Report
Geotechnical Engineering Services
Proposed Starbucks
9030 West U.S. Highway 192
Kissimmee, Osceola County, Florida
PSI Project No. 07573224

Project Number: 07573224
March 5, 2024

Professional Service Industries, Inc.
1748 33rd Street, Orlando, FL 32839
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Mr. Randy Hodge
Executive Vice President
K&B Westside, LLC
5555 S. Kirkman Road
Suite 201
Orlando, Florida 32819

RE: Report
Geotechnical Engineering Services
Proposed Starbucks
9030 West U.S. Highway 192
Kissimmee, Osceola County, Florida

Dear Mr. Hodge:

In general accordance with our proposal dated February 12, 2024, **Professional Service Industries, Inc. (PSI), an Intertek company**, has carried out geotechnical engineering services in connection with the noted project. This report provides an overview of the field work completed by us for the assignment, plus it confirms recommendations for site preparation and foundation design.

PROJECT CONSIDERATIONS

The project is a proposed Starbucks facility to be built at the intersection of U.S. Highway 192 and Westside Boulevard in Kissimmee, Florida. The planned construction is to be located in a vacant lot, on the south side of US-192 and west of Westside Boulevard. The site is rectangular in shape occupying a plan area of approximately 0.94 acres with an existing Fifth Third Bank being present immediately to the east. Construction will include a one-story Starbucks building (1,359 square feet), plus pavement areas (parking and drive through lanes). A plan view of the proposed Starbucks is included on **Sheet 1**. We anticipate foundation loads being relatively light with shallow spread foundations being used for the support of the building with an at-grade slab used for the ground floor of the building.

It is our assumption that stormwater for the new construction is to be handled by the existing master drainage system for the overall property. The Architect for the project is requiring a project specific geotechnical report for the facility and requested two borings in the building footprint. Additionally, you requested that we perform two auger borings in the planned pavement areas while our drill rig was on site.

SCOPE OF WORK

Our scope of work on the project has included the following tasks.

- Drill/sample two Standard Penetration Test (SPT) borings in the building area. These borings were advanced to depths of 25 feet below existing grade.
- Drill/sample two 8-foot-deep auger borings in proposed pavement areas.
- Visually stratify the soil samples recovered from the borings in general accordance with the Unified Soil Classification System (USCS).
- Review data from the field to ascertain the impact of the prevailing conditions on the planned construction.
- Prepare and submit this geotechnical report for the project that transmits the factual data from the field plus provides recommendations for site preparation and foundation design. The recommendations have been directed at building and pavement areas of the project.

SITE CONDITIONS

The site of the proposed Starbucks facility is located at the southwest quadrant of the intersection of U.S. Highway 192 and Westside Boulevard in Kissimmee, Florida (south of US Highway 192 and west of Westside Boulevard). The site is rectangular in shape occupying a plan area of approximately 0.94 acres. A plan view of the Starbucks site is included on **Sheet 1**. At the present time the site is flat at a ground surface elevation unknown to us at this time. It appears that some filling may have been carried out at the site in the recent past.

A review of the SCS Soil Survey for Osceola County indicates that the surficial soils at the site are mapped as Group 16, Immokalee fine sand. The typical profile for this soil group is 80 inches of fine sands that grade clean to slightly silty and silty in composition (i.e. SP, SP/SM and SM materials). This surficial soil is hydrologic group A/D with the normal seasonal high groundwater level being present within one foot of the natural (pre-development) ground surface.

SUBSURFACE CONDITIONS

General

Subsurface conditions at the site were evaluated by drilling/sampling engineering borings at the site. This included performing two Standard Penetration Test (SPT) borings and two auger borings at the subject property. The SPT borings were drilled in the proposed building area and extended to depths of 25 feet below existing grade. The auger borings were generally drilled in proposed pavement/hardscape areas and advanced to depths of 8 feet below grade. The approximate locations at which the borings were drilled are shown on **Sheet 1**.

