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June 24, 2021

Taco Bell Corporation
1 Glen Bell Way
Irvine, California 92618

Attn: Mr. Chad Gornall
Associate Construction Manager
email: Chad.Gornall@yum.com

Re: **Report of Geotechnical Engineering Services**
Proposed Taco Bell # 314881
10801 Woodland Beaver Road
Mint Hill, North Carolina 28215
PSI Report No.: 05111011

Dear Mr. Gornall:

Professional Service Industries (PSI), an Intertek Company, is pleased to transmit our Geotechnical Engineering Services Report for the proposed Taco Bell # 314881 project located at 10801 Woodland Beaver Road in Mint Hill, North Carolina. This report includes the results of field and laboratory testing, and recommendations for foundation and pavement design, as well as general site development.

PSI appreciates 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 PSI may be of further service, please contact our office at 704-598-2234.

PSI also has great interest in providing materials testing and inspection services during the construction of this project. If you will advise us of the appropriate time to discuss these engineering services, we will be pleased to meet with you at your convenience.

Very truly yours,
PROFESSIONAL SERVICE INDUSTRIES, INC.

Andrew O. Steege
Senior Geologist

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TABLE OF CONTENTS

1 PROJECT INFORMATION

1.1 PROPOSAL AND PROJECT AUTHORIZATION

This report presents our findings and recommendations of a geotechnical exploration and assessment performed by Professional Service Industries (PSI) for the proposed Taco Bell # 314881 project located at 10801 Woodland Beaver Road in Mint Hill, North Carolina. These services were performed in general accordance with the Project Agreement for Architectural/Engineering/Consultant Services between Taco Bell Corporation and PSI, and dated May 14, 2021. Authorization to proceed was given to PSI on June 7, 2021.

1.2 PROJECT DESCRIPTION

Taco Bell provided PSI with a drawing titled “Site Sketch”, dated February 26, 2021. Based on this, it is understood that a new Taco Bell restaurant will be constructed on the subject property. Based on the current layout of the site, the building will be situated in the southwest portion of the approximately 1.08-acre property, and paved parking (total of 39 parking stalls provided) will be located in the eastern portion of the site. One entrance will be constructed to the site, in the north site area connecting to Woodland Beaver Road. A drive-thru aisle will be constructed to the west of the proposed building.

The new building will have a footprint of about 2,400 square feet (approximately 28 feet by 86 feet). We were not provided with specific building or structural loading information at the time of this report. However, based on previous Taco Bell projects, we anticipate the building will be a single story, wood frame structure with full brick façade and a truss roof system supported on an exterior perimeter foundation. The trusses span the transverse (short) direction of the building. At the front of the building, columns, which support beams and headers, are concealed within longitudinal exterior walls. This report is based on maximum structural loads on longitudinal (side) bearing walls being about 3 kips per linear foot (klf). The floor slab is expected to carry a maximum design live load of 100 pounds per square foot (psf).

Based on previous Taco Bell projects, we understand that two types of pavements may be used: Flexible Asphalt Concrete (AC) surfaced pavement; and Rigid Portland Cement (PC) Concrete pavement. It is anticipated that the parking lot will be divided into two areas: 1) driving lanes, and 2) parking stalls. The driving lanes will be subjected to estimated daily traffic of 1,000 cars and five 20,000 - 25,000 pounds single axle load from trucks. The parking stalls will experience as many as 50 cars per day. Parking stall pavements will only be used in areas that will not receive truck traffic. This report is based on a twenty-year design period to determine minimum pavement thickness and subgrade preparation requirements.

Existing topographic and proposed grading information was not provided. Based on our site reconnaissance, the site is a rough-graded outparcel in a newly constructed retail area and the ground surface across the proposed construction area is generally flat and level with relief estimated to be about 3 feet. This report is based on maximum cut and fill depths associated with the proposed construction being on the order of 2 feet. We are not aware of any proposed earth retaining structures at this time. No below ground construction is planned to our knowledge.

The information presented in this section was used in the evaluation. Estimated loads and corresponding foundation sizes have a direct effect on the recommendations, including the type of foundation, the allowable soil bearing capacity, and the estimated potential settlement. In addition, estimated subgrade elevations and cut/fill quantities can have a direct effect on the provided recommendations. If any of the noted information is incorrect or has changed, please inform PSI so that we may amend the recommendations presented in this report, if appropriate. If PSI is not retained to perform this function, PSI cannot be responsible for the impact of the changes on the performance of the project.

1.3 PURPOSE AND SCOPE OF WORK

The purpose of this study was to obtain information regarding the general subsurface conditions within the proposed construction area, to assess the engineering characteristics of the subsurface materials, and to provide general design recommendations regarding the geotechnical aspects of the proposed construction. To accomplish this, PSI performed a site reconnaissance, drilled seven soil test borings within the areas of proposed site improvements, conducted laboratory classification testing and prepared this report summarizing the findings, as well as our conclusions and recommendations.

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

PSI did not provide nor was it requested to provide any service to investigate or detect the presence of moisture, mold or other biological contaminants in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. Client acknowledges that mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. Client further acknowledges that site conditions are outside of PSI's control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSI cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

2 EXPLORATION PROCEDURES

2.1 FIELD SERVICES

PSI advanced seven soil test borings (Borings B-1 through B-7) within the proposed site at the approximate requested locations to depths of about 20 feet below grade. Borings B-1 and B-2 were drilled within the proposed building footprint area, borings B-3 through B-6 were drilled within proposed pavement areas, and boring B-7 was located within the proposed dumpster enclosure area. The approximate boring locations are shown on the "Boring Location Plan" (Figure 2) included in the Appendix. Horizontal and vertical survey control was not performed for the test boring locations prior to our field exploration program. The borings were located based upon estimated distances and relationships to obvious landmarks, and the site plan provided by the client. The boring locations are considered accurate to the degree implied by these methods.

Soil test borings were advanced at this site by FST, a subcontractor hired by PSI, utilizing a Diedrich D50T track-mounted drilling rig using hollow-stem, continuous-flight augers. All boring and sampling operations were conducted in general compliance with ASTM D 1586. At regular intervals, soil samples were obtained with a standard 2-inch O.D. split-barrel sampler.

An automatic trip drop hammer was used for the standard penetration testing, which has a higher efficiency than a manual cathead-and-rope hammer. Typically, the automatic hammer yields lower standard penetration test resistances (N-values) than a manual cathead-and-rope hammer. This reduction has been taken into account in our evaluation. The N-values reported on the logs, and the consistency descriptions on the boring logs are based on the field-recorded values.

The recovered soil samples were visually classified in the field by a geologist, then transported to our laboratory for testing and additional classification. A “Boring Log” was prepared for each boring and the “Logs” are included in the Appendix of the report. The logs were prepared using the observations made in the field, as well as the classifications in the laboratory and the laboratory test results. Strata descriptions, presented on the logs, were based on visual-manual evaluations by our geologist and include the classifications in general accordance with the Unified Soil Classification System (USCS). The “Soil Classification Chart”, included in the Appendix, illustrates the USCS legend depicted on the logs. Existing topographic information was not provided to us. Therefore, ground surface elevations are not presented on the boring logs or referenced in this report.

Groundwater levels and cave depths were measured in the boreholes at the time of boring and upon completion, when encountered. Delayed groundwater readings (after a period of about 2 to 5 hours) were also recorded at select boring locations. The results of the groundwater readings, when encountered; are included on the soil test boring logs. The borings were backfilled after the delayed groundwater reading or immediately upon completion, using the soil cuttings, for safety considerations.

2.2 LABORATORY TESTING

A geologist visually-manually classified the soil samples in the laboratory in general accordance with the Unified Soil Classification System (USCS) (ASTM D2487 and D2488). Percent finer than the No. 200 sieve (ASTM D1140), Atterberg limits tests (ASTM D4318), and natural water content determinations (ASTM D2216) were conducted on representative samples recovered from the test boring locations. The laboratory test results are presented in Section 3.3.4 and/or are shown on the individual boring logs.

