STRATUM ENGINEERING, LLC
Geotechnical Engineering ◆ Testing and Inspection Services

November 21, 2024

K.B. Kaufmann & Co., Inc.
3173 Terrace Avenue East
Slidell, Louisiana 70458
Phone: (985) 649-7381

Attn: Mr. Duane Arbo

Re: Geotechnical Engineering Report
Proposed Dental Office
New Orleans, Louisiana
SE Project No. G24-092

Dear Mr. Arbo:

Stratum Engineering, LLC (SE) is pleased to submit our Geotechnical Engineering Report for the above referenced project. This report includes the results of the field exploration and laboratory testing, and recommendations for foundation and pavement design as well as general site development.

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, P.E.
Vice President

Tony Y. Maroun, P.E.
Principal

STATE OF LOUISIANA
TONY Y. MAROUN
License No. 26198
PROFESSIONAL ENGINEER
CIVIL ENGINEERING

11/21/24

WDM/TYM:jkh

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EXECUTIVE SUMMARY

An exploration and evaluation of the subsurface conditions have been completed for the proposed Dental Office to be constructed off Harrison Avenue in New Orleans, Louisiana.

The site is currently an undeveloped parcel of land covered with short surface vegetation, and located on the southside of Harrison Avenue between West End Boulevard and Catina Street.

The project includes the construction of a single-story dental clinic and associated parking lot having a plan area of about 3,022 square feet. The structure will either have a light gauge metal or wood frame and load bearing walls. Detailed structural loading information was not available at the time this report was prepared; however, maximum column and wall loads of less than 30 kips and 2 to 3 kips per linear foot were assumed for the structure. The building will have a crawl space with minimal amount of fill added in the building footprint. Minimal amount of fill may be needed to reach the parking lot design grades.

The site was characterized by one (1) boring drilled to a depth of 50 feet in the building area and two (2) borings drilled to 6 feet in the parking area. Based on the borings, the site is covered with about 10 inches of topsoil with organics. The topsoil was followed by alternating layers of sandy clay and silty clay to a depth of 12 feet where loose silty sand and poorly graded sand was extended to a depth of about 37 deet. The sand was followed by firm to stiff fat clay to depth of at least 50 feet, the maximum depth explored. Groundwater was encountered at 8 feet during the drilling operations.

The results of the exploration indicate that the near surface soils present at the site are poor in bearing quality and compressible in nature. Consequently, a pile foundation system was evaluated for support of the proposed building. Consideration was given to small and large treated timber piles to support the structure including the floor slab. Details related to site development, foundation and pavement design as well as 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 Dental Office to be constructed off Harrison Avenue in New Orleans, Louisiana. The exploration was accomplished in general accordance with SE Proposal No. G24-150, dated October 16, 2024 and through Purchase Order No. 71960.

Project Description

The project includes the construction of a single-story dental clinic having a plan area of about 3,022 square feet. The building will either have a wood or a light gauge metal frame and load bearing walls. Detailed structural loads were not available at the time this report was prepared; however, maximum column and wall loads of less than 30 kips and 2 to 3 kips per linear foot were assumed for the structure. Parking areas and drives will be provided on the north and west sides of the building. The parking area will be designed to accommodate light duty traffic and occasional solid waste and heavy duty delivery trucks. Considerations will be given to flexible and rigid pavements.

The geotechnical recommendations presented in this report are based on the available project information, building location, and 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.

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 Dental Office. One (1) boring was drilled in the building area to a depth of 50 feet below the existing ground surface. In addition, two (2) shallow borings were drilled to a depth of 6 feet across the parking area. 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 which is a reproduction of a drawing that was provided to us by K.B. Kaufmann & Co., Inc.

Our scope of services included a reconnaissance to 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 provides recommendations regarding the following:

- Foundation type, allowable pile capacities, and an estimate of settlement;
- Flexible and rigid pavements;
- Seismic site classification;
- Site preparation, including subgrade preparation and fill compaction requirements;
- Factors influencing construction and performance of the proposed development.

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. Prior to development of this site, an environmental site assessment is advisable.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The site encompasses about an acre of vacant property located on Harrison Avenue between West End Boulevard and Catina Street. The site is currently covered with short surface vegetation with the exception of a gravel surfaced driveway that extends along the west side of the site.