Soil samples recovered from the borings were returned to our Orlando office for visual stratification. Subsoils were visually stratified following guidelines contained in the Unified Soil Classification System. Records of the materials encountered in the borings are presented as soil profiles on **Sheet 2**. This sheet includes a legend describing the subsoils in USCS format.

Stratigraphy

A review of the soil profiles on **Sheet 2** indicates reasonably consistent subsoil conditions at the site. For the purpose of discussion, these conditions can be generalized as follows.

From the ground surface to depths in the range 8 to 25 feet below grade (depth interval of drilling), subsoils comprise a varying sequence of fine sands. These sands grade clean to slightly silty in composition (i.e. SP and SP/SM materials). Based on SPT blow counts, the sands in the building area are for the most part in a medium dense condition. Some of the upper soils are thought to comprise fill.

The observed subsoil conditions are in line with our experience of geologic conditions in this general area of Kissimmee.

Groundwater

Groundwater level measurements were made in most of the borings at the time of drilling. These measurements disclosed the groundwater at depths in the range 1.5 to 3.9 feet below grade. Water levels will fluctuate seasonally in response to rainfall or lack thereof. Consistent with the Soil Survey, we would expect the normal seasonal high groundwater to be within one foot of the pre-development/pre-filling ground surface.

SITE SUITABILITY

Based on the results of the borings, it is our opinion that the subsoil and groundwater conditions are suitable for development from a geotechnical engineering perspective. Shallow spread foundations can be used for building support. Such foundations should be based in compacted native soils or densified engineered fill. A design bearing value of 3,000 pounds per square foot (psf) can be used to size the foundations. An at-grade slab can be used for the ground floor of the building. Normal site preparation and construction should be considered for new pavement areas.

More detailed discussions related to site preparation matters and foundation design recommendations follow.

SITE PREPARATION CONSIDERATIONS

Site Clearing/Stripping

At the outset of construction, the site should be cleared/stripped of unwanted ground cover including the removal of organic-laden topsoil (if any), reestablished vegetation, plus the removal of conflicting construction that may be present in the area. Associated with the initial site clearing work, any conflicting buried foundations or unwanted utilities should be removed with the resultant excavations backfilled with compacted sand. At a minimum, it is recommended that the clearing/stripping operations extend at least ten feet beyond the proposed building perimeters, plus new pavement and hardscape areas, where possible.

Care should be exercised during initial site clearing activities so as not to disturb existing construction that is to remain. In particular, this work should be carried out so as not to undermine foundations, pavements, utilities or slabs that are to remain.

Initial site clearing and stripping work should be carried out under the observation of a representative from our office.

Subgrade Preparation

After general site clearing/stripping operations, the exposed subgrade should be compacted. This should be accomplished with a self-propelled vibratory roller. The subgrade should be thoroughly compacted to achieve at least 95 percent of the soil's modified Proctor maximum dry density to a minimum depth of 12 inches. Compaction can be completed in the vibratory or static mode in order to meet the minimum density requirements stated above. Based on past experience, we recommend compaction equipment be operated in the static mode within 75 feet of existing structures to reduce vibrations that could cause structural distress or disturb building occupants.

New hardscape areas should be similarly compacted to provide a stable/unyielding subgrade prior to placing any new fill. Fill soils (if required) can then be placed and compacted to a minimum of 95 percent of their modified Proctor maximum dry density (ASTM D-1557). If unstable/yielding soils are encountered during subgrade preparation operations, then such materials should be removed and replaced with clean sand fill that is thoroughly and uniformly compacted.

A representative of PSI should be retained to provide on-site observations and testing of the compaction and filling operations so that proper documentation of the required minimum compaction and compliance with the recommendations herein can be provided.

Engineered Fill

Any off-site fill imported for the project should consist of clean fine sand with less than 12 percent by dry weight passing the U.S. Standard No. 200 sieve and be free of rubble, organics, clay, debris and other deleterious material. Fill should be tested and approved prior to import and placement. Each lift should have a loose thickness not exceeding 12 inches. Density tests should be performed to confirm the required compaction is being achieved prior to placing the next lift.

