

**Exhibit S - Preliminary
Geotechnical Engineering
Report & Letter**

October 22, 2015

Mr. Larry Henson
Louisiana Economic Development (LED)
1051 North Third St.
Baton Rouge, LA 70802-5239

Mr. David Conner
Southwest Economic Development Alliance (SWLA)
P.O. Box 3110
Lake Charles, LA 70602

RE: H.C. Drew Property (+/- 183 Acres)
Preliminary Geotechnical Engineering Report

Dear Gentlemen:

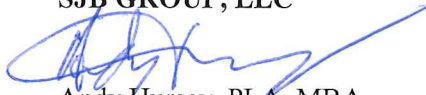
SJB Group, LLC (SJB) has been authorized by Louisiana Economic Development (LED and Southwest Louisiana Economic Alliance (SWLA) to perform due diligence investigations to determine the existence of fatal flaws, if any, that would inhibit the development of H.C. Drew Property (1,000 Acres) – Development Area (+/- 183 Acres), located west of the City of Sulphur, in Calcasieu Parish, Louisiana.

The attached report presents the findings of the Preliminary Geotechnical Engineering Report for the site. The Geotechnical Investigation was performed by Daniel J. Holder, P.E., Inc. of Lake Charles, LA.

Please feel free to contact me at (225) 769-3400, at any time, should you have any questions or need further information.

Sincerely,

SJB GROUP, LLC



Andy Hursey, PLA, MBA
Landscape Architect

Enclosure: Preliminary Geotechnical Engineering Report

Parks & Planning

Transportation

Site Development

Utility Systems

Land Surveying

Construction Services

Environmental Services

Real Estate Services

P. O. Box 1751

Baton Rouge, Louisiana

70821-1751

(225) 769-3400

Fax (225) 769-3596

www.sjbgroup.com

Preliminary Geotechnical Engineering Report

**H.C. Drew 1,000 Acre Property
U.S. Highway 90 and Fabacher Road
Edgerly, Louisiana**

for

**SJB Group, LLC
P.O. Box 1751
Baton Rouge, LA 70821**

prepared by

**Daniel J. Holder, P.E., Inc.
Consulting Civil / Geotechnical Engineer
2767 Scarborough Drive
Lake Charles, LA 70615**

**DJH File 14-108
22 December 2014**

Daniel J. Holder, P.E., Inc.
Consulting Civil / Geotechnical Engineer

2767 Scarborough Drive
Lake Charles, LA 70615
dan@danholderpe.com
337-274-4125

22 December 2014

SJB Group, LLC
P.O. Box 1751
Baton Rouge, LA 70821

Attn: Mr. Michael L. Thompson, P.E., CET

RE: Preliminary Geotechnical Engineering Report
H.C. Drew 1,000 Acre Property
U.S. Highway 90 and Fabacher Road
Edgerly, Louisiana
DJH File 14-108

Dear Mr. Thompson:

I have completed the Preliminary Geotechnical Engineering Report for the referenced project, and am submitting the same herewith. This work was performed in general accordance with my written scope of work dated 28 January 2014, and was authorized by you in a telephone conversation on 07 November 2014.

Please advise if you have any questions regarding this information, or if I may be of any additional assistance. It has been a pleasure working with you on this project.

Sincerely,



Daniel J. Holder, P.E.
Louisiana P.E. Reg. No. 26532



Report Distribution:

2 copies; 1 electronic file (.PDF)

Preliminary Geotechnical Engineering Report

**H.C. Drew 1,000 Acre Property
U.S. Highway 90 and Fabacher Road
Edgerly, Louisiana**

DJH File 14-108; 22 December 2014

PROJECT INFORMATION

1. Description of Project. Based on the information provided, it is understood that this project will consist of the preliminary geotechnical evaluation of a 1,000 acre property for the purpose of initial planning for the economic development of this site. No specific development plans are available for the property at present. Thus, the intent of this study is to make a number of widely spaced soil borings at representative locations to provide an overview of soils and ground water conditions and discuss probable earthwork issues, possible foundation types, and provide preliminary geotechnical recommendations for the general economic development of this site. It is understood that additional studies will be made for specific foundation recommendations once more detailed design information is available.

The 1,000 acre property is rectangularly shaped parcel located at the southeast corner of the intersection of U.S. Highway 90 and Fabacher Road, in Edgerly, Louisiana. Refer to the Site Vicinity Map (Figure 1) and Google Earth Aerial Photograph and Boring Location Plan (Figure 2) in the Appendix.

RESULTS OF INVESTIGATION

2. General. This investigation included the following work activities.

- a review of available geologic information,
- a site reconnaissance by the project engineer,
- five (5) soil borings to the 25 foot depth,
- laboratory testing of selected soil samples,
- engineering analyses and evaluations, and,
- the preparation of this report by the Geotechnical Engineer.

The approximate boring locations are shown on Figure 2 in the Appendix to this report.

3. Site Conditions. The 1,000 acre property essentially consists of pasture that is traversed by a number of drainage ditches. Vegetation generally consists of tall grass and weeds, with a number of scattered individual trees and groups of trees; particularly along the drainage ditches. Overall, the site appeared to be relatively flat and level, with poor drainage.

According to the Geologic Map of Louisiana (*Pope, et al, 1984*), the site is underlain by the Prairie Formation of Pleistocene Age. These soils are described as "*Light gray to light brown clay, sandy clay, silt, sand, and some gravel.*" A portable GPS unit indicated that the center of the site is located at an approximate latitude and longitude of N30° 13' 14.5" and W 93° 29' 48.4", respectively. The appropriate U.S.G.S. Topographic Map indicates that the site is at an elevation of about +15 MSL. Refer to Figures 1 and 2 in the Appendix

4. Soil and Ground Water Conditions. In general, the soils encountered in the borings made at this site may be summarized as follows.

Generalized Soil Stratification

<u>Depth (ft)</u>	<u>Soil Description</u>
0 to 2	Firm dark grayish brown SILTY CLAY (CL), CLAYEY SILT (CL-ML), or SANDY SILT (ML), w/ roots
2 to 10	Firm to stiff light gray & tan SILTY or SANDY CLAY (CL), w/ brown oxides & gray silt pockets & streaks
10 to 17	Medium dense tan & gray CLAYEY fine SAND (SC), moist to wet
17 to 22	Stiff dark brown & dark gray CLAY (CH), w/ gray silt lenses & a few small shells
22 to 25	Stiff light gray w/ brown SILTY CLAY (CL), w/ brown oxides

The borings were initially advanced using dry augering methods to determine the presence of and the hydrostatic conditions of ground water in the boreholes. Ground water was first encountered at about the 7 to 13 foot depth, and was observed to rise to as high as the 3 foot depth during a brief (about 15 minute) observation period. The depth to ground water can fluctuate with seasonal variations in rainfall and evaporation, etc. The actual depth to ground water should be determined more accurately at the time of construction.

It should be emphasized that the actual soil and ground water conditions encountered in the relatively few soil borings made for this preliminary investigation varied widely. The information contained in this section has been generalized from the data obtained from all of the soil borings made for this investigation, and is meant to provide with a general overview of the soil and ground water conditions. For more specific information, refer to the Boring Logs in the Appendix.

