GEOTECHNICAL ENGINEERING SERVICES
(GEOTECHNICAL EXPLORATION)

For

TACO BELL #315420
HAMMOCK RIDGE ROAD & U.S. 27
CLERMONT, FLORIDA

Prepared for

TACO BELL CORPORATION
1 GLEN BELL WAY
IRVINE, CALIFORNIA 92618

Prepared by

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DECEMBER 17, 2021

PSI PROJECT NO. 07572735

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Project Number: 07572735
December 17, 2021

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Mr. Chad Gornall
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1 Glen Bell Way
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Re: Geotechnical Engineering Services (Geotechnical Exploration)
Taco Bell #315420
Hammock Ridge Road & U.S. 27
Clermont, Florida 34711
PSI Project No. 07572735

Dear Mr. Gornall:

In accordance with Project Agreement for Architectural/Engineering/Consultant Services dated October 19, 2021, and your authorization, **Professional Service Industries, Inc. (PSI), an Intertek company**, has provided geotechnical engineering services for the above referenced project.

We appreciate you choosing PSI as your geotechnical consultant for this project. If you have any questions regarding the contents of this report, or if we can be of additional service, please contact us at your earliest convenience.

Respectfully submitted,
Professional Service Industries, Inc.
Certificate of Authorization No. 3684

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EXECUTIVE SUMMARY

PSI has completed geotechnical engineering services including a geotechnical exploration at the site of the referenced project for the future Taco Bell Restaurant (#315420) to be located at the northwest corner of the intersection of Hammock Ridge Road and U.S. 27 in Clermont, Florida. The project site consists of a 1.14+/- acre vacant parcel of land. The project will include the construction of a one-story Taco Bell restaurant building with paved parking and drive areas, plus a dumpster pad/enclosure. We understand stormwater for the project will be handled by an existing off-site system/facility from earlier development. The assessment was performed in general accordance with the scope of Yum! Brands, Inc.'s Guidelines for Environmental Assessments and Geotechnical Engineering Studies, dated August 2006, to comply with the Project Agreement for Architectural/Engineering/Consultant Services between Yum! Brands, Inc. and PSI, Inc. dated October 19, 2021.

This summary does not contain all the information that is found in the full report. The report should be read in its entirety to obtain a complete understanding of the information provided, and to aid in any decisions made or actions taken based on this information.

1. The site under consideration is located at the northwest corner of the intersection of Hammock Ridge Road and U.S. Highway 27 in Clermont, Florida. The site is currently a vacant tract of land that has been rough graded with a relatively flat main pad area. The site is slightly elevated compared to Hammock Ridge Road to the south and U.S. 27 to the east. Current groundcover at the site consists of exposed sands and low grass/vegetation.

2. Subsurface conditions encountered in our borings at the site are reasonably consistent and comprise relatively clean to slightly silty/clayey, silty and occasionally clayey fine sands (i.e. SP, SP-SM, SP-SC, SM and SC materials) from the existing ground surface to the boring termination depths of 20 feet below the existing ground surface. Groundwater was not encountered within the upper 10 feet of the borings at the time of drilling. Below a depth of 10 feet in SPT borings, the use of drilling fluid for borehole stabilization prevents the accurate measurement of groundwater levels.

3. Based on the results of our borings and laboratory testing, the site is generally considered suitable for the planned Taco Bell construction from a geotechnical engineering perspective provided the site is prepared as recommended herein prior to foundation and pavement construction.

4. Shallow spread foundations and a slab-on-grade bearing on compacted engineered fill or compacted native sands can be used for the new building provided the site preparation recommendations noted herein are implemented. The foundations can be sized for a net allowable bearing pressure of 2,500 pounds per square foot (psf).

Detailed analyses of subsurface conditions, foundation types and pertinent design recommendations are included herein. The final decision as to which foundation type will be used should be based on the design parameters provided, costs, risk of foundation movement, and other factors beyond the scope of this study. PSI cannot be responsible for the interpretation or implementation of this report by others. PSI should be retained to perform services sufficient to determine compliance with its recommendations. If PSI is not so retained, it will not accept any responsibility for the performance of the structure.

SUMMARY OF RECOMMENDATIONS		
Design Item	**Recommended Parameter**	**Report Page No.**
Foundations:		
Allowable Bearing Pressure Spread Footing Wall Footing	 2,500 psf 2,500 psf	9
Building Foundation Type	Spread footing	9
Bearing Materials	Engineered Fill/Compacted Subgrade	13
Coefficient of Friction	0.4	9
Soil Expansion Potential	N/A	10
Geologic Hazards:		
Liquefaction Potential	N/A	N/A
Nearest Fault and Magnitude	N/A	N/A
Fault Type	N/A	N/A
Seismic Design Category	A	7
Subsurface Site Classification	D	7
Near-Source Distance	N/A	N/A
Seismic Coefficient, F_A	1.6	7
Seismic Coefficient, F_V	2.4	7
Pavement:		
Light Traffic/Parking Stalls (Flexible)	1.5” Asphaltic Concrete 6.0” Aggregate Base Course 12.0” Stabilized Subgrade	11
Heavy Traffic/Roadways (Flexible)	2.0” Asphaltic Concrete 8.0” Aggregate Base Course 12.0” Stabilized Subgrade	11
Slabs:		
Building Floor Slabs	On Engineered Fill/Compacted Subgrade	13
Modulus of Subgrade Reaction	150 pci	10
Existing Site Conditions:		
Existing Fill (Estimated from Borings and limited topographic information)	On the order of 2 feet or less	3
Groundwater Depth (Estimated Seasonal High)	Greater than 6 feet below the existing ground surface	9
Estimated Cut and Fill	Minimal	4
Existing Underground Structures	N/A	N/A
Existing Aboveground Structures	N/A	N/A

1. INTRODUCTION

1.1 Authorization

Authorization to perform this assessment was given by Mr. Chad Gornall, on November 16, 2021 and performed in general accordance with the Project Agreement for Architectural/Engineering/Consultant Services, between Taco Bell of America, Inc. and PSI.

1.2 Purpose and Scope of Work

The purpose of this evaluation was to determine the geotechnical engineering parameters for the site. All work was conducted in accordance with Yum! Brands, Inc. Guidelines for Environmental Assessments and Geotechnical Engineering Studies, dated August 2006.

The scope of the evaluation included a subsurface exploration, field and laboratory testing, engineering analysis and evaluation of the foundation materials.

1.3 Site Location

The site is located at the northwest corner of the intersection of Hammock Ridge Road and U.S. Highway 27 in Clermont, Florida. The site is bordered by U.S. Highway 27 to the east, Hammock Ridge Road to the south, and an Action Gator Tire store to the west. To the north of the site is a sloped earth embankment with a church property being at the top of the embankment (i.e. the subject site is at the toe of the earthen slope).

