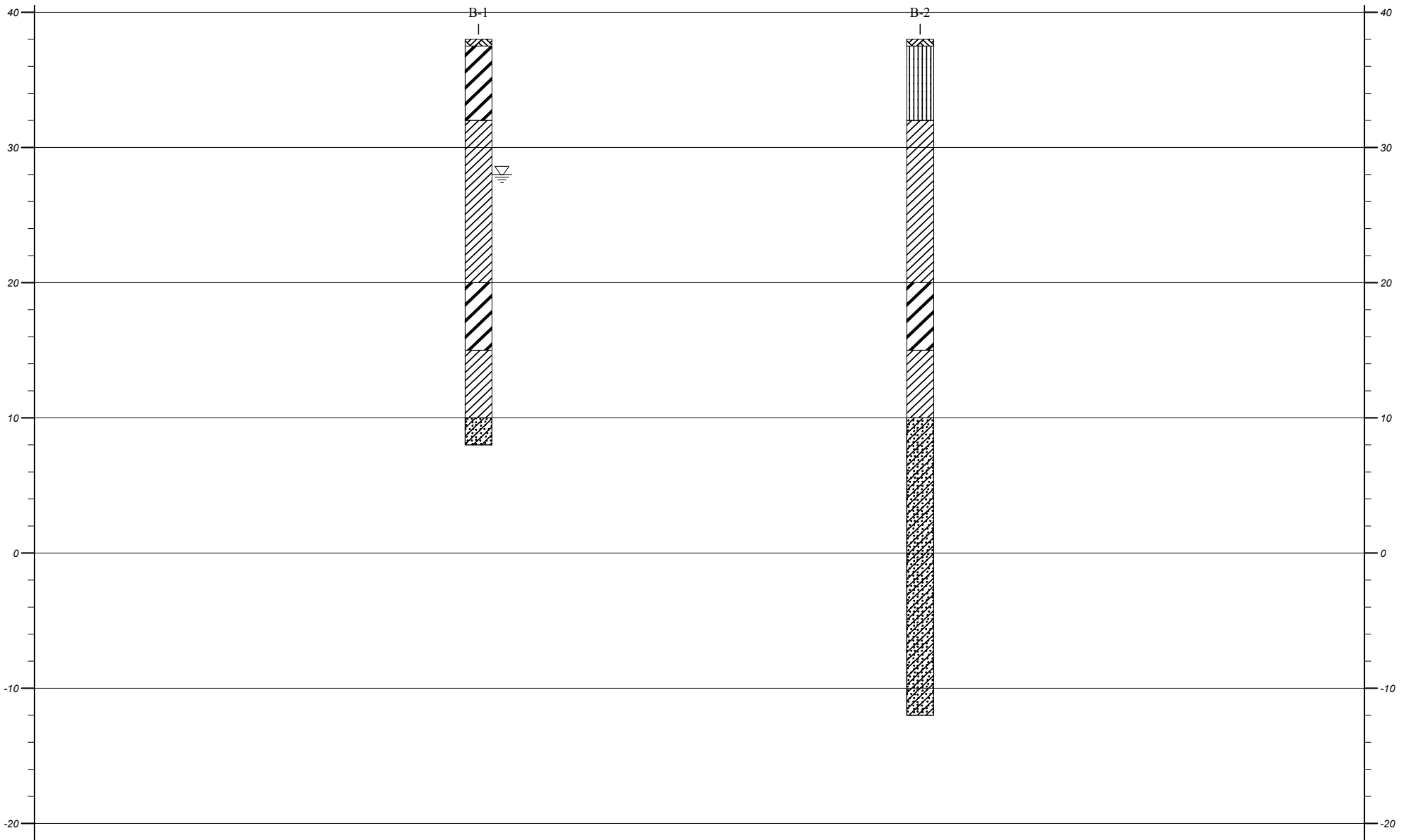
# BORING LOCATION DIAGRAM GIROUARD SITE

N GIROUARD RD & HWY 90 E, BROUSSARD, LOUISIANA  
ONEACADIANA

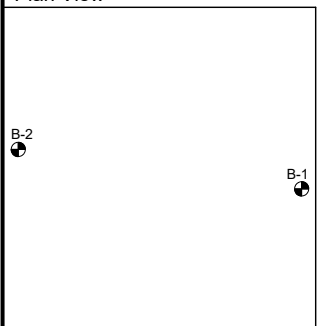
ENGINEER DM01
SCALE AS NOTED
PROJECT NO. 65:1076
SHEET 1 OF 1
DATE 4/9/2021






ELEVATION IN FEET

ELEVATION IN FEET



Plan View



-  Topsoil
-  High plasticity clay
-  Low plasticity clay
-  Clayey sand/  
Low plasticity clay
-  Silt