GEOTECHNICAL RECOMMENDATIONS

5. General Considerations. The soil conditions encountered in the very widely spaced soil borings made for this investigation consisted of about 2 feet (or more) of silty surface soils, followed by firm to stiff natural clayey soils and some sandy soils to the limit of the exploration at about the 25 foot depth.

These soil conditions should be suitable for a wide variety of development options, including single story metal buildings to wood or steel frame buildings of several stories. Conventional shallow spread footings or reinforced slab-on-grade foundations should be suitable for the support of these structures, or drilled, cast-in-place concrete shafts may be considered for relatively heavy buildings or where settlement movements are less tolerable.

Typical site preparation and earthwork procedures (e.g., stripping the top 2 feet or more of silty soils and placing select fill to achieve the desired subgrade) should be expected at this site.

Although recommendations for foundations, etc., for specific buildings is beyond the scope of this preliminary investigation, typical recommendations for Site Preparation and Earthwork, Shallow Foundations, and Drilled Shaft Foundations are provided in Sections 6, 7, and 8, respectively. It is understood that additional study, including more field exploration and laboratory testing will be required to provide detailed design information once more specific building information is available.

6. Site Preparation and Earthwork Activities. Typically, all vegetation, organic matter, and roots, etc., is removed from the site to expose the firm to stiff clayey subgrade. An undercut of about 2 feet or so should be anticipated at this site, with deeper undercuts in some areas (e.g., at B-4, etc.). The exposed subgrade surface should be inspected to ensure that a suitable surface exists upon which to place select fill. This inspection may include proofrolling the subgrade with a loaded, tandem-axle dump truck or other means as determined by the inspector. Any areas that are determined to be unsuitable for fill placement should be further undercut or stabilized to achieve a stable subgrade surface. Proper subgrade preparation and inspection is essential for the development of this project.

Once a firm subgrade exists upon which to conduct fill operations, select fill may be placed to achieve the desired building pad elevation, if required. Select fill should consist of a silty or sandy clay with a Liquid Limit of 30 to 42 and a Plasticity Index of 12 to 22. The fill should be placed in 6 inch thick loose lifts or less and compacted to 95% of the Standard Proctor Maximum Dry Density at $\pm 2\%$ of the Optimum Moisture Content (ASTM D 698). Each lift should be tested to ensure compliance with these recommendations prior to placing subsequent lifts. A minimum testing frequency of one test per 2,500 square feet, but not less than 3 tests, per lift is recommended. All

subgrade preparation and earthwork activities should be observed and tested by qualified personnel experienced in earthwork inspection.

Good surface drainage should be established prior to and during the earthwork activities. Standing water on the subgrade or in any excavations should be promptly drained or pumped off.

7. Shallow Foundations. The shallow soils at this site or properly placed and compacted select fill should be suitable for the support of shallow foundations for lightly loaded buildings. The following general recommendations for shallow foundations can be used for planning purposes for this site.

7.1 Reinforced Slab (or "Ribbed") Foundation. Typically, a reinforced slab foundation is used for lightly loaded buildings in this area to help accommodate normal soil movements. A reinforced slab foundation consists of a monolithic slab-on-grade with turned-down edges (perimeter grade beams); interior grade beams may be included if required by the building loads and/or stiffness considerations. The perimeter grade beams function as shallow foundations to carry the exterior wall loads and serve to cutoff moisture fluctuations in the soils supporting the slab from the surrounding environment. Interior grade beams serve to stiffen the slab system, allowing it to better accommodate movements in the supporting soils. Interior grade beams should be located beneath any load bearing interior walls and/or columns, in which case they should be designed as a shallow foundation. In general, interior grade beams should be spaced at distances of 15 feet or less (each way). Adequate reinforcement, as determined by the structural engineer, should be provided in the slab-on-grade foundation and grade beams. The entire slab system should be placed monolithically (in one pour), or dowelled to provide equivalent rigidity.

The slab foundation may be reinforced with conventional reinforcing steel (rebar) or post tensioned steel tendons (i.e., a post-tensioned slab). The slab and grade beam dimensions and reinforcement of either foundation system should be determined by a qualified design professional knowledgeable in the design of slabs-on-grade.

The slab section should be underlain by a suitable polyethylene vapor barrier (e.g., Visqueen) and a granular leveling layer. The vapor barrier should extend beneath the grade beams and/or shallow foundation elements; the granular layer is typically located just beneath the slab-on-grade.

7.2 Bearing Capacity and Settlement Estimates. Shallow foundations should bear within the undisturbed, stiff clayey soils or properly placed and compacted select fill at a depth of at least 2 feet. Typically, a net allowable soil bearing pressure of 2,000 pounds per square foot (psf) is recommended for continuous

footings, and 2,600 psf for isolated column footings in the stiff, shallow natural soils and/or properly placed and compacted fills in this area.

The allowable bearing pressures recommended in the preceding paragraph are net values, which means that the weight of the footing and overlying backfill has already been accounted for. Regardless of the computed footing width, a minimum footing width of 18 inches and 24 inches is recommended for continuous and isolated footings, respectively, to minimize the possibility of localized "shear punch" failure.

The long term settlement of shallow foundations is typically on the order of 1 inch or less for foundations designed for the recommended bearing pressures.

7.3 Rectangular Footings and Overturning. Capacities for rectangular footings may be increased according to the following formula:

$$q_r = q_w (1 + 0.3 B/L)$$

where q_r = net allowable bearing pressure for rectangular footings (psf)
 q_w = net allowable bearing pressure for continuous footings given in Section 7.2 (psf)
 B = footing width
 L = footing length ($L > B$)

Resistance to overturning loads should only consider the **effective** footing area, i.e., the portion of the footing centered beneath and effective in carrying the load. The equivalent footing dimensions B' and L' of the effective footing area are defined as:

$$B' = B - 2e_B \quad \text{and} \quad L' = L - 2e_L$$

where e_B and e_L are the eccentricity in each direction. Eccentricity is defined as the moment (M) divided by the axial load (P), or

$$e_B = M_B / P_B \quad \text{and} \quad e_L = M_L / P_L$$

7.4 Lateral Loads. Lateral loads on foundations will be resisted by lateral earth pressure against the side of the foundation and skin friction (or adhesion) between the base of the foundation and the underlying soil. The lateral earth pressure resistance should be neglected for shallow (i.e., 4 feet deep or less) foundations, and, in any case, the sliding resistance should be more than adequate for the anticipated lateral loads. The allowable sliding resistance may typically be taken as 250 psf for foundations bearing on undisturbed natural soils.

This value includes a factor of safety of about 2 against shear failure of the foundation soils.

7.5 Construction Considerations. Shallow (i.e., less than about 4 to 6 feet deep) excavations in clayey soils should remain stable (i.e., not cave) for short periods of time in the absence of surface or ground water. The reinforcing steel and concrete should be placed expeditiously following the completion of the excavation. The excavation should not be permitted to stand open any longer than necessary. Any water that may accumulate in the excavation should be pumped out immediately.

The foundation excavations should be inspected by a qualified representative of the geotechnical engineer to ensure that the bearing surface is properly prepared prior to placing the reinforcing steel or concrete for the foundation. The soils at this site can become significantly weaker if wetted or disturbed during the construction operations. Traffic in the excavation should be prohibited, and drainage should be provided to direct surface and ground water (if any) away from the excavation. If the concrete for the foundation will not be placed on the same day as the excavation, a "mud mat" of lean concrete should be placed to protect the bearing surface.