1.4 Site Description and Conditions

The site is a vacant parcel of land that has been rough graded. Based on our review of historical aerial images available through Google Earth Pro, it appears that the site was formerly occupied by planted pines that were cleared sometime in the mid to late 2000's with the general area been graded and Hammock Ridge Road being constructed shortly thereafter. For the most part, the site is relatively flat. As previously discussed, an existing sloped embankment to a church property (at a higher elevation) is present in the northern portion of the site. At the southerly and easterly limits of the property, the site slopes down to the grades of Hammock Ridge Road and U.S. Highway 27, respectively. A generalized plan of the site is included on **Sheet 1** of the **Appendix**.

1.5 Previous Geotechnical Data

We were not provided with any information on previous geotechnical evaluations performed at the site.

1.6 Review of Published Data

1.6.1 USGS Quadrangle Map

Based on our review of the USGS Quadrangle Map titled "Clermont East, Florida", the natural ground surface elevation in the project vicinity is ranging from +135 to +150 feet, National Geodetic Vertical Datum of 1929 (NGVD). Refer to **Figure 1** for an excerpt of the referenced map. A review of the site-specific topographic data provided to PSI indicates elevations in the proposed development areas to be on the order of +119 to +123 feet, North American Vertical Datum of 1988 (NAVD88) (approximately +120 to +124 feet NGVD). Based on the noted survey data, the northerly embankment appears to have a slope of 2H:1V.

1.6.2 Orange County Soil Survey

The "Soil Survey of Lake County, Florida", published by the USDA SCS and as contained on the Web Soil Survey (WSS), was reviewed for general near-surface soil information within the general project vicinity. An excerpt of the SCS soil map for the project site is included on **Figure 2**. This information indicates two soil map units at the project site. A brief description of the mapped soil groups is provided below.

8 – Candler fine sand, 0 to 5 percent slopes consists of nearly level to strongly sloping, excessively drained soils that are sandy throughout. Slopes are 0 to 5 percent. A seasonal high water table is reported at a depth of more than 80 inches below natural grade.

9 – Candler fine sand, 5 to 12 percent slopes consists of nearly level to strongly sloping, excessively drained soils that are sandy throughout. Slopes are 5 to 12 percent. A seasonal high water table is reported at a depth of more than 80 inches below natural grade.

The site is predominately mapped as Soil Group 9 with Soil Group 8 being mapped in the very northwest corner of the site.

2. PROJECT DESIGN DATA

2.1 Development Plans

Based on project plans and information provided to PSI, the new development is to include the construction of a new, single-story Taco Bell restaurant (End 20 layout) with drive-thru, plus parking and drive areas, and a dumpster pad with enclosure. New construction is expected to be finished at grades/elevations similar to that of the existing rough graded pad area (i.e. little to no additional fill is anticipated). The proposed dumpster pad and enclosure as shown on the plans will encroach slightly into the northerly earthen embankment area. We understand stormwater for the site will be handled by existing off-site facilities associated with previous adjacent development.

2.2 Structure Types

We were not provided with specific structure information, however, based on previous Taco Bell projects, we assume the building will be a masonry structure with a truss roof system supported on the exterior foundations only. We also assume that columns along the front of the building, which support beams and headers, will be concealed within longitudinal exterior walls.

2.3 Foundation Loads

Structural loading information was not available at the time of this report. However, based on our experience with other Taco Bell restaurants and similar projects, we assume the maximum structural loads on longitudinal (side) bearing walls are less than 2,500 pounds per lineal foot (plf).

2.4 Grading and Slopes

At the time of this report, no final grading plans were made available to PSI. However, we have assumed the final grade for the most part will be at or near the existing site grades (currently on the order of +119 to +123) with little to no fill being required for the project. If this information is incorrect, please notify the geotechnical engineer so that he may determine if changes in the foundation recommendations are required. No significant slopes are anticipated.

2.5 Pavement

Depending on the site conditions/pavement use, either of two types of pavements may be used: Flexible Asphalt Concrete (AC) surfaced pavement; or Rigid Portland Cement (PC) Concrete pavement. The structural section design shall be based on a ten-year design period to determine pavement thickness and subgrade preparation requirements. In boring B-3 drilled in a proposed pavement area, a buried layer of clayey fine sand was present in the depth interval 2 to 4 feet below existing grade. Due to the poor drainage characteristics of clayey fine sands, we recommend these soils be locally removed and replaced with cleaner, more well-draining sands (i.e. engineered fill or suitable on-site soils) to provide at least 24 inches of clearance from the bottom of pavement base to the clayey fine sands (to promote subgrade drainage).

Pavement structural sections are to be designed according to American Association of State Transportation and Highway Official (AASHTO) standards, Portland Cement Association (PCA) procedures, or applicable design procedures used by local government or State Transportation Department. Repeated stopping and starting motions should be taken into account during the design.

3. SUBSURFACE INVESTIGATION

3.1 Soil Borings

To evaluate subsurface conditions at the site, we drilled/sampled six (6) Standard Penetration Test (SPT) borings to depths of 20 feet below existing grade across the site. The borings were completed at the approximate locations shown on **Sheet 1** of the **Appendix.**

Standard Penetration Tests were performed in accordance with ASTM D-1586. The upper 4 feet of each SPT boring was augured by hand to confirm clearance from shallow buried utilities. Beginning at 4 feet below the existing ground surface, split spoon samples were collected at 2-foot intervals to 10 feet and on 5-foot centers thereafter. In all SPT borings, mud-rotary wash procedures were used to advance drilling below a depth of 10 feet. The SPT borings were completed using a truck-mounted drill rig equipped with an automatic hammer.

Existing groundcover at the boring locations consisted of mostly exposed sands with low vegetation (grass, weeds, etc.). Upon completion of drilling operations, the boreholes were backfilled

Samples from the borings were transported to our Orlando laboratory for visual classification. The samples were identified with the boring number and depth and sealed in glass jars to protect against moisture loss.

The soils encountered in the borings are presented in to form of boring logs on **Sheet 2** of the **Appendix**.

3.2 Field Testing

3.2.1 Strength Tests

Throughout the proposed development areas, Standard Penetration Tests were performed at sample depths beginning at 4 feet below the existing ground surface.

3.2.2 Water Level Measurements

At the time of our field work (November 30, 2021), groundwater was not encountered within the upper 10 feet of the borings. Below a depth of 10 feet in SPT borings, the use of bentonite drilling slurry for borehole stabilization prevents the accurate measurement of groundwater levels. Seasonal variations, land-use, irrigation practices, proximity to water bodies and recent rainfall conditions may influence the depth of the groundwater levels.

3.2.3 Ground Surface Elevations

Based on interpolation of the provided site-specific topographic information, ground surface elevations at the test boring locations are understood to be on the order of +119 to +122 feet NAVD88. References to depths of the various soil strata encountered are from existing grade at the time of our drilling operations.

