Exhibit AA. I-12 Industrial Site
Preliminary Geotechnical Engineering Report

CSRS

STRATUM ENGINEERING, LLC
Geotechnical Engineering ◆ Testing and Inspection Services

July 20, 2018

Reimers Company, LLC
23107 Zemurray Gardens Drive
Loranger, Louisiana 70446
Phone: (985) 878-8022

Attn: Ms. Jeanine Connelley

I-12 Industrial Site Preliminary Geotechnical Engineering Report

Re: Preliminary Geotechnical Engineering Report
General Site Characterization
Tangipahoa I-12 Site
Tangipahoa Parish, Louisiana
Project No. G18-042

Dear Ms. Connelley:

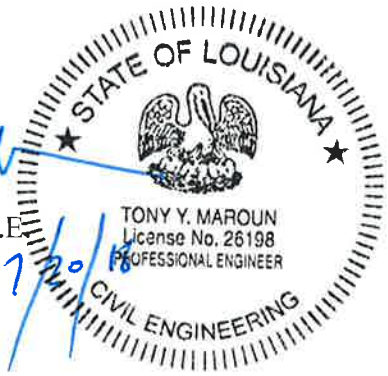
Stratum Engineering, LLC (SE) is pleased to submit our Preliminary Geotechnical Engineering Report for the above referenced project. The report includes the results of field and laboratory testing, as well as preliminary recommendations regarding the suitability of the site for future industrial developments.

We appreciate the opportunity to perform this geotechnical study and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office.

Respectfully submitted,
STRATUM ENGINEERING, LLC

Norman S. Vallette, Jr.
Project Manager

Tony Y. Maroun, P.E.
Principal



NSV/TYM

PRELIMINARY GEOTECHNICAL ENGINEERING REPORT

GENERAL SITE CHARACTERIZATION
TANGIPAHOA I-12 SITE
TANGIPAHOA PARISH, LOUISIANA

SE PROJECT NO. G18-042

PREPARED FOR

REIMERS COMPANY, LLC
C/O MS. JEANINE CONNELLEY
23107 ZEMURRAY GARDENS DRIVE
LORANGER, LOUISIANA 70446

JULY 20, 2018

BY

STRATUM ENGINEERING, LLC
585 JOHNNY F. SMITH AVENUE
SLIDELL, LOUISIANA 70460

TABLE OF CONTENTS

EXECUTIVE SUMMARY

An exploration of the subsurface conditions has been completed at the Tangipahoa I-12 Site in Tangipahoa Parish to assess its suitability for potential future industrial developments.

The site encompasses about 290 acres of undeveloped property located south of US Highway 190 just west of the Florida Parishes Juvenile Detention Center located at 28528 Highway 190 in Covington, Louisiana near the Tangipahoa-St. Tammy Parish border. The site is currently heavily wooded with some existing pathways crossing the property. The surface is covered with surface vegetation and brush. Topographic information was not available to us during this study; however, it was assumed that two (2) to 3 feet of cut and fill may be needed to achieve the design grades. It is understood that the site will be marketed for industrial type developments. Typical facilities could be of structural steel frame or cast-in-place concrete.

Based on the borings, about eight (8) to 10 inches of silty sandy topsoil with organics covered the surface. The topsoil was generally underlain by medium sandy silt or very stiff silty sandy clay to a depth of 2 to 4 feet and followed by alternating layers of firm to stiff sandy clay or loose to medium clayey sand to a depth of approximately 13 to 20 feet. The sandy clay or clayey sand was underlain by alternating layers of stiff to very stiff lean clay and sandy lean clay to about 57 feet followed by very stiff lean to fat clay to a depth of 72 feet. The fat clay was underlain by very dense poorly graded sand and silty sand to a depth of at least 100 feet, the maximum depth explored. Groundwater was initially encountered in the borings at a depth of 13 to 16 feet during drilling and measured at a depth of 10 to 13 feet upon completion of drilling.

Based on the field data and laboratory test results, the soils encountered near the surface consist mostly of medium sandy silts or very stiff silty sandy clays. The near surface silty soils encountered at the site are generally stable when dry. However, they are moisture sensitive and can lose their support capabilities if they become saturated. Therefore, depending on the site condition at the time of construction, the surficial silty soils may have to be removed and replaced with compacted structural fill.