According to OSHA regulations (CFR 1926.650 through 1926.652, and Appendix A to Subpart P), the contractor is responsible for developing and maintaining the appropriate safety systems for excavations on the project. The soils should be classified as Type C for this purpose. Recommendations for temporary slopes and/or shoring are beyond the scope of this investigation, but can be provided upon request once more specific design details are available.

After the foundation is placed, the excavation should be properly backfilled. The on-site soils should be suitable for this purpose, following some processing (e.g., mixing and moisture control, etc.) to achieve the specifications previously provided in this section. The fill should be placed in thin lifts (6 inches thick or less before compaction) and compacted thoroughly (to at least 95% of the Standard Proctor Dry Density value) before the next lift is placed. All backfill operations should be monitored and approved by the geotechnical engineer's representative as part of the Construction Inspection Services.

8. Drilled Shaft Foundations. The deeper, natural soils at this site should be suitable for the support of drilled shaft foundations for relatively heavily loaded buildings or those that have strict settlement criteria. Drilled shafts are especially suitable for resisting the relatively large axial and shear loads and overturning moments typical of steel frame structures. As long as the site preparation and earthwork activities described in Section 6 are followed, grade supported reinforced floor slabs should be able to be used with

the drilled shafts. The following general recommendations for shallow foundations can be used for planning purposes for this site.

Straight-sided drilled shafts should be utilized at this site; belled (underreamed) shafts will experience construction difficulties due to the presence of sandy soils and ground water at this site, particularly between about the 8 to 17 foot depth. Excavations for drilled shafts will require the use of full depth drilling slurry and/or temporary steel casing to maintain the sides of the excavations (i.e., prevent caving). Temporary steel casing should be effective if it is extended into the deeper clayey soils and used to “seal off” the shallow water bearing sandy soils. The contractor should be thoroughly experienced with the use of these drilling techniques or significant construction difficulties and/or inadequate shaft sections could result. Refer to Section 8.5 for construction considerations.

8.1 Axial Capacity. The compressive axial capacity of drilled shafts is derived from skin friction at the soil-shaft interface and end bearing. Uplift resistance is provided by skin friction and the buoyant weight of the shaft.

Numerous shaft diameters and embedment depths may be considered in order to allow the project designer to select the most suitable shaft geometry for the specific loading conditions. Representative values for drilled shafts in this area are tabulated below. The allowable shaft capacities include factors of safety of 2 and 2.5 for skin friction and end bearing in compression, respectively, and 2.5 for skin friction in uplift. The buoyant unit weight of the shaft is also included in the provided uplift capacities, along with a factor of safety of 1.1. Capacities for intermediate diameters and/or depths may be interpolated from the table. Extrapolation beyond the specified diameters and depths is not recommended without further consultation.

Typical Allowable Compression/Uplift Loads for Single Drilled Shaft Foundations
(kips)

<u>Depth* (ft)</u>	<u>18 Inch Diameter</u>	<u>24 Inch Diameter</u>	<u>30 Inch Diameter</u>	<u>36 Inch Diameter</u>
10	18 / 12	27 / 17	36 / 22	47 / 27
15	33 / 22	47 / 30	64 / 38	82 / 48
20	47 / 34	66 / 46	87 / 59	110 / 73

* Depth refers to depth below existing site grades.

All shaft capacities cited above are based on good quality construction procedures being utilized. Sufficient full depth reinforcement, as determined by the structural engineer, is required to develop the full tensile capacity of the shaft.

8.2 Settlement. Total settlements for drilled shaft foundations designed and constructed in accordance with these recommendations are estimated to be about one-quarter inch or less. Differential settlements between adjacent shafts should be about one-half to three-quarters of the observed total settlement.

8.3 Lateral Loads and Overturning Moments. It is not known if the tops of the drilled shafts will be subject to lateral loads and/or overturning moments, or if these forces will be resisted by the structure itself. The evaluation of lateral loading and overturning moments on drilled shafts can be complex and time consuming for a large number of shaft geometries, such as that provided in Section 8.1. Once the final loading conditions on the drilled shafts are known, this office should be contacted for further evaluation.

8.4 Shaft Spacing and Group Effects. Shafts should be spaced a minimum of 2.5 to 3 diameters center-to-center or 5% of the shaft length, whichever is greater. Large groups of shafts are not anticipated; however, if groups of 5 or more shafts are utilized, the Geotechnical Engineer should be permitted to evaluate group efficiencies.

8.5 Construction Considerations. Excavations for drilled shafts will require the use of full depth drilling slurry and/or temporary steel casing to maintain the sides of the excavations (i.e., prevent caving). Temporary steel casing should be effective if it is extended into the deeper clayey soils and used to “seal off” the shallow water bearing sandy soils. The contractor should be thoroughly experienced with the use of these drilling techniques or significant construction difficulties and/or inadequate shaft sections could result.

Drilling slurry, if utilized, should be introduced into the excavation immediately upon drilling, and maintained at full depth during the drilling and concreting operations. The excavation and concrete placement should proceed as expeditiously as possible. Once the excavation is started, it should be completed and concrete placed without delay. The slurry should be premixed and brought to the proper consistency, etc., before introducing into the excavation. The drilling tools (augers) should be designed such that the slurry can pass freely around or through the tool as the auger is withdrawn, and the auger should be operated slowly enough that suction does not develop beneath the auger and cause caving. The bottom of the excavation should be cleaned out with an air lift pump or similar device; a clean-out bucket is not recommended. Prior to cleanout, the slurry should be allowed to stand undisturbed for about 15 to 30 minutes to allow all suspended solids to settle out.

The reinforcing steel and concrete for the shaft should be placed immediately after the clean out operations are complete. The reinforcing cage should be fixed in place with centralizers or other means so that it is not disturbed by the concrete placement. If temporary steel casing is used achieve a dry excavation, the concrete may be dropped freely through the excavation, provided it is not permitted to strike any obstructions on the way down and does not land in standing water. If this cannot be achieved, a full depth tremie should be utilized to place the concrete. A "head" of concrete of at least 5 feet above the bottom of the casing should be maintained while the temporary casing is withdrawn.

If drilling slurry is utilized, the concrete should be placed by means of a full depth, water-tight tremie with a valve or other means of separating the slurry from the concrete (e.g., a pig). The concrete should be proportioned so that it has the proper strength as determined by the project designers, while maintaining a slump of 6 to 8 inches at the time of placement. This is critical to ensure that the slurry is completely displaced, and that no voids remain within the completed shaft. All drilling and concreting operations should be observed by qualified personnel experienced in drilled shaft inspection techniques.

8.6 Floor Slabs. The floor slabs should consist of ground supported slab-on-grade placed monolithically with exterior and interior grade beams. The grade beams should be designed to rest upon and span across the drilled shaft foundations. The exterior grade beams should extend to a minimum depth of 2 feet below exterior finished grade to help minimize moisture fluctuations of the soils supporting the floor slab. The interior grade beams may be placed at any convenient depth as required by the structural considerations for the floor slab system. Sufficient reinforcement (for both positive and negative moments) and control joint spacing, as determined by the Structural Engineer, should be utilized.

