STRATUM ENGINEERING, LLC
Geotechnical Engineering ♦ Testing and Inspection Services

June 2, 2014

Continental 294 Fund, LLC
W134 N8675 Executive Parkway
Menomonee Falls, Wisconsin 53051

Attn: Mr. Keith Kumpula
Construction Project Manager

Re: Geotechnical Engineering Report
Springs at Fremaux Town Center
Slidell, Louisiana
SE Project No. G14-036

Dear Mr. Kumpula:

Stratum Engineering, LLC (SE) is pleased to submit our Geotechnical Engineering Report for the above referenced project. This report includes the results of our field exploration and laboratory testing, and recommendations for foundation and pavement design, as well as general site development for the proposed apartment complex to be constructed at the Fremaux Town Center in Slidell, Louisiana.

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

William "Dean" McInnis, E.I.
Project Manager

Tony Y. Maroun, P.E.
Principal

STATE OF LOUISIANA
TONY Y. MAROUN
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PROFESSIONAL ENGINEER
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CIVIL ENGINEERING

WDM/TYM:wdm

TABLE OF CONTENTS

EXECUTIVE SUMMARY

An exploration and evaluation of the subsurface conditions have been completed for the proposed Springs at Fremaux Town Center to be constructed off Town Center Parkway, south of Fremaux Avenue in Slidell, Louisiana.

The site encompasses about 20 acres of undeveloped property adjacent to the W-14 Canal at the Fremaux Town Center. The site is partially cleared with several stockpiles of material overgrown with surface vegetation. The north end of the property is wooded. The existing ground surface elevation in the development area ranges from about Elevation +7.3 to +13.4 feet. Considering a tentative Finished Floor Elevation (FFE) of +12.5 feet, a minimal amount of cut and up to 5 feet of fill will be required to achieve the finished floor slabs elevation.

The project includes the construction of multiple freestanding apartment buildings. The structures will have wood frames and post tensioned floor slabs having footprints of about 11,250 square feet each. Detailed structural loading information was also unavailable at the time this summary was prepared. However, maximum wall loads are anticipated to be about 2 to 3 kips per linear foot.

A total of 21 borings were drilled to a depth of 10 to 20 feet below the ground surface in the building, parking, and detention areas. Based on the borings, about eight (8) to 10 inches of silty sandy topsoil with organic materials covered the ground surface. The topsoil was generally underlain by firm to stiff silty clay with sand to about 2 feet and followed by firm lean clay or sandy lean clay to approximately 6 feet. The lean clay was underlain by dense silty or poorly graded sand extending to a depth of 10 to 15 feet and followed by stiff to very stiff lean to fat clay extending to the termination depth of the borings at 20 feet. Groundwater was measured at about 5 to 10 feet in most of the building borings upon completion of drilling.

Provided the near surface moisture sensitive silty soils area stripped from the site, the proposed Springs at Fremaux Town Center may be supported on a shallow foundation system with grade supported floor slabs. Spread and continuous footings, supported on the naturally occurring stiff sandy clay or compacted structural fill at least 2 feet below the finished grade, may be designed for maximum allowable soil bearing pressures of 2,500 psf and 2,000 psf, respectively. The floor slabs should be supported on a minimum of 2 feet of compacted structural fill.

Based on the subsurface soil condition encountered at the site and the anticipated residential type of traffic loads, consideration was given to flexible and rigid pavements to accommodate the development. Details related to site development, foundation design and construction considerations are included in subsequent sections of this report.

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 geotechnical exploration for the proposed Springs at Fremaux Town Center to be constructed at the south end of Town Center Parkway off Fremaux Avenue in Slidell, Louisiana. The exploration was accomplished in general accordance with SE Proposal No. G14-072, dated March 27, 2014.

Project Description

The project includes the construction of fourteen (14), freestanding 2-story apartment buildings and associated parking areas and drives. The residential structures will have wood frames and load bearing walls with footprints of about 11,250 square feet. They will likely be supported on post tensioned slabs. Although structural loading information was not available at the time the report was prepared, it is expected that the buildings will have maximum column and wall loads of less than 50 kips and 2 to 3 kips per linear foot, respectively. In addition, a small clubhouse structure and a swimming pool will be provided in the northeast corner of the property. A large water quality pond area will also be constructed along the W-14 Canal in the northwest portion of the property.

Traffic loads are expected to be typical of an apartment complex consisting of light passenger vehicles and occasional heavy delivery and solid waste trucks. Consideration will be given to flexible and rigid pavements to accommodate the complex.

