

**GEOTECHNICAL EXPLORATION REPORT**

**FUTURE DUPLEXES  
LOTS 15A AND 39A  
OAK AVENUE AND BROOKTER ROAD  
SLIDELL, LOUISIANA**

**FOR**

**MR. ROGER WARNER  
SLIDELL, LA**

*GULF SOUTH ENGINEERING AND TESTING FILE NO. 22-011*

*April 11, 2022*



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April 11, 2022

Mr. Roger Warner  
57388 Oak Avenue  
Slidell, LA 70461

Attn: Mr. Roger Warner E-mail: [ro57381@hotmail.com](mailto:ro57381@hotmail.com)  
PN: (985) 966-9786  
Client Rep.: Mr. Ed Wahlberg E-mail: [edwater47@yahoo.com](mailto:edwater47@yahoo.com)

Re: Geotechnical Exploration Report  
Future Duplexes  
Lots 15A and 39A  
Oak Avenue and Brookter Road  
Slidell, LA  
*Gulf South Engineering & Testing File No. 22-011*

Dear Mr. Warner,

Please find attached our geotechnical exploration report that was completed for the referenced project. We appreciate the opportunity to serve your geotechnical needs. Please contact us should you have any questions.

Sincerely,

**GULF SOUTH ENGINEERING AND TESTING, INC.**

CHAD M. POCHE, P.E.  
Owner, Vice President

SARA E. LOCKWOOD, E.I.  
Graduate Geotechnical Engineer

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# GEOTECHNICAL EXPLORATION REPORT

## FUTURE DUPLEXES LOTS 15A AND 39A OAK AVENUE AND BROOKTER ROAD SLIDELL, LOUISIANA

*GULF SOUTH ENGINEERING AND TESTING FILE NO. 22-011*

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### 1.0 INTRODUCTION & LIMITATIONS

This report contains the results of a geotechnical exploration made at the subject site. Instructions to proceed with the exploration were received from Mr. Roger Warner (Client) via approval of our proposal dated January 18, 2022.

The study included drilling soil test borings and the performance of soil mechanics laboratory tests to evaluate the soil's physical characteristics. Engineering analyses were made and based on the field and laboratory test data to develop recommendations for the project.

The analyses and recommendations presented in this report are based on the provided project information and the results of the exploration. While it is not likely that conditions will differ significantly from those observed during the field exploration it is always possible that variations can occur away from the borehole location(s).

If it becomes apparent during construction that subsurface conditions differing significantly from those observed in our boring(s) are encountered, Gulf South should be notified. Also, should the nature of the project change or should any of the stated assumptions be inaccurate, the recommendations provided in this report should be re-evaluated.

This report has been prepared for the exclusive use of our Client. The recommendations provided in this report are site specific and are not intended for use at any other site or for any other project. This report provides recommendations for design and construction and should not be used as construction specifications.

## **FUTURE DUPLEXES – OAK AVE. AND BROOKTER ST., SLIDELL, LA**

Gulf South considers the materials testing and onsite inspection during construction an extension of our geotechnical exploration and a key component to ensuring the recommendations provided in this report are followed. For this type of project, these services may consist of earthwork testing and monitoring, vibration monitoring, concrete testing and inspection, and steel inspection. Gulf South should be retained to provide the construction inspection services for this project.

### **2.0 SOIL BORINGS**

Four (4) undisturbed soil borings were each drilled to a depth of 20 feet (B-1 through B-4) below ground surface on February 23, 2022. The borings were drilled with a track mounted drilling rig at the designated locations as approximately shown on Figure 1.

Undisturbed sampling was performed continuously or on approximate 5 foot centers in all cohesive or semi-cohesive materials with a three inch diameter thin wall tube sampler. The samples were extruded in the field, representative portions of each sample were trimmed and placed in moisture proof containers, the samples were properly labeled, and secured for transport to the laboratory.