3.3 Laboratory Testing

A limited laboratory testing program was carried out consisting of visual classification (ASTM D-2487) of the soil samples obtained from our borings, along with U.S. Standard No. 200 sieve analyses (ASTM D-422) and moisture content determinations (ASTM D-2216) of select samples. Laboratory testing was conducted in general accordance with applicable ASTM Specifications. The results of the laboratory tests are provided on the individual boring logs on **Sheet 2** and are also summarized in **Table 1** of the **Appendix**.

4. FINDINGS AND INTERPRETATION

4.1 Regional and Local Geology

Lake County is underlain by the Eocene Ocala Limestone. These sedimentary deposits typically are very fine or fine grained, are chalky and porous, and have a cream color. These limestone units contain many large foraminifera and abundant mollusks. The surface is irregular because of the dissolution of the limestone. The sedimentary deposits that are immediately underlain by the upper Eocene limestone units are of the Hawthorn Group. The highly variable, diverse, lithologic character of the Hawthorn Group includes interbedded and interfingering sand, clayey sand, sandy clay, phosphatic sediment, dolomite and limestone. Overlying the Hawthorn group in the area of interest within Lake County is the Cypresshead Formation which consists of quartz sands ranging from fine to very coarse materials that are moderately to well sorted. Clay is present is very minor amounts and is typically kaolinite. Colors range from reddish orange in exposed sections to olive gray in the subsurface.

PSI's scope of work included an assessment of sinkhole risk based on a desktop review of readily available geologic information. Based on our review and our experience in Central Florida, it is our opinion the project site falls within an area of general high sinkhole risk. Further information obtained from sinkhole maps on the Florida Geologic Survey's (FGS) website indicates that the project area is in a portion Central Florida consisting mainly of cohesive clayey sediments of low permeability (Area III). Sinkholes are most numerous, of varying size and develop abruptly. Cover-collapse sinkholes dominate. According to FGS data, the nearest reported subsidence incident to the site occurred in a residential neighborhood approximately 0.85 miles to the southwest. If desired by the Owner, commercial sinkhole insurance is available to cover risk of ground subsidence due to karst geology/sinkhole activity.

4.2 Seismicity

We understand the project site is located within a municipality that employs the 2020 Florida Building Code which is based on the 2018 edition of the 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 have 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 on our evaluation and experience in the project vicinity, the subsurface conditions within the site are consistent with the characteristics of a Site Class "D" as defined in Chapter 20 of ASCE 7. The associated IBC probabilistic ground acceleration values and site coefficients for the general site area were obtained from the ATC Hazards by Location online tool: https://hazards.atcouncil.org/. The seismic values and coefficients are presented in the table that follows.

Period (sec)	Mapped MCE Spectral Response Acceleration		Site Coefficients		Site-modified Spectral Response Acceleration		Numeric Seismic Design Value	
0.2	S_s	0.076	F_a	1.6	S_{Ms}	0.121	S_{Ds}	0.081
1.0	S_1	0.037	F_v	2.4	S_{M1}	0.09	S_{D1}	0.06

The project site is classified as a Seismic Design Category A for probable seismic activity. On this basis, it is expected that this site has a low potential for seismic activity.

4.3 Subsurface Soil Conditions

4.3.1 General

The soil samples recovered from the borings were returned to our Orlando laboratory for visual stratification. Subsoils were visually stratified following the guidelines contained in the Unified Soil Classification System (USCS). Records of the materials encountered in the borings are presented as soil profiles on **Sheet 2**. **Sheet 2** include a legend describing the subsoils in USCS format and laboratory test results.

The stratification presented is based on visual observation of the recovered soil samples, laboratory testing and interpretation of field logs by a geotechnical engineer. It should be noted that variations in the subsurface conditions are expected and may be encountered between and away from the borings. Also, whereas the individual boring logs indicate distinct strata breaks, the actual transition between the soil layers may be more gradual than shown on the soil profiles.

4.3.2 Soil Conditions

The site was explored by drilling six (6) soil test borings. The following summarizes the boring locations:

Boring Number	Existing Groundcover	General Location/Planned Construction
B-1	Vacant, graded land with exposed sands and low vegetation	SW Building Corner
B-2	Vacant, graded land with exposed sands and low vegetation	NE Building Corner
B-3	Vacant, graded land with exposed sands and low vegetation	Pavement
B-4	Vacant, graded land with exposed sands and low vegetation	Pavement
B-5	Vacant, graded land with exposed sands and low vegetation	Dumpster Pad
B-6	Vacant, graded land with exposed sands and low vegetation	Drive Thru Lane

In general, subsurface conditions at the site are reasonably consistent and comprise a varying sequence of fine sands in the depth interval drilled (20 feet below the existing ground surface). The sands grade relatively clean to slightly silty/clayey, silty and occasional clayey in composition (i.e. SP, SP-SM, SP-SC, SM and SC materials). The clayey fine sand was disclosed in an isolated zone from 2 to 4 feet below grade in boring B-3.

Based on the recorded Standard Penetration Test (SPT) N-values, the soils are generally in a loose to medium dense condition.

4.4 Groundwater Conditions

As previously noted, groundwater was not encountered in the upper 10 feet of the borings at the time of drilling (November 30, 2021). Below a depth of 10 feet in SPT borings, the use of bentonite drilling slurry to for borehole stabilization prevents the accurate measurement of groundwater levels.

Based on our review of the USDA Soil Conservation Service (SCS) "Soil Survey of Lake County, Florida", the results of the borings performed by PSI, and our experience in the project vicinity, we estimate the normal seasonal high groundwater level will occur at a depth greater than six feet below the current ground surface at the site (generally at an elevation lower than +113 feet NAVD88). Temporary perching of groundwater can occur atop the less-permeable silty and clayey soils following periods of heavy or prolonged rainfall.

In general, the normal seasonal high groundwater level is not intended to define a limit or ensure that future seasonal fluctuations in groundwater levels will not exceed the estimated levels. Groundwater conditions will vary with environmental changes and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences, such as swales, drainage ponds, underdrains and areas of covered soil (buildings, paved parking lots, sidewalks, etc.).

5. ENGINEERING RECOMMENDATIONS

5.1 Special Conditions and Mitigating Measures

Based on the results of our borings and our understanding of the proposed construction, we anticipate normal site preparation for the majority of the site. As previously discussed, a buried layer of clayey fine sand (Stratum 5) was encountered from 2 to 4 feet below existing grade in boring B-3 corresponding to a proposed pavement area. Due to the poor drainage characteristics of clayey fine sands, we recommend these soils be locally removed and replaced with cleaner, more well-draining sands (i.e. engineered fill or Stratum 1 soils or Stratum 3 soils) to provide at least 24 inches of clearance from the bottom of pavement basecourse to the clayey soils (to promote subgrade drainage).