3 SITE AND SUBSURFACE CONDITIONS

3.1 SITE DESCRIPTION

The proposed Taco Bell # 314881 site is located south of and adjacent to Woodland Beaver Road, approximately 450 feet east of its intersection with Rocky River Church Road, in Mint Hill, North Carolina. Albemarle Road (NC 24/27) bounds the site to the south. The site reportedly has a physical address of 10810 Woodland Beaver Road. The site location is depicted on the “Site Vicinity Map” (Figure 1) included in the Appendix.

At the time of our reconnaissance, the site was a roughly graded outparcel within a recently constructed retail development. The ground surface across the site was generally covered with sparse grass and high weeds. However, several large trees were noted along the south site boundary (adjacent to Albemarle Road). Based on a review of historical aerial photographs available on Google Earth, the site area appears as residential and partially wooded in 1993. It appears the residences were removed and the site area partially cleared around 2000, followed by mass grading of the site and surrounding area around 2009. Woodland Beaver Road appears to have been constructed around 2013.

The ground surface across the site generally appeared to be flat and level with total relief across the site estimated to be on the order of 3 feet. Buried utility lines were noted within the north and south edges of the site. At the time of our field work, the ground surface was firm and our equipment (a track-mounted drill rig) experienced no apparent difficulty moving across the site.

3.2 SITE GEOLOGY

The project site is located within Mecklenburg County, North Carolina, and lies within the Charlotte Belt of the Piedmont Physiographic Province of the eastern United States. This province is characterized by broad, gently rolling ridges formed on the stronger bedrock of the area. Between these ridges, lowlands and drainage areas are formed on the less resistant bedrock. The Piedmont is a complex assemblage of igneous (volcanic and plutonic) and sedimentary rocks that were generally formed during the Late Proterozoic Era and the Early Cambrian Period (approximately 550 to 900 million years ago). During and subsequent to formation these rocks were subjected to several major tectonic events, including plate collisions, folding, faulting, and igneous intrusions, that resulted in the uplift and metamorphism of the preexisting rocks. The tectonic activity generally stopped about 200 to 250 million years ago and erosional forces have formed the current ground surface. Review of the Geologic Map of the Charlotte 1° by 2° Quadrangle, North Carolina and South Carolina (USGS, by Goldsmith, Milton and Horton, 1988) indicates the site is underlain by metamorphosed volcanic rocks of late Proterozoic to early Cambrian age.

Residual soils are the result of in-place physical and chemical weathering of the parent bedrock. In this area residual soils generally consist of an upper layer of fine-grained SILT or CLAY underlain by Sandy SILT or Silty SAND. The sand content generally increases with depth. Separating the residual soil from the underlying parent bedrock is typically a transition zone of high consistency material referred to as partially weathered rock. Partially weathered rock is defines as residual material with standard penetration resistance (ASTM D1586) in excess of 50 blows per 6-inches penetration.

The weathering processes that produced the residual soils and partially weathered rock were extremely variable, due to such factors as rock type and mineralogy, past groundwater conditions, and the tectonic history of the specific area (resulting in localized fractures, joints and faults within the bedrock). Differential weathering of the parent bedrock has resulted in highly variable subsurface conditions, and can include abrupt changes in soil type and consistency over relatively short horizontal and vertical distances. Furthermore, depths to rock can also be highly variable; and suspended boulders, discontinuous rock layers/lenses, or rock pinnacles can be present within the residual soils and transitional zones of soft weathered rock.

Previously placed fill material was not encountered in any of the borings. However, existing fill materials are often encountered on previously graded sites such as this. The suitability of existing fill can vary significantly across the site. It is not uncommon to encounter buried debris and unsuitable materials on previously developed sites.

As requested, PSI conducted a review of readily available literature for information regarding karst activity within the site area. Caves, internal drainage, lack of surface streams, and topographic features such as sinkholes characterize karst terrain. These features are the result of dissolution of soluble bedrock, such as limestone or dolomite, by groundwater and/or infiltration of surface water. As groundwater enters fractures or bedding planes in soluble bedrock, it slowly dissolves the rock and enlarges the fractures. This results in the formation of solution channels, underground streams or ravines, and caves. Based on our review of geologic maps for the site area as well as our understanding of Piedmont geology, no soluble bedrock (such as limestone or dolomite) is known to occur within this region. Therefore, no potential for karst features underlying the site is anticipated.

3.3 SUBSURFACE CONDITIONS

General subsurface conditions encountered during the subsurface exploration are described below. For more detailed soil descriptions and stratifications at the boring locations, the “Boring Logs” should be reviewed. The “Boring Logs” represent our interpretation of the subsurface conditions based on a review of the field logs and an engineering examination of the samples. The horizontal stratification lines designating the interface between various strata represent approximate boundaries. Transition between different strata in the field may be gradual in both the horizontal and vertical directions. Groundwater, or lack thereof, encountered in the borings and noted on the “Boring Logs” represents conditions only at the time of the exploration.

3.3.1 SURFACE

Appreciable amounts of topsoil were not readily apparent at the boring locations. However, pockets of topsoil may be present in other areas of the site, particularly in the vicinity of the vegetation and trees noted along the south site boundary (near Albemarle Road). The term topsoil, as used in this report, is a general designation given to the surface horizon of soil which appears to have an elevated organic content. No laboratory testing was performed on the topsoil to determine its suitability for supporting plant life, or ability to satisfy a particular specification.

3.3.2 RESIDUUM

Residual soils were encountered from the ground surface in all of the test borings performed at the site. At two of the borings (B-1 and B-2) the shallow sampled residual soils generally initially consisted of stiff to very stiff Elastic SILT (MH). These MH residual soils extended to depths ranging from about 3 to 6 feet. Standard Penetration Test resistances (N-values) recorded in the MH soil layer ranged from 10 to 16 blows per foot (bpf).

Underlying the near-surface MH layer at B-1 and B-2, and from the ground surface at the remaining borings, residual soils consisting of firm to very stiff Sandy SILT or SILT with Fine Sand (ML) were encountered at the borings. The N-values recorded in the ML soils ranged from 5 to 20 bpf but were typically in the 7 to 14 bpf range. All of the borings were terminated in residual

ML soils at a depth of about 20 feet without encountering partially weathered rock or auger refusal material.

3.3.3 GROUNDWATER INFORMATION

The borings were checked for groundwater at the time of drilling and upon completion. Delayed groundwater readings (after a period of about 2 to 5 hours) were also recorded at select boring locations. The borings were backfilled after the delayed groundwater reading or immediately upon completion, using the soil cuttings, for safety considerations. Groundwater was not readily apparent in any of the borings.

Subsurface water levels within this region tend to fluctuate with seasonal and climatic changes, as well as with some types of construction operations. Generally, the highest groundwater levels occur in late winter and early spring; and the lowest levels in late summer and early fall. Therefore, water may be encountered during construction at depths not indicated during this study.

Additionally, perched groundwater conditions can develop over low permeability soil or weathered rock following periods of heavy or prolonged precipitation. Groundwater may be encountered during construction at depths not indicated during this exploration.

3.3.4 LABORATORY TEST RESULTS

The results of the laboratory testing program are summarized in the following table.

Sample Location	Sample Depth (ft)	Moisture Content (%)	Percent Fines (%)	ATTERBERG LIMITS			USCS Soil Classification
				LL	PL	PI	
B-1	1 – 2 ½	24.0	85.7	59	32	27	MH*
B-2	1 – 2 ½	27.4	75.0	53	41	12	MH*
B-4	1 – 2 ½	18.5	79.7	40	28	12	ML
B-7	3 ½ - 5	26.9	--	--	--	--	--

*Typically not recommended for direct support of foundations, slabs or pavements.

4 GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

4.1 GEOTECHNICAL ASSESSMENT

The following geotechnical design recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions encountered. If there are any changes in these project criteria, including building location on the site or the construction of earth retaining structures are required, a review should be made by PSI to determine if modifications to the recommendations are warranted.

Once final design plans and specifications are available, a general review by PSI is recommended as a means to check that the evaluations made in preparation of this report are correct and that earthwork and foundation recommendations are properly interpreted and implemented.