Grading information was not available at the time the report was prepared. However, we understand the building will be elevated about 3 feet above existing grades by providing a crawl space. Therefore, minimal amount of fill is expected in the building footprint to provide positive drainage away from the building. Since minimal fill will be placed in the building area, it was assumed that about 1 foot of fill may be required to reach the parking lot design grades.

Drilling, Sampling, and Laboratory Testing Procedures

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 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 three (3) borings drilled to a depth of 6 to 50 feet in the building and parking areas. Based on the borings, the site is covered with about 10 inches of topsoil with organics. The topsoil was underlain by either soft to very soft fat clay or silty clay with sand extending to a depth of about 12 feet. The soft clay was followed by loose to medium dense silty sand and poorly graded sand extending to a depth of 37 feet where firm to stiff fat clay was noted to a depth of at least 50 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 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 encountered in the building area at a depth of about 8 feet during the drilling and was later measured at 7 feet upon completion of the drilling operations. It should be noted that groundwater level 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, if needed.

IBC Site Classification

The International Building Code (IBC), 2021 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 "E", as outlined in Section 1613.2.2. 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 poor in bearing quality and compressible in nature. Therefore, a pile foundation system consisting of small and large treated timber piles was evaluated for the proposed Dental Office. Details related to foundation and pavement design, as well as site preparation and development, are presented in subsequent sections of this report.

Site Preparation

Site preparation is expected to include, but not be limited to stripping vegetation and removing the topsoil with organics, and any other deleterious materials from the development area. The actual stripping depth should be determined by a representative of the Geotechnical Engineer at the time of construction.

The subgrade in the non-pile supported areas of the site, including the parking areas and access drives, should be proofrolled with a tandem axle dump truck or a similar heavily loaded rubber tired vehicle. 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 the subgrade preparation and observation have been completed, the structural fill should be placed in a relatively uniform horizontal lift and should be adequately keyed into the stripped and scarified soils. Granular structural fill, such as "pumped" river sand, may be used for structural fill. The sand should have less than ten (10) percent passing the #200 sieve and should be compacted to at least 95 percent of the fill's maximum dry density as determined by ASTM D698 (Standard Proctor).

The structural fill should be placed in maximum lifts of 8 inches of loose material and should be compacted within the range of one (1) percentage point below to three (3) percentage points above the optimum moisture content value. If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying. Each lift of compacted structural fill should be tested by a representative of the Geotechnical Engineer prior to placement of subsequent lifts. In-place density measurements should be taken to assure that the above degree of compaction is achieved. The compacted structural fill should extend 5 feet beyond the perimeter of the building prior to sloping. Proofrolling of the subgrade and compaction of the fill in the pile supported building area may be waived.

Pile Foundation

Analyses were made based on the field data and laboratory test results to evaluate a pile foundation system for support of the proposed structure. Consideration was given to small and large treated timber piles to support the proposed building including the floor slab, sidewalks and landings.

Loose sand was encountered in the boring at an approximate depth of 12 feet and becomes medium dense around 20 feet. Consequently, the piles at the site will generally derive their support partly through "skin friction" along their embedded lengths with some end bearing when tipped in the sand. The small timber piles should have minimum tip and butt diameters of 6 and 8 inches, respectively; while the large timber piles should have minimum tip and butt diameters of 7 and 12 inches, respectively. They should conform to ASTM D25 and the American Wood Protection Association (AWPA) Standards for quality and treatment, respectively.

The recommended pile lengths and corresponding capacities are from the existing ground surface and additional pile length should be provided to account for the fill thickness. The recommended pile lengths and the estimated corresponding allowable capacities are presented in the following table:

Estimated Allowable Single Pile Load Capacity in Tons* F.S. = 2.0 in Compression F.S. = 3.0 in Tension				
Pile Length in feet	Small Treated Timber Pile (6" Tip – 8" Butt)		Large Treated Timber Pile (7" Tip – 12" Butt)	
	Compression	Tension	Compression	Tension
±25	8+	4	20	5
30	--	--	25+	8

*** Capacities are soil pile related capacities and consideration should be given to the structural integrity of the pile member.**

The above capacities include a factor of safety of 2 in compression and 3 in tension. Since the pile will be embedded in the dense sand with minimal amount of fill added in the building area, the effect of drag loads on the piles should be insignificant at this site.