OTHER GEOTECHNICAL CONSIDERATIONS

9. Drainage. Proper long term drainage should be provided to direct surface water away from the completed building foundations. Gutters and downspouts, as well as positive site grading, should be utilized for this purpose as required.

10. Additional Consulting Services. The Geotechnical Engineer should be kept informed of and permitted to address all aspects of the soils-related aspects of the project. Often, concerns may arise that are not specifically addressed by the Geotechnical Engineering Report. A brief conference can often address any such concerns, and can identify any other issues not anticipated by the design team.

Upon completion of design, and prior to the start of construction, the Geotechnical Engineer should be provided with the opportunity to review the design drawings and specifications to assure compliance with the Geotechnical Engineering Report. Such review is considered to be an integral part of the recommendations of this report.

11. Construction Inspection Services. Construction inspection services for this project are essential to assure that the soil conditions do not vary from that assumed in this report and to ensure that the recommendations in this report are followed. These services should be retained by the owner to assure that unbiased reporting is provided. The Geotechnical Engineer should be provided with timely copies of all test results.

12. Limitations. This report is based upon the information provided by the owner's representative, as well as the soil and ground water conditions encountered during the field investigation. Variations may occur away from or between the borehole locations. If such variations become apparent, or if the nature of the project changes significantly, the Geotechnical Engineer should be consulted for additional recommendations. It is understood that additional study will be required to provide specific foundation recommendations once more detailed design information is available.

The recommendations in this report pertain only to the soils-related aspects of the project. The structural design of the building foundations is beyond the scope of these services. Likewise, this report does not address the environmental aspects of the project. We would be pleased to assist with these additional services if requested.

APPENDIX

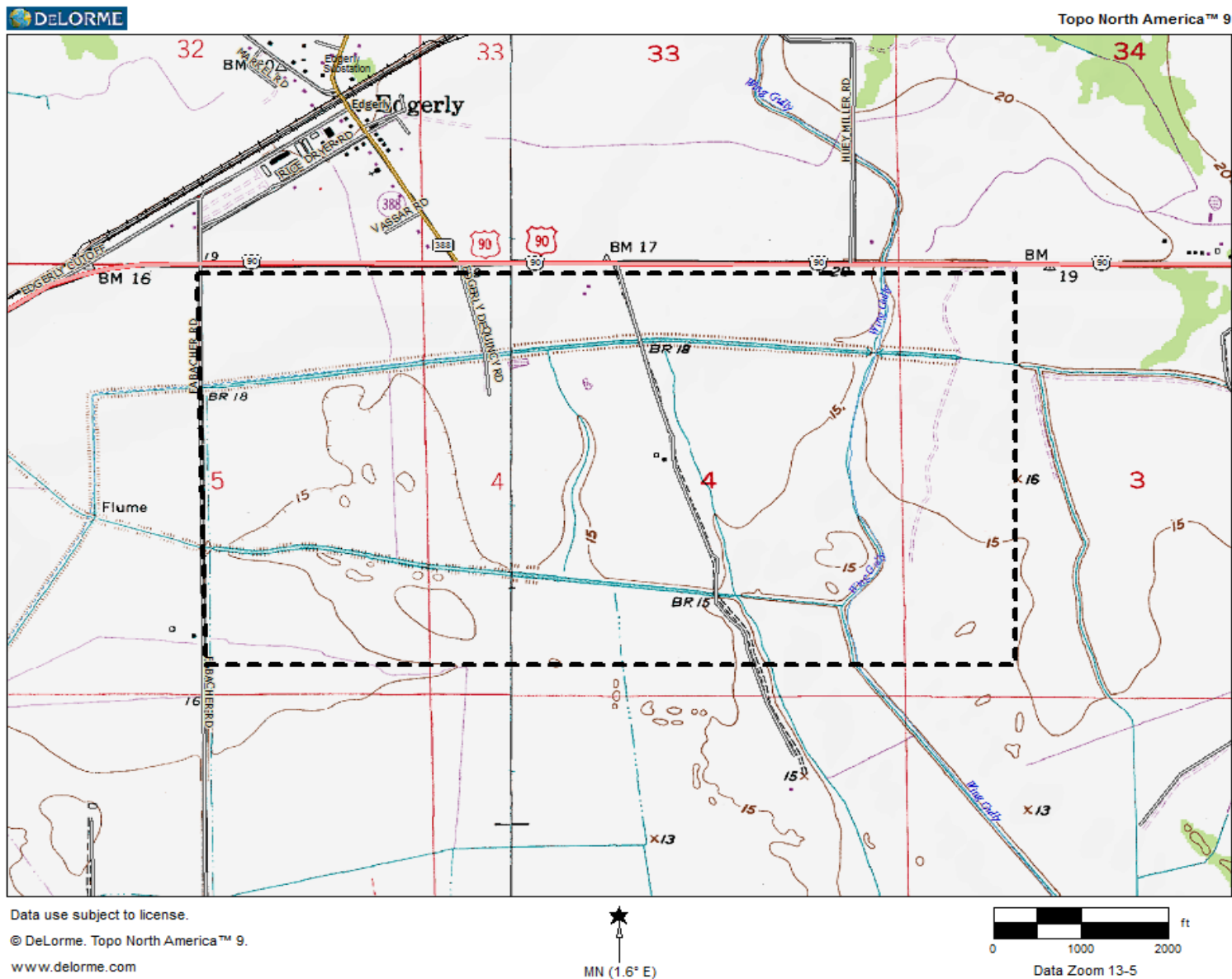
U.S.G.S. Topographic Map / Site Vicinity Map (Figure 1)

Google Earth Aerial Photograph and Boring Location Plan (Figure 2)

Soil Boring Logs (5)

Particle Size Analyses (2)
(Figures PSA-1 and PSA-2)

Description of Field and Laboratory Testing Procedures



Daniel J. Holder, P.E., Inc.
 Consulting Civil / Geotechnical Engineer
 2767 Scarborough Drive
 Lake Charles, LA 70615
 (337) 274-4125 dan@danholderpe.com

H.C. Drew Property
 Edgerly, Louisiana
 for
 SJB Group, LLC
 Baton Rouge, Louisiana

Project Engineer: DJH	DJH File No. 14-108
Drawn By: dan	Date: 21 Dec 14
Checked By: <i>[Signature]</i>	Figure No. 1
Site Vicinity Map / U.S.G.S. Topographic Map	

Source: U.S.G.S. 7.5 Minute Topographic Map, 1999 (3-D TopoQuads, DeLorme)



SJB GROUP, LLC
CONSULTING ENGINEERS
 P.O. BOX 1751 BATON ROUGE, LA 70821 (225) 789-3400 FAX: (225) 789-3596

SUBJECT AREAS
H.C. DREW PROPERTY -1,000 ACRES
SOUTHWEST LOUISIANA

FIGURE
2

Daniel J. Holder, P.E., Inc.
 Consulting Civil / Geotechnical Engineer
 2767 Scarborough Drive
 Lake Charles, LA 70615
 (337) 274-4125 dan@danholderpe.com

H.C. Drew Property
 Edgerly, Louisiana
 for
 SJB Group, LLC
 Baton Rouge, Louisiana