Based on the results of the fieldwork, laboratory evaluation and engineering analyses, we have identified the following potential constraint to the development of this site; the presence of moderate-plasticity, high fines content soils. However, we believe with proper planning and execution, the site can be adapted for the proposed structure and associated improvements.

Elastic SILT (MH) residual soil was encountered from the ground surface at borings B-1 and B-2 to depths of about 6 feet and 3 feet below grade, respectively. Borings B-1 and B-2 were located within the proposed building footprint, and additional MH soils may be encountered in unexplored or other areas of the site. These soils generally exhibit moderate plastic properties and are typically susceptible to changes in volume with even slight changes in moisture content (i.e. shrink/swell behavior). As a result, MH soils are not recommended for direct support of foundations, slabs or pavements. We recommend a minimum 1-foot thick buffer of low-plastic soils be provided between these soils and slabs or foundations, and a minimum 6-inch thick buffer between these soils and pavements, curbs and sidewalks. In the case of foundations, they may be deepened to extend beneath the MH soils when encountered in footing excavations, or footings may bear in these materials (MH soils) provided the foundations are not less than 3 feet below final finished grade.

The extent of MH soils requiring undercutting and removal will be dependent on the proposed grading plans, which were not available at the time of this report. However, the project budget should include a contingency for the removal and replacement of near-surface MH soils to provide the buffers described above, particularly within the southwest site area (proposed building area). In addition, MH soils are not recommended for reuse as structural fill.

Furthermore, MH soils are moisture sensitive and will likely become unstable due to the presence of excess moisture and normal construction equipment traffic operating over them. Accordingly, construction traffic should be kept to a minimum on the exposed soils to reduce the potential for creating an unstable subgrade.

4.2 SITE PREPARATION AND EARTHWORK

Site clearing, stripping and grubbing operations should only be performed in dry weather conditions.

Initially, wet soils, topsoil, organics, debris, and other unsuitable materials, should be stripped from an area extending at least 10 feet beyond the outline of the proposed construction. Any existing below-grade construction encountered during site grading or construction should be examined by the Geotechnical Engineer to determine if these materials will require removal. Removal of the near-surface, moderate plasticity MH soils as previously discussed may also be required in some areas (such as the proposed building footprint, area of B-1 and B-2). Depressions or low areas resulting from stripping and grubbing or removal of foundations, utility lines, and other subsurface appurtenances should be backfilled with compacted structural fill in accordance with the recommendations presented in this report.

Based on our project understanding and the minimal grading anticipated, the need for undercutting of shallow elastic residual MH soils is anticipated over portions of the site. Actual extents and depths of required undercut will be dependent upon final site grades and will be determined in the field by PSI personnel during grading operations. Areas receiving more than 1 foot of fill in the building area and 6 inches of fill in pavement areas may not require undercutting for slabs and pavements. We do not recommend that the on-site Elastic SILT (MH) soils be reused as structural fill.

After stripping, removal of unsuitable surface soils, and rough excavation grading, we recommend that areas to provide support for the floor slabs, pavements, and/or structural fill be evaluated for the presence of soft, surficial soils and/or plastic soils by proofrolling and inspection by the Geotechnical Engineer. We caution that the subgrade soils exposed after stripping contain sufficient silt and clay to render them both moisture sensitive and frost susceptible. Due to their moisture sensitivity, proper site drainage should be maintained during earthwork operations to reduce accumulation of moisture and wet weather delays. These soils will likely become unstable due to the presence of excess moisture and normal construction equipment traffic operating over them. Accordingly, construction traffic should be kept to a minimum on the exposed soils to reduce the potential for creating an unstable subgrade. If the surface soils become softened/unstable during wet weather or freeze cycles, these soils should be removed before additional fill is placed.

The proofroll should be performed using a loaded tandem axle dump truck, or similar rubber-tired equipment, weighing between 15 and 20 tons. The vehicle should make at least four passes over each location, with the last two passes perpendicular to the first two. Areas that wave, rut, or deflect significantly and continue to do so after several passes of the proofroller should be undercut to firmer soils as recommended by the Geotechnical Engineer. Undercut areas should be backfilled in thin lifts with approved, compacted fill materials. Proofroll operations should be monitored carefully by PSI's Project Geotechnical Engineer.

Drying soils for re-use as structural fill is often considered a routine aspect of typical grading operations and is not considered a pay item. Based on the in-situ moistures of the site soils, some drying should be expected prior to their use as fill. If unit prices for earthwork operations are established, they should be examined closely before the contract is executed. If undercutting is a pay item, then undercut volumes should be determined by field measurement. Methods such as counting trucks should not be used for determination of undercut volume, as they are less accurate.

Recommended criteria for soil fill characteristics (both on-site and imported materials) and compaction procedures are listed below. The project design documents should incorporate the following recommendations to address proper placement and compaction of project fill materials. Earthwork operations should not begin until representative samples are collected and tested. The maximum dry density and optimum moisture content should be determined at the onset of construction.

EARTH FILL MATERIALS

- Imported or on-site fill material satisfactory for structural fill should include clean soil material with USCS classifications of (SP, SW, SM, and some SC, CL or ML). The fill material should have a Standard Proctor (ASTM D698) Maximum Dry Density of at least 100 pcf, a maximum Liquid Limit of 50 and a Plasticity Index of 20 or less. Fat CLAY (CH) and Elastic SILT (MH) soils should generally not be used as structural fill.

- Organic content or other foreign matter (debris) should be no greater than 3 percent by weight, and no large roots (greater than ¼ inch in diameter) should be allowed. Organic materials should not be intentionally mixed into structural fill.

- Material utilized as fill should not contain rocks greater that 3 inches in diameter or greater than 30 percent retained on the ¾-inch sieve.

COMPACTION RECOMMENDATIONS

- Maximum loose lift thickness – 8 inches, mass fill. Loose lifts of 4 to 6 inches in trenches and other confined spaces where hand operated equipment is used.

- Compaction requirements – 95 percent of the maximum dry density and 98 percent within the upper 12 inches as determined by the standard Proctor (ASTM D698) compaction test.

- Soil moisture content at time of compaction – within ±3 percent of the optimum moisture content.

TEST CRITERIA TO EVALUATE FILL AND COMPACTION

- One standard Proctor compaction test and one Atterberg limits test for each soil type used as project fill. Gradation tests may be necessary and should be performed at the Geotechnical Engineer's discretion.

- One density test every 2,500 square feet for each lift or two tests per lift, whichever is greater (for preliminary planning only; the test frequency should be determined by our engineering staff).

- Trench fill areas – one density test every 75 linear feet at vertical intervals of 2 feet or less.

It will be important to maintain positive site drainage throughout construction. Storm water runoff should be diverted around the building and pavement areas. The site should be graded at all times such that water is not allowed to pond. The surface should be sealed with a smooth drum roller to enhance drainage if precipitation is expected. Subgrades damaged by construction equipment should be repaired immediately to avoid further degradation in adjacent areas and to help prevent water ponding.

Should there be a significant time lag or period of inclement weather between site grading and the fine grading of the slab prior to the placement of stone or concrete, the Geotechnical Engineer of Record or qualified representative should assess the condition of the prepared subgrade. The subgrade may require scarification and re-compaction or other remedial measures to provide a firm and unyielding subgrade prior to final slab construction.

4.3 SEISMIC CONSIDERATIONS

The project site is located within a municipality that employs the 2015 International Building Code® (IBC). As part of this Code, the design of structures must consider dynamic forces resulting from seismic events. These forces are dependent upon the magnitude of the earthquake event, as well as the properties of the soils that underlie the site. As part of the procedure to evaluate seismic forces, the Code requires the evaluation of the Seismic Site Class, which categorizes the site based upon the characteristics of the subsurface profile within the upper 100 feet of the ground surface.

To define the Site Class for this project, we first interpreted the results of soil test borings drilled within the project site and estimated appropriate soil properties below the base of the borings to a depth of 100 feet, as permitted by the Code. The estimated soil properties were based upon our experience with subsurface conditions in the general site area.