The geotechnical recommendations presented in this report are based on the available project information, building locations, and the subsurface materials described in this report. If any of the noted information is incorrect, please inform SE in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. SE will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

3

Purpose and Scope of Services

The purpose of this study was to explore the subsurface conditions at the site to enable an evaluation of cost effective foundation and pavement systems for the proposed apartment complex. A total of twenty-one (21) borings were drilled to depths of 10 to 20 feet below the existing ground surface. Since completing the field work, revisions were made to the project resulting in some of the borings to be drilled out of the building footprints. A diagram depicting the boring locations is attached in the Appendix. The following table summarizes the borings drilled at the site:

Area	No. of Borings	Boring Depth, Feet
Apartment Buildings	16	20
Detention Area	1	20
Parking Areas	4	10

Our scope of services included a reconnaissance of the project site, drilling the soil borings, select laboratory testing, and preparation of this geotechnical report. The report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and presents recommendations regarding the following:

- Foundation types, allowable bearing capacity, and an estimate of settlement;
- Flexible and rigid pavement recommendations;
- Seismic site classification;
- Site preparation, including subgrade preparation and fill compaction requirements;
- Suitability of the existing soils for use as structural fill;
- Factors influencing construction and performance of the proposed improvements.

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.

4

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The site encompasses about 20 acres of undeveloped property. The property was partially cleared during the improvement of the W-14 Canal and subsequent construction of the adjacent Fremaux Town Center. Portions of the site appear to have been stripped and the topsoil may be stockpiled on-site as several stockpiles exist across the property. The site is currently overgrown with surface vegetation on the south side while the north end is wooded.

Limited topographic information provided to us by Duplantis Design Group, the Civil Engineers for the project, indicate the existing ground surface elevation in the development area ranges from about Elevation +7.3 to +13.4 feet. Considering a tentative Finished Floor Elevation (FFE) of +12.5 feet, about 1 foot of cut and up to 5 feet of fill will be required to achieve the finished floor slabs elevation.

Drilling, Sampling, and Laboratory Testing Procedures

The borings were drilled with an All Terrain Vehicle (ATV) mounted drill 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 percent passing the #200 sieve and Atterberg Limits determination. Additional estimates of unconfined compressive strength and undrained shear strength were made using a hand penetrometer and a torvane, respectively. The laboratory testing was performed in general accordance with ASTM Standard Procedures.

Subsurface Conditions

The site was characterized by a total of twenty-one (21) borings drilled across the property. Based on the borings, about eight (8) to 10 inches of silty topsoil with organic materials covered the ground surface. The topsoil was generally underlain by firm to stiff silty clay with sand or dense silty sand to about 2 feet and followed by firm lean clay or sandy lean clay to approximately 6 feet. The lean clay was underlain by dense silty or poorly graded sand extending to a depth of 10 to 15 feet and followed by stiff to very stiff lean to fat clay extending to the termination depth of the borings at 20 feet.

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, laboratory test data and locations of the samples. 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 measured at depths ranging between 5 and 10 feet upon completion of drilling operation. It should be noted that groundwater levels will fluctuate with seasonal variations in rainfall, extended periods of drought and 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

The type and depth of foundation suitable for a given structure primarily depends on several factors including the subsurface conditions, the function of the structure, the loads it may carry, the cost of the foundation and the criteria set by the Design Engineer with respect to vertical and differential movement which the structure can withstand without damage.

The results of the exploration indicate that the subsurface soil conditions at the site are generally fair and suitable to support the proposed apartment complex on a shallow foundation system with floor slabs on grade. Details related to site preparation and foundation recommendations, as well as construction considerations, are presented in subsequent sections of the report.

Site Preparation

Site preparation is expected to include, but not be limited to, stripping of all topsoil with organics and other deleterious materials as well as removing all unsuitable stockpiled materials. Based on the borings, 8 to 10 inches of silty topsoil was encountered at the boring locations. However, the actual stripping depth may be up to 18 inches at isolated locations and should be determined by a representative of the Geotechnical Engineer at the time of construction.

The near surface soils encountered at the site consists of moisture sensitive silty materials. These near surface soils were stable at the time of the field exploration since the investigation was conducted in a period of dry weather. Should the near surface soils become wet, they could lose their support capabilities and will have to be removed and replaced with compacted structural fill. Therefore, positive drainage should be maintained to minimize water ponding and reduce the potential for over excavation.

The exposed subgrade in the building and parking areas should be proofrolled with a rubber tired vehicle weighing about 20 tons. Soils, which are observed to rut or deflect excessively under the moving load, should be undercut and replaced with 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, the initial layer of fill should be placed in a relatively uniform horizontal lift and be adequately keyed into the stripped and scarified subgrade soils. The structural fill should consist of sandy clays or clayey sands having a maximum liquid limit of 40 and a maximum plasticity index of 18 percent.

The fill should be placed in maximum lifts of eight (8) inches of loose materials and should be compacted within one (1) percentage point below and 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. The fill placed in the building areas and parking lot should be compacted to at least 95 percent of the Standard Proctor maximum dry density as determined by ASTM D698. Adequate drainage should be provided prior to and during site work. The site should be graded to promote rapid runoff throughout the construction phase.

Shallow Footings

Based on the field data and laboratory test results, the proposed apartment complex may be supported on a shallow foundation system. Spread and continuous footings bearing at least two (2) feet below the finished grade in the naturally occurring sandy soils or on compacted structural fill, could be designed for maximum allowable bearing pressures of 2,500 psf and 2,000 psf, respectively. Minimum dimensions of twenty-four (24) inches for column footings and eighteen (18) inches for continuous footings should be used in the foundation design to minimize the possibility of a localized bearing failure. The above bearing capacities include a design factor of safety of three (3).