Project Engineer: DJH	DJH File No. 14-108
Drawn By: dan	Date: 21 Dec 14
Checked By: <i>[Signature]</i>	Figure No. 2

Google Earth® Aerial Photograph
 and Boring Location Plan

Source: Site Plan Provided By SJB Group, LLC


SOIL BORING LOG

Boring No. B-1

Page 1 of 1

Project: H.C. Drew Property
 Location: U.S. Highway 90 and Fabacher Road
 Edgerly, Louisiana
 Client: SJB Group, LLC
 Baton Rouge, Louisiana

DJH File No: 14-108
 Date Drilled: 11/18/2014
 Logged By: Mike Fogarty
 Drilled By: Masa Drilling, Inc.
 Equipment: Ardco Top Drive (Buggy)

Depth (ft)	Field Tests			Laboratory Tests						Symbol	Description		
	Sample Type	Penetrometer (tsf) or SPT (bpf)	Ground Water	Qu / UU (tsf)	Dry Density, γ_d (pcf)	Moisture Content, w (%)	Atterberg Limits					Notes / Other Tests	
							Liquid Limit, %	Plastic Limit, %	Plasticity Index, %				
1	ST	1¾ tsf		1.0	105	20	47	19	28	$\epsilon_f = 10\%$		Firm dark gray CLAYEY SILT (CL-ML)	
2												Stiff light gray & tan SILTY CLAY (CL), w/ small brown oxides	
3	ST	2 tsf	▽	1.3	100	23				$\epsilon_f = 10\%$			
4													
5	ST	1¾ tsf											Stiff light gray & tan SILTY to SANDY CLAY (CL), w/ large gray silt pockets
6													
7	ST	1½ tsf	▽	0.8	102	21	32	18	14	$\epsilon_f = 10\%$			Firm light gray & brown SANDY CLAY (CL), w/ brown oxides, moist
8													
9	ST	2¼ tsf											Firm brown & gray very SANDY CLAY (CL), w/ brown oxides, moist
10													
11	ST	2¼ tsf		0.7	95	26	40	23	17	$\epsilon_f = 2.9\%$			
12													
13													
14	ST	1¼ tsf											- ditto, very moist
15													
16													
17													
18													Stiff dark brown & dark gray CLAY (CH), w/ gray silt lenses & few small shells
19	ST	2 tsf		1.4	77	42	91	35	56	$\epsilon_f = 3.6\%$			
20													
21													
22													
23													
24	ST	1¾ tsf											- dark gray, w/ few small shells
25													Boring Completed at 25' Depth
Boring Data						Ground Water Data				Notes / Other Tests			
Boring Advancement: Dry Auger: 0 - 8' Rotary Wash: 8' - 25'						▽ First Encountered: 7½' ▽ After 15 Minutes: 3' Boring Caved to 10' After 15 Mins.				ϵ_f = Failure Strain			
Boring Abandonment: Boring Backfilled w/ Soil Cuttings Upon Completion						Sample Type: ST: Shelby Tube (ASTM D 1587) SS: Split Spoon (ASTM D 1586)							
											Soil Stratification is Approximate		

Daniel J. Holder, P.E., Inc.
 Consulting Civil / Geotechnical Engineer

2767 Scarborough Drive
 Lake Charles, LA 70615

(337) 274-4125
dan@danholderpe.com

SOIL BORING LOG

Boring No. B-2

Page 1 of 1

Project: H.C. Drew Property
 Location: U.S. Highway 90 and Fabacher Road
 Edgerly, Louisiana
 Client: SJB Group, LLC
 Baton Rouge, Louisiana

DJH File No: 14-108
 Date Drilled: 11/18/2014
 Logged By: Mike Fogarty
 Drilled By: Masa Drilling, Inc.
 Equipment: Ardco Top Drive (Buggy)

Depth (ft)	Field Tests			Laboratory Tests							Symbol	Description
	Sample Type	Penetrometer (tsf) or SPT (bpf)	Ground Water	Qu / UU (tsf)	Dry Density, γ_d (pcf)	Moisture Content, w (%)	Atterberg Limits			Notes / Other Tests		
							Liquid Limit, %	Plastic Limit, %	Plasticity Index, %			
1	ST	¾ tsf										Firm dark grayish brown CLAYEY SILT (CL-ML), w/ fine roots
2												
3	ST	¾ tsf		0.6	102	22	33	21	12	$\epsilon_f = 8.6\%$		Firm light gray & brown very SILTY CLAY (CL), w/ brown oxides
4			▽									
5	ST	1¾ tsf		0.8	103	21				$\epsilon_f = 10\%$		- ditto, w/ large gray silt pockets
6												
7	ST	2 tsf	▽									Firm light gray w/ brown very SANDY CLAY (CL) to CLAYEY SAND (SC),
8												very moist
9	ST	¼ tsf										Soft brown mottled very SILTY CLAY (CL), moist
10												
11	SS	12 bpf 3-5-7										Medium dense light gray w/ brown CLAYEY fine SAND (SC), moist
12												
13												
14	SS	15 bpf 5-7-8										- ditto, wet
15												
16												
17												
18												
19	ST	2¼ tsf		0.8	75	45				$\epsilon_f = 1.4\%$		Firm to stiff dark brown w/ dark gray CLAY (CH), w/ light gray silt lenses & slickensides
20												
21												
22												
23												Stiff light gray w/ brown SILTY CLAY (CL), w/ brown oxides
24	ST	1¾ tsf		1.4	99	24	49	20	29	$\epsilon_f = 5.9\%$		
25												Boring Completed at 25' Depth
Boring Data						Ground Water Data					Notes / Other Tests	
Boring Advancement: Dry Auger: 0 - 8' Rotary Wash: 8' - 25'						▽ First Encountered: 7' ▽ After 15 Minutes: 4' Boring Caved to 5' After 15 Mins.					ϵ_f = Failure Strain	
Boring Abandonment: Boring Backfilled w/ Soil Cuttings Upon Completion						Sample Type: ST: Shelby Tube (ASTM D 1587) SS: Split Spoon (ASTM D 1586)					Soil Stratification is Approximate	

Daniel J. Holder, P.E., Inc.
 Consulting Civil / Geotechnical Engineer

2767 Scarborough Drive
 Lake Charles, LA 70615

(337) 274-4125
dan@danholderpe.com

SOIL BORING LOG

Boring No. B-3

Page 1 of 1

Project: H.C. Drew Property
 Location: U.S. Highway 90 and Fabacher Road
 Edgerly, Louisiana
 Client: SJB Group, LLC
 Baton Rouge, Louisiana

DJH File No: 14-108
 Date Drilled: 11/18/2014
 Logged By: Mike Fogarty
 Drilled By: Masa Drilling, Inc.
 Equipment: Ardco Top Drive (Buggy)