Based upon the SPT N-values recorded during the field exploration, the subsurface conditions within the site are consistent with the characteristics of a ***Site Class "D"*** as defined in Table 1613.5.2 of the Code.

The associated IBC (2015) probabilistic ground acceleration values and site coefficients for the general site area were obtained from the USGS U.S. Seismic Design Maps Web Application (http://geohazards.usgs.gov/designmaps/us/application.php) and are presented in the table below:

Ground Motion Values for Site Class "D"*

Period (sec)	Mapped MCE Spectral Response Acceleration** (g)		Site Coefficients		Adjusted MCE Spectral Response Acceleration (g)		Design Spectral Response Acceleration (g)	
0.2	S_s	0.239	F_a	1.6	SM_s	0.383	SD_s	0.255
1.0	S_1	0.103	F_v	2.387	SM_1	0.246	SD_1	0.164

**2% Probability of Exceedance in 50 years for Latitude 35.22407 and Longitude -80.63348*
***At B-C interface (i.e. top of bedrock).*
MCE = Maximum Considered Earthquake

The Site Coefficients, F_a and F_v presented in the above table were obtained also from the noted USGS webpage, as a function of the site classification and mapped spectral response acceleration at the short (S_s) and 1-second (S_1) periods, but can also be interpolated from IBC Tables 1613.5.3(1) and 1613.5.3(2).

4.4 FOUNDATION RECOMMENDATIONS

Based on the subsurface exploration performed at the site and the recommended site preparation, the following recommendations are provided to support the proposed structure at the site.

SHALLOW FOUNDATIONS

Based on the results of the geotechnical exploration, we recommend that the proposed structure be supported on conventional shallow spread and wall footings. We recommend that footings be designed for a maximum net allowable soil bearing capacity of 2,000 psf. This recommendation assumes that the building foundations will bear in suitable bearing natural undisturbed soil and/or new structural fill placed and compacted in accordance with the recommendations of this report.

We recommend continuous wall and column footings with minimum widths of at least 18 inches and 24 inches, respectively, regardless of the actual resulting bearing pressure. The recommended allowable soil bearing capacity may be increased by one-third for short term wind and/or seismic loads.

All foundation excavations should be evaluated for the presence of organic-laden and/or poorly compacted fill soils as well as high plasticity soils. If high plasticity soils (MH) are found within 1 foot of the bearing level for foundations, these soils will have to be removed and replaced with low-plastic soils to a depth of at least 12 inches below the footing bottom. The replacement material should be low plasticity silt, clay, non-excavatable flowable fill, or lean concrete. Number 57 stone should not be used as backfill beneath foundations because of the tendency of water to accumulate in open-graded aggregate.

All foundations should bear at a minimum depth of 18 inches below the lowest adjacent final ground surface for frost penetration, and protective embedment. PSI recommends that the foundations be designed in accordance with the 2015 International Building Code.

We estimate that footings with width no larger than 3 feet, designed and constructed in accordance with the recommendations herein will experience post-construction total settlements generally less than 1-inch with differential settlement along a 40-foot long portion of a continuous footing, or similarly spaced column footings generally less than ½-inch. Total and differential settlements of these magnitudes are usually considered tolerable for the anticipated construction. However, the tolerance of the proposed structure to the predicted total and differential settlements should be confirmed by the structural engineer.

The base adhesion/frictional resistance and the passive soil resistance will resist the horizontal loads on shallow foundations. For a footing cast against natural soil or properly compacted fill, the adhesion/frictional resistance and the passive soil resistance values for both transient and sustained loading conditions are given herein. For sustained and transient loading conditions, a frictional coefficient of 0.35 and an allowable passive resistance of 225 psf per foot depth is recommended. Passive resistance from the upper two feet of soil should be neglected unless the area adjacent to the footing is paved. Also, the passive resistance of any un-compacted fill material should be neglected.

The uplift resistance of a shallow foundation formed in an open excavation will be limited to the weight of the foundation concrete and the soil above it. For design purposes, the ultimate uplift resistance should be based on effective unit weights of 110 and 150 pcf for soil and concrete, respectively. This value should then be reduced by an appropriate factor of safety to arrive at the allowable uplift load. If there is a chance of submergence, the buoyant unit weights should be used.

Foundation concrete should be placed as soon as possible after excavation. If foundation excavations must be left open overnight, or exposed to inclement weather, the base of the excavation should be protected with a “mud mat” consisting of a couple of inches of lean concrete. Footing excavations should be protected from surface water run-off and freezing. If water is allowed to accumulate within a footing excavation and soften the bearing soils, or if the bearing soils are allowed to freeze, the deficient soils should be removed from the excavation prior to concrete placement.

Footing excavations should be evaluated by the Geotechnical Engineer of Record, or his representative to determine that soils capable of supporting the recommended design bearing pressures are present at and immediately below the bearing level after excavation and prior to placement of reinforcing steel in the footing excavations. We recommend that the bearing soils at the bottom of and below the footing excavations be verified with a dynamic cone penetrometer to assess the suitability of the soils. A hand auger should be used to advance a borehole for this evaluation to a depth equal to at least the foundation width or 3 feet, whichever is greater.

If unsuitable bearing soils are encountered, these materials should be removed. The foundations can then be established at the new, lower bearing elevation, or the unsuitable material can be replaced with properly compacted fill, non-excavatable flowable fill, or lean concrete. If compacted structural fill is used as backfill, the undercut excavations to remove unsuitable materials should be centered beneath the footing and widened 1/2 foot in each direction for each foot of undercut depth, measured from the outside edge of the new foundation. If lean concrete or non-excavatable flowable fill is used as backfill, the foundation excavation need not be widened. Open graded stone, such as No. 57 stone, should not be used to backfill foundation excavations.

4.5 FLOOR SLAB RECOMMENDATIONS

Floor slabs may be supported on subgrades prepared in accordance with the SITE PREPARATION AND EARTHWORK section (paragraph 4.2) of this report. Depending upon grading, we anticipate that potentially expansive Elastic SILT (MH) residual soils will have to be removed and replaced with low plastic structural fill to a depth of 1 foot in slab areas. Additional undercutting may not be required in areas receiving more than 1 foot of new fill.

Where concrete slabs are designed as beams on an elastic foundation, the soils that will comprise the subgrade soils should be assumed to have a modulus of subgrade reaction (k) of 125 pounds per cubic inch (pci). This value is estimated based on the expected results of a plate load test using a nominal 12-inch square plate and should be adjusted for the size and geometry of the proposed slab.

In order to provide uniform support beneath any proposed floor slab-on-grade, we recommend that floor slabs be underlain by a minimum of 4 inches of compacted aggregate base course material. The estimated modulus of subgrade reaction after the addition of 4 inches of aggregate subbase material is 150 pci.

The aggregate base course material should be compacted to at least 98 percent of its standard Proctor maximum dry density. Open-graded crushed stone, such as No. 57 stone, may also be used; however, it is our experience that open graded crushed stone can collect water during periods of rain and cause saturation and softening of the subgrade soils prior to placement of the floor slab concrete. Therefore, construction sequencing/timing, and the season in which the stone is placed, should be taken into consideration.

The crushed rock base course is intended to provide a capillary break to limit migration of moisture through the slab. If additional protection against moisture vapor is desired or moisture sensitive floor coverings are proposed, a vapor retarding membrane may also be incorporated into the design; however, there are no specific conditions that mandate its use. Factors such as cost, special considerations for construction, and the floor coverings suggest that decisions on the use of vapor retarding membranes be made by the architect and owner. Based on the subsurface materials and the intended use of the structure, we recommend the use of a vapor retarding membrane. Vapor retarders, if used, should be installed in accordance with ACI 302.1, Chapter 3.

The precautions listed below should be closely followed for construction of slabs-on-grade. These details will not prevent the amount of slab movement but are intended to reduce potential damage should some settlement of the supporting subgrade take place.