<b>ECS Southeast, LLP</b>		
<b>GENERALIZED SOIL PROFILE</b>		
HORIZONTAL SCALE:	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=10'		4/9/2021
<b>GIROUARD SITE</b>		
PROJECT NO. 1076		FIGURE NUMBER

## **APPENDIX B – Field Operations**

Reference Notes for Boring Logs  
Boring Logs B-1 to B-2



# REFERENCE NOTES FOR BORING LOGS

MATERIAL <sup>1,2</sup>	
	<b>ASPHALT</b>
	<b>CONCRETE</b>
	<b>GRAVEL</b>
	<b>TOPSOIL</b>
	<b>VOID</b>
	<b>BRICK</b>
	<b>AGGREGATE BASE COURSE</b>
	<b>FILL<sup>3</sup> MAN-PLACED SOILS</b>
	<b>GW WELL-GRADED GRAVEL</b> gravel-sand mixtures, little or no fines
	<b>GP POORLY-GRADED GRAVEL</b> gravel-sand mixtures, little or no fines
	<b>GM SILTY GRAVEL</b> gravel-sand-silt mixtures
	<b>GC CLAYEY GRAVEL</b> gravel-sand-clay mixtures
	<b>SW WELL-GRADED SAND</b> gravelly sand, little or no fines
	<b>SP POORLY-GRADED SAND</b> gravelly sand, little or no fines
	<b>SM SILTY SAND</b> sand-silt mixtures
	<b>SC CLAYEY SAND</b> sand-clay mixtures
	<b>ML SILT</b> non-plastic to medium plasticity
	<b>MH ELASTIC SILT</b> high plasticity
	<b>CL LEAN CLAY</b> low to medium plasticity
	<b>CH FAT CLAY</b> high plasticity
	<b>OL ORGANIC SILT or CLAY</b> non-plastic to low plasticity
	<b>OH ORGANIC SILT or CLAY</b> high plasticity
	<b>PT PEAT</b> highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS			
SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION	
DESIGNATION	PARTICLE SIZES
Boulders	12 inches (300 mm) or larger
Cobbles	3 inches to 12 inches (75 mm to 300 mm)
Gravel: Coarse	¾ inch to 3 inches (19 mm to 75 mm)
Gravel: Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand: Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
Sand: Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
Sand: Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")	<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS		
UNCONFINED COMPRESSIVE STRENGTH, Q <sub>p</sub> <sup>4</sup>	SPT <sup>5</sup> (BPF)	CONSISTENCY <sup>7</sup> (COHESIVE)
<0.25	<3	Very Soft
0.25 - <0.50	3 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT <sup>7</sup>	COARSE GRAINED (%) <sup>8</sup>	FINE GRAINED (%) <sup>8</sup>
Trace	≤5	≤5
Dual Symbol (ex: SW-SM)	10	10
With	15 - 20	15 - 25
Adjective (ex: "Silty")	≥25	≥30

GRAVELS, SANDS & NON-COHESIVE SILTS	
SPT <sup>5</sup>	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS <sup>6</sup>		
	WL	Water Level (WS)(WD) (WS) While Sampling (WD) While Drilling
	SHW	Seasonal High WT
	ACR	After Casing Removal
	SWT	Stabilized Water Table
	DCI	Dry Cave-In
	WCI	Wet Cave-In

<sup>1</sup>Classifications and symbols per ASTM D 2488-09 (Visual-Manual Procedure) unless noted otherwise.

<sup>2</sup>To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

<sup>3</sup>Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

<sup>4</sup>Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

<sup>5</sup>Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf).

<sup>6</sup>The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

<sup>7</sup>Minor deviation from ASTM D 2488-09 Note 16.