Provided the site is prepared as recommended in the report, the soils at the site are generally suitable for supporting typical industrial facilities on shallow foundations with floor slabs on grade. Although the soil condition at the site is fair, the foundation type will also depend on the type of structure proposed and the magnitude of the structural loads. Accordingly, deep foundations may also be used to support heavily loaded structures.

The recommendations provided in this report are preliminary in nature and were formulated based on typical loading conditions for either lightly loaded structures or heavily loaded industrial structures. Furthermore, the recommendations were based on a few borings drilled across the site at accessible locations. Therefore, additional borings will be necessary when the type of facilities are identified and the locations of the structures are finalized to verify the soil conditions and provide final site specific recommendations for the structures.

The owner/designer should not rely solely on this Executive Summary and must read and evaluate the entire contents of this report prior to utilizing our engineering recommendations in preparation of design/construction documents.

PROJECT INFORMATION

Project Authorization

Stratum Engineering, LLC (SE) has completed a preliminary geotechnical exploration to characterize the Tangipahoa I-12 Site for a potential future development in Tangipahoa Parish, Louisiana. The exploration was accomplished in general accordance with SE Proposal No. G17-173R-3, dated December 4, 2018 and revised May 16, 2018.

Project Description

The property is located along the I-12 corridor in an area of prime industrial/business developments. In anticipation of comparable business or industrial developments on this property, the site will be characterized to verify the soil conditions and provide preliminary foundation recommendations for typical structures which could be constructed at the site.

Generally, industrial developments could consist of multiple structures with associated light and heavy duty pavements. The buildings may be single story structures with steel frames and load bearing masonry or tilt up walls, or could be of cast-in-place concrete. Depending on the building spans, maximum interior column load could range from 100 to 200 kips. Maximum wall loads are assumed to be 3 to 5 kips per foot. Depending on the facility type, floor loads could range between 250 to 1000 psf. The facilities may be dock high, requiring 4 to 5 feet of fill to reach the building finished floor elevation.

Traffic associated with industrial facilities could consist of heavy tractor trailers with an average daily traffic (ADT) of 100 to 300 trucks per day for a design life of 20 years. For these types of facilities, rigid pavements are widely considered for their longevity and ability to support the high volume of traffic.

Purpose and Scope of Services

The purpose of this study was to explore the subsurface conditions at the site and to enable an evaluation of a cost effective foundation system for potential future industrial facilities.

The scope of services included drilling one (1) boring to a depth of 100 feet and four (4) borings to a depth of 20 feet at accessible locations across the site. The borings were located in the field by a Stratum Engineering representative using normal taping from existing landmarks as indicated on the attached boring location plan is a reproduction of an aerial photograph of the property. In addition to drilling the soil borings, our scope of services included a reconnaissance of the project site, select laboratory testing, and preparation of this geotechnical report. This report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and provides results of analysis and recommendations regarding the following:

- Preliminary foundation type, depths, allowable bearing capacities, pile capacities, and estimate of settlements;
- Seismic site classification;
- Typical soil parameters for flexible and rigid pavements;
- Site preparation, including subgrade preparation and fill compaction requirements
- Suitability of the on-site soil for use as structural fill.

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

SITE AND SUBSURFACE CONDITIONS

Site Description and Location

The site encompasses approximately 290 acres of undeveloped property located adjacent to US Highway 190 on the south side just west of the Florida Parishes Juvenile Detention Center. The property is heavily wooded with several existing pathways, including the Tammany Trace Bike Trail, bisecting the area.

Detailed grading information was not available at the time this report was prepared. However, it was assumed that two (2) to 3 feet of fill may be needed to reach the design grades.

Drilling and Sampling

The borings were drilled with an All-Terrain Vehicle (ATV) mounted drilling rig. Auger and wet rotary drilling techniques were used to advance the borings. Samples were generally obtained continuously from the ground surface to a depth of ten feet and at maximum five foot intervals thereafter. Drilling and sampling techniques were accomplished in general accordance with ASTM Standards.

Undisturbed samples of cohesive soils were generally obtained using thin-wall tube sampling procedures in general accordance with the procedures for "Thin-Walled Tube Geotechnical Sampling of Soils" (ASTM D1587). These samples were extruded in the field with a hydraulic ram and were wrapped in aluminum foil prior to placement in a plastic wrapping to preserve moisture. The samples were transported to the laboratory in containers to prevent disturbance.