- Cracking of slabs-on-grade is normal and should be expected. Cracking can occur not only as a result of heaving or compression of the supporting soil, but also as a result of concrete curing stresses. The occurrence of concrete shrinkage cracks, and problems associated with concrete curing may be reduced and/or controlled by limiting the water to cement ratio of the concrete, proper concrete placement, finishing, and curing, and by the placement of crack control joints at frequent intervals, particularly, where re-entrant slab corners occur. The American Concrete Institute (ACI) recommends a maximum panel size (in feet) equal to approximately three times the thickness of the slab (in inches) in both directions. For example, joints are recommended at a maximum spacing of 12 feet assuming a four-inch thick slab. We also recommend that control joints be scored three feet in from and parallel to all foundation walls. Using fiber reinforcement in the concrete can also control shrinkage cracking.

- Some increase in moisture content is inevitable as a result of development and associated landscaping; however, extreme moisture content increases can be largely controlled by proper and responsible site drainage, building maintenance and irrigation practices.

- All backfill in areas supporting slabs should be moisture conditioned and compacted as described earlier in this report. Backfill in all interior and exterior utility line trenches should be carefully compacted.

- Exterior slabs should be isolated from the building. These slabs should be reinforced to function as independent units. Movement of these slabs should not be transmitted to the building foundation or superstructure.

4.6 PAVEMENT DESIGN GUIDELINES AND PARAMETERS

4.7.1 PAVEMENT SUBGRADE PREPARATION

Following the stripping of deleterious materials, we recommend the proposed pavement subgrade be prepared and compacted in accordance with the recommendations provided in Section 4.2 “SITE PREPARATION AND EARTHWORK” of this report.

We recommend proofrolling and re-compacting the upper six inches of subgrade immediately prior to placement of the ABC base course. The exposed pavement subgrade should also be evaluated by a representative of PSI immediately prior to placing ABC. If low consistency soils are encountered which cannot be adequately compacted in place, such soils should be removed and replaced with well-compacted soil fill or crushed stone materials.

Based upon the findings of our borings and the assumed grading, we anticipate residual ML soils, or newly placed structural fill soils will be present at the subgrade elevation. A California Bearing Ratio (CBR) value of about 5 can be reasonably assumed for the residual ML soil or structural fill at compaction levels of about 98 percent of the standard Proctor maximum dry density within about 3 percent of optimum moisture.

Site grading is generally accomplished early in the construction phase. Subsequently as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, and rainfall. As a result, the pavement subgrade may not be suitable for pavement construction and corrective action will be required. The subgrade should be carefully evaluated at the time of pavement construction and subgrade areas should be reworked, moisture conditioned, and property compacted to the recommendations in this report immediately prior to paving.

Prevention of infiltration of water into the subgrade is essential for the successful long-term performance of any pavement. Both the subgrade and the pavement surface should be sloped to promote surface drainage away from the pavement structure.

4.6.2 FLEXIBLE PAVEMENT RECOMMENDATIONS

Specific traffic loading information was not provided at the time of this report. However, based on previous Taco Bell projects we anticipate that two types of pavements may be used: Flexible Asphalt Concrete (AC) surfaced pavement; and Rigid Portland Cement (PC) Concrete pavement. It is anticipated that the parking lot will be divided into two areas: 1) driving lanes, and 2) parking stalls. The driving lanes will be subjected to estimated daily traffic of 1,000 cars and five 20,000 - 25,000 pounds single axle load from trucks. The parking stalls will experience as many as 50 cars per day. Parking stall pavements will only be used in areas that will not receive truck traffic. This report is based on a twenty-year design period to determine minimum pavement thickness and subgrade preparation requirements.

A conservative California Bearing Ratio (CBR) value of 5 was assumed for the on-site low plasticity SILTS (ML), or newly placed structural fill, at compaction levels of 98 percent of the standard Proctor maximum dry density within about 3 percent of optimum moisture.

Based on our experience with similar facilities and subgrade conditions which are typical for this region, we recommend the following preliminary pavement sections. Once detailed traffic information is available, actual pavement section calculations should be performed to develop the design sections.

PAVEMENT SECTION	**MATERIAL THICKNESS (in.)**			**TOTAL PAVEMENT SECTION (in.)**
	Graded Aggregate Base	**Asphalt Course INTERMEDIATE** (I-19.0B)	**Asphalt Course SURFACE** (S-9.5B)	
Parking Stalls	6	--	3	9
Driving Lanes	8	2 ½	1 ½	12

Notes: 1) Parking Stall Areas calculated based on traffic loading of 25,000 ESALS or less. Parking stalls only with no through traffic.

2) Driving Lanes calculated based on traffic loading of 100,000 ESALS or less.

Actual pavement section thickness should be provided by the design civil engineer based upon anticipated traffic loads, volume, and the owner's design life requirements. The above sections represent minimum thickness representative of typical, local construction practices, and as such periodic maintenance should be anticipated.

4.6.3 RIGID PAVEMENT RECOMMENDATIONS

The use of concrete for paving has become more prevalent in recent years due to the long-term maintenance cost benefits of concrete compared to asphaltic pavements. Proper finishing of concrete pavements 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 sealed to reduce the potential for water infiltration into pavement joints and subsequent infiltration into the supporting soils. 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. All pavement materials and construction procedures should conform to NCDOT or appropriate city, county requirements.

Large front-loading trash dump trucks frequently impose concentrated front-wheel loads on pavements during loading. This type of loading typically results in rutting of the pavement and ultimately, pavement failures. Therefore, we recommend that the pavement in trash pickup areas consist of a minimum 6-inch graded aggregate base overlain by a minimum 6-inch thick, rigid pavement.

RIGID (CONCRETE) PAVEMENT	**PARKING STALLS**	**DRIVING LANES**
Portland Cement Concrete (4,000 psi)	5 inches	6 inches
Graded Aggregate Base (ABC)	4 inches	6 inches

5 CONSTRUCTION CONSIDERATIONS

5.1 GROUNDWATER

Based on the results of the boring explorations, it appears that groundwater will not significantly impact the proposed construction. However, groundwater levels within this region tend to fluctuate with seasonal and climatic changes, and confined pockets of perched water often occur above the groundwater table. Generally, the highest groundwater levels occur in late winter and early spring; and the lowest levels in late summer and early fall. Therefore, water may be encountered during construction at depths not indicated during this study.

If groundwater is encountered, we recommend that the groundwater table be lowered and maintained at a depth of at least 2 feet below bearing levels and excavation bottoms during construction. Adequate control of groundwater could likely be accomplished by means of pumping from gravel-lined, cased sumps. However, the contractor should be responsible for selecting the most optimal dewatering method. If a sheet pile wall is installed to cut-off the groundwater seepage into the excavation, sump and pump technique can be employed to dewater the excavation pit. Furthermore, we recommend that the Contractor determine the actual groundwater levels at the time of construction to determine the groundwater impact on the construction procedures. The contractor should be prepared to promptly remove surface water from the general construction area by similar methods. If groundwater is encountered during trenching or foundation installation, PSI should be notified so that we might determine whether there is a need for underslab drainage, perimeter drains, or other recommendations for temporary or permanent dewatering.

5.2 EXCAVATION AND SAFETY

Based on the data available from the borings, anticipated excavations during site grading should encounter firm to very stiff soils that can generally be removed by conventional earthmoving equipment such as pans, scrapers, and backhoes.

In evaluating grading considerations, please keep in mind that subsurface conditions, particularly the level and location of bedrock (boulder or massive form) vary erratically in the Piedmont Geologic Province of which Mecklenburg County and this site are parts. If large boulders or massive rock is encountered during the grading operations between boring locations, blasting may be necessary to facilitate removal. In addition, confined excavations such as utility trenches are more likely to require rock excavation techniques than large open cuts. All excavations should be sloped or shored in accordance with applicable OSHA regulations.

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 allow for the safety of workers entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavations or footing excavations, 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 all local, state, and federal safety regulations.

We are providing this information solely as a service to our client. PSI 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. Groundwater control is critical to excavation safety and is described above.

6 REPORT LIMITATIONS

The recommendations submitted are based on the available subsurface information obtained by PSI and design details furnished by **Taco Bell Corporation** for the proposed project. 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, PSI should be notified immediately to determine if changes in the foundation recommendations are required. If PSI is not retained to perform these functions, we will not be responsible for the impact of those conditions on the geotechnical recommendations for the project.