When cohesionless material was encountered or when soils could not be adequately sampled by undisturbed methods, the Standard Penetration Test was performed. This test consists of driving a two-inch diameter split spoon sampler a total of approximately 18 inches with a 140 lb. hammer falling 30 inches. The number of blows required to drive the sampler per 6 inch increment is recorded and gives an indication of the density of the material. The blows per foot shown on the boring log are the total of the blow counts for the final 12 inches of penetration.

## **FUTURE DUPLEXES – OAK AVE. AND BROOKTER ST., SLIDELL, LA**

### **3.0 LABORATORY TESTING**

Soil mechanics laboratory tests were performed on samples obtained from the borings. The testing consisted of natural moisture content, unit weight, Atterberg limits, and unconfined compression strength testing. The results of the laboratory tests are shown on the soil boring logs provided in the Appendix of this report.

### **4.0 SUBSOIL CONDITIONS**

#### **4.1 Subsoil Description**

Reference to the borings shows soft to stiff sandy clay from the ground surface to the approximate 10 foot depth. Below these layers, interbedded layers of medium stiff to stiff clay follow to the deepest boring's termination depth of 20 feet.

#### **4.2 Groundwater**

At the time of making the borings, groundwater was encountered at 14 feet to 20 feet below the ground surface within the borings. After a short time period (15 minutes), a rise in water level was detected at 8 feet to 10 feet below the ground surface within Borings B-1 and B-2. Borehole cave-in occurred at the remaining borings so no further readings were possible.

These observations were made during a short period of time and groundwater may not have become fully realized at the time of observation. Groundwater can fluctuate with seasonal precipitation, drainage, and prolonged drought. If the depth to groundwater is important to construction, it should be measured at that time.

## **FUTURE DUPLEXES – OAK AVE. AND BROOKTER ST., SLIDELL, LA**

### **5.0 FURNISHED INFORMATION AND FOUNDATION RECOMMENDATIONS**

Furnished information indicates two (2) new multi-family residences (duplexes) will be constructed at Lot 15A off Oak Avenue and Lot 39A off Brookter Road in Slidell, LA. The proposed structures will be single-story and approximately 5,300 square feet in plan dimensions.

In general, the near surface silty clay and clay soils encountered in the borings are considered adequate with regards to support of the proposed residence using shallow foundations. If shallow footings are used, they should be placed to bear at least 2 feet below the ground surface and within the firm soils encountered in our borings. Alternatively, should the values provided in this report for bearing and settlement not be tolerable, deep foundations should be used for support. Deep foundation recommendations can be provided upon request.

Preliminary laboratory test results indicate the near surface soils may have minimal to slight shrink/swell potential. Care should be taken during and after construction to limit activities that could affect moisture within the soils below and around the foundations. By precluding surface waters from saturating the soils, the resulting volumetric movements will be minimized. In this regard, good roof and surface drainage should be assured with positive collection and runoff of these waters away from foundations.

Structural analyses and the structural adequacy of the foundations are outside our scope of work for the project. Utilities to and from the structure should be attached to the slab using suitable hangers and flexible connections.

## **FUTURE DUPLEXES – OAK AVE. AND BROOKTER ST., SLIDELL, LA**

### **6.0 SHALLOW FOUNDATIONS**

#### **6.1 Allowable Soil Bearing Capacities**

We estimate net allowable soil bearing capacities of 1,500 lbs. per sq. ft. (psf) and 1,800 psf are available for design of shallow strip or square footings, respectively. These allowable soil bearing capacities assume the footings are seated in firm natural soils as described and encountered in our borings.

Foundation excavations should be thoroughly inspected to assure that the footings are seated in firm and well drained soil. The allowable soil bearing capacities contain a factor of safety of at least 3.0 against failure but do not preclude settlements, as will be discussed.