Depth (ft)	Field Tests			Laboratory Tests							Symbol	Description
	Sample Type	Penetrometer (tsf) or SPT (bpf)	Ground Water	Qu / UU (tsf)	Dry Density, γ _d (pcf)	Moisture Content, w (%)	Atterberg Limits			Notes / Other Tests		
							Liquid Limit, %	Plastic Limit, %	Plasticity Index, %			
1	ST	1½ tsf				18	22	19	3	PSA 1		Firm dark gray w/ brown SANDY SILT (ML), w/ fine roots
2												
3	ST	1¼ tsf		1.4	110	21	41	17	24	ε _f = 10%		Stiff dark gray w/ brown SILTY CLAY (CL), w/ brown oxides & dark gray silt streaks
4												
5	ST	1½ tsf		1.0	101	21				ε _f = 10%		Stiff brown & light gray SILTY CLAY (CL), w/ brown oxides & dark gray silt streaks
6												
7	ST	1¼ tsf										
8												
9	ST	2 tsf										Firm light gray & brown SANDY CLAY (CL), w/ brown oxides & large black oxide nodules
10												
11	SS	11 bpf 3-5-6										Soft mottled dark brown w/ light gray & brown very SANDY CLAY (CL)
12			▽									
13												
14	SS	6 bpf 2-3-3										Medium dense brown w/ gray very CLAYEY SAND (SC)
15												- loose, w/ brown oxides
16												- ditto, loose @ 13½'
17												
18												Stiff dark brown w/ dark gray CLAY (CH), w/ slickensides
19	ST	3 tsf		1.4	74	46	107	37	70	ε _f = 2.9%		
20												
21												
22												
23												Very stiff light gray & brown SILTY CLAY (CL), w/ brown oxides
24	ST	1½ tsf		3.1	108	19				ε _f = 10%		
25												Boring Completed at 25' Depth
Boring Data						Ground Water Data					Notes / Other Tests	
Boring Advancement: Dry Auger: 0 - 25' Rotary Wash: n / a						▽ First Encountered: 13' ▽ After 15 Minutes: 12½' Boring Caved to 5' After 15 Mins.					ε _f = Failure Strain PSA = Particle Size Analysis (ASTM D 422) (refer to Figure PSA 1 in Appendix)	
Boring Abandonment: Boring Backfilled w/ Soil Cuttings Upon Completion						Sample Type: ST: Shelby Tube (ASTM D 1587) SS: Split Spoon (ASTM D 1586)					Soil Stratification is Approximate	

Daniel J. Holder, P.E., Inc.
 Consulting Civil / Geotechnical Engineer

2767 Scarborough Drive
 Lake Charles, LA 70615

(337) 274-4125
dan@danholderpe.com

SOIL BORING LOG

Boring No. B-4

Page 1 of 1

Project: H.C. Drew Property
 Location: U.S. Highway 90 and Fabacher Road
 Edgerly, Louisiana
 Client: SJB Group, LLC
 Baton Rouge, Louisiana

DJH File No: 14-108
 Date Drilled: 11/18/2014
 Logged By: Mike Fogarty
 Drilled By: Masa Drilling, Inc.
 Equipment: Ardco Top Drive (Buggy)

Depth (ft)	Field Tests			Laboratory Tests							Symbol	Description
	Sample Type	Penetrometer (tsf) or SPT (bpf)	Ground Water	Qu / UU (tsf)	Dry Density, γ _d (pcf)	Moisture Content, w _r (%)	Atterberg Limits			Notes / Other Tests		
							Liquid Limit, %	Plastic Limit, %	Plasticity Index, %			
1	ST	1½ tsf		1.4	105	14	23	18	5	ε _f = 2.1%		Firm to stiff dark brownish gray
2												CLAYEY SILT (CL-ML), w/ light gray
3	ST	2¼ tsf										silt pockets
4												- ditto
5	ST	2 tsf		1.3	107	17	35	17	18	ε _f = 6.4%		Stiff light gray & brown SILTY CLAY
6												(CL), w/ brown oxides
7	ST	2 tsf		1.0	105	18				ε _f = 6.4%		- ditto, sandy, w/ black oxide nodules
8												
9	ST	1½ tsf	▽	0.4	95	25	29	19	10	ε _f = 3.6%		Soft light gray & brown very SANDY
10												CLAY (CL), w/ brown oxides, very
11	ST	1¼ tsf	▽									moist
12												- grading to CLAYEY SILT (CL-ML)
13												
14	ST	2½ tsf		1.8	78	41	99	35	64	ε _f = 2.9%		Stiff dark gray w/ dark brown CLAY
15												(CH), w/ few small shells
16												
17												
18												
19	ST	2 tsf										- dark brownish gray
20												
21												
22												
23												Hard light gray & brown SILTY
24	ST	1½ tsf		4.7	111	17	44	16	28	ε _f = 10%		CLAY (CL), w/ brown oxides
25												Boring Completed at 25' Depth
Boring Data						Ground Water Data					Notes / Other Tests	
Boring Advancement:						▽ First Encountered: 12'					ε _f = Failure Strain	
Dry Auger: 0 - 12'						▽ After 15 Minutes: 9½'						
Rotary Wash: 12' - 25'						Boring Caved to 10½' After 15 Mins.						
Boring Abandonment:						Sample Type:					Soil Stratification is Approximate	
Boring Backfilled w/ Soil						ST: Shelby Tube (ASTM D 1587)						
Cuttings Upon Completion						SS: Split Spoon (ASTM D 1586)						

Daniel J. Holder, P.E., Inc.
 Consulting Civil / Geotechnical Engineer

2767 Scarborough Drive
 Lake Charles, LA 70615

(337) 274-4125
dan@danholderpe.com

SOIL BORING LOG

Boring No. B-5

Page 1 of 1

Project: H.C. Drew Property
 Location: U.S. Highway 90 and Fabacher Road
 Edgerly, Louisiana
 Client: SJB Group, LLC
 Baton Rouge, Louisiana

DJH File No: 14-108
 Date Drilled: 11/18/2014
 Logged By: Mike Fogarty
 Drilled By: Masa Drilling, Inc.
 Equipment: Ardco Top Drive (Buggy)

Depth (ft)	Field Tests			Laboratory Tests							Symbol	Description
	Sample Type	Penetrometer (tsf) or SPT (bpf)	Ground Water	Qu / UU (tsf)	Dry Density, γ_d (pcf)	Moisture Content, w (%)	Atterberg Limits			Notes / Other Tests		
							Liquid Limit, %	Plastic Limit, %	Plasticity Index, %			
1	ST	3½ tsf	★			16	41	20	21	PSA 2		Firm dark brown & light gray SILTY CLAY (CL), w/ roots
2												
3	ST	2½ tsf		2.5	111	11	34	17	17	$\epsilon_f = 4.3\%$		- ditto, very stiff w/ light gray silt pockets
4												
5	SS	15 bpf 4-6-9										Medium dense dark brownish gray SILTY fine SAND (SM)
6												
7	ST	2½ tsf		2.5	110	17	49	16	33	$\epsilon_f = 10\%$		Very stiff dark gray & brown SILTY CLAY (CL), w/ brown oxides &
8												dark gray silt streaks
9	ST	1½ tsf		1.4	105	20				$\epsilon_f = 9.3\%$		Stiff light gray & brown SILTY CLAY (CL), w/ brown oxides & large black
10												oxide nodules
11	ST	1½ tsf		0.4	95	25	34	21	13	$\epsilon_f = 10\%$		Soft light gray w/ brown SILTY CLAY (CL), w/ brown oxides, moist
12												Stiff dark brown CLAY (CH), w/ lots
13												of light gray silt lenses & large dark
14	ST	1¾ tsf										gray silt streaks
15												
16												
17												
18												
19	ST	1½ tsf		0.8	66	56	107	36	71	$\epsilon_f = 2.1\%$		- w/ slickensides
20												
21												
22												
23												
24	ST	1¼ tsf										- dark gray, w/ lots of small shells
25												Boring Completed at 25' Depth
Boring Data						Ground Water Data					Notes / Other Tests	
Boring Advancement: Dry Auger: 0 - 25' Rotary Wash: n / a						★ No Ground Water Encountered					ϵ_f = Failure Strain PSA = Particle Size Analysis (ASTM D 422) (refer to Figure PSA 2 in Appendix)	
Boring Abandonment: Boring Backfilled w/ Soil Cuttings Upon Completion						Sample Type: ST: Shelby Tube (ASTM D 1587) SS: Split Spoon (ASTM D 1586)					Soil Stratification is Approximate	