Floor Slab

The building floor slab will be elevated above existing grade with a crawl space provided. Therefore, the building floor slab, including sidewalks immediately adjacent to the building, should be pile supported. Should the floor slab be of Portland Cement Concrete, the slab should have an adequate number of joints to reduce cracking resulting from shrinkage and any differential movement. A vapor barrier consisting of polyethylene sheeting should be provided at the floor slab/fill soil interface.

All utility lines in the building area should be hung from the slab. Hangers and connections used should be made of stainless steel, meeting the applicable Building Code. Flexible connections must be provided at the interface of pile supported and non-pile supported areas to accommodate at least 6 inches of settlement over the life of the structure.

Pile Settlement

It is estimated that long term settlement of piles tipped in the dense sand and loaded to their allowable capacities will be less than 1 inch. Differential settlement is expected to be on the order of 50 percent of the total settlement.

Spacing and Group Effect

A group of piles subjected to vertical loads may not necessarily have the same capacity as the sum of the capacities of the individual piles. For axially loaded piles, published results indicate that the ratio of capacity per pile in a group to that of a single isolated pile typically ranges from 0.5 to 1.0. This efficiency factor depends on the spacing or distance between each pile. In planning groups of driven piles, a minimum center-to-center spacing of 3D (where D is the pile diameter) is recommended to avoid the reduction in capacity and maximize the pile group efficiency.

Pile Installation

Pile driving hammers used to drive foundation piles should be selected according to pile type, length, size and weight of pile, as well as potential vibrations resulting from pile driving operations. Care should be taken to assure that the hammer selected is capable of achieving the desired penetration without causing damage to the piles or causing excessive vibrations which could damage existing, nearby structures.

Hammers having a rated energy in the range of 7,000 to 10,000 foot-pounds per blow are recommended for the small timber piles while hammers with a rated energy of 15,000 to 20,000 foot-pounds are recommended for the large timber piles. Each pile should be driven to the desired tip elevation and the driving resistance should be monitored without interruption in the driving operations.

Driving of the center piles in the cluster first will better facilitate the driving operations. Accurate records of the final tip elevation and driving resistances should be obtained during the pile driving operations. Some pile heaving may be experienced during installation of adjacent displacement type piles. It is therefore recommended that the tip elevation of the piles be recorded and if significant heave is noted after driving of subsequent piles, provisions must be made for reseating them.

Pile Driving Monitoring

We recommend that the pile driving be monitored by the Geotechnical Engineer or his representative. Sometimes, premature refusal occurs due to poor performance of the hammer rather than from soil resistance. Any changes in hammer blow counts should be carefully examined before making any decisions about the pile penetration.

Pile Load Test

It is recommended that the pile capacity be verified by a field load test. At least two (2) probe piles of the type of pile used should be driven to the design tip elevation within the building footprint using the same equipment and technique proposed for the job piles. The pile, which exhibits the least resistance to driving, should be load tested to failure in accordance with ASTM D1143 Standard Procedure. The pile load test should be performed under the guidance of the Geotechnical Engineer so that the data may be interpreted and the recommended pile capacity adjusted, if necessary, according to the load test results.

Vibration Monitoring

Thresholds of vibration induced cracking are generally site specific and depend on the type and age of the structure, the frequency of ground vibration, and the type of soil supporting the structure. Research by the U.S. Bureau of Mines (USBM) and other investigative groups have established criteria relating the occurrence of structural damage to certain frequencies and level of ground motion. According to the USBM, within the range of four (4) to 12 hertz, the maximum particle velocity recommended to preclude the threshold damage to plaster-on-wood old structures is 0.5 inch per second (ips).

Peak particle velocities of 0.25 ips are perceived to be uncomfortable to humans. Furthermore, peak particle velocities in excess of 0.25 ips could densify near surface cohesionless soils resulting in cosmetic cracks in structures supported on these soils. Therefore, if sustained peak particle velocities exceed 0.25 ips, the construction activities causing these vibration levels should be halted and the construction procedures altered to maintain a safe level of vibration and minimize potential damage to adjacent structures.