5.2 Foundation Design

5.2.1 Proposed Structure

We understand that a shallow spread footing foundation system is the preferred foundation type for the proposed restaurant structure. Therefore, after the soils in the building area have been prepared as discussed in Section 5.9, the footings should be based at a depth of at least 18 inches below the final grade. The footings should be designed for a maximum allowable net bearing pressure of 2,500 psf. An allowable coefficient of friction of 0.4 between the base of the foundation elements and underlying compacted soil is recommended.

Based on the anticipated construction and recommendations provided herein, we expect foundation settlements to be within normal structural tolerances (i.e. total settlements not exceeding one inch, with differential settlements of one-half inch or less). The tolerance of the structure to the predicted settlement should be confirmed by the project structural engineer.

5.2.2 Proposed Dumpster Pad/Trash Enclosure

For the dumpster pad/trash enclosure, spread footings founded in compacted sands may be designed for a maximum net allowable bearing pressure of 2,500 psf. The footings should bear a minimum of 18 inches below finished grade. Where the enclosure area encroaches into the existing northerly embankment, the structure should be properly reinforced to carry any surcharge or lateral loads from the noted embankment to remain (if the enclosure itself will act as a retaining wall).

5.3 Concrete Slabs-on-Grade

Floor slabs utilized in conjunction with a continuous wall foundation system may consist of a soil-supported slab-on-grade. We recommend interior floor slab subgrade soils be covered with a vapor barrier (such as visqueen, normally 6 mm thick) before constructing the slab. The seams should be overlapped at least 12 inches. The slab should be adequately reinforced to carry the loads that are to be applied. The floor slab design, if based on elastic methods, should employ a modulus of subgrade reaction of 150 pounds per cubic inch (pci). To help avoid potential problems with cracking because of differential loadings, the floor slab should be liberally jointed and separated from columns and walls.

5.4 Expansive Soils

We did not encounter any expansive soils at the site. The slightly clayey and clayey fine sands encountered in the borings are generally non-plastic to very low-plasticity materials.

5.5 Lateral Earth Pressures

Based on the site development plan, we understand the proposed dumpster enclosure may encroach into the northerly embankment. While no detailed grading plans around the dumpster enclosure were available to PSI, we anticipate the enclosure structure may potentially need to retain the embankment areas to remain.

Recommended soil parameters for the near-surface granular soils encountered at the site and clean sand backfill are presented below.

Total Unit Weight, γT	=	120 lb/ft^3
Angle of Internal Friction, ϕ	=	30°
Coeff. of Sliding Friction	=	0.40
Active Soil Pressure coeff., Ka	=	0.33
At-rest Soil Pressure coeff., Ko	=	0.50
Passive Soil Pressure coeff., Kp	=	3.00

The recommended parameters assume that adequate drainage is provided behind the wall to prevent the buildup of excess hydrostatic pressures. The design should incorporate hydrostatic effects and any surcharge loads that may be placed behind the wall. In order to avoid wall damage due to excessive compaction, hand operated mechanical tampers should be used to densify backfill soils; heavy compaction equipment should not be allowed within five feet of wall. The soils behind the wall should be compacted to approximately 95 percent of the material's modified Proctor (ASTM D-1557) maximum dry density.

It is our assumption that the actual design of the retaining wall(s) will be by others using the parameters provided herein. In the event that there are any questions on the parameters, please do not hesitate to contact us.

5.6 Slopes

Permanent slopes should be graded 1 vertical to 3 horizonal (1V:3H) or flatter for stability and maintenance.

5.7 Excavation Dewatering

Dewatering is not anticipated for the site. However, depending on the time of year of construction and depth of excavations, dewatering may be required. Excavations that are only a few feet below the water table can typically be dewatered with a sump pump. Deeper excavations may require well pointing or sock drains. In either case, water should be maintained at least 2 feet below the bottom of surfaces to be compacted in any given area.

Because the foundation materials generally tend to loosen when exposed to free water, every effort should be made to keep excavations dry if water is encountered or if stormwater runoff enters the excavation. Water should not be allowed to collect in the foundation excavations. Sloping excavations to one corner will aid in removal of accumulated surface runoff. Dewatering systems should be designed and operated in accordance with applicable Water Management District requirements.

5.8 Pavement Design

The conditions that will influence the pavement design can be summarized as follows:

- Bearing values of the subgrade. These can be represented by a Limerock Bearing Ratio (LBR) for the design of flexible pavements, or a Modulus of Subgrade Reaction (K) for rigid pavements.
- Vehicular traffic, in terms of the number and frequency of vehicles and their range of axle loads.
- Probable increase in vehicular use over the life of the pavement.
- The availability of suitable materials to be used in the construction of the pavement and their relative costs.

The following flexible pavement sections have been used successfully on similar projects in this geographic area, provided a minimum separation of 18 inches is maintained between the bottom of pavement basecourse and the estimated normal seasonal high groundwater table. The pavement design values should be considered the minimum recommended thickness based on past experience with similar projects.

For light and heavy-duty uses, the minimum pavement sections are recommended to be as follows:

Light-Duty Pavement Option (Car Parking)		
Asphalt:	Type SP	1.5 inches
Basecourse:	Limerock (LBR = 100) compacted to 98 percent of its Modified Proctor maximum dry density (ASTM D1557)	6 inches
Compacted Subgrade:	Stabilized Subgrade (LBR = 40)	12 inches
Heavy-Duty Pavement Option (Service Roads/Entrance Lanes / Drive Thru Lanes)		
Asphalt:	Type SP	2 inches
Basecourse:	Limerock (LBR = 100) compacted to 98 percent of its Modified Proctor maximum dry density (ASTM D1557)	8 inches
Compacted Subgrade:	Stabilized Subgrade (LBR = 40)	12 inches

We have also provided the following pavement sections that meet Taco Bell minimum pavement requirements.

Light-Duty Pavement Option (Car Parking)		
Asphalt:	Type SP	3 inches
Basecourse:	Limerock (LBR = 100) compacted to 98 percent of its Modified Proctor maximum dry density (ASTM D1557)	6 inches
Compacted Subgrade:	Stabilized Subgrade (LBR = 40)	12 inches
Heavy-Duty Pavement Option (Service Roads/Entrance Lanes/ Drive Thru Lanes)		
Asphalt:	Type SP	6 inches
Basecourse:	Limerock (LBR = 100) compacted to 98 percent of its Modified Proctor maximum dry density (ASTM D1557)	6 inches
Compacted Subgrade:	Stabilized Subgrade (LBR = 40)	12 inches

We recommend that the upper 12 inches of the subgrade soils be compacted to a minimum of 98 percent of their Modified Proctor maximum dry density (ASTM D1557). If the soils at the pavement subgrade level cannot be compacted to a stable unyielding condition, then they should be removed and replaced with clean compacted engineered fill. The moisture content at the time of compaction should be within 2 percentage points of the material's optimum value.