#### **6.2 Estimated Settlement**

**Fill.** We have calculated the estimated long-term settlement of the ground surface due to the placement an average of 2 feet of fill over an approximate 53 ft. by 100 ft. area to be on the order of ½ to 1 inch. Our analyses are based on a unit weight of 110 pounds per cubic foot (pcf) for the fill material. Settlement due to fill placement should be quick (within 2 to 3 months of placement). Any additional fill will induce further settlement. Fill should be placed as far in advance of construction as possible.

**Footings.** Settlement analyses were made using applied pressures equal to 100% of the allowable soil bearing values. Long-term settlement of square footings no larger than 6 feet in width and strip footings no wider than 3 feet in width is estimated to be on the order of ½ to 1 inch. Settlement will increase with the size of the footing and/or loading and if larger footings are needed for support, revised settlement analyses should be made.

**Slab.** Long term consolidation settlement at the center of an approximate 53 ft. by 100 ft. flexible slab is estimated to be on the order of ½ to 1 inch using a uniform loading of up to 150 psf. The estimated settlement should occur over most of the loaded area while the edge settlements should be approximately one-half (1/2) of the center settlement and may only occur over a limited range near the perimeter. Slab settlement should be added to the

## **FUTURE DUPLEXES – OAK AVE. AND BROOKTER ST., SLIDELL, LA**

estimates calculated for footings if footings are used in conjunction with the slab.

In view of the magnitude of the estimated settlement and to bridge any undetected soft or loose areas, good rigidity should be assured in the foundations to minimize the effects of differential settlements. This may be accomplished by using a post tensioned slab, a ribbed or waffle type slab, etc.

The provided settlement estimates for a flexible slab can be reduced by 15% if a rigid slab is used. Adequate steel reinforcement should be designed and included within the foundations. If the estimated settlements for shallow footings are considered prohibitive, driven piles should be used for support of the structure.

### **6.3 Site Preparation and Fill Materials**

Prior to construction, the foundation areas should be proof rolled using a heavy wheeled vehicle. Any “soft” soils noted during the proof rolling or observed within excavations should be removed to a depth where stiffer soils are encountered or to a minimum depth of 2 feet. Excavated soils and organic matter should be replaced with controlled-compacted structural fill. If fill is needed, the area should be brought to grade using a clean, select, fill material free from debris or organic matter.

A lean, silty or sandy clay (CL - USCS Classification) may be used for fill. The clay fill should have a Liquid Limit of less than 40 and a Plasticity Index (PI) of less than 20.

### **6.4 Fill Placement and Compaction**

Fill should be placed in 10 to 12 inch loose lifts. Minimum compaction criteria of a dry density at least equal to 95% of its maximum, as determined by the Standard Proctor compaction test (ASTM D698), should be used for fill that will support foundations.

## **FUTURE DUPLEXES – OAK AVE. AND BROOKTER ST., SLIDELL, LA**

### **6.5 Vibrations**

Vibrations due to construction activities should be expected and they should be monitored during all construction activities. In general, vibrations should be limited to about 0.25 inch/sec. (average peak particle velocity) at all existing nearby sensitive structures. Construction should be stopped if peak values exceed about 0.5 in./sec.

### **7.0 CLOSING**

Gulf South is available to answer any questions you may have concerning this report. Should additional analyses be required or requested, additional fees may be necessary.

As previously discussed, Gulf South considers the materials testing and onsite inspection during construction an extension of our geotechnical exploration. Gulf South should be retained to provide the construction inspection services.

The issuance of this report completes the geotechnical exploration scope and Gulf South's involvement on the project. Retaining Gulf South as a vital member of the design team can add considerable value. Over the next few months, the project will incur many changes, challenges, and opportunities – all of which will occur without our knowledge and in some cases render our recommendations compromised or irrelevant. Gulf South's additional involvement will be a small price to pay for the peace of mind that any foundation, earthwork, and paving components of the project are fully integrated during design, resulting in potential cost savings and efficient construction. Please consider including Gulf South as a full member of your design team and throughout the project duration.