Although the threshold of 0.25 ips is adopted by the local engineering community, it is presented as a guide for consideration by the design engineer. The determination of site specific vibration thresholds involves a more detailed study of the structure in question as well as an evaluation of typical pre-construction background vibration levels in the area. As such, a lower threshold may be necessary should construction take place near historic structures. These services are beyond the scope of this study, and if desired, should be completed by others prior to commencement of construction activities.

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.

Detailed grading information was unavailable at the time of this report, but it is assumed that about 1 foot of fill may be required in the parking areas to achieve the design grade. Traffic load is anticipated to mostly consist of light duty vehicles and occasional heavy waste and delivery trucks for a design life of 20 years.

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 value of 3 for flexible pavement design. The recommended pavement sections are summarized in the following table. These pavement sections should be evaluated to ensure conformance with the minimum pavement section requirements of the local jurisdiction.

FLEXIBLE PAVEMENT Recommended Minimum Thickness, inches		
Pavement Materials	**Light Duty**	**Heavy Duty**
Asphaltic Concrete Wearing Course	1	2
Asphaltic Concrete Binder Course	2	2
Compacted Class II Base	8	10
Compacted Structural Fill	12 min.	12 min.

RIGID PAVEMENT Recommended Minimum Thickness, inches		
Pavement Materials	**Light Duty**	**Heavy Duty**
Portland Cement Concrete	6	8
Compacted Granular Fill – Sand	12 min.	12 min.

The asphaltic concrete should meet the requirements of the latest edition of the Louisiana Standard Specifications for Roads 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 should meet LSSRB, Section 1003.03, and should be compacted to at least 95 percent of the aggregate's maximum dry density as determined by ASTM D698. The sand under the rigid pavement should meet the requirements of LSSRB, Section 1003.09.

Portland Cement Concrete pavements should be utilized in the heavy truck parking and service areas. In these areas which will be accessed by heavy trucks, a minimum concrete pavement thickness of 8 inches underlain by 12 inches of compacted granular fill is recommended.

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 and American Concrete Institute guidelines. Joints should be sealed to reduce the potential for water infiltration into pavement joints and subsequent infiltration into the supporting soils. Load transfer devices at the pavement joints should be designed in accordance with accepted codes. The concrete should have a minimum compressive strength of 4,000 psi at 28 days.

Geotextile Fabric

Should soft conditions be encountered at the site, a woven geotextile consisting of MIRAFI 600X or equivalent is recommended to improve the subgrade condition prior to fill placement. The geotextile, which is sold in rolls of various sizes, should be installed per the manufacturer's recommendations and be overlapped a minimum of 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 D4632	600
Puncture resistance, lbs.	ASTM D4632	120
Trapezoid tear strength, lbs.	ASTM D4632	120
UV resistance after 500 hrs, % strength resistance	ASTM D4632	70

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 relatively 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.

Drainage and Groundwater Concerns

Water should not be allowed to collect in the foundation excavations, floor slab area, 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 building.

Groundwater was encountered at a depth of about 8 feet during the drilling operations. 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. 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 1926, 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