Prior to beginning compaction, soil moisture conditioning may be required. Soil moisture contents should be controlled in order to facilitate proper compaction. A moisture content within two percentage points of the material's optimum indicated by the modified Proctor test (ASTM D-1557) is recommended prior to compaction of the natural ground and fill. All engineered fill should be compacted to at least 95 percent of the material's modified Proctor (ASTM D-1557) maximum dry density.

FOUNDATION DESIGN CONSIDERATIONS

General

Based on our evaluations and analyses, the soil conditions encountered in the borings performed for the project are considered capable of supporting the proposed building on shallow spread foundations following satisfactory completion of the subgrade preparation recommendations noted herein.

Shallow Foundations

Based on the anticipated construction and recommended site preparation, shallow foundations may be designed for a net allowable bearing pressure of 3,000 psf. The foundations and floor slabs should bear on properly placed and compacted cohesionless (sand) fills and/or densified native soils as discussed earlier. As an alternate to conventional foundations, consideration can be given to using a monolithic thickened edge slab foundation. This system should be designed/constructed to meet Code requirements.

All footings should be embedded so that the bottom of the foundation is a minimum of 18 inches below adjacent finished grade on all sides. Strip or wall footings should be a minimum of 18 inches wide, while column footings should be at least 3 feet by 3 feet. Monolithic thickened edge slab foundations should be dimensioned so as to meet Building Code requirements.

All foundation excavations should be observed by the geotechnical engineer or his representative to explore the extent of any fill, excessively loose, soft, or otherwise undesirable materials. If the foundation excavations appear suitable for support, the bottom of foundation excavations should be compacted after excavation. The subgrade soils should be compacted to a density requirement of at least 95 percent of the material's modified Proctor (ASTM D-1557) maximum dry density for a minimum depth of one foot below the bottom of footings, as determined by field density compaction tests. Backfill soils placed adjacent to footings or walls should be carefully compacted with a light, walk-behind roller or vibratory plate compactor to avoid damaging in-place footings or walls.

Settlement

Provided the recommended subgrade preparation operations presented herein are properly performed, total settlement should be on the order of one inch or less. Differential settlements should be approximately 50 percent of the total movements. These estimates are based on foundation loads being relatively light as noted earlier in this report. The settlement of shallow foundations supported on sandy soils should occur relatively quickly after initial loading. Thus, the majority of the expected settlement should occur during construction as dead loads are imposed.

OTHER CONSIDERATIONS

Floor Slabs

Floor slabs can be safely supported as slab-on-grade systems provided the final subgrade elevation is densified and prepared as recommended herein. We further recommend that the upper one foot of the subgrade soils within the building pad be compacted to at least 95 percent of the maximum dry density of the soil's modified Proctor (ASTM D-1557).

It is recommended that the floor slab bearing soils be covered by lapped polyethylene sheeting in order to minimize the potential for floor dampness which can affect the performance of floor coverings. This membrane should consist of a minimum six mil thick, single layer of non-corroding, non-deteriorating sheeting material placed to minimize seams and to cover all of the soil below the building floor slabs. Seams should be overlapped a minimum of 12 inches.

Based on the soil conditions encountered at the project site and the recommended site preparation requirements, the modulus of vertical subgrade reaction is expected to be on the order of 150 pounds per cubic inch (pci).

Earth Pressures on Walls

Retaining walls (if any) should be designed to resist pressures exerted by the adjacent soils and hydrostatic head. For walls that are not restrained during backfilling but are free to rotate at the top, active earth pressure should be used in design. Walls that are restrained should be designed assuming at-rest pressures. Recommended equivalent fluid densities for each pressure condition are presented below.