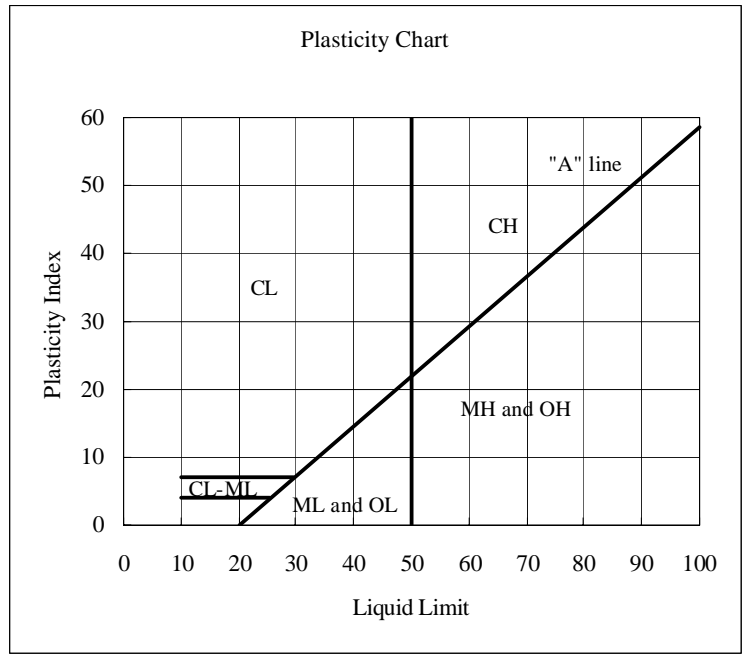
<sup>8</sup>Percentages are estimated to the nearest 5% per ASTM D 2488-09.

# UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

Major Divisions		Group Symbols	Typical Names	Laboratory Classification Criteria		
Coarse-grained soils (More than half of material is larger than No. 200 Sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = D_{60}/D_{10}$ greater than 4 $C_c = (D_{30})^2/(D_{10} \times D_{60})$ between 1 and 3  Not meeting all gradation requirements for GW  Atterberg limits below "A" line or P.I. less than 4  Atterberg limits below "A" line or P.I. less than 7  $C_u = D_{60}/D_{10}$ greater than 6 $C_c = (D_{30})^2/(D_{10} \times D_{60})$ between 1 and 3  Not meeting all gradation requirements for SW  Atterberg limits above "A" line or P.I. less than 4  Atterberg limits above "A" line with P.I. greater than 7  Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols  Limits plotting in CL-ML zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols	
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines		
		Gravels with fines (Appreciable amount of fines)	GM <sup>a</sup>	d		Silty gravels, gravel-sand mixtures
				u		
	GC	Clayey gravels, gravel-sand-clay mixtures				
		Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	
	SP			Poorly graded sands, gravelly sands, little or no fines		
	Sands with fines (Appreciable amount of fines)	SM <sup>a</sup>	d	Silty sands, sand-silt mixtures		
			u			
	SC	Clayey sands, sand-clay mixtures				


Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:  
 Less than 5 percent GW, GP, SW, SP  
 More than 5 percent GM, GC, SM, SC  
 More than 12 percent Borderline cases requiring dual symbols<sup>b</sup>

Fine-grained soils (More than half material is smaller than No. 200 Sieve)	Sils and clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
		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
	Sils and clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
	Highly Organic soils	Pt	Peat and other highly organic soils



<sup>a</sup> Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.

<sup>b</sup> Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder. (From Table 2.16 - Winterkorn and Fang, 1975)

CLIENT <b>ONE ACADIANA</b>	Job #: <b>65:1076</b>	BORING # <b>B-1</b>	SHEET <b>1 OF 1</b>	
PROJECT NAME <b>GIROUARD SITE</b>	ARCHITECT-ENGINEER			

SITE LOCATION  
**CORNER OF N GIROUARD RD & HWY 90 E**

NORTHING <b>30.149031</b>	EASTING <b>-91.944830</b>	STATION
------------------------------	------------------------------	---------