The uplift resistance of shallow spread footings formed in open excavations should be limited to the weight of the foundation concrete and the soil above it. For preliminary design purposes, the uplift resistance can be computed by using a total unit weight of 115 pcf for the structural fill placed and compacted above the footing and the unit weight of 150 pcf for the concrete. Concrete reinforcing steel should be properly sized to resist uplift forces. We recommend that a factor of safety of at least 1.5 be used when determining the allowable uplift resistance of spread footings.

Soil resistance to horizontal forces is developed by lateral earth pressures acting on the face of the footing and by friction or adhesion on the footing base. We recommend that the allowable passive pressure be computed for spread footings below grade using the following equation:

$$P_p = 1500 + 120\ H\ (Clay)$$
$$P_p = 350\ H\ (Sand)$$

where P_p is the lateral soil resistance in pounds per square foot and H is the depth in feet. For exterior footings, H is measured from one (1) foot below adjacent finished grade, provided that the adjacent finished grade extends level and at least beyond a point that makes a 45-degree angle from the bottom of the exterior footing to the finished ground surface.

The top foot of passive resistance at foundations should be neglected unless the ground surface around the footing is covered by concrete or pavement. The resistance to sliding of spread footings bearing in structural fill can be computed by multiplying the footing base contact area by a sliding friction factor of 0.38. Spread footings should also be sized to resist overturning due to moment forces.

The foundation excavations should be observed by a representative of SE prior to steel or concrete placement to assess that the foundation materials are capable of supporting the design loads and 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 soils or adequately compacted fill as directed by the Geotechnical Engineer. Cavities formed as a result of excavation of soft or loose soil zones should be backfilled with compacted structural fill or graded crushed stone, as determined by the Geotechnical Engineer.

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 prior to or after concrete placement. The foundation concrete should be placed during the same day the excavation is made. If it is required that footing excavations be left open for more than one day, they should be protected to reduce evaporation or entry of moisture.

Foundation Settlement

Settlement of a spread footing designed for the recommended bearing pressure is estimated to be less than one (1) inch. Differential settlements could be 50 percent of the total settlement. While settlement of this magnitude is generally considered tolerable for the structure, the design of masonry or brick walls should include provisions for liberally spaced vertical control joints to minimize the effects of cosmetic cracking.

Floor Slabs

The soil supported floor slabs for the proposed apartment buildings should bear on a minimum of two (2) feet of compacted structural fill. Placement of the new fill and preparation of the subgrade should be performed in accordance with the Site Preparation section of the report to identify any soft or unstable soils which should be removed from the floor slab areas prior to additional fill placement and/or floor slab construction. Polyethylene sheeting should be placed between the fill and the floor slabs to act as a vapor barrier. The floor slabs should have an adequate number of joints to reduce cracking resulting from any differential movement and shrinkage.

Utility Lines

It is recommended that aggregate bedding material be placed beneath the RCP culverts to distribute the load and minimize initial subsidence. The bedding material should be at least 6 inches in thickness and should extend one-half of the pipe diameters beyond the edge of either side of the pipe or a minimum of 12 inches, whichever is greater. The RCP should be side bedded to the mid-height of the pipe or to the pipe spring line if arch pipe is used. The bedding material should consist of 6 inches of well-graded, free draining aggregate, meeting the requirements of #57 stone. A geotextile fabric should also be placed around the pipe at each joint to reduce potential migration of the fill into the joints of the pipe.

The trench excavation should be backfilled to the surface with granular fill. The fill should be placed in lifts not exceeding 8 inches and compacted to 95 percent of the maximum dry density, as determined by ASTM D698.

Pavement Recommendations

The performance of pavements depends upon several factors including (1) the characteristics of the supporting soils; (2) the magnitude and frequency of wheel load applications; (3) the quality of construction materials; (4) the contractor's placement and workmanship abilities; and (5) the desired period of design life. SE has evaluated both rigid and flexible pavements for your considerations.

Grading information for the parking areas was not available at the time the report was prepared. However, topographic information revealed the ground surface elevation in the parking ranges from +8.3 feet to +12.0 feet. Considering the proposed FFE of +12.5 feet for the apartment buildings, about one (1) to 4 feet of fill may be needed in the parking areas and drives to achieve the design grade.

Although traffic information was not available to us at the time the report was prepared, traffic was assumed to be typical of an apartment complex consisting mainly of cars, light trucks and occasional heavy delivery and waste collection trucks.

The recommended pavement sections presented are considered typical and minimum for the assumed parameters in the general site area and anticipated traffic condition. We understand that budgetary considerations sometimes warrant thinner pavement sections than those presented. However, the owner and the project designers should be aware that thinner pavement sections may result in increased maintenance cost and lower than anticipated pavement life.