The use of concrete for paving has become more prevalent in recent years due to a decrease in the material cost of concrete and the long-term maintenance cost benefits of concrete compared to asphaltic pavements. Rigid (concrete) pavements could also be used for driveway, loading, and dumpster approach areas. Should concrete pavement be utilized, the concrete should be properly reinforced and jointed in accordance with ACI standards and should have a minimum 28-day compressive strength of 4000 psi. Concrete pavement at least eight (8) inches thick is recommended for the entrance drives and dumpster approach due to the high wheel and impact loads that these areas receive. A minimum of six (6) inches of concrete pavement is recommended in the drive-thru lane. Expansion joints should be sealed with a polyurethane sealant so that moisture infiltration into the subgrade soils and resultant concrete deterioration at the joints is reduced.

Grades should be set such that a minimum separation of 18 inches is provided between the estimated normal seasonal high groundwater table and the bottom of the pavement base materials and concrete pavements. Allowances for proper drainage and proper material selection of base materials are most important for performance of asphaltic pavements. Ruts and birdbaths in asphalt pavement allow for quick deterioration of the pavement primarily due to saturation of the underlying base and subgrade. Concrete pavement is recommended in areas which receive continuous repetitive traffic such as drive-through or loading lanes and parking lot entrances.

Pavement materials and placement criteria should comply with the more stringent of governing City/County requirements and Florida Department of Transportation (FDOT) guidelines and specifications.

Yum Brands "Hot Mix Asphalt Pavement" guidelines are also included in the Appendix.

5.9 Site Clearing and Preparation

The entire construction area, including a minimum margin of 5 feet beyond the perimeter of proposed building and pavement areas wherever practical, should be cleared to remove all surface vegetation, topsoil, roots and other deleterious material. The stripped subgrade should then be proof rolled using a vibratory compactor making a minimum of 10 overlapping passes across the subgrade until the soils to a depth of 12 inches are compacted to a minimum of 95 percent of their modified Proctor maximum dry density (ASTM D-1557). Once the subgrade soils are properly compacted, the engineered fills should then be placed, as required to reach desired grades and be compacted to a minimum of 95 percent of their Modified Proctor maximum dry density (ASTM D1557). Compaction should be achieved by a heavy vibratory roller. Based on experience, vibratory rollers should not be used in the vibratory mode within 75 feet of any existing structures without vibration monitoring.

In building, parking, and drive areas, the final subgrade should then be proof rolled to detect zones of loose, soft and/or wet soils. Areas which rut or pump excessively should be undercut and replaced with properly compacted engineered fill. Engineered fill should be placed in accordance with the guidelines and procedures found in the following paragraphs.

Since grading plans have not been provided at this time, we recommend PSI review the plans prior to construction to check that our recommendations have been implemented properly.

We recommend that all engineered fill required for the project be compacted to a minimum of 95 percent of the soil's Modified Proctor maximum dry density (ASTM D1557), with a moisture content within 2 percentage points of the optimum moisture. This compaction criterion should be tested for a minimum depth of two feet below foundations and floor slabs. Lift thickness should be 12 inches or less, loose measure. Engineered fill soils should have a fines content of less than 12 percent by dry unit weight passing the U.S. Standard No. 200 sieve, and be free of organics, clay, debris or other deleterious materials.

It will be important to maintain positive site drainage during construction. Stormwater runoff should be diverted around the building and parking areas. The site should be graded at all times such that water is not allowed to pond. If any surface soils become excessively wet due to rains, they should be removed or allowed to dry prior to further sitework operations and/or fill placement.

Fill placement should be monitored and tested during construction by qualified engineering technicians. Field density tests should be conducted as required to document compaction requirements with a minimum of 5 tests conducted for every lift of fill placed. Any area failing to achieve both the required compaction and moisture requirements should be recompacted and/or moisture conditioned and retested.

6. REPORT LIMITATIONS

The recommendations submitted in this report are based on the available subsurface information obtained by PSI and design details furnished by Taco Bell for the purpose of this 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 our recommendations are required. If PSI is not notified of such changes, PSI will not be responsible for the impact of those changes on the project.

Subsurface conditions may vary between and away from the boring locations. We recommend that the contract specifications include the following clause:

"The contractor will, upon becoming aware of subsurface or latent physical conditions differing from those disclosed by the original soil exploration work, promptly notify the owner verbally to permit verification of the conditions, and in writing, as to the nature of the differing conditions. No claim by the contractor for any conditions differing from those anticipated in the plans and specifications and disclosed by the soil studies will be allowed unless the contractor has so notified the owner, verbally and in writing, as required above, of such differing conditions."

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

After the plans and specifications are more complete, the geotechnical engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At this time, it may be necessary to submit supplementary recommendations. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the project. This report has been prepared for the exclusive use of Taco Bell for the specific application to the proposed restaurant.

TABLES

LABORATORY TESTING (TABLE 1)

TABLE 1
Laboratory Test Results
Proposed Taco Bell #315420
Hammock Ridge Road & U.S. 27
Clermont, Florida
PSI Project No. 07572735

Boring No.	Sample Depth (feet)	Moisture Content (%)	Percent Finer #200 Sieve	Organic Content	Liquid Limit	Plasticity Index
B-1	6 to 8	-	9	-	-	-
B-2	4 to 6	-	15	-	-	-
B-3	2 to 4	13	28	-	-	-
B-4	13.5	-	17	-	-	-
B-5	2 to 4	-	7	-	-	-
B-6	0 to 2	18	9	-	-	-