PSI 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 at the date of this report. No other warranties are implied or expressed.

After the plans and specifications are more complete, PSI 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 into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of **Taco Bell Corporation** and their consultants for the specific application to the **Proposed Taco Bell # 314881 located at 10810 Woodland Beaver Road in Mint Hill, North Carolina**.

APPENDICES

SITE VICINITY MAP

Project Name:

Taco Bell #314881
10810 Woodland Beaver Road
Mint Hill, North Carolina

Project No.: **05111011**

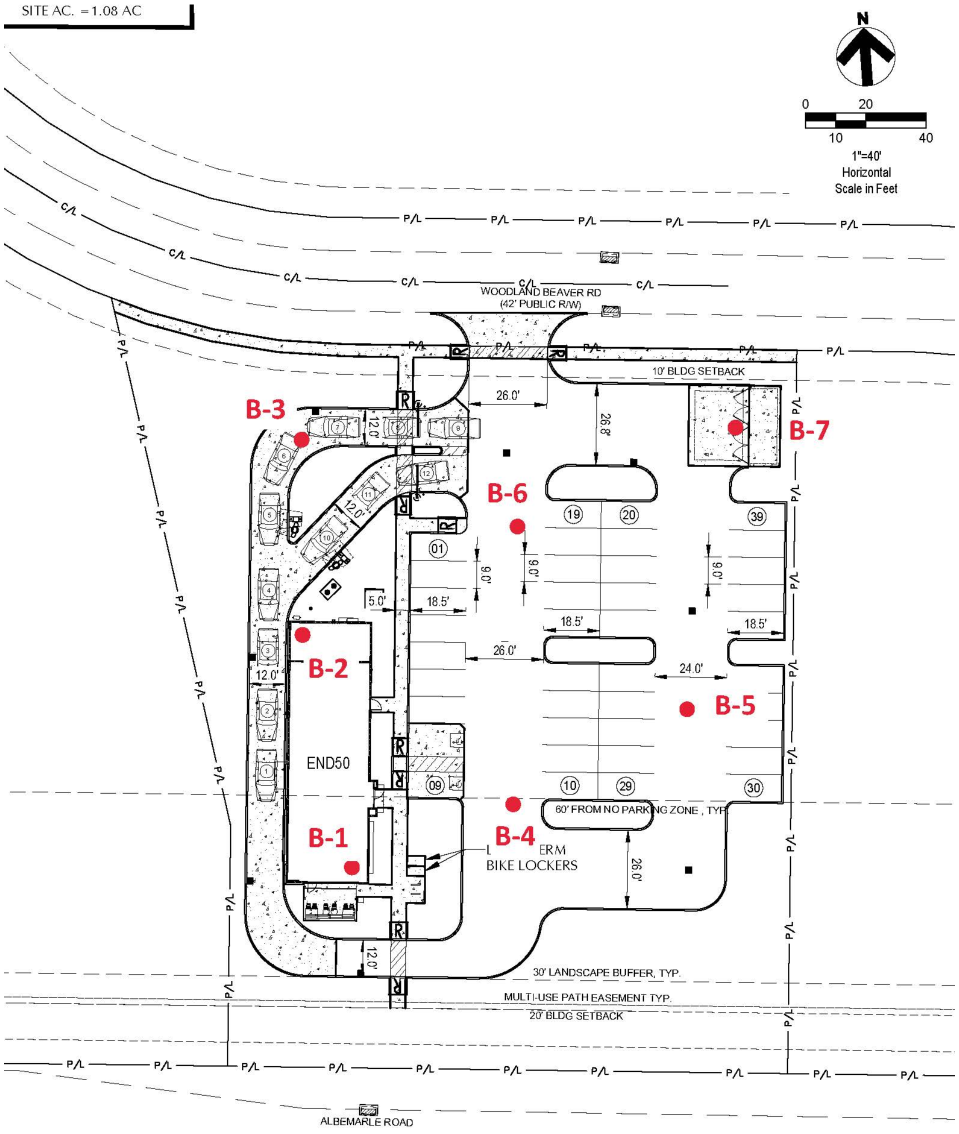
Date: **June 2021**

2019 Base Aerial Obtained From Google Earth

Figure 1
Site Vicinity Map

intertek psi

BORING LOCATION PLAN



Legend

● Approximate Boring Location

Project Name:

Taco Bell #314881
10801 Woodland Beaver Road
Mint Hill, North Carolina

Project No.: 05111011

Date: June, 2021

Base Drawing "Site Sketch" provided by Taco Bell and dated February 26, 2021

Figure 2

Boring Location Plan

GENERAL NOTES AND SOIL CLASSIFICATION CHART

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.
HSA: Hollow Stem Auger - typically 3¼" or 4¼ I.D. openings, except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry
R.C.: Diamond Bit Core Sampler
H.A.: Hand Auger
P.A.: Power Auger - Handheld motorized auger

☒ SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
■ ST: Shelby Tube - 3" O.D., except where noted.
▯ RC: Rock Core
⬇ TC: Texas Cone
✋ BS: Bulk Sample
▦ PM: Pressuremeter
CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
N_{60}: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
Q_u: Unconfined compressive strength, TSF
Q_p: Pocket penetrometer value, unconfined compressive strength, TSF
w%: Moisture/water content, %
LL: Liquid Limit, %
PL: Plastic Limit, %
PI: Plasticity Index = (LL-PL),%
DD: Dry unit weight, pcf
▼,▽,▼ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	N - Blows/foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

Component	Size Range
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

Description	Criteria
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% Dry Weight
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%

GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

Q_U - TSF	N - Blows/foot	Consistency
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

Description	Criteria
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term	% Dry Weight
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

Description	Criteria
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided:	Fracture planes appear polished or glossy, sometimes striated

Description	Criteria
Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed:	Inclusion of small pockets of different soils
Layer:	Inclusion greater than 3 inches thick (75 mm)
Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

Q_U - TSF	Consistency
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

Description	Criteria
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

Voids	Void Diameter
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

Component	Size Range
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

Rock Mass Description	RQD Value
Excellent	90 -100
Good	75 - 90
Fair	50 - 75
Poor	25 -50
Very Poor	Less than 25

DEGREE OF WEATHERING

Slightly Weathered:	Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered:	Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered:	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS	●	GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LITTLE OR NO FINES)	○	GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES	○	GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)	▨	GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS	⁘	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		(LITTLE OR NO FINES)	⋯	SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES	⁘	SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)	▨	SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	▥	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			▨	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			☰	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	▥	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			▨	CH	INORGANIC CLAYS OF HIGH PLASTICITY
			≈	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			⁂	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

psi

BORING LOGS

BORING B-1

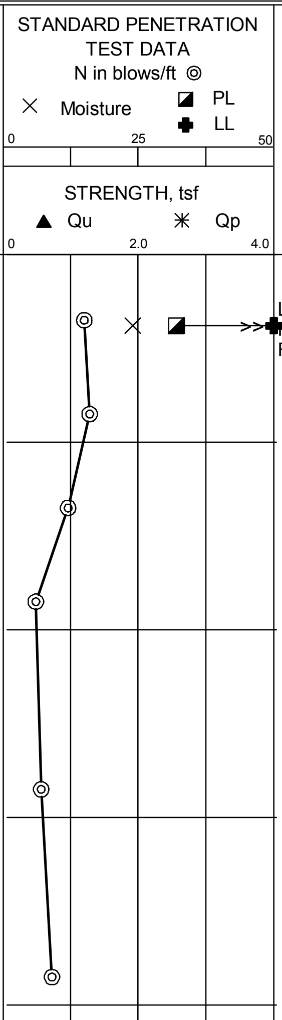
DATE STARTED: 6/15/20
DATE COMPLETED: 6/15/20
COMPLETION DEPTH 20.0 ft
BENCHMARK: N/A
ELEVATION: N/A
LATITUDE:
LONGITUDE:
STATION: N/A **OFFSET:** N/A
REMARKS: Borehole backfilled with the auger cuttings upon completion. CID = Cave-In Depth

DRILL COMPANY: FST
DRILLER: Brantley **LOGGED BY:** Steege
DRILL RIG: Diedrich D50T
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: 2-in SS, Standard
HAMMER TYPE: Automatic
EFFICIENCY N/A
REVIEWED BY: AOS

Water		
▽	While Drilling	None
▼	Upon Completion	Dry
▼	5 Hr Delay	Dry, CID=18 feet

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0				**RESIDUUM** - Stiff to Very Stiff, Red/Brown, Elastic SILT - Moist	MH			
		☒	1	18			5-6-9 N=15	24	LL = 59 PL = 32 Fines = 85.7%
		☒	2	18			6-8-8 N=16		
	5				Stiff, Brown/Red, Fine Sandy SILT with Clay - Moist	ML			
		☒	3	16			5-5-7 N=12		
					Firm to Stiff, Brown, Silt with Fine Sand - Moist	ML			
		☒	4	18			3-2-4 N=6		
	10								
	15	☒	5	18			3-3-4 N=7		
		☒	6	18			3-4-5 N=9		
	20				Boring terminated at 20 feet.				