For cohesionless soils and semi-cohesive soils, Standard Penetration Tests (SPT) were performed to obtain standard penetration values of the soil. The standard penetration value (N) is defined as the number of blows of a 140 pound hammer, falling 30 inches, required to advance the split-barrel sampler one (1) foot into the soil. Samples of granular soils were obtained utilizing a two (2) inch O.D. split-barrel sampler in general accordance with procedures for "Penetration Test and Split-Barrel Sampling of Soils" (ASTM D1586). To perform the test and obtain a sample, the sampler is lowered to the bottom of the previously cleaned drill hole and advanced by blows from the hammer. The number of blows is recorded for each of three (3) successive increments of six (6) inches penetration. The "N" value is obtained by adding the second and third incremental numbers. The results of the standard penetration test indicate the relative density of cohesionless soils and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components. The split spoon samples were identified according to the project number, boring number and depth, and were also placed in polyethylene plastic wrapping to protect against moisture loss.

The laboratory testing program included supplementary visual classification and water content tests on all of the soil samples. In addition, selected samples were subjected to unconfined compression testing, percent passing the #200 sieve and Atterberg Limits determination. Additional estimates of unconfined compressive strength were made using a hand penetrometer. The laboratory testing was performed in general accordance with ASTM Standard Procedures.

Subsurface Conditions

Based on the borings, about eight (8) to 10 inches of silty sandy topsoil with organics covered the surface. The topsoil was generally underlain by medium gray sandy silt or very stiff tannish gray silty sandy clay to a depth of 2 to 4 feet. The surficial material was followed by alternating layers of firm to stiff tannish gray sandy clay or loose to medium clayey sand to a depth of approximately 13 feet. The sandy clay or clayey sand was underlain by alternating layers of stiff to very stiff tannish gray lean clay and sandy lean clay to about 57 feet and followed by very stiff tannish gray lean to fat clay to a depth of 72 feet. The fat clay was underlain by very dense tan poorly graded sand and silty sand to a depth of at least 100 feet, the maximum depth explored.

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in the Appendix should be reviewed for specific information at the boring locations. These records include soil descriptions, stratification, penetration resistances, and locations of the samples and laboratory test data. The stratification shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratification represents the approximate boundary between subsurface materials and the actual transition may be gradual. Water level information obtained during field operations is also shown on the boring logs. The samples, which were not altered by laboratory testing, will be retained for 60 days from the date of this report and then will be discarded.

Groundwater Conditions

Groundwater was initially encountered in the borings at a depth of 13 to 16 feet during drilling and measured at a depth of 10 to 13 feet upon completion of drilling. However, it should be noted that groundwater levels will fluctuate with seasonal variations in rainfall, extended periods of drought or surface runoff. Therefore, it is recommended that the actual groundwater level at the site be determined by the contractor at the time of the construction activities.

IBC Site Classification

The International Building Code (IBC), 2012 edition, was reviewed to determine the site classification for seismic design. Based on the soils encountered in the borings and our experience in the general vicinity, the site can be classified as Site Class “D”, as outlined in Section 1613.3.2 of the building code.

EVALUATION AND RECOMMENDATIONS

General

It is our understanding the site will be marketed for potential industrial development. Typical structures could be dock high facilities requiring 4 to 5 feet of fill to reach the design grade. Otherwise, single story structures with slab-on-grade could require about 2 to 3 feet of fill to achieve the design grade.

The results of the exploration indicate that the near surface soils present at this site are generally adequate to support typical industrial facilities on a shallow foundation system. However, the recommendations provided are preliminary in nature and were formulated based on assumed loading conditions for typical industrial structures. Heavily loaded structures may be supported on pile foundations with a length ranging between 40 and 80 feet. Consequently, additional borings will be necessary when the type of facilities are identified and the locations of the structures are finalized to verify the soil conditions and provide final site specific recommendations for the development.

Site Preparation

Site preparation is expected to include, but not be limited to, clearing of the site, stripping of the topsoil, organics and other deleterious materials, and removal of any soft material encountered in the building and parking areas. Based on the borings, up to 10 inches of silty sandy topsoil with organics was encountered at the site. However, the actual stripping depth should be determined by a representative of the Geotechnical Engineer at the time of construction.

The borings were conducted at accessible locations across the site at a time when the surface was relatively dry and stable. However, the silty soil encountered near the surface is moisture sensitive and could lose its strength if saturated with water. Depending on the site condition at the time of construction, about 12 to 24 inches of the near surface moisture sensitive soil may have to be undercut prior to fill placement.