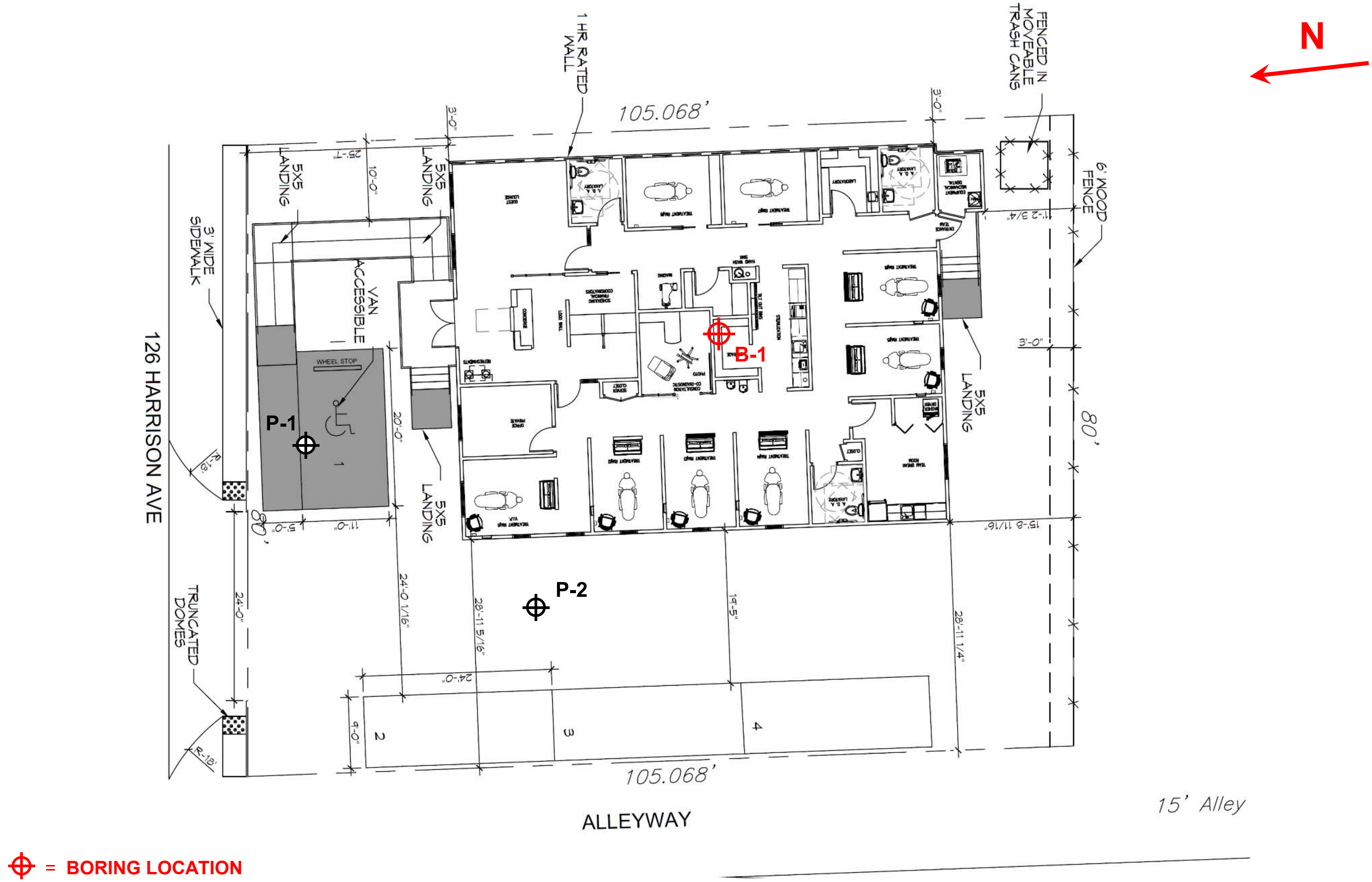
The recommendations submitted in this report are based on the available subsurface information obtained by SE and design details furnished by K.B. Kaufmann & Co., Inc. If there are any revisions to the plans for this project, or if deviations from the subsurface conditions noted in this report are encountered 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 K.B. Kaufmann & Co., Inc. for the specific application to the proposed Dental Office to be constructed off Harrison Avenue between West End Boulevard and Catina Street in New Orleans, Louisiana.

APPENDIX

STRATUM
ENGINEERING, LLC



STRATUM ENGINEERING, LLC

BORING LOCATION PLAN

SE PROJECT NO. G24-092

GEOTECHNICAL ENGINEERING SERVICES
PROPOSED DENTAL OFFICE
NEW ORLEANS, LOUISIANA

STRATUM ENGINEERING, LLC

LOG OF BORING B-1

PROPOSED DENTAL OFFICE
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** BUILDING AREA **PROJECT NO.:** G24-092

DEPTH, FT.	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				0.15		43			
	Soft gray Fat Clay with sand									
	Very soft gray Sandy Lean Clay		0.16		0.10	85	32			
5	Very soft to soft gray Fat Clay				0.15		53			
			0.09		0.10	74	51			
					0.10		54			
10										
	Loose to medium dense gray Silty Sand									
15		WOH					51			48
20		15					28			18
	Dense to very dense gray Poorly Graded Sand									
25		31					37			
30		50+					30			8
	Medium dense gray Silty Sand									
35		18					25			17
	Firm to stiff gray Fat Clay									
40		7					57			
45			0.99	1.00		73	54			
50				0.75			52			