Active Pressure			At-Rest Pressure		
Above water table	-	35 pcf	Above water table	-	50 pcf
Below water table	-	80 pcf	Below water table	-	90 pcf

The recommended density/pressures presented herein assume that adequate drainage is provided behind the walls to prevent the build-up of excess hydrostatic pressures. This can be achieved by installing drains, using geotextiles or backfilling with free draining sand in association with adequate weep holes.

Pavement Considerations

A standard flexible pavement section can be used for the new pavement areas. Prior to construction of the pavements, the area should be prepared in a manner similar to that provided earlier for the building. A pavement section comprising the following should be suitable for car parking and other light duty pavement uses.

1.5 inches	-	Type SP Asphaltic concrete
6.0 inches	-	Limerock or crushed concrete basecourse, (LBR = 100 for limerock, LBR = 150 for crushed concrete)
8.0 inches	-	Stabilized subgrade, LBR = 40

The pavement section should be confirmed by the design engineer based on the soil and groundwater conditions noted herein and the Owner's design/traffic requirements. All pavement materials and construction should meet the more stringent of Florida Department of Transportation (FDOT) and local city/county requirements.

In the dumpster pad area, consideration can be given to using a concrete pavement section. Such a section should be designed to meet traffic/loading needs being jointed and reinforced as appropriate.