The subgrade in the building and pavement areas should be proofrolled with a tandem axle dump truck or a similar heavily loaded rubber tired vehicle weighing 15 to 20 tons. Soils which are observed to rut or deflect excessively under the moving load should be undercut and replaced with properly compacted structural fill. The proofrolling and undercutting activities should be witnessed by a representative of the Geotechnical Engineer and should be performed during a period of dry weather.

After subgrade preparation and observation have been completed, structural fill placement may begin. The fill may consist of silty sand, sandy clay or clayey sand and should be free of organics or other deleterious materials. The fill should have a liquid limit less than 40 and a plasticity index less than 20 percent. Structural fill soils with plasticity indices in this range will require close moisture content control to achieve the recommended degree of compaction. The structural fill should be compacted to at least 95 percent of the fill's maximum dry density as determined by ASTM D698 (Standard Proctor).

The fill should be placed in maximum lifts of eight (8) inches of loose material and should be compacted within one (1) percentage point below to three (3) percentage points above the optimum moisture content. If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying. Each lift of compacted fill should be tested by a representative of the Geotechnical Engineer prior to placement of subsequent lifts. The edge of compacted structural fill should extend at least 10 feet beyond the edge of building prior to sloping.

Crowning the building pad during fill placement, particularly in wet periods, is highly recommended to minimize ponding of water and allow rapid runoff of surface water. Construction traffic should not be allowed on the building pad during wet weather, where practical.

Shallow Foundations

Based on the field data and laboratory test results, the site is suitable to support typical industrial developments on shallow foundations bearing at least two (2) feet below the finished grade. Shallow spread and continuous wall footings bearing in the compacted structural fill or in the naturally occurring stiff clay can be designed for maximum allowable bearing pressures of 2,500 and 2,000 pounds per square foot, respectively. Minimum dimensions of 24 inches for spread footings and 18 inches for continuous footings should be used in the design, even if the resulting bearing pressure is less than the allowable bearing pressure, to minimize the possibility of a local bearing failure. The recommended preliminary bearing capacities include a factor of safety of three (3).

The foundation excavations should be observed by a representative of Stratum Engineering prior to steel or concrete placement to assess that the foundation materials are consistent with the materials discussed in this report. Soft or loose soil zones encountered at the bottom of the footing excavations should be removed to the level of firm, suitable bearing soils or adequately compacted fill as directed by the Geotechnical Engineer.

The footing excavations should be observed and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond. If it is required that footing excavations be left open for more than one day, they should be protected to reduce changes in moisture content of the bearing soils.

Settlement

Areal settlement under a building is generally caused by the amount of fill placed, the building footprint and the subsurface soil conditions encountered in the building area. Similarly, footing settlement depends on the footing size as well as the soil conditions below the footing. At the time this report was prepared, the type of structures had not been identified and the amount of fill needed to achieve the design grade was not known. However, based on the subsurface conditions encountered at the site, areal settlement is anticipated to be minimal with the addition of two (2) to 3 feet of fill.

Based on the assumed structural loads, foundation settlement will be less than one (1) inch provided the footings are designed for the recommended bearing pressure.

Floor Slabs

A slab-on-grade may be supported on compacted low plasticity structural fill. Placement of new structural fill and preparation of the existing subgrade beneath the floor slabs should be prepared as outlined in the "Site Preparation" section of this report. Proofrolling, as discussed earlier in this report, should be accomplished to identify any soft or unstable soils which should be removed from the floor slab areas prior to fill placement and/or floor slab construction.

For design purposes, a Modulus of Subgrade Reaction (k) of 125 pci can be used for the compacted structural fill. This can be increased up to 250 pci with the addition of a 6 inch layer of 610 limestone below the floor slabs. In addition to improving the Modulus of Subgrade Reaction, the aggregate base will evenly distribute the load and provide a better working table during construction.

The floor slabs should have an adequate number of joints to reduce cracks resulting from any differential movement and shrinkage. The floor slabs should not be rigidly connected to columns, walls or foundations. Polyethylene sheeting should be placed on top of the aggregate base to act as a vapor barrier and protect the slabs from potential problems commonly associated with moisture migration through floor slabs in a controlled environment.