Our scope of services did not include extensive sampling for determination of Modulus of Subgrade Reaction (k) and California Bearing Ratio (CBR) of the existing subgrade or potential sources of imported fill for the specific purpose of a detailed pavement analysis. Instead, we have assumed pavement related design parameters that are considered to be typical for the area soil types. We have assumed the subgrade soils will be prepared to achieve a Modulus of Subgrade Reaction (k) of 100 psi per inch which could be used for rigid pavement design, and a CBR of 3 for flexible pavement design.

The general pavement design information presented in this report is based on information published by AASHTO and the Portland Cement Association as well as past experience in the area. The published information was utilized in conjunction with the available field data and laboratory test results to develop general pavement recommendations.

Specific design parameters considered in the pavement analyses are as follows:

CBR	3
Modulus of Subgrade Reaction, k	100 pci
Reliability	85%
Deviation	0.45 Asphalt
	0.35 Rigid
Initial Serviceability	4.2
Terminal Serviceability	2.0
Modulus of Rupture	650 psi
Modulus of Elasticity	3.4×10^6 psi
Load Transfer	3.2 Dowels or Keys
Drainage Coefficient	1.0
Design Life	20 Years
Layer Coefficients	0.41 Asphalt
	0.14 Limestone or Crushed Concrete
	0.08 Structural Fill

11

The recommended minimum sections for the light and heavy duty pavements are as follows:

FLEXIBLE PAVEMENT RECOMMENDED MINIMUM THICKNESS		
Pavement Materials	**Light Duty**	**Heavy Duty**
Asphaltic Concrete Wearing Course	1 ½"	2"
Asphaltic Concrete Binder Course	1 ½"	2"
Compacted Class II Base	6"	8"
Compacted Structural Fill	12"	12"

RIGID PAVEMENT RECOMMENDED MINIMUM THICKNESS		
Pavement Materials	**Light Duty**	**Heavy Duty**
Portland Cement Concrete	5"	7"
Compacted Granular Fill (Sand)	12"	12"

Portland Cement Concrete pavement should be utilized for trash enclosures. The area should be sufficiently large so that the front wheels of the collection truck are supported on the rigid pavement. In this area, and in areas which will be accessed by heavy trucks (solid waste trucks and delivery trucks), a minimum concrete pavement thickness of seven (7) inches is recommended underlain by 12 inches of compacted granular fill.

Proper finishing of concrete pavement requires the use of appropriate construction joints to reduce the potential for cracking. Construction joints should be designed in accordance with current Portland Cement Association guidelines. Joints should be connected with smooth, greased or sleeved dowels and should be sealed to reduce the potential for water infiltration into pavement joints and subsequent infiltration into the supporting soils. The design of steel reinforcement should be in accordance with accepted codes. The concrete should have a minimum compressive strength of 4,000 psi at 28 days. The concrete should also be designed with 5 ± 1 percent entrained air to improve workability and durability.

The asphaltic concrete should meet the requirements of the latest edition of the Louisiana Standard Specifications for Roadways and Bridges (LSSRB) and should be compacted to a minimum of 95 percent of the density of the laboratory molded specimen.

The Class II base may consist of 610 limestone or crushed concrete meeting the requirements of the latest edition of LSSRB, Section 1003.3D. The sand base under the rigid pavement shall meet the requirements of LSSRB, Section 1003.07. The Class II base in the flexible pavement section and the sand base under the concrete should be compacted to at least 95 percent of the maximum dry density determined by ASTM D698 (Standard Proctor) within 3 percent of the optimum moisture content.

Geotextile Fabric

Should soft conditions be encountered, a woven geotextile consisting of MIRAFI 600X or equivalent may be placed over the soft subgrade to improve its condition. The fabric may be used as needed under the direction of the Geotechnical Engineer. The geotextile, which is sold in rolls of various sizes, should be installed per the manufacturer's recommendations and be overlapped a minimum of two (2) feet. The geotextile fabric should meet or exceed the following properties.

Property	Test Method	Minimum Average Roll Values
Grab tensile strength, lbs	ASTM D4632	315
Grab tensile elongation, %	ASTM D4632	15
Mullen burst strength, psi	ASTM D3786	600
Puncture resistance, lbs	ASTM D4833	120
Trapezoid tear strength, lbs.	ASTM D4533	120
UV resistance after 500 hrs, % strength resistance	ASTM D4355	70

Detention Area

Boring D-1 was drilled within the proposed water quality pond area with consideration given to using the excavated pond material as fill to grade the site. Based on the boring, very stiff sandy silty clay was encountered to 2 feet and followed by alternating layers of stiff to very stiff lean clay or lean clay with sand to at least 20 feet. Based on the field data and laboratory test results from the single boring, the lean clay is marginal and its use should be limited to grading the parking areas and drives. However, since the soil varied across the site as depicted in the borings, it is likely that sandy soils may be present in other portions of the detention pond that can be used in the building areas. Therefore, bulk samples of the material should be obtained from various pond locations and depths prior to construction for further evaluation. The samples should be analyzed in the laboratory to verify compliance with the structural fill requirements.