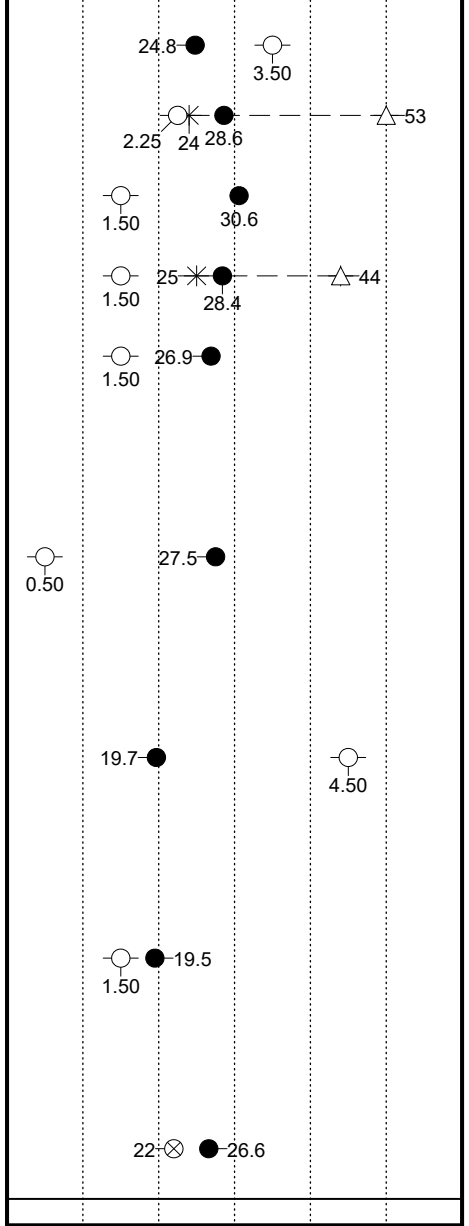
○ CALIBRATED PENETROMETER TONS/FT<sup>2</sup>

ROCK QUALITY DESIGNATION & RECOVERY  
RQD% - - - REC% - - -

PLASTIC LIMIT%      WATER CONTENT%      LIQUID LIMIT%


⊗ STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/6"
					BOTTOM OF CASING	LOSS OF CIRCULATION >100%		
					SURFACE ELEVATION <b>38 FEET</b>			
0	S-1	ST	6	6	6" Topsoil			
18	S-1	ST	18	18	(CH) FAT CLAY, brown, moist, stiff to very stiff, with organics on surface			
24	S-2	ST	24	24				
24	S-3	ST	24	24				
24	S-4	ST	24	24	(CL) LEAN CLAY, light brown, moist, medium stiff to stiff			
24	S-5	ST	24	24				
24	S-6	ST	24	24				
24	S-7	ST	24	24	(CH) FAT CLAY, brown and tan, moist, hard			
24	S-8	ST	24	24	(CL) SANDY LEAN CLAY, tan, moist, stiff			
18	S-9	SS	18	18	(SC) CLAYEY SAND, tan, moist, medium dense			
					END OF BORING @ 30 FEET			



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 10 FEET      WS <input type="checkbox"/> WD <input checked="" type="checkbox"/>	BORING STARTED      01/15/2021	CAVE IN DEPTH
WL(SHW)      WL(ACR) <input checked="" type="checkbox"/>	BORING COMPLETED      01/15/2021	HAMMER TYPE      CATHEAD
WL	RIG      ATV      FOREMAN      DYLAN	DRILLING METHOD      MUD ROTARY

CLIENT <b>ONE ACADIANA</b>	Job #: <b>65:1076</b>	BORING # <b>B-2</b>	SHEET <b>1 OF 2</b>	
PROJECT NAME <b>GIROUARD SITE</b>	ARCHITECT-ENGINEER			

SITE LOCATION  
**CORNER OF N GIROUARD RD & HWY 90 E**

NORTHING <b>30.149297</b>	EASTING <b>-91.946781</b>	STATION
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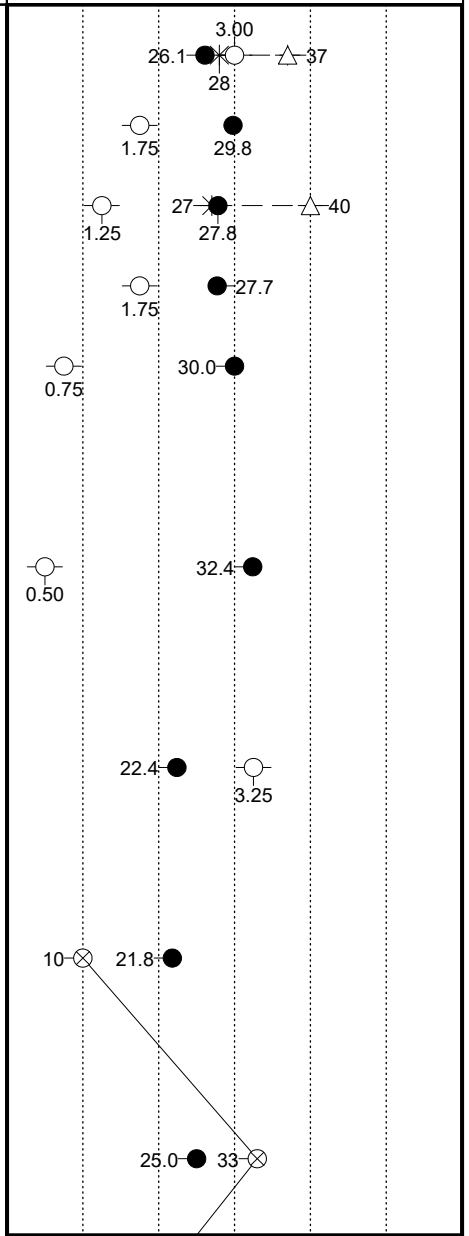
○ CALIBRATED PENETROMETER TONS/FT<sup>2</sup>