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, general construction 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 local, state, and federal safety regulations.

PSI is 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.

REPORT LIMITATIONS

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This company is not responsible for the conclusions, opinions or recommendations made by others based on these data.

The scope of the investigation was intended to evaluate soil conditions within the influence of the proposed building and pavement areas and does not include an evaluation of potential deep soil problems such as sinkholes. The analysis and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated. If any subsoil variations become evident during the course of this project, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed structure.

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our client.

CLOSURE

We appreciate the opportunity to be of service on this project and we trust that the foregoing and accompanying attachments are of assistance to you and the project team at this time. In the event that you have any questions or if you require additional information, please call.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.
Certificate of Authorization No. 3684

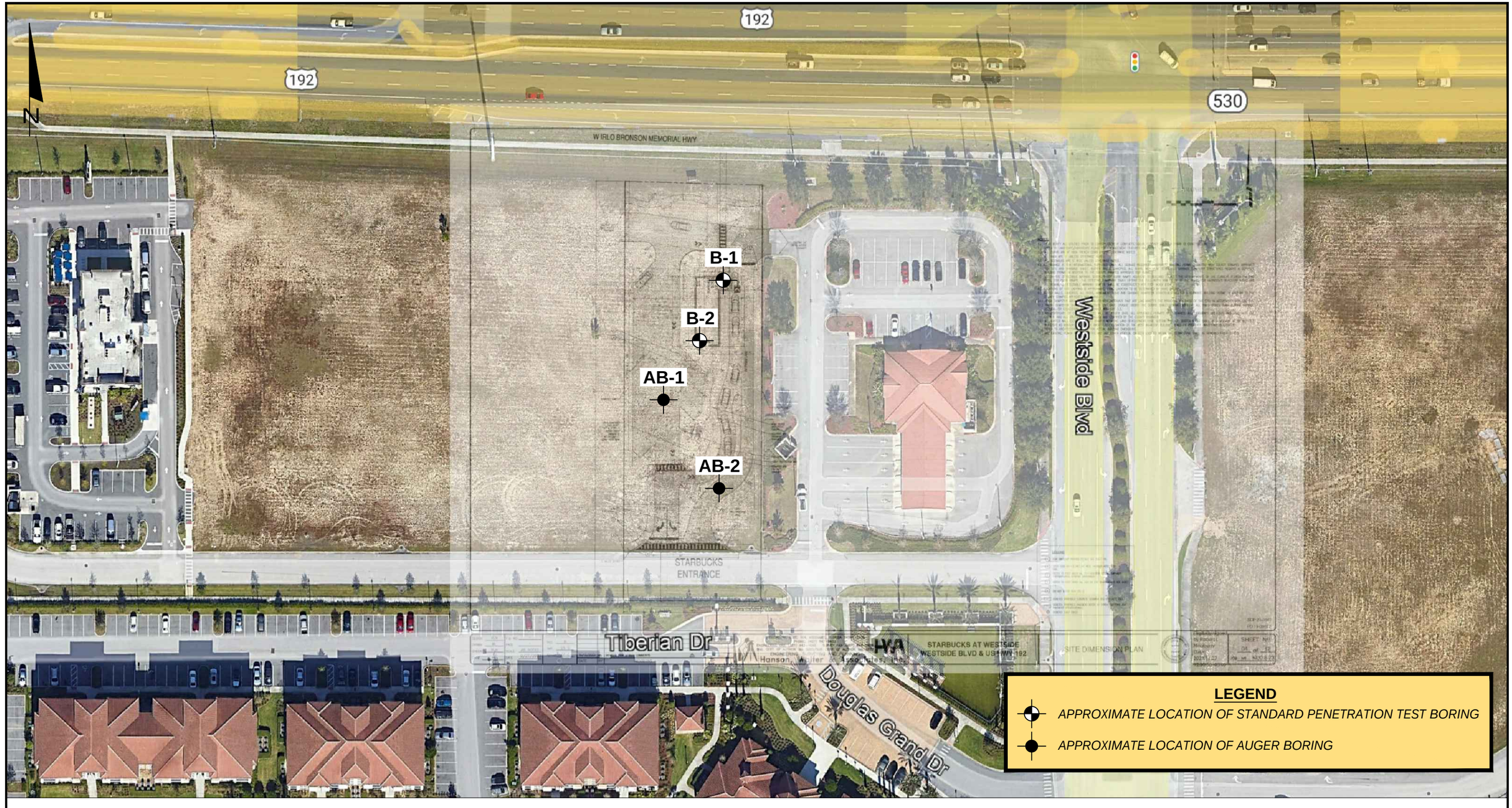
Max S. McGahan, P.E.
Senior Project Engineer
Florida License No. 86580