Professional Service Industries, Inc.
5021-A West W.T. Harris Boulevard
Charlotte, NC 28269
Telephone: (704) 598-2234

PROJECT NO.: 05111011
PROJECT: Taco Bell # 314881
LOCATION: 10810 Woodland Beaver Road
Mint Hill, North Carolina

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-2

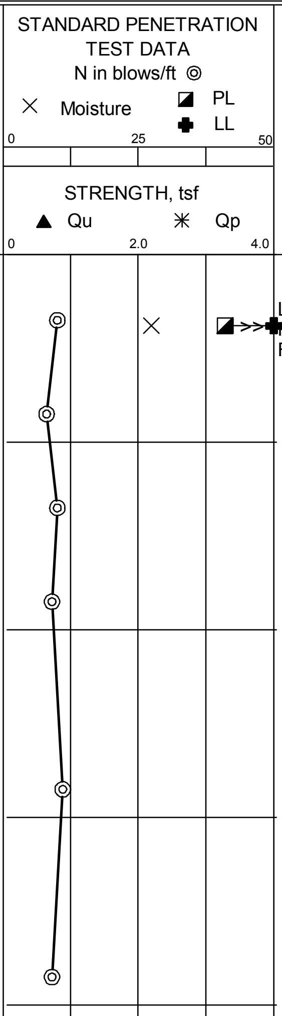
DATE STARTED: 6/15/20
DATE COMPLETED: 6/15/20
COMPLETION DEPTH 20.0 ft
BENCHMARK: N/A
ELEVATION: N/A
LATITUDE:
LONGITUDE:
STATION: N/A **OFFSET:** N/A
REMARKS: Borehole backfilled with the auger cuttings upon completion. CID = Cave-In Depth

DRILL COMPANY: FST
DRILLER: Brantley **LOGGED BY:** Steege
DRILL RIG: Diedrich D50T
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: 2-in SS, Standard
HAMMER TYPE: Automatic
EFFICIENCY N/A
REVIEWED BY: AOS

Water		
▽	While Drilling	None
▼	Upon Completion	Dry
▼	4 Hr Delay	Dry, CID=18 feet

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0	1	18	**RESIDUUM** - Stiff, Red/Tan, Fine Sandy Elastic SILT - Moist	MH	4-4-6 N=10	27	LL = 53 PL = 41 Fines = 75.0%
		2	18	Firm, Red/Tan, Fine Sandy SILT with Clay - Moist	ML	3-3-5 N=8		
	5	3	16	Stiff, Red/Brown/Tan, Fine Sandy SILT - Moist	ML	3-4-6 N=10		
		4	16			4-3-6 N=9		
	10							
		5	18			3-5-6 N=11		
	15							
		6	18			3-4-5 N=9		
	20			Boring terminated at 20 feet.				



PROJECT NO.: 05111011
PROJECT: Taco Bell # 314881
LOCATION: 10810 Woodland Beaver Road
Mint Hill, North Carolina

intertek psi
Professional Service Industries, Inc.
5021-A West W.T. Harris Boulevard
Charlotte, NC 28269
Telephone: (704) 598-2234

The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 6/15/20
DATE COMPLETED: 6/15/20
COMPLETION DEPTH 20.0 ft
BENCHMARK: N/A
ELEVATION: N/A
LATITUDE:
LONGITUDE:
STATION: N/A **OFFSET:** N/A
REMARKS: Borehole backfilled with the auger cuttings upon completion.

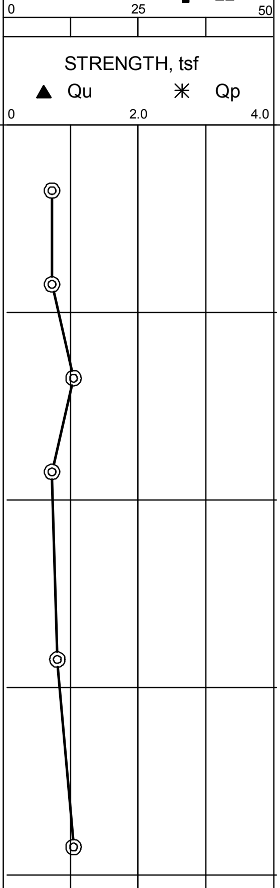
DRILL COMPANY: FST
DRILLER: Brantley **LOGGED BY:** Steege
DRILL RIG: Diedrich D50T
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: 2-in SS, Standard
HAMMER TYPE: Automatic
EFFICIENCY N/A
REVIEWED BY: AOS

BORING B-3

Water		
▽	While Drilling	None
▼	Upon Completion	Dry
▼	Delay	N/A

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL 0 25 50 STRENGTH, tsf ▲ Qu ✳ Qp 0 2.0 4.0	Additional Remarks
	0					**RESIDUUM** - Stiff, Tan/Brown, Fine Sandy SILT - Moist	ML				
				1	18			3-4-5 N=9			
				2	18			3-4-5 N=9			
	5										
				3	18			4-6-7 N=13			
				4	18			3-3-6 N=9			
	10										
				5	18			4-4-6 N=10			
	15										
				6	18			4-5-8 N=13			
	20					Boring terminated at 20 feet.					



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PROJECT NO.: 05111011
PROJECT: Taco Bell # 314881
LOCATION: 10810 Woodland Beaver Road
Mint Hill, North Carolina

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BORING B-4

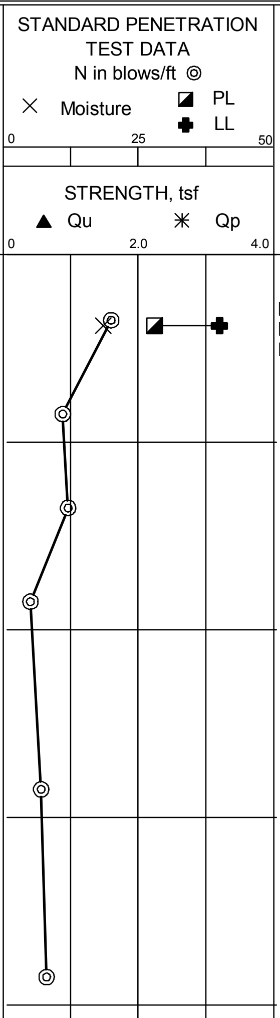
DATE STARTED: 6/15/20
DATE COMPLETED: 6/15/20
COMPLETION DEPTH 20.0 ft
BENCHMARK: N/A
ELEVATION: N/A
LATITUDE:
LONGITUDE:
STATION: N/A **OFFSET:** N/A
REMARKS: Borehole backfilled with the auger cuttings upon completion. CID = Cave-In Depth

DRILL COMPANY: FST
DRILLER: Brantley **LOGGED BY:** Steege
DRILL RIG: Diedrich D50T
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: 2-in SS, Standard
HAMMER TYPE: Automatic
EFFICIENCY N/A
REVIEWED BY: AOS

Water		
▽	While Drilling	None
▼	Upon Completion	Dry
▼	3 Hr Delay	Dry, CID=17 feet

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA	Additional Remarks
	0					**RESIDUUM** - Very Stiff, Tan/Orange, Fine Sandy SILT with Clay - Moist					
			☒	1	16		ML	6-9-11 N=20	19		LL = 40 PL = 28 Fines = 79.7%
						Stiff, Tan/Brown, Fine Sandy SILT - Moist					
			☒	2	18			4-5-6 N=11			
	5						ML				
			☒	3	16			3-6-6 N=12			
						Firm, Tan/Brown, SILT with Fine Sand - Moist					
			☒	4	18			2-3-2 N=5			
	10										
			☒	5	18		ML	3-3-4 N=7			
	15										
			☒	6	18			3-4-4 N=8			
	20					Boring terminated at 20 feet.					