Daniel J. Holder, P.E., Inc.
 Consulting Civil / Geotechnical Engineer

2767 Scarborough Drive
 Lake Charles, LA 70615

(337) 274-4125
dan@danholderpe.com

Particle Size Analysis (ASTM D 422)

Sample Location:

B-3, 0' - 2'

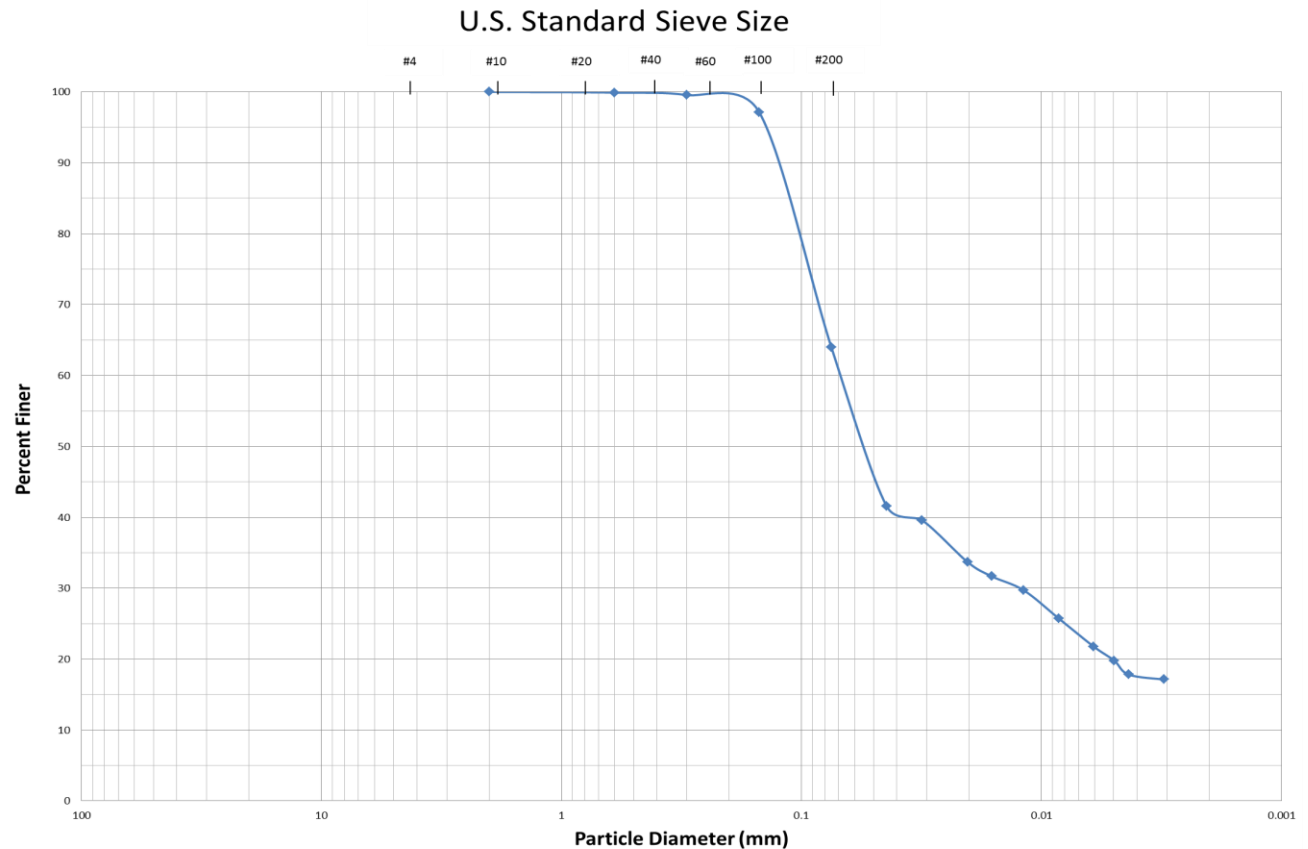
Sample Description:

Firm dark gray w/ brown SANDY SILT (ML), w/ fine roots

Particle Size (Sieve) (mm.)	Percent Finer By Wt.
1½"	38.100
¾"	19.050
⅜"	9.525
#4	4.750
#10	2.000
#30	0.600
#50	0.300
#100	0.150
#200	0.075
	0.044
	0.031
	0.020
	0.016
	0.012
	0.008
	0.006
	0.005
	0.004
	0.003

Atterberg Limits	
Liquid Limit, LL:	22
Plastic Limit, PL:	19
Plasticity Index, PI:	3
Moisture Content, w:	18

Gravel	Sand		Silt	Clay
	Coarse to Medium	Fine		



Daniel J. Holder, P.E., Inc.
Consulting Civil / Geotechnical Engineer
2767 Scarborough Drive
Lake Charles, LA 70615
(337) 274-4125 dan@danholderpe.com

H.C. Drew Property
Edgerly, Louisiana
for
SJB Group, LLC
Baton Rouge, Louisiana

Project Engineer: DJH	DJH File No. 14-108
Drawn By:	Date: 21 Dec 14
Checked By: <i>[Signature]</i>	Figure No. PSA-1

Particle Size Analysis
B-3, 0' - 2'

Particle Size Analysis (ASTM D 422)