On-Site Stockpiles

Several stockpiles exist across the development area. Test pits were conducted to investigate the stockpiled material to determine its suitability for use as structural fill. Based on the test pits, the stockpiled material ranged from sandy lean clay or sandy silty clay to silty clayey sand or silty sand. The sandy materials appear to be of structural fill quality and may be used to grade the site including the building pads. However, since the stockpiles varied greatly in consistency, bulk samples should be obtained from the stockpiles and tested for compliance with the structural fill requirements indicated in the report.

CONSTRUCTION CONSIDERATIONS

It is recommended that SE be retained to provide observation and testing of construction activities involved in the foundations, pavements, and related activities of this project. SE cannot accept any responsibility for any conditions which deviate from those described in this report, nor for the performance of the foundations and pavements, if not engaged to also provide construction observation and testing for this project.

Moisture Sensitive Soils/Weather Related Concerns

The upper soils encountered at this site are extremely sensitive to disturbances caused by construction traffic and changes in moisture content. During wet weather periods, an increase in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather.

The site contractor should be responsible for maintaining a firm 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. A representative of the Geotechnical Engineer should be present during the site work activities to evaluate the condition of the improved soil and verify the material is adequate prior to placement of additional fill.

Drainage and Groundwater Concerns

Water should not be allowed to collect in the foundation excavations, floor slab areas, or on the prepared subgrade in the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff. Positive site surface drainage should be provided to reduce infiltration of surface water around the buildings.

Groundwater was measured at 5 to 10 feet upon completion of drilling operation. However, it is possible that seasonal variations will cause fluctuations of the water table. Additionally, perched water may be encountered in discontinuous zones within the overburden soils, particularly after extended periods of rain. Any water accumulation should be removed from the excavations by pumping. If excessive and uncontrolled amounts of seepage occur, the Geotechnical Engineer should be consulted to provide additional recommendations, if necessary.

Excavations

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, Part 1928, Subpart P". This document was issued to better ensure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavation or footing excavation, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