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PROJECT NO.: 05111011
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DATE STARTED: 6/15/20
DATE COMPLETED: 6/15/20
COMPLETION DEPTH 20.0 ft
BENCHMARK: N/A
ELEVATION: N/A
LATITUDE:
LONGITUDE:
STATION: N/A **OFFSET:** N/A
REMARKS: Borehole backfilled with the auger cuttings upon completion. CID = Cave-In Depth

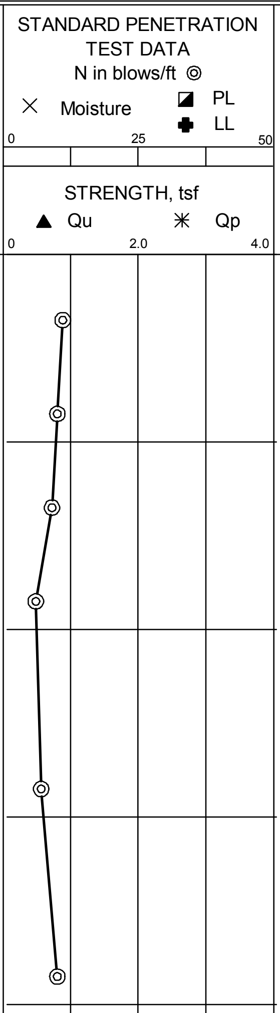
DRILL COMPANY: FST
DRILLER: Brantley **LOGGED BY:** Steege
DRILL RIG: Diedrich D50T
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: 2-in SS, Standard
HAMMER TYPE: Automatic
EFFICIENCY N/A
REVIEWED BY: AOS

BORING B-5

Water		
▽	While Drilling	None
▼	Upon Completion	Dry
▼	2 Hr Delay	Dry, CID=17 feet

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0					**RESIDUUM** - Stiff, Red/Tan, Fine Sandy SILT with Clay - Moist	ML			
				1	16			4-5-6 N=11		
				2	16			3-4-6 N=10		
	5									
				3	16	Stiff, Brown, Fine Sandy SILT - Moist	ML	3-4-5 N=9		
				4	18	Firm to Stiff, Brown, SILT with Fine Sand - Moist	ML	2-3-3 N=6		
	10									
				5	18			3-3-4 N=7		
	15									
				6	18			4-4-6 N=10		
	20					Boring terminated at 20 feet.				



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PROJECT NO.: 05111011
PROJECT: Taco Bell # 314881
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Mint Hill, North Carolina

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BORING B-6

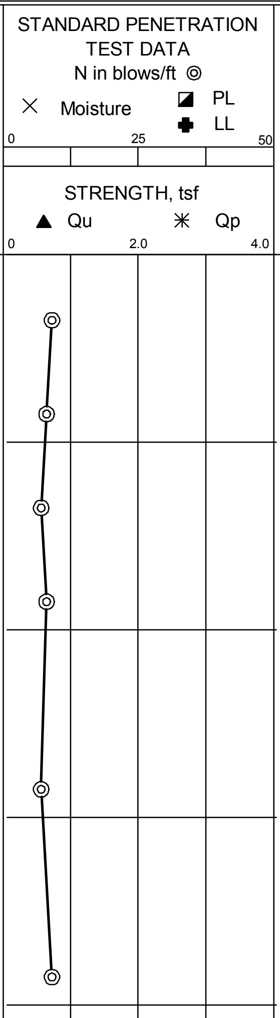
DATE STARTED: 6/15/20
DATE COMPLETED: 6/15/20
COMPLETION DEPTH 20.0 ft
BENCHMARK: N/A
ELEVATION: N/A
LATITUDE:
LONGITUDE:
STATION: N/A **OFFSET:** N/A
REMARKS: Borehole backfilled with the auger cuttings upon completion.

DRILL COMPANY: FST
DRILLER: Brantley **LOGGED BY:** Steege
DRILL RIG: Diedrich D50T
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: 2-in SS, Standard
HAMMER TYPE: Automatic
EFFICIENCY N/A
REVIEWED BY: AOS

Water		
▽	While Drilling	None
▼	Upon Completion	Dry
▽	Delay	N/A

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0					**RESIDUUM** - Stiff and Firm, Brown/Tan, SILT with Fine Sand - Moist				
			⊠	1	18			4-4-5 N=9		
			⊠	2	16			3-4-4 N=8		
	5									
			⊠	3	18			3-3-4 N=7		
			⊠	4	18			3-3-5 N=8		
	10						ML			
			⊠	5	18			3-3-4 N=7		
	15									
			⊠	6	18			3-3-6 N=9		
	20					Boring terminated at 20 feet.				



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PROJECT NO.: 05111011
PROJECT: Taco Bell # 314881
LOCATION: 10810 Woodland Beaver Road
Mint Hill, North Carolina

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DATE STARTED: 6/15/20
DATE COMPLETED: 6/15/20
COMPLETION DEPTH 20.0 ft
BENCHMARK: N/A
ELEVATION: N/A
LATITUDE:
LONGITUDE:
STATION: N/A **OFFSET:** N/A
REMARKS: Borehole backfilled with the auger cuttings upon completion.

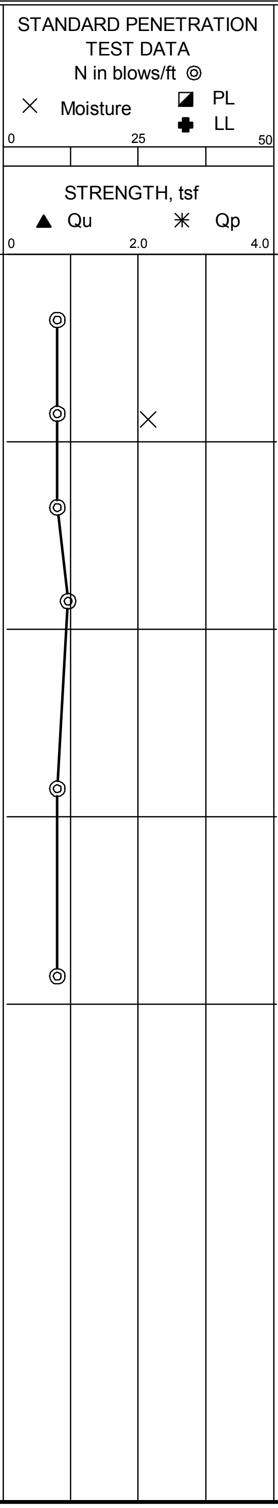
DRILL COMPANY: FST
DRILLER: Brantley **LOGGED BY:** Steege
DRILL RIG: Diedrich D50T
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: 2-in SS, Standard
HAMMER TYPE: Automatic
EFFICIENCY N/A
REVIEWED BY: AOS

BORING B-7

Water		
▽	While Drilling	None
▼	Upon Completion	Dry
▽	Delay	N/A

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0					**RESIDUUM** - Stiff, Red/Tan/Brown, Fine Sandy SILT - Moist				
			☒	1	18			4-4-6 N=10		
			☒	2	14			4-4-6 N=10	27	
	5									
			☒	3	16			3-4-6 N=10		
			☒	4	18			4-5-7 N=12		
	10						ML			
			☒	5	18			4-4-6 N=10		
	15									
			☒	6	14			5-5-5 N=10		
	20					Boring terminated at 20 feet.				



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