Ian Kinnear, P.E.
Chief Geotechnical Engineer
Florida License No. 32614

07573224 (Starbucks, US Hwy 192-Westside Blvd).doc

Attachments

- Sheets 1 and 2



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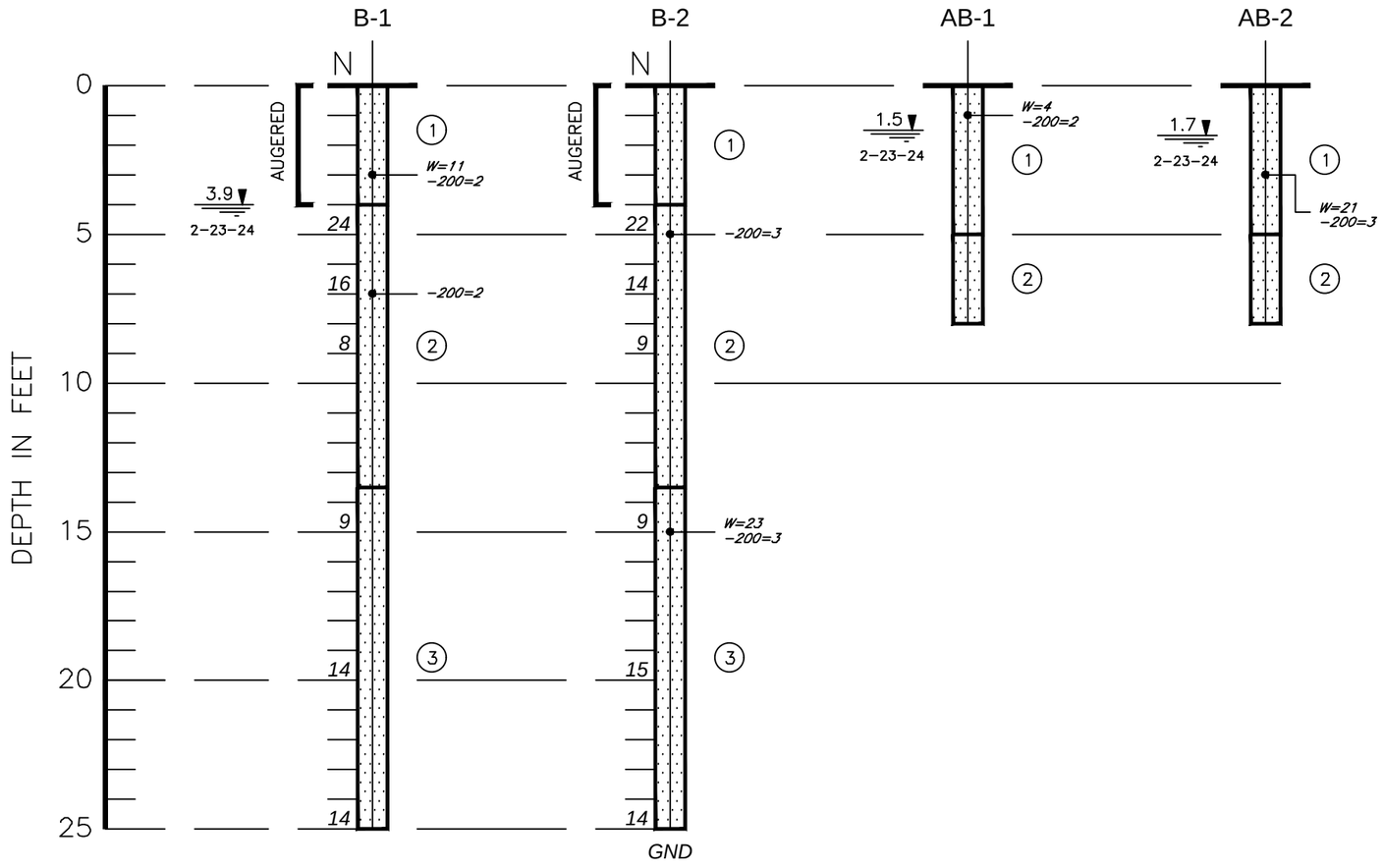
PROJECT NO. 07573224 SCALE: 1"=80' DATE CREATED: 2-27-24	intertek psi 1748 33rd Street Orlando, FL 32839 (407)304-5560 (407)304-5561 fax	GEOTECHNICAL ENGINEERING SERVICES **PROPOSED STARBUCKS** **9030 WEST U.S. HIGHWAY 192** KISSIMMEE, OSCEOLA COUNTY, FLORIDA	SHEET: 1 DRAWN: DJW CHECKED: MM



SOIL PROFILES

SCALE: 1"=5'

LEGEND

①	*LIGHT ORANGE TO BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP), (SP-SM)*
②	*LIGHT GRAY TO GRAY-BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP), (SP-SM)*
③	*DARK BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP), (SP-SM)*
(SP)	*UNIFIED SOIL CLASSIFICATION GROUP SYMBOL*
N	*STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT USING AN AUTOMATIC HAMMER*
1.5 ▼ 2-23-24	*DEPTH TO GROUNDWATER LEVEL IN FEET WITH DATE OF READING*
GND	*GROUNDWATER NOT DETERMINED*
W	*NATURAL MOISTURE CONTENT IN PERCENT*
-200	*FINES PASSING #200 SIEVE IN PERCENT*

PROJECT NO. 07573224	intertek psi	1748 33rd Street Orlando, FL 32839 (407)304-5560 (407)304-5561 fax	GEOTECHNICAL ENGINEERING SERVICES **PROPOSED STARBUCKS** **9030 WEST U.S. HIGHWAY 192** KISSIMMEE, OSCEOLA COUNTY, FLORIDA	SHEET: 2
SCALE: NOTED				DRAWN: DJW
DATE CREATED: 2-27-24				CHECKED: MM