DEPTH OF BORING: 50 Feet **GROUNDWATER:** Measured at 7 Feet Upon Completion of Drilling

DATE: 10/31/2024

STRATUM ENGINEERING, LLC

LOG OF BORING P-1

PROPOSED DENTAL OFFICE
NEW ORLEANS, LOUISIANA

TYPE OF BORING: AUGER ROTARY **LOCATION:** PARKING AREA **PROJECT NO.:** G24-092

DEPTH, FT.	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" Sitly Topsoil with organics Stiff dark brown Silty Clay with sand			1.25			26			
	Very soft gray Sandy Lean Clay				0.10		34	38	14	68
5	Soft gray Fat Clay				0.15		58			
	Boring terminated at 6 feet									
10										
15										
20										
25										
30										
35										
40										
45										
50										

DEPTH OF BORING: 6 Feet **GROUNDWATER:** Dry Upon Completion of Drilling
DATE: 10/31/2024

STRATUM ENGINEERING, LLC

LOG OF BORING P-2

PROPOSED DENTAL OFFICE
NEW ORLEANS, LOUISIANA

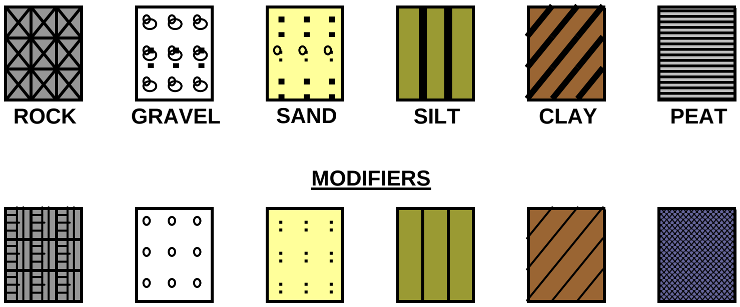
TYPE OF BORING: AUGER ROTARY **LOCATION:** PARKING AREA **PROJECT NO.:** G24-092

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 Soft to firm dark brown Fat Clay with sand & organics			0.50			89	141	99	86
			Very soft gray Sandy Lean Clay				0.10		41			
5							0.10		39			
			Boring terminated at 6 feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

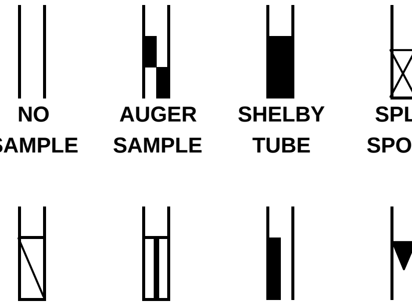
DEPTH OF BORING: 6 Feet **GROUNDWATER:** Dry Upon Completion of Drilling
DATE: 10/31/2024

KEY TO TERMS AND SYMBOLS USED ON LOGS

SOIL TYPE



SAMPLER TYPE



UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D 2487 (1980)

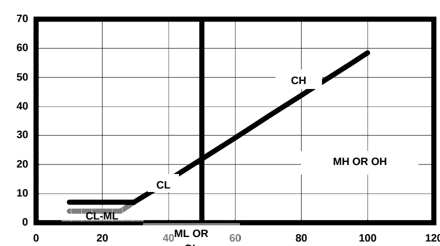
MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS LESS THAN 50% PASSING NO. 200 SIEVE	GRAVEL & GRAVELY SOILS LESS THAN 50% PASSING NO. 4 SIEVE	CLEAN GRAVEL (LITTLE OR NO FINES	GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY GRADED GRAVEL, GRAVEL-SAND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

▼ DELAYED GROUNDWATER LVL

∇ LEVEL GROUNDWATER ENCOUNTERED

NOTE: PLOT INDICATES SHEAR STRENGTH AS OBTAINED BY ABOVE TESTS

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