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

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

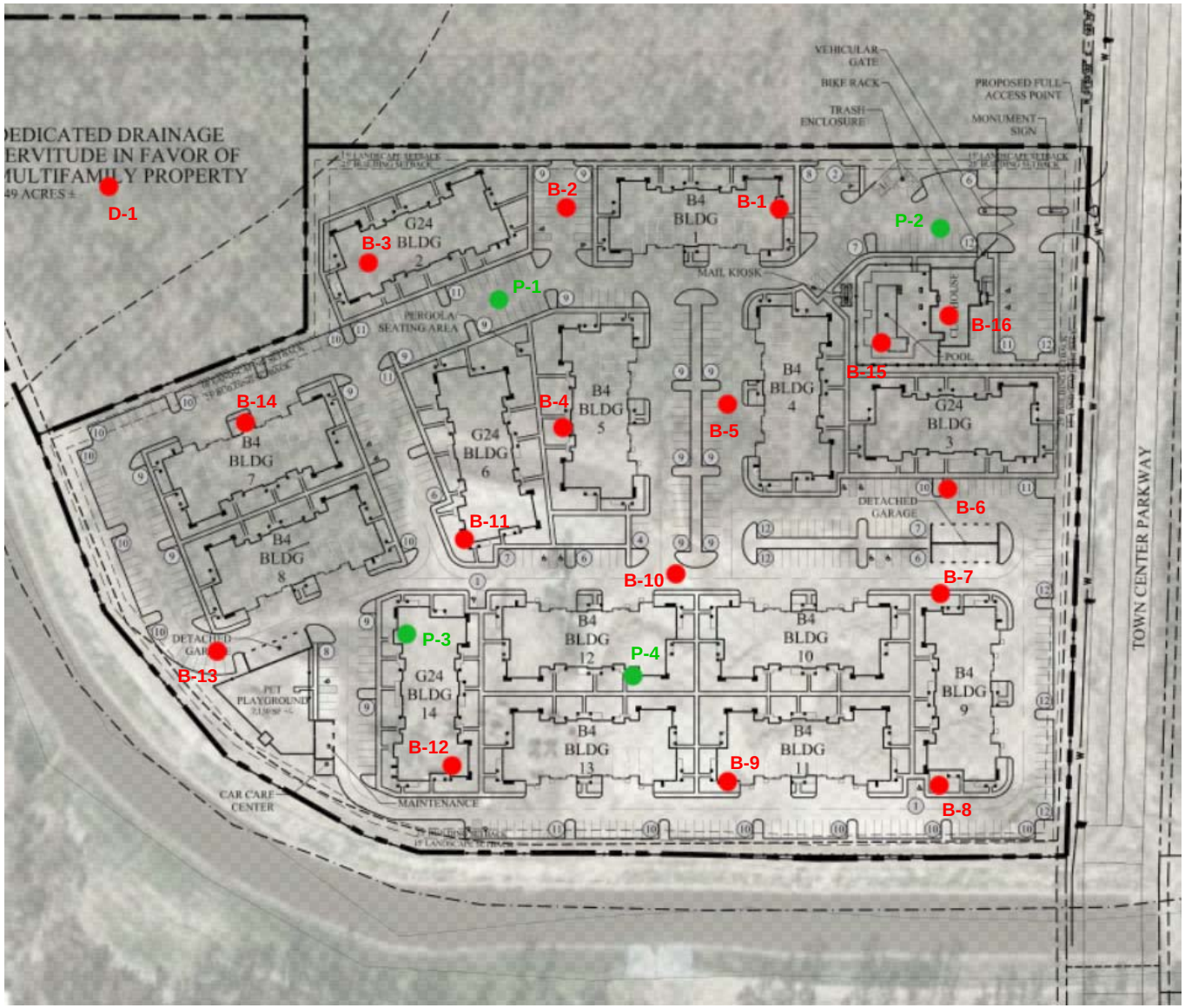
REPORT LIMITATIONS

The recommendations submitted in this report are based on the available subsurface information obtained by SE and design details furnished by Continental Properties Company , Inc and Duplantis Design Group. If there are any revisions to the plans for this project, or if deviations from the subsurface conditions noted in this report are encountered during construction, SE should be notified immediately to determine if changes in the foundation recommendations are required. If SE is not notified of such changes, SE will not be responsible for the impact of those changes on the project.

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.

After the plans and specifications are more complete, the Geotechnical Engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated in to the design documents. At that time, it may be necessary to submit supplementary recommendations. If SE is not retained to perform these functions, SE will not be responsible for the impact of those conditions on the project. This report has been prepared for the exclusive use of Continental 294 Fund, LLC for the specific application to the proposed Springs at Fremaux Town Center to be constructed off Town Center Parkway in Slidell, Louisiana.

APPENDIX



STRATUM ENGINEERING, LLC

BORING LOCATION PLAN

GEOTECHNICAL ENGINEERING SERVICES
PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

STRATUM ENGINEERING, LLC

LOG OF BORING B-1

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics Stiff gray Silty Clay with trace of organics			1.00			32			
			Soft gray Lean Clay			0.25			28	33	16	91
5			- becomes firm at 4' ▽				0.40		27			
			- becomes very stiff tannish gray with silt seams at 6'		1.10	2.25		99	26			
10						2.75			22			
			Very stiff gray Lean to Fat Clay with silt pockets			4.00			21			
15												
20			Very stiff tannish gray Fat Clay with silt seams and sand lenses			2.50			42			
25			Boring Terminated at 20 Feet									
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 5 Feet Upon Completion of Drilling
DATE: 5/1/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-2

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics				0.30		27			
			Firm tannish gray Silty Clay with sand									
			Soft to firm reddish tan Lean Clay		0.46	0.25		107	24			
			- with silt seams and sand lenses, 2' to 8'									
5							0.25		27	35	17	
			▽									
					0.73	0.75		105	23			
			- becomes stiff at 8'			1.75			23			
10												
			Very stiff tannish gray Lean to Fat Clay			2.50			28			
15												
						2.50			28			
20												
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 6 Feet Upon Completion of Drilling
DATE: 5/2/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-3

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics Very stiff gray Silty Sandy Clay			2.50			14			
			Stiff to very stiff tannish gray Lean Clay - with silt seams and sand pockets, 2' to 6'		0.97	1.50		107	19			
5			- with ferrous nodules, 4' to 6'			2.50			18			
			▽		1.75	2.50		106	22			
			Very stiff tannish gray Lean to Fat Clay			2.00			25			
10												
			- becomes gray at 13'			2.50			27			
15												
			Very stiff tannish gray Fat Clay			2.75			31			
20												
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 7 Feet Upon Completion of Drilling
DATE: 5/2/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-4

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics			0.50			23	26	7	82
			Firm gray Silty Clay with sand									
			Firm tannish gray Lean Clay		0.34		0.45	96	24			
			- with silt seams, 2' to 10'									
5						1.00			24			
			- becomes very stiff at 6'		1.75	2.50		114	18			
						3.00			19			
10												
						2.00			20			
15												
			Very stiff tannish gray Fat Clay with silt seams ▽			2.00			39			
20												
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 17 1/2 Feet Upon Completion of Drilling
DATE: 5/2/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-5

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics Stiff dark gray Silty Sandy Clay			1.25			27			
			Stiff tannish gray Sandy Lean Clay		0.52	1.00		111	21			
5			- becomes very stiff, 4' to 6'			4.25			19			
			▽		0.96	1.50		113	19			
			- with sand layers at 7'									
			Medium tan Silty Sand	10					22		NP	16
10												
15			- becomes very dense at 13'	38					23			17
			Dense tan poorly graded Sand	45					21			
20												
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 6 1/2 Feet Upon Completion of Drilling
DATE: 5/1/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-6

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics Very stiff dark gray Silty Clay			2.50			19			
5			Medium tannish gray Silty to Clayey Sand ▽			1.50 1.25			18 18			
10			Very stiff tannish gray Sandy Lean Clay		1.55	3.00 3.00		115	18 15	33	14	61
15			Medium tan poorly graded Sand	26					24			
20			Very stiff tannish gray Fat Clay with sand layers	18					32			86
25			Boring Terminated at 20 Feet									
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 6 Feet Upon Completion of Drilling
DATE: 5/1/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-7