Deep Foundations

Generally, deep foundations systems are used to support heavily loaded structures by transferring the structural loads through the surficial soils to more adequate bearing strata and hence minimizing long term settlements.

Typical deep foundation systems used in the area include timber piles and auger cast-in-place piles which will derive their support capabilities mainly from skin friction as well as end bearing when tipped in the dense sand encountered around 72 feet below the existing ground surface.

Large timber piles driven to a penetration depth of 40 to 45 feet could yield a maximum allowable compression capacity of about 20 to 25 tons while 14-inch diameter auger cast-in-place piles installed to a penetration depth of 50 to 65 feet could be designed for a maximum allowable compression capacity of 45 to 60 tons, respectively. The auger cast pile capacity could be as much as 100 tons if tipped in the dense sand encountered below 72 feet. The preliminary capacities presented in the report include a factor of safety of two (2) in compression.

Parameters for Pavement Design

Parking areas and drives associated with an industrial park are expected to consist generally of light duty pavement for employee parking as well as heavy duty pavement for large truck staging areas, parking areas and drives.

Based on the field data and laboratory test results, the near surface soil consists of sandy silts or sandy silty clays. Typical California Bearing Ratio (CBR) values for the existing silty subgrade or imported clayey sand structural fill were estimated to be on the order of 4 to 5 corresponding to a Modulus of Subgrade Reaction (k) of 125 to 150 pci which may be used for the design of flexible and rigid pavements, respectively. These values may be used with consideration given to the frequency and magnitude of anticipated traffic loads associated with the type of facilities being constructed.

Class II base including crushed limestone or cement treated low plasticity clays below the flexible and/or rigid pavements are widely used in the area.

CONSTRUCTION CONSIDERATIONS

Moisture Sensitive Soils/Weather Related Concerns

The upper silty soils encountered at the site are extremely sensitive to changes in moisture content and may lose significant strength if allowed to become saturated. In addition, soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. During wet weather periods, increases in the moisture content of the upper soils can cause some reduction in the soil strength and support capabilities. Therefore, it will be advantageous to perform earthwork construction activities during dry weather. The site contractor shall be responsible for maintaining a firm, unyielding and stable subgrade condition. Should the near surface soils become wet, the contractor should be prepared to mitigate these conditions by repeated aeration and exposure to sunlight or by admixture treatment.

REPORT LIMITATIONS

The recommendations submitted in this report are based on the available subsurface information obtained by SE and assumed typical design loads for industrial developments. These recommendations are preliminary and generalized in nature. They should not be used in the design of a specific structure without conducting a detailed investigation to verify the subsurface soil condition and determine if revisions to the recommendations are necessary.