**FUTURE DUPLEXES – OAK AVE. AND BROOKTER ST., SLIDELL, LA**

We appreciate the opportunity to provide this report and look forward to working with you again in the future.

Sincerely,

**GULF SOUTH ENGINEERING AND TESTING, INC.**




CHAD M. POCHE, P.E.  
Owner, Vice President



SARA E. LOCKWOOD, E.I.  
Graduate Geotechnical Engineer

# FIGURE



<p><b>Gulf South File 22-011</b></p>	 <p><b>GULF SOUTH</b> ENGINEERING AND TESTING, INC. Geotechnical &amp; Materials Consultants</p>	
<p><b>Future Duplexes Lots 15A and 39A Oak Avenue and Brookter Road Slidell, LA</b></p>	<p><b>For Mr. Roger Warner Slidell, LA</b></p>	<p><b>BORING PLAN</b></p> <hr/> <p><b>Figure No. 1</b></p>

# **APPENDIX**

## **BORING LOGS**

## SOIL BORING LOG - DESCRIPTION OF TERMS AND SYMBOLS

Depth (Feet)	S a m p l e	Field Test (PP or SPT)	Comp. Strength (tsf)	Water Content (%)	Wet Density (pcf)	Atterberg Limits		T Y P E	Description of Stratum
						LL (%)	PI (%)		
0									Field Test (PP or SPT): Pocket penetrometer (PP) results in tsf or standard penetration test (SPT) results
5	--								Comp. Strength: Value based on peak strength in tsf determined by an unconfined compressive strength test unless noted otherwise
10	X	15 b/f (7-6-9)							Water Content (%): As determined in general accordance with ASTM D2216
10	/								Wet Density (PCF): As determined in general accordance with ASTM D2937
15	--								Atterberg Limits (LL and PI): Atterberg limits as determined in general accordance with ASTM D4318. LL = Liquid Limit; PI = Plasticity Index (LL-PI)
15									Description of Stratum: Classifications are based on visual observations and laboratory test results (where available) as well as judgment by a geotechnical engineer (where appropriate)
20									Type: Misc. Fill - limestone, bricks, broken concrete, etc.
25									Type: USCS Classification - High plasticity clay (CH)
30									Type: USCS Classification - Low plasticity clay (CL)
35									Type: USCS Classification - Low or high plasticity silt (ML or MH)
35									Type: USCS Classification - Silty or clayey sand or gravel, well graded or poorly graded sand or gravel (SM, SC, SW, SP, GM, GC, GW, GP)
40									Type: USCS Classification - Organic clay or silt, peat (OL, OH, PT) or Wood

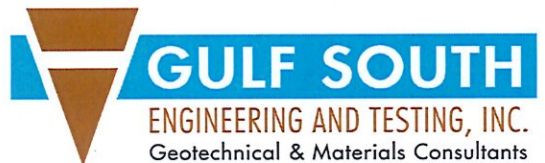
**Standard Penetration Test (SPT):**  
 No. of blows per last foot of driving (blows per six inch increments)  
 For "0 b/f", Weight of Rotary, Pipe, or Hammer (WOR, WOP, WOH) is noted and Pushed Split Spoon (PSS) is reported

**Sample Legend:**

- Core (Shelby Tube)
- Standard Penetration Test (SPT)
- No Recovery
- Auger Sample

**Comments/Notes:**

General notes or comments regarding boring and data







**Boring No. B-1**

**Project:** Future Duplexes  
 Lots 15A and 39A  
**Location:** Oak Avenue and Brookter Road  
 Slidell, LA  
**Client:** Mr. Roger Warner  
 Slidell, LA