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics			4.50			12			
			Very stiff dark gray Silty Sandy Clay									
			Medium reddish tan Clayey Sand		0.84	1.50		123	13	23	8	47
5						2.25			13			
			Medium tannish gray Silty Sand ▽	15					13			19
10				27					21			
			Dense to very dense tan poorly graded Sand	50					25			5
15												
20				44					23			
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 6 1/2 Feet Upon Completion of Drilling
DATE: 4/30/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-8

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics			1.75			17	31	15	
			Stiff gray Lean Clay with silt seams and sand pockets			1.00			17			
5			Stiff dark gray Silty Clay with sand		1.50	4.50		113	16			
				15					18	23	6	79
10			Very stiff tannish gray Lean Clay ▽ - with silt seams and sand pockets at 8'			3.50			20			
15			Medium tan Silty Sand	16					22			
20			Stiff gray Fat Clay with sand	9					33			
25			Boring Terminated at 20 Feet									
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 9 Feet Upon Completion of Drilling
DATE: 4/30/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-9

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics		0.47	0.75		112	21			
			Loose to medium gray Silt with sand									
			- with trace of roots, 2' to 4'			1.00			17			
5						2.75			20		NP	72
			▽		0.67		0.50	112	26			
10			Firm tannish gray Lean Clay with silt seams and sand pockets				0.25		22			
15			Dense tan Silty Clayey Sand	41					23			42
20			- becomes loose at 18'	8					33			
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 6 Feet Upon Completion of Drilling
DATE: 5/1/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-10

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics			2.25			12			
			Stiff to very stiff gray Silty Sandy Clay									
			- becomes tannish red at 2'		0.83	1.50		117	17			
5			Very stiff tannish gray Sandy Lean Clay with silt seams and sand pockets ▽			4.50			17			
					0.93	2.75		120	16			
10			Medium gray Silty Sand	15					18		NP	30
15			Medium to dense tan poorly graded Sand	30					22			
20			Loose gray Clayey Sand	9					34			
25			Boring Terminated at 20 Feet									
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 7 Feet Upon Completion of Drilling
DATE: 4/30/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-11

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics Very stiff dark gray Silty Sandy Clay			4.50			11			
			Stiff reddish tan Sandy Lean Clay		0.98	1.75		118	16			
5			- becomes very stiff with silt seams at 4'			4.00			18			
			▽			3.25			18			
10						2.50			17			
			Dense tan Silty Sand	49					25			13
15												
20				45					23			
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 7 Feet Upon Completion of Drilling
DATE: 4/30/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-12

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics			4.50			11			
			Very stiff dark gray Sandy Silty Clay			3.75			11	22	5	55
5			Very stiff gray Sandy Lean Clay with silt seams		1.11	3.00		116	15			
			▽			4.50			13			
10						3.75			14			
			Dense tan poorly graded Sand	47					26			6
15												
20				46					28			
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 6 1/2 Feet Upon Completion of Drilling
DATE: 5/1/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-13

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics			4.50			10			
			Very stiff gray Sandy Silty Clay									
			- becomes stiff tannish gray at 2'			1.75			16	26	7	70
5			Stiff tannish gray Sandy Lean Clay ▽		1.03	1.50		117	19			
			- becomes very stiff with silt seams at 6'		1.32	2.50		113	19			
						4.50			17			
10												
			Very stiff tannish gray Lean Clay			2.25			27			
15												
			- stiff with silt seams and sand pockets at 18'			1.25			18			
20												
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 6 Feet Upon Completion of Drilling
DATE: 5/1/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-14

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics			2.00			23			
			Very stiff gray Silty Clay									
			Stiff tannish gray Lean Clay		0.63	1.50		103	24	42	26	87
			- with silt seams, 2' to 8'									
5			- becomes very stiff at 4'			2.00			21			
					1.29	2.50		116	18			
			▽									
						2.75			20			
10												
			Very stiff tannish gray Lean to Fat Clay			2.75			28			
15												
						3.00			26			
20												
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 8 Feet Upon Completion of Drilling
DATE: 5/2/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-15

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics			1.00			19			
			Firm to stiff tannish gray Lean Clay with sand		0.51	1.00		108	23			
5			- becomes very stiff at 4'			2.25			19			
			Very stiff tannish gray Sandy Lean Clay ▽		0.78	3.00		117	16			
10			Medium gray Silty Sand	19					21		NP	24
15			Dense to very dense tan poorly graded Sand	45					21			3
20				50					21			
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 6 1/2 Feet During Drilling
DATE: 5/2/2014