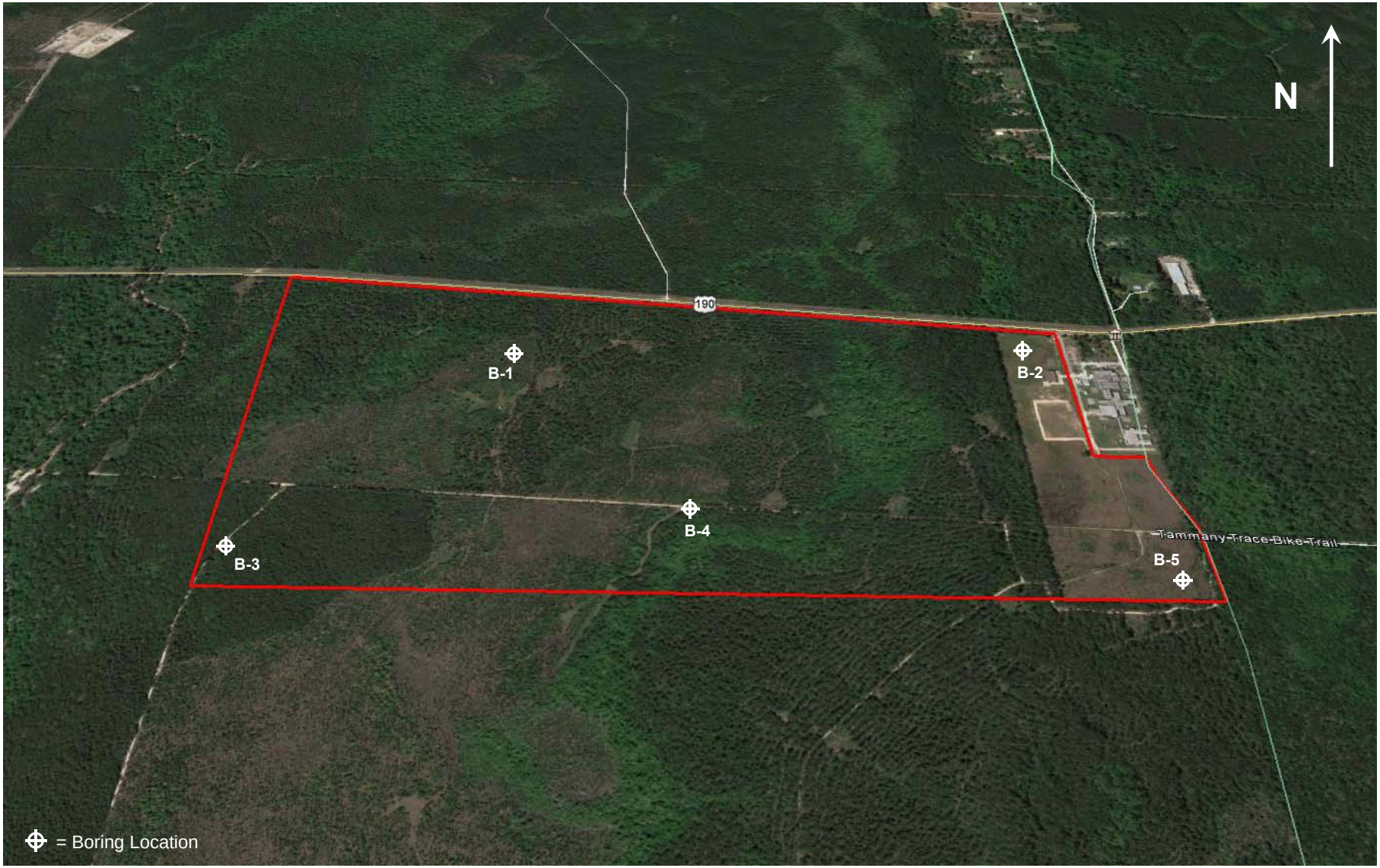
The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

Once specific plans for the development are complete, Stratum Engineering may be retained and provided the opportunity to conduct a more thorough geotechnical investigation and analysis utilizing project specific plans and specifications under consideration.

This report has been prepared for the exclusive use of Reimers Company, LLC for marketing and planning of the Tangipahoa I-12 Site in Tangipahoa Parish, Louisiana.

APPENDIX

STRATUM ENGINEERING, LLC



STRATUM ENGINEERING, LLC

BORING LOCATION PLAN

SE PROJECT NO. G18-042

GEOTECHNICAL ENGINEERING SERVICES
GENERAL SITE CHARACTERIZATION
TANGIPAHOA I-12 SITE
TANGIPAHOA PARISH, LOUISIANA

STRATUM ENGINEERING, LLC

LOG OF BORING B-1

GENERAL SITE CHARACTERIZATION
TANGIPAHOA I-12 SITE
TANGIPAHOA, LOUISIANA

TYPE OF BORING: AUGER ROTARY **LOCATION:** NW CORNER OF PROPERTY **PROJECT NO.:** G18-042

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			8" Silty Sandy Topsoil with Organics Stiff tannish gray Sandy Lean Clay			1.50			15			
			Medium tannish gray Clayey Sand	18					13	21	9	47
5			-loose to medium at 4'	8					14			
				16					14			
10			Stiff tannish gray Lean Clay with sand			1.50			20			
15			Very stiff tannish gray Sandy Lean Clay -with sand pockets, 13' to 20' ▼ ▽		2.15	2.75		116	16	36	23	51
20			Medium tan Clayey Sand	24					17			
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Measured at 13 Feet Upon Completion of Drilling
DATE: 7/2/2018

STRATUM ENGINEERING, LLC

LOG OF BORING B-2

GENERAL SITE CHARACTERIZATION
TANGIPAHOA I-12 SITE
TANGIPAHOA, LOUISIANA

TYPE OF BORING: AUGER ROTARY **LOCATION:** NE CORNER OF PROPERTY **PROJECT NO.:** G18-042

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			10" Silty Sandy Topsoil with Organics Medium gray Sandy Silt with trace organics, 0' to 2'	15					19			
			Firm tannish gray Sandy Lean Clay		0.53	0.75		105	19	23	8	60
5			-very stiff at 4'			2.50			13			
			-becomes firm to stiff at 6'			1.00			20			
			-with sand pockets, 6' to 10'									
10			▼	10					22	47	28	61
			Firm to stiff gray Lean Clay ▽									
15			-with sand pockets, 13' to 15'		0.35	1.00		105	21			
			Medium tan Silty Clayey Sand									
20				16					22			
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Measured at 10 Feet Upon Completion of Drilling
DATE: 6/26/2018