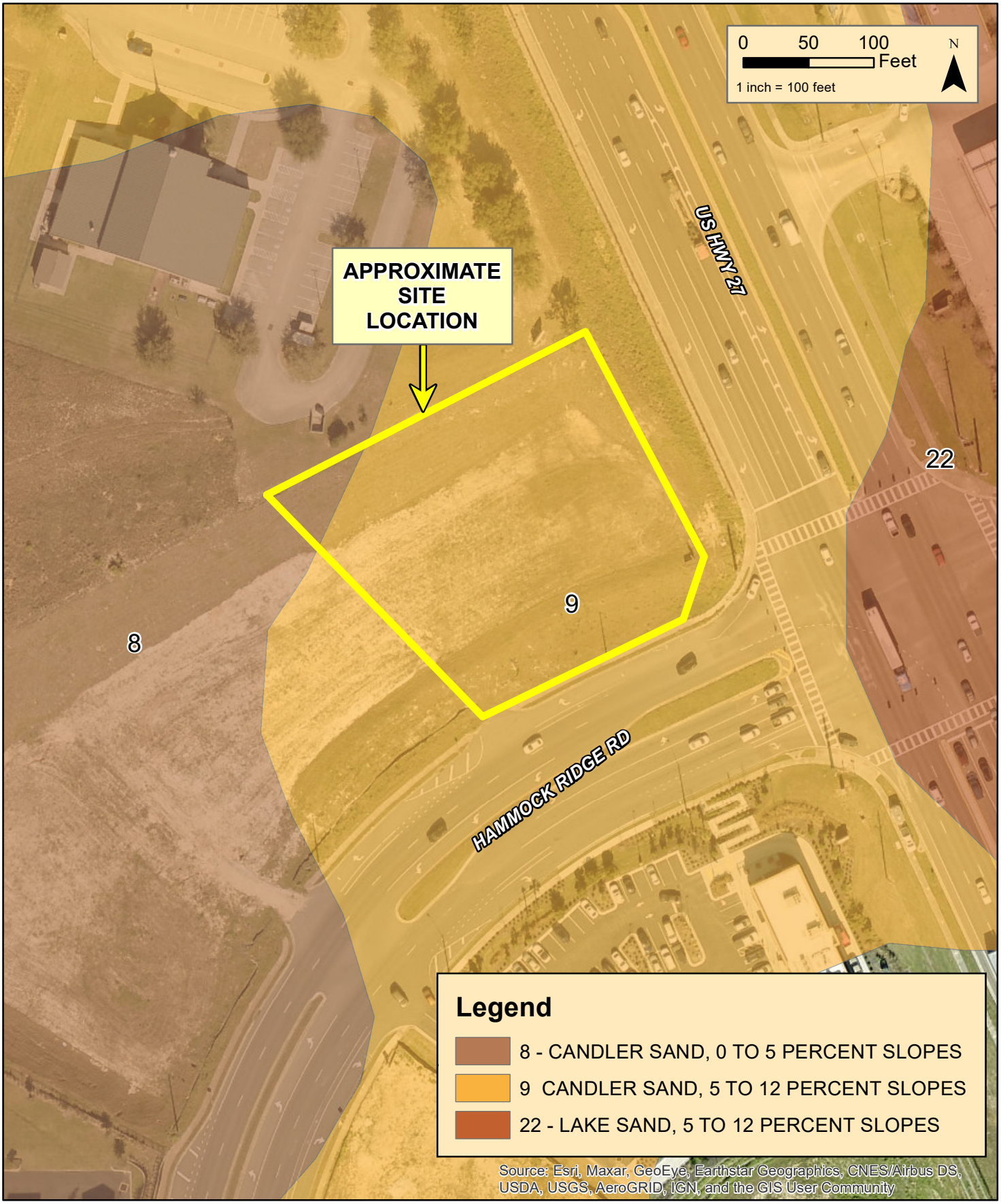
FIGURES

USGS SITE VICINITY MAP (FIGURE 1)

REFERENCE: THE 2017 AERIAL PHOTOGRAPH WAS OBTAINED FROM ESRI. THE PRESENTED DATA IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. INTERTEK-PSI ASSUMES NO RESPONSIBILITY FOR ANY DECISIONS MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON INFORMATION OBTAINED FROM THE ABOVE DATA.

PROJECT NO. **07572735**	intertek psi 1748 33rd Street Orlando, FL 32839 (407)304-5560 (407)304-5561 fax	TOPOGRAPHIC MAP **TACO BELL #315420** **HAMMOCK RIDGE & US 27** CLERMONT, FLORIDA	FIGURE: **1**
TWN/RNG/SEC **-**			DRAWN: **DJW**
DATE CREATED **12-17-21**			CHECKED: **MM**

USDA SCS SOILS MAP (FIGURE 2)

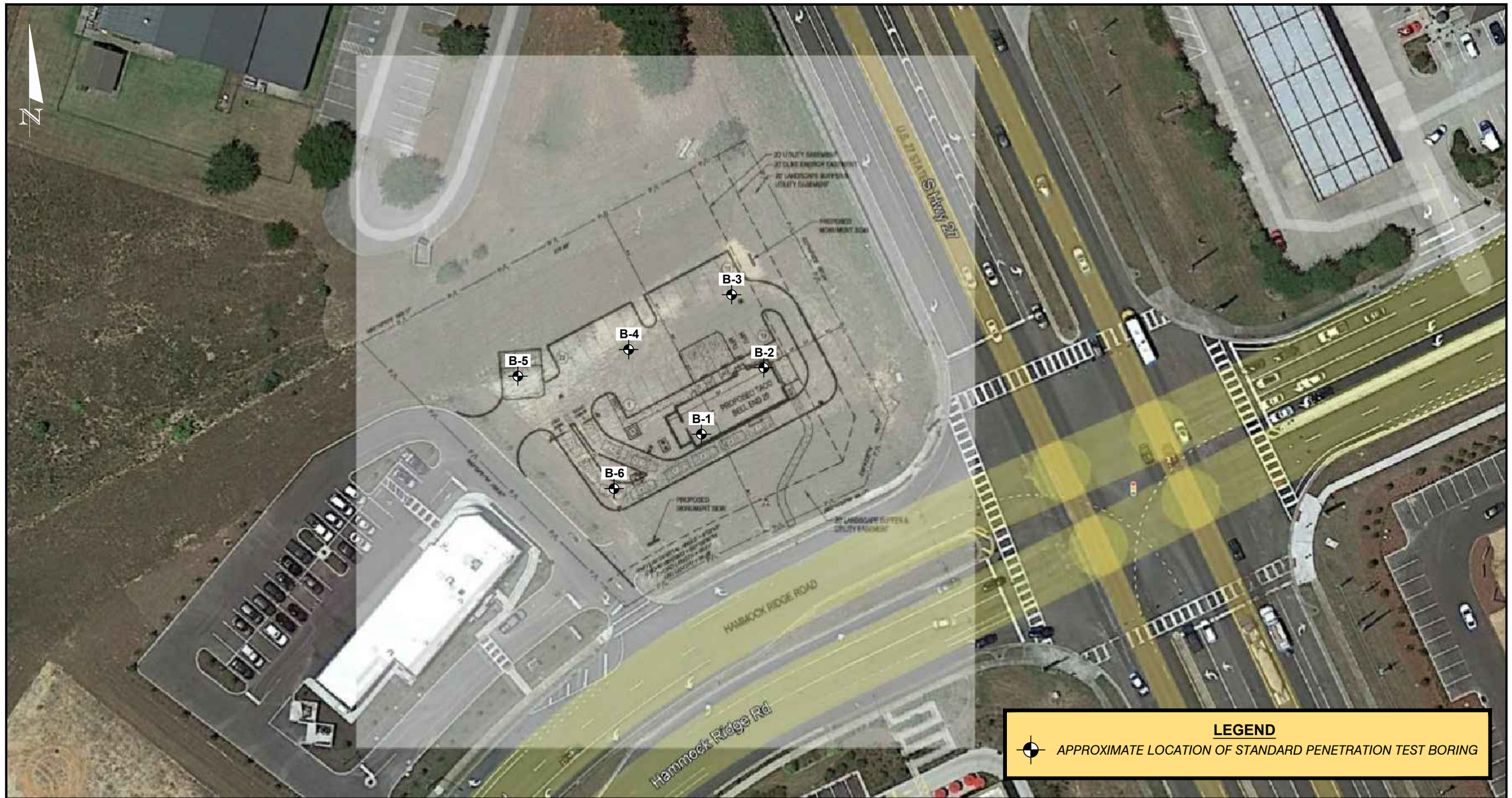


REFERENCE: THE 2017 AERIAL PHOTOGRAPH WAS OBTAINED FROM ESRI. THE PRESENTED DATA IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. INTERTEK-PSI ASSUMES NO RESPONSIBILITY FOR ANY DECISIONS MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON INFORMATION OBTAINED FROM THE ABOVE DATA.