**GSE&T File No.:** 22-011  
**Date:** 2/23/2022  
**Technician:** B. Beard  
**Rig Type:** Track

Depth (Feet)	S a m p l e	(Field Test)	Comp. Strength (tsf)	Water Content (%)	Wet Density (pcf)	LL (%)	PI (%)	% Passing #200 Sv	T Y P E	Coord: 30° 15' 57.4" N, 89° 45' 3.2" W
		PP/ SPT								Description of Stratum
0		<0.25 (PP)		29.2				24.9		Tan SILTY SAND (SM) with organic material
		0.50 (PP)	0.417*	21.2	131			63.5		Soft to Medium Stiff tan and gray SANDY CLAY (CL); low strain value, strength test may be inaccurate [* - UU Confining Pressure = 1.3 psi] [* - UU Confining Pressure = 2.0 psi]
5		0.50 (PP)	0.617*	20.3	128					
		0.50 (PP)		17.2		35	21			Stiff tan and gray SILTY CLAY (CL) trace sand
		0.50 (PP)	1.278	22.9	124			92.7		
10		1.50 (PP)		23.4						
		<0.25 (PP)	0.218*	21.9	127			63.9		Very Soft brown SANDY CLAY (CL) [* - UU Confining Pressure = 5.0 psi]
15										
		1.50 (PP)	1.035	32.0	119					Stiff gray and brown CLAY (CH)
20										Boring completed at 20 feet below the ground surface
25										
30										
35										
40										

**Sample Legend:**

-  Core (Shelby Tube)
-  Standard Penetration (SPT)
-  No Recovery
-  Auger Sample

**Comments/Notes:**

- Borehole backfilled per LA DOTD & LA DEQ requirements upon completion
- Dry Auger Depths = 0 to 20 ft.
- Rotary Wash Depths = n/a
- Ground Water = Encountered at 20 ft. After waiting approx. 15 minutes, groundwater rose to 8 ft.







**Boring No. B-2**

**Project:** Future Duplexes  
 Lots 15A and 39A  
**Location:** Oak Avenue and Brookter Road  
 Slidell, LA  
**Client:** Mr. Roger Warner  
 Slidell, LA

**GSE&T File No.:** 22-011  
**Date:** 2/23/2022  
**Technician:** B. Beard  
**Rig Type:** Track

Depth (Feet)	S a m p l e	(Field Test)	Comp. Strength (tsf)	Water Content (%)	Wet Density (pcf)	LL (%)	PI (%)	% Passing #200 Sv	T Y P E	Coord: 30° 15' 56.7" N, 89° 45' 3.2" W
		PP/ SPT								Description of Stratum
0		1.50 (PP)	1.165*	24.0	121	26	16	54.6		Stiff black, brown and tan SILTY CLAY (CL) with sand [* - UU Confining Pressure = 0.7 psi]
		0.25 (PP)	0.294*	24.1	124			66.2		Soft orange and gray SANDY CLAY (CL); strength test may be inaccurate [* - UU Confining Pressure = 1.3 psi]
5		0.50 (PP)		16.9		37	22			Stiff gray and brown SANDY CLAY (CL)
		1.75 (PP)	1.873	15.1	132					
		0.50 (PP)		19.4				75.8		
10		1.00 (PP)	1.280	25.2	127			91.0		Medium Stiff to Stiff gray, brown and tan CLAY (CH)
		3.00 (PP)		27.3		66	49			
15										
		1.50 (PP)	0.863	36.7	117					
20										Boring completed at 20 feet below the ground surface
25										
30										
35										
40										

**Sample Legend:**

-  Core (Shelby Tube)
-  Standard Penetration (SPT)
-  No Recovery
-  Auger Sample

**Comments/Notes:**

- Borehole backfilled per LA DOTD & LA DEQ requirements upon completion
- Dry Auger Depths = 0 to 20 ft.
- Rotary Wash Depths = n/a
- Ground Water = Encountered at 20 ft. After waiting approx. 15 minutes, groundwater rose to 10 ft.