STRATUM ENGINEERING, LLC

LOG OF BORING B-3

GENERAL SITE CHARACTERIZATION
TANGIPAHOA I-12 SITE
TANGIPAHOA, LOUISIANA

TYPE OF BORING: AUGER ROTARY **LOCATION:** SW CORNER OF PROPERTY **PROJECT NO.:** G18-042

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			8" Silty Sandy Topsoil with Organics Very stiff tannish gray Silty Sandy Clay			3.50			14			
			Very stiff tannish gray Sandy Lean Clay		1.69	2.25		108	18	17	8	45
5			Medium tannish gray Clayey Sand	16 18					12 14			
10			Stiff tannish gray Lean Clay -with silt seams and sand lenses, 8' to 10' ▼			1.75			20			
15			Medium tannish gray Clayey Sand ▽	22					14	26	10	32
20			Stiff gray Sandy Lean Clay			1.50			25			
25			Boring Terminated at 20 Feet									
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Measured at 11 Feet Upon Completion of Drilling
DATE: 7/2/2018

STRATUM ENGINEERING, LLC

LOG OF BORING B-4

GENERAL SITE CHARACTERIZATION
TANGIPAHOA I-12 SITE
TANGIPAHOA, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** CENTER OF PROPERTY **PROJECT NO.:** G18-042

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			10" Silty Sandy Topsoil with Organics			2.50			15			
			Very stiff tannish gray Sandy Lean Clay									
			-stiff at 2'		1.45	1.50		118	17	32	17	55
5			Loose tannish gray Clayey Sand	8					14			
				8					13			
			-medium at 8'	17					13			
10			▼									
			Very stiff tannish gray Lean Clay		2.63	3.00		110	20			
15			▽									
			-stiff to very stiff at 18'			2.00			22			
20												
			Stiff gray Sandy Lean Clay		1.03	1.25		114	18			
25												
						1.50			19			
30												
			Very stiff tannish gray Lean Clay with sand		2.70	3.00		113	23	42	25	75
35												
						2.00			24			
40												
			-stiff, 43' to 50'		1.16	1.25		96	29			
45												
						1.75			22			
50												

DEPTH OF BORING: 100 Feet **GROUNDWATER:** Measured at 12 Feet Upon Completion of Drilling
DATE: 7/2/2018

STRATUM ENGINEERING, LLC

LOG OF BORING B-4 (continued)

GENERAL SITE CHARACTERIZATION
TANGIPAHOA I-12 SITE
TANGIPAHOA, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** CENTER OF PROPERTY **PROJECT NO.:** G18-042

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
55			Stiff tannish gray Lean Clay with sand		1.42	1.50		105	24	34	16	91
60			Very stiff tannish gray Lean to Fat Clay -with silt seams, 58' to 65'			3.00			29			
65			-stiff to very stiff at 63'		1.62	2.00		101	27			
70						2.75			28			
75			Very dense tannish gray Poorly Graded Sand -with trace of pea gravel, 73' to 80'	50+					21			9
80				50+					18			
85			Very dense tan Silty Sand	50+					21			12
90				50+					28			
95			Very dense tan Poorly Graded Sand	50+					18			10
100				50+					17			

DEPTH OF BORING: 100 Feet
DATE: 7/2/2018

STRATUM ENGINEERING, LLC

LOG OF BORING B-5

GENERAL SITE CHARACTERIZATION
TANGIPAHOA I-12 SITE
TANGIPAHOA, LOUISIANA

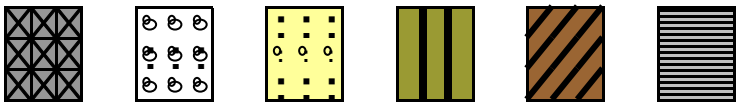
TYPE OF BORING: AUGER ROTARY **LOCATION:** SW CORNER OF PROPERTY **PROJECT NO.:** G18-042