PROJECT NO. 07572735 TWN/RNG/SEC - DATE CREATED 12-17-21	intertek psi 1748 33rd Street Orlando, FL 32839 (407)304-5560 (407)304-5561 fax	SOILS MAP **TACO BELL #315420** **HAMMOCK RIDGE & US 27** CLERMONT, FLORIDA	FIGURE: 2 DRAWN: DJW CHECKED: MM

APPENDICES

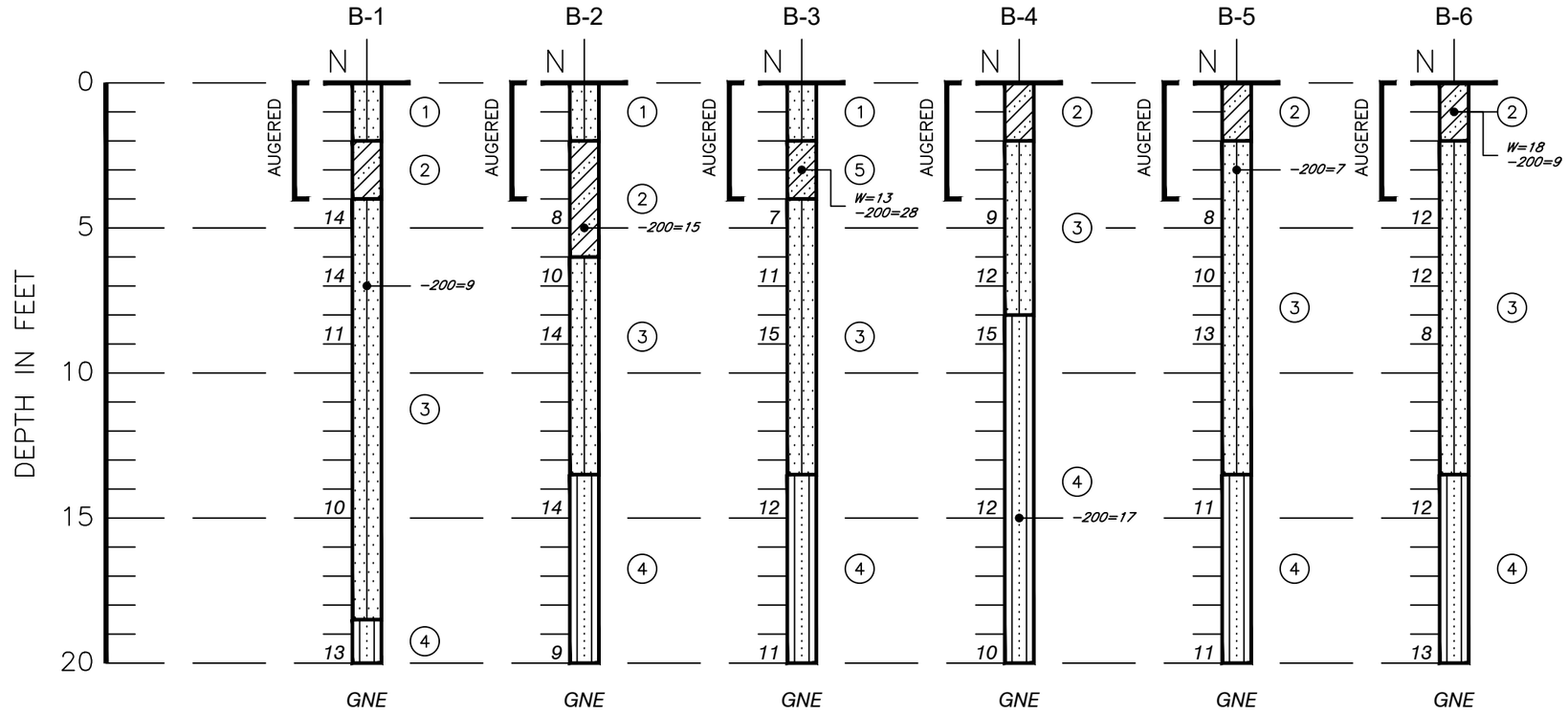
BORING LOCATION PLAN (SHEET 1)



REFERENCE: THE AERIAL PHOTOGRAPH WAS OBTAINED FROM GOOGLE EARTH. THE PRESENTED DATA IS FOR INFORMATION PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. INTERTEK–PSI ASSUMES NO RESPONSIBILITY FOR ANY DECISIONS MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON INFORMATION OBTAINED FROM THE ABOVE DATA.

PROJECT NO. 07572735	intertek psi	1748 33rd Street Orlando, FL 32839 (407)304-5560 (407)304-5561 fax	GEOTECHNICAL ENGINEERING SERVICES **TACO BELL #315420** **HAMMOCK RIDGE & US 27** CLERMONT, FLORIDA
SCALE: 1"=60'			SHEET: 1
DATE CREATED: 12-7-21			DRAWN: DJW
			CHECKED: MM

BORING LOGS (SHEET 2)



LEGEND

①	*ORANGE-BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP), (SP-SM)*
②	*LIGHT ORANGE TO ORANGE-BROWN SLIGHTLY CLAYEY FINE SAND, (SP-SC)*
③	*LIGHT GRAY TO LIGHT GRAY-ORANGE FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP), (SP-SM)*
④	*LIGHT PINK SLIGHTLY SILTY FINE SAND TO SILTY FINE SAND, (SP-SM), (SM)*
⑤	*ORANGE-CLAYEY FINE SAND, (SC)*
(SP)	*UNIFIED SOIL CLASSIFICATION GROUP SYMBOL*
N	*STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT USING AN AUTOMATIC HAMMER*
GNE	*GROUNDWATER NOT EVIDENT IN UPPER 10 FEET OF BORING*
W	*NATURAL MOISTURE CONTENT IN PERCENT*
-200	*FINES PASSING #200 SIEVE IN PERCENT*

SOIL PROFILES

SCALE: 1"=5'

PROJECT NO. 07572735	intertek psi	1748 33rd Street Orlando, FL 32839 (407)304-5560 (407)304-5561 fax	GEOTECHNICAL ENGINEERING SERVICES **TACO BELL #315420** **HAMMOCK RIDGE & US 27** CLERMONT, FLORIDA	SHEET: 2	
SCALE: NOTED				DRAWN: DJW	
DATE CREATED: 12-7-21				CHECKED: MM	

YUM! BRANDS HOT MIX ASPHALT PAVEMENT REQUIREMENTS & CLARIFICATIONS

Field Communication "OFI # 1778"

Issued: 28 February, 2008

"YUM Site Standard Paving Clarifications"

For these plan sets:

This Field Communication shall be applied to:
All YUM Concepts

ISSUE SUMMARY:

This communication is intended only to bring specific light to the current Yum Site Standard Hot Mix Asphalt Paving Specifications.