**Boring No. B-3**

**Project:** Future Duplexes  
 Lots 15A and 39A  
**Location:** Oak Avenue and Brookter Road  
 Slidell, LA  
**Client:** Mr. Roger Warner  
 Slidell, LA

**GSE&T File No.:** 22-011  
**Date:** 2/23/2022  
**Technician:** B. Beard  
**Rig Type:** Track

Depth (Feet)	S a m p l e	(Field Test) PP/ SPT	Comp. Strength (tsf)	Water Content (%)	Wet Density (pcf)	LL (%)	PI (%)	% Passing #200 Sv	T Y P E	Coord: 30° 15' 57.4" N, 89° 45' 1.8" W
										<b>Description of Stratum</b>
0		0.50 (PP)		26.8		23	10	56.1		Medium Stiff to Stiff black, orange and gray SANDY CLAY (CL)
		0.50 (PP)	0.695*	20.5	131			56.3		[ * - UU Confining Pressure = 1.3 psi]
5		0.50 (PP)	0.902	19.6	130					
		0.50 (PP)		18.1		30	17			
		1.00 (PP)	1.649*	22.2	132					[ * - UU Confining Pressure = 3.3 psi]
10		1.00 (PP)		25.9				92.4		Medium Stiff gray and brown CLAY (CH) with sand
		0.50 (PP)	0.618*	28.2	122					[ * - UU Confining Pressure = 5.0 psi]
15		0.50 (PP)	0.658	34.8	116			99.8		
20										Boring completed at 20 feet below the ground surface
25										
30										
35										
40										

**Sample Legend:**

- Core (Shelby Tube)
- Standard Penetration (SPT)
- No Recovery
- Auger Sample

**Comments/Notes:**

- Borehole backfilled per LA DOTD & LA DEQ requirements upon completion
- Dry Auger Depths = 0 to 20 ft.
- Rotary Wash Depths = n/a
- Ground Water = Encountered at 14 ft. After waiting approx. 15 minutes, cave-in occurred







**Boring No. B-4**

**Project:** Future Duplexes  
 Lots 15A and 39A  
**Location:** Oak Avenue and Brookter Road  
 Slidell, LA  
**Client:** Mr. Roger Warner  
 Slidell, LA

**GSE&T File No.:** 22-011  
**Date:** 2/23/2022  
**Technician:** B. Beard  
**Rig Type:** Track

Depth (Feet)	S a m p l e	(Field Test) PP/ SPT	Comp. Strength (tsf)	Water Content (%)	Wet Density (pcf)	LL (%)	PI (%)	% Passing #200 Sv	T Y P E	Coord: 30° 15' 56.6" N, 89° 45' 1.8" W
0		0.50 (PP)	0.415*	19.6	120	61	52		[ * - UU Confining Pressure = 0.7 psi] [ * - UU Confining Pressure = 1.3 psi]	Description of Stratum Soft to Medium Stiff tan and black SANDY CLAY (CH); low strain value, strength test may be inaccurate
		0.50 (PP)	0.731*	21.6	121			11.9		
5		1.00 (PP)		18.2		35	20		with sand layers	Medium Stiff to Stiff orange and gray CLAYEY SAND (SM)
		1.50 (PP)	1.899	19.9	129					
		1.00 (PP)		16.3				9.2		
10		0.50 (PP)	0.676	15.8	132			63.5		
15		1.25 (PP)		30.3		69	48			Stiff gray CLAY (CH) trace sand
20		1.00 (PP)	1.370	32.2	120					Boring completed at 20 feet below the ground surface
25										
30										
35										
40										

**Sample Legend:**

-  Core (Shelby Tube)
-  Standard Penetration (SPT)
-  No Recovery
-  Auger Sample

**Comments/Notes:**

- Borehole backfilled per LA DOTD & LA DEQ requirements upon completion
- Dry Auger Depths = 0 to 20 ft.
- Rotary Wash Depths = n/a
- Ground Water = Encountered at 14 ft. After waiting approx. 15 minutes, cave-in occurred





# **GULF SOUTH**

**ENGINEERING AND TESTING, INC.**  
Geotechnical & Materials Consultants

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p 225-450-3361

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