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			8" Silty Sandy Topsoil with Organics			1.25			21	26	10	64
			Stiff gray Sandy Lean Clay		1.68	1.75		114	18			
5			-very stiff at 4'			3.75			18			
					1.49	1.75		107	24			
						3.00			24			
10												
			-becomes stiff tannish gray at 13' ▼									
					1.14	1.50		107	23	29	12	67
15			▽									
						1.25			22			
20												
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Measured at 12 Feet Upon Completion of Drilling
DATE: 6/26/2018

KEY TO TERMS AND SYMBOLS USED ON LOGS

SOIL TYPE

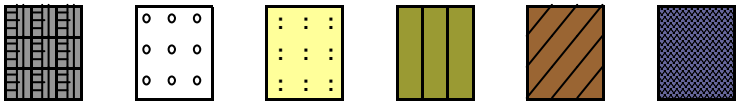


ROCK | GRAVEL | SAND | SILT | CLAY | PEAT

SAMPLER TYPE

NO SAMPLE | AUGER SAMPLE | SHELBY TUBE | SPLIT SPOON

MODIFIERS



STONE | GRAVELY | SANDY | SILTY | CLAYEY | FILL

NO RECOVERY | ROCK CORE | 2" SHELBY TUBE | TXDOT CONE

UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D 2487 (1980)

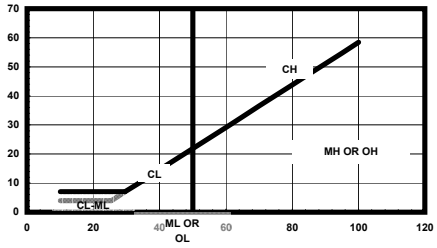
MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS LESS THAN 50% PASSING NO. 200 SIEVE	GRAVEL & GRAVELY SOILS LESS THAN 50% PASSING NO. 4 SIEVE	CLEAN GRAVEL (LITTLE OR NO FINES	GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		W/ APPRECIABLE FINES	GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN 50% PASSING NO. 4 SIEVE	CLEAN SANDS LITTLE FINES	SW	WELL GRADED SAND, GRAVELY SAND (LITTLE FINES)
			SP	POORLY GRADED SANDS, GRAVELY SAND (L.FINES)
		SANDS WITH APPREA. FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS,SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS & VERY FINE SANDS,ROCK FLOUR SILTY OR CLAYEY FINE SANDS OR CLAYEY SILT W/ LOW PI
			CL	INORGANIC CLAY OF LOW TO MEDIUM PI LEAN CLAY GRAVELY CLAYS, SANDY CLAYS, SILTY CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PI
	SILTS 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 MED TO HIGH PI, ORGANIC SILT
HIGHLY ORGANIC SOIL			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS
UNCLASSIFIED FILL MATERIALS			ARTIFICIALLY DEPOSITED AND OTHER UNCLASSIFIED SOILS AND MAN-MADE SOIL MIXTURES	

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	SHEAR STRENGTH IN TONS/FT^2
VERY SOFT	0. TO 0.125
SOFT	0.125 TO 0.25
FIRM	0.25 TO 0.5
STIFF	0.5 TO 1.0
VERY STIFF	1.0 TO 2.0
HARD	> 2.0 OR 2.0+

RELATIVE DENSITY - GRANULAR SOILS

CONSISTENCY	N-VALUE (BLOWS/FOOT)
VERY LOOSE	0-4
LOOSE	4-9
MEDIUM DENSE	10-29
DENSE	30-49
VERY DENSE	> 50 OR 50+



ABBREVIATIONS

HP - HAND PENETROMETER
TV - TORVANE
MV - MINIATURE VANE
UC - UNCONFINED COMPRESSION TEST
UU - UNCONSOLIDATED UNDRAINED TRAIXIAL
CU - CONSOLIDATED UNDRAINED

NOTE: PLOT INDICATES SHEAR STRENGTH AS OBTAINED BY ABOVE TESTS

DELAYED GROUNDWATER LVL

LEVEL GROUNDWATER ENCOUNTERED

CLASSIFICATION OF GRANULAR SOILS

U.S. STANDARD SIEVE SIZE(S)

6"	3"	3/4"	4	10	40	200

BOUL--DERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

152	76.2	19.1	4.76	2.0	0.42	0.075	0.002

GRAIN SIZE IN MM