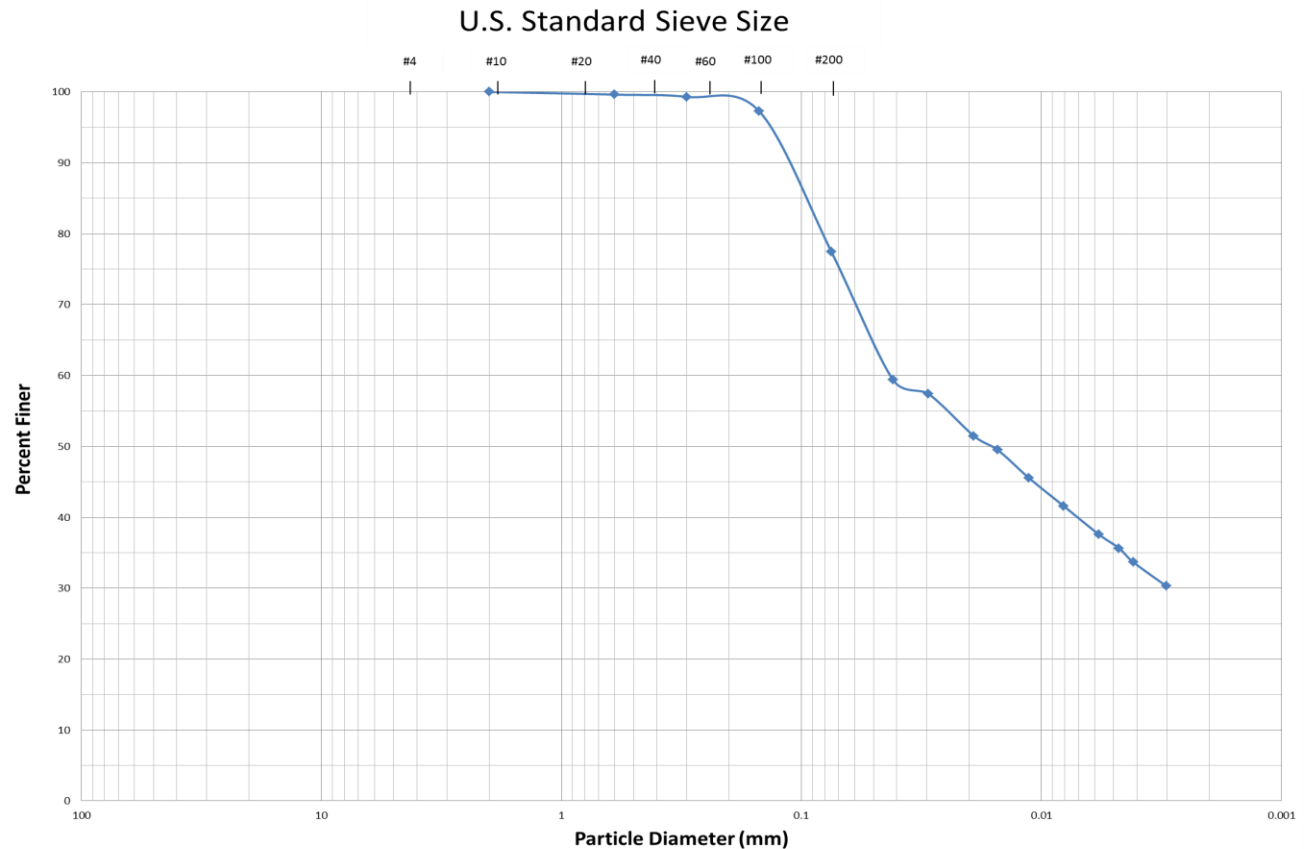
Sample Location: B-5, 0' - 2'

Sample Description: Firm dark brown & light gray SILTY CLAY (CL), w/ roots

Particle Size (Sieve) (mm.)	Percent Finer By Wt.
1½"	38.100
¾"	19.050
⅜"	9.525
#4	4.750
#10	2.000
#30	0.600
#50	0.300
#100	0.150
#200	0.075
	0.042
	0.030
	0.019
	0.015
	0.011
	0.008
	0.006
	0.005
	0.004
	0.003

Atterberg Limits	
Liquid Limit, LL:	41
Plastic Limit, PL:	20
Plasticity Index, PI:	21
Moisture Content, w:	16

Gravel	Sand		Silt	Clay
	Coarse to Medium	Fine		



Daniel J. Holder, P.E., Inc.
Consulting Civil / Geotechnical Engineer
2767 Scarborough Drive
Lake Charles, LA 70615
(337) 274-4125 dan@danholderpe.com

H.C. Drew Property
Edgerly, Louisiana
for
SJB Group, LLC
Baton Rouge, Louisiana

Project Engineer: DJH	DJH File No. 14-108
Drawn By:	Date: 21 Dec 14
Checked By: <i>[Signature]</i>	Figure No. PSA-2
Particle Size Analysis B-5, 0' - 2'	

Description of Field and Laboratory Testing Procedures

Field Testing Procedures. The borings were (initially) advanced using dry augering methods. Soil samples were obtained continuously in the upper 10 foot and on 5 foot centers thereafter. The sample depths and types are recorded on the soil boring logs.

In general, relatively undisturbed "Shelby" tube samples (ASTM D 1587) were taken in clays and silty clays. Undisturbed soil samples are required for strength and density tests, and other properties that are dependent upon the soil being close to its natural state. In this procedure, the boring is advanced to the desired sampling depth, then a 3 inch diameter, thin-walled "Shelby" tube is inserted into the borehole. The tube is then pushed hydraulically about 2 feet into the undisturbed soil. The tube is withdrawn, and the sample extruded with a hydraulic piston. The sample is visually classified and tested with a spring loaded penetrometer, which provides a crude estimate of the unconfined compressive strength. The penetrometer test result is recorded on the soil boring log, and a representative portion of the sample is secured for transport to the laboratory.

In sands and silts, Standard Penetration Tests (ASTM D 1586) are generally made. This test provides a measure of the in-situ density or stiffness of the soil and provides a relatively disturbed sample that may be used for classification testing. In this procedure, the boring is advanced to the desired sampling depth, and a relatively heavy walled "split spoon" sampler is inserted into the borehole. The sampler is driven into the soil using a 140 pound "drop" hammer with 30 inch strokes. The number of blows required to drive each 6 inch increment is recorded. The first increment is a seating drive; the number of blows required to drive the second and third increments are added together to determine the "N-value," which has units of blows per foot (bpf). The N-value and the number of blows per increment are recorded on the soil boring log. The sample is visually classified, and a representative portion secured for transport to the laboratory.

Laboratory Testing Procedures. Representative samples from the field investigation were selected by the project engineer for laboratory testing to determine their relevant engineering characteristics. These tests generally fall into one of the following categories.

Strength Tests. Strength tests generally consist of the Unconfined Compressive Strength, or Qu Test, (ASTM D 2166), and the Unconsolidated, Undrained Triaxial Compressive Strength, or UU Test, (ASTM D 2850). In each of these tests, a cylindrical sample of undisturbed soil is subjected to an axial load until failure occurs, yielding the compressive strength of the soil. The principal difference between the two tests is that the Qu is not confined laterally, which can lead to premature failure, and thus, lower compressive strength values. The UU test is confined laterally in a triaxial cell, typically to the lateral stress that the in-situ soil sample was subject to. The compressive strength and axial strain at failure (ϵ_f) are recorded on the soil boring log. The confining stress of UU tests is also recorded.

Classification Tests. Common classification tests include the Atterberg Limit Tests and Particle Size Analyses. Atterberg Limit Tests (ASTM D 4318) are performed to determine the consistency (or "clayeyiness") of a soil. The Atterberg limits consist of the Liquid Limit (LL) and the Plastic Limit (PL), and the Plasticity Index (PI), which is the difference between the LL and the PL. These values are recorded on the soil boring log.

The Particle Size Analysis Test (ASTM D 422) is performed to determine the distribution of the individual particle sizes of a soil sample. The test is typically performed using mechanical sieves for soils containing gravel and sands, or a "hydrometer" for clayey and silty soils. The results of the Particle Size Analysis are typically plotted on a log scale.

Physical Tests. Common physical tests include the Moisture Content Test (ASTM D 2216) and the Dry Density Test. As the names indicate, these tests determine the moisture content and dry density (or dry unit weight) of a soil sample.