STRATUM ENGINEERING, LLC

LOG OF BORING B-16

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics			2.25			16			
			Firm to very stiff tannish gray Sandy Lean Clay		0.90	2.50		116	17			
5						3.00			17			
			▽		0.69	2.00		112	22			
10			Loose tannish gray Silty Sand	7					28			
15			Dense tan poorly graded Sand	33					21			9
20			Very stiff gray Fat Clay	21					30			99
25			Boring Terminated at 20 Feet									
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 7 Feet Upon Completion of Drilling
DATE: 5/1/2014

STRATUM ENGINEERING, LLC

LOG OF BORING D-1

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** DETENTION AREA **PROJECT NO.:** G14-036

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 Topsoil with organics Very stiff brownish gray Sandy Silty Clay			4.50			15			
			Stiff to very stiff gray Lean Clay with sand			2.00			17	30	14	81
5			- with silt seams, 4' to 10'			3.00			17			
						2.00			15			
10			▽			1.50			21	42	26	89
			Very stiff tannish gray Lean to Fat Clay			2.25			26			
15												
20						2.50			27			
			Boring Terminated at 20 Feet									
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 20 Feet **GROUNDWATER:** Encountered at 8 Feet During Drilling Operations
DATE: 5/2/2014

STRATUM ENGINEERING, LLC

LOG OF BORING P-1

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: AUGER ROTARY **LOCATION:** PARKING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics			3.00			20	27	6	81
			Very stiff tannish gray Silty Clay with sand									
			Stiff tannish gray Lean Clay			1.50			23			
5			- becomes very stiff at 4'			2.75			17			
			- with silt seams and sand pockets, 4' to 8'									
						3.00			17			
			- with ferrous nodules at 8'			2.50			21			
10												
			Boring Terminated at 10 Feet									
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 10 Feet **GROUNDWATER:** Dry Upon Completion of Drilling Operations
DATE: 5/2/2014

STRATUM ENGINEERING, LLC

LOG OF BORING P-2

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: AUGER ROTARY **LOCATION:** PARKING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics			1.50			20			
			Stiff to very stiff tannish gray Sandy Silty Clay			2.50			18	24	7	
5			Very stiff reddish tan Sandy Lean Clay with silt seams ▽			3.50			17			
						2.00			22			
10			Loose gray Silty Sand			1.00			25			
			Boring Terminated at 10 Feet									
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 10 Feet **GROUNDWATER:** Encountered at 6 Feet During Drilling
DATE: 5/2//2014

STRATUM ENGINEERING, LLC

LOG OF BORING P-3

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

TYPE OF BORING: AUGER ROTARY **LOCATION:** PARKING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics			4.50			11	27	10	
			Very stiff gray Lean Clay with sand			2.75			15			
5			Stiff to very stiff tannish gray Sandy Lean Clay			1.25			20			
						3.00			14			
10			Medium tannish gray Silty Clayey Sand			0.75			16			
			Boring Terminated at 10 Feet									
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 10 Feet **GROUNDWATER:** Dry Upon Completion of Drilling
DATE: 4/30/2014

STRATUM ENGINEERING, LLC

LOG OF BORING P-4

PROPOSED SPRINGS AT FREMAUX TOWN CENTER
TOWN CENTER PARKWAY
SLIDELL, LOUISIANA

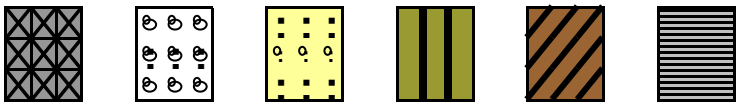
TYPE OF BORING: AUGER ROTARY **LOCATION:** PARKING AREA **PROJECT NO.:** G14-036

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 Topsoil with organics Stiff tannish gray Lean Clay with sand			1.00			18			
5			Very stiff tannish gray Sandy Silty Clay			3.25 4.25			17 17	26	7	61
10			Very stiff tannish gray Lean Clay with sand			3.25 2.75			20 17			
15			Boring Terminated at 10 Feet									
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 10 Feet **GROUNDWATER:** Dry Upon Completion of Drilling
DATE: 4/30/2014

KEY TO TERMS AND SYMBOLS USED ON LOGS

SOIL TYPE

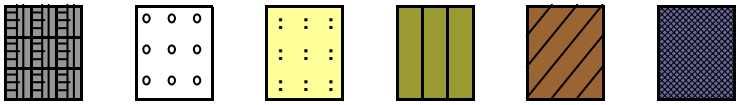


ROCK GRAVEL SAND SILT CLAY PEAT

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)

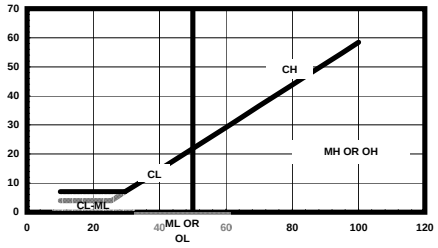
MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS LESS THAN 50% PASSING NO. 200 SIEVE	GRAVEL & GRAVELY SOILS LESS THAN 50% PASSING NO. 4 SIEVE	CLEAN GRAVEL (LITTLE OR NO FINES	GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY GRADED GRAVEL, GRAVEL-SAND 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

BOULDERS	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