ROCK QUALITY DESIGNATION & RECOVERY  
RQD% - - - REC% - - -

PLASTIC LIMIT%      WATER CONTENT%      LIQUID LIMIT%

⊗ STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/6"
					BOTTOM OF CASING	LOSS OF CIRCULATION >100%		
					SURFACE ELEVATION <b>38 FEET</b>			
0	S-1	ST	6	6	6" Topsoil			
1	S-1	ST	18	18	(ML) CLAYEY SILT, brown, moist, stiff to very stiff			
2	S-2	ST	24	24				
3	S-3	ST	24	24				
4	S-4	ST	24	24	(CL) LEAN CLAY, brown, moist, medium stiff to stiff			
5	S-5	ST	24	24				
6	S-6	ST	24	24				
7	S-7	ST	24	24	(CH) FAT CLAY, tan and brown, moist, very stiff			
8	S-8	SS	18	18				
9	S-9	SS	18	18	(CL) LEAN CLAY WITH SAND, tan, moist, stiff to hard			
10					(SC) CLAYEY SAND, tan, moist, medium dense to dense			
11								




**CONTINUED ON NEXT PAGE.**

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL	WS	WD	BORING STARTED	01/15/2021	CAVE IN DEPTH
WL(SHW)	WL(ACR)		BORING COMPLETED	01/15/2021	HAMMER TYPE CATHEAD
WL			RIG ATV	FOREMAN DYLAN	DRILLING METHOD MUD ROTARY



CLIENT <b>ONE ACADIANA</b>	Job #: <b>65:1076</b>	BORING # <b>B-2</b>	SHEET <b>2 OF 2</b>	
PROJECT NAME <b>GIROUARD SITE</b>	ARCHITECT-ENGINEER			

SITE LOCATION  
**CORNER OF N GIROUARD RD & HWY 90 E**

NORTHING <b>30.149297</b>	EASTING <b>-91.946781</b>	STATION
------------------------------	------------------------------	---------

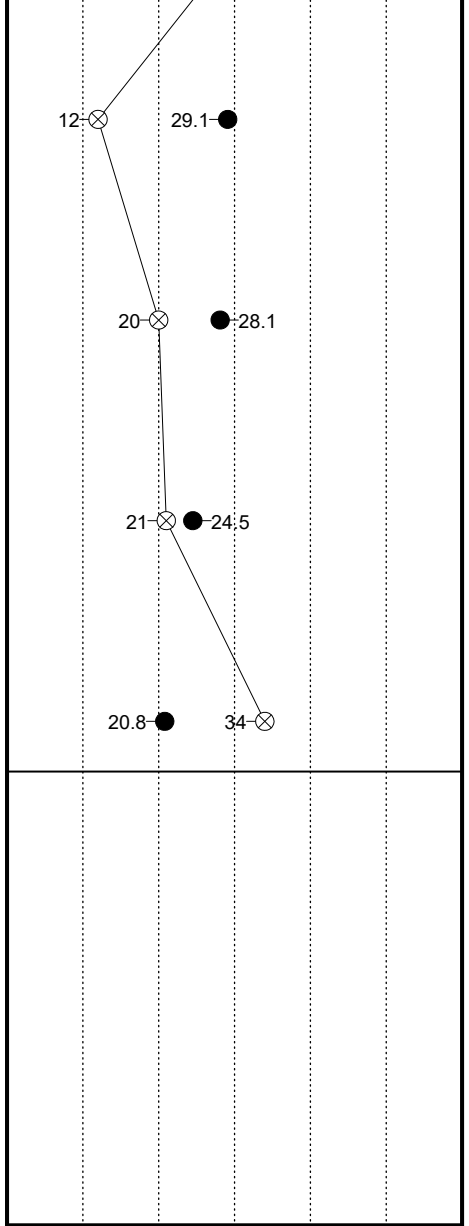
○ CALIBRATED PENETROMETER TONS/FT<sup>2</sup>

ROCK QUALITY DESIGNATION & RECOVERY  
RQD% - - - REC% - - -

PLASTIC LIMIT%      WATER CONTENT%      LIQUID LIMIT%

⊗ STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					BOTTOM OF CASING	LOSS OF CIRCULATION			
					SURFACE ELEVATION	<b>38 FEET</b>			
35	S-10	SS	18	18	(SC) CLAYEY SAND, tan, moist, medium dense to dense			3 5 7	12- 29.1-
40	S-11	SS	18	18			0	10 9 11	20- 28.1-
45	S-12	SS	18	18			-5	10 11 10	21- 24.5-
50	S-13	SS	18	18			-10	10 18 16	20.8- 34-
55					-15				
60					-20				
					END OF BORING @ 50 FEET				



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL	WS <input type="checkbox"/>	WD <input type="checkbox"/>	BORING STARTED	01/15/2021	CAVE IN DEPTH
WL(SHW)	WL(ACR)		BORING COMPLETED	01/15/2021	HAMMER TYPE CATHEAD
WL			RIG ATV	FOREMAN DYLAN	DRILLING METHOD MUD ROTARY

## **APPENDIX C – Laboratory Testing**

Laboratory Test Results Summary

# Laboratory Testing Summary

Sample Source	Sample Number	Start Depth (feet)	End Depth (feet)	Sample Distance (feet)	MC1 (%)	Soil Type <sup>2</sup>	Atterberg Limits <sup>3</sup>			Percent Passing No. 200 Sieve <sup>4</sup>	Moisture - Density (Corr.) <sup>5</sup>		CBR Value <sup>6</sup>	Unconfined Compression (tsf) <sup>7</sup>
							LL	PL	PI		Maximum Density (pcf)	Optimum Moisture (%)		
<b>B-1</b>														
	S-1	0.0	0.5	0.50		Topsoil								
	S-1	0.5	2.0	1.50	24.8	CH								
	S-2	2.0	4.0	2.00	28.6	CH	53	24	29	99.9				
	S-3	4.0	6.0	2.00	30.6	CH								0.679
	S-4	6.0	8.0	2.00	28.4	CL	44	25	19	99.9				0.810
	S-5	8.0	10.0	2.00	26.9	CL								1.209
	S-6	13.0	15.0	2.00	27.5	CL								
	S-7	18.0	20.0	2.00	19.7	CH								
	S-8	23.0	25.0	2.00	19.5	CL								
	S-9	28.0	29.5	1.50	26.6	SC				41.6				
<b>B-2</b>														
	S-1	0.0	0.5	0.50		Topsoil								
	S-1	0.5	2.0	1.50	26.1	ML	37	28	9	99.2				
	S-2	2.0	4.0	2.00	29.8	ML								1.405
	S-3	4.0	6.0	2.00	27.8	ML	40	27	13	100.0				0.915
	S-4	6.0	8.0	2.00	27.7	CL								1.088
	S-5	8.0	10.0	2.00	30.0	CL								
	S-6	13.0	15.0	2.00	32.4	CL								
	S-7	18.0	20.0	2.00	22.4	CH								
	S-8	23.0	24.5	1.50	21.8	CL				73.5				
	S-9	28.0	29.5	1.50	25.0	SC								
	S-10	33.0	34.5	1.50	29.1	SC								
	S-11	38.0	39.5	1.50	28.1	SC								
	S-12	43.0	44.5	1.50	24.5	SC				36.6				
	S-13	48.0	49.5	1.50	20.8	SC								

**Notes:** 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method, 7. ASTM D 2166

**Definitions:** MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

Project No. 65:1076  
 Project Name: GIROUARD SITE  
 PM: LANDON MEYER  
 PE: DAVID MARSH  
 Printed On: Friday, April 9, 2021



# Important Information about This

# Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

**The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.**

## **Geotechnical-Engineering 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 given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

## **Read this Report in Full**

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

## **You Need to Inform Your Geotechnical Engineer about Change**

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

## **This Report May Not Be Reliable**

*Do not rely on this report* if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be, and, in general, if you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying it.* A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

## **Most of the "Findings" Related in This Report Are Professional Opinions**

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

## This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

## This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

## Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may

perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

## Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include 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 personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old*.

## Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration*. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists*.



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