Please refer to attached specification section 02743 Hot Mix Asphalt Paving and to the enclosed YUM Standard Site Paving Plan for additional information / direction.

ACTION:

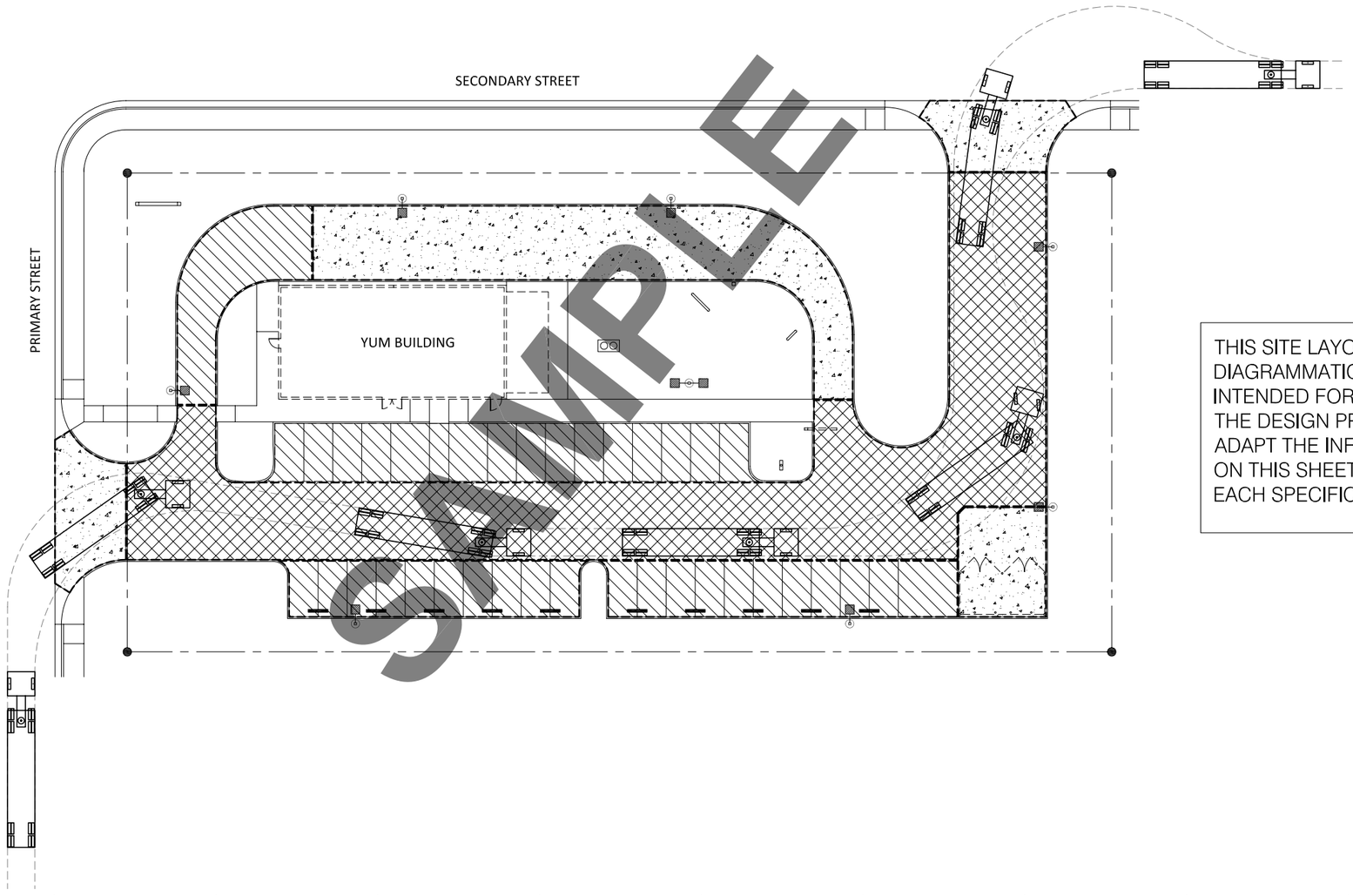
- Construction Managers: Please ensure that the bidding General Contractors are made aware of the Hot Mix Asphalt Specification during all pre-bid conferences / pre-construction conferences.
- Brand Architects: Please ensure the Site-Adapt Consultants are provided with and made aware of the applicable specification sections and Site Design Guidelines for use in preparation of the site-adapt plan sets. Please note that it is encouraged that the site-adapt civil engineers incorporate a paving plan specifically with the corresponding "hatch patterns" indicated on the enclosed YUM Standard Site Paving Plan / Legend; this will offer a quick point of reference when reviewing the site-adapt plans against the standard specification.

IMPACT TO COSTS:

There is no cost impact associated with this Field Communication.

For site specific questions please contact your Brand Architect. For questions regarding this communication, feel free to reply to this note or contact me by phone.

Frank Leist
Yum Standards Architect
Ph: 502.874.2605
frank.leist@yum.com



THIS SITE LAYOUT IS OF A DIAGRAMMATIC NATURE AND IS NOT INTENDED FOR CONSTRUCTION. THE DESIGN PROFESSIONAL MUST ADAPT THE INFORMATION PROVIDED ON THIS SHEET INTO THE DESIGN OF EACH SPECIFIC SITE.

NORTH

12 11 10 9 8 7 6 5 4 3 2 1

SITE PAVING PLAN 1" = 20'-0" | **B**

CONCRETE PAVING

TYPICAL AT SITE ENTRANCE / EXIT, TRASH ENCLOSURE PAD AND THROUGHOUT DRIVE-THRU LANE.
REFER TO SPECIFICATIONS MANUAL.

HEAVY-DUTY ASPHALT PAVING

TYPICAL AT PATH OF TRAVEL FOR ALL HEAVY TRUCKS ON SITE.
MINIMUM REQUIREMENTS:
6" HOT MIX ASPHALT PAVEMENT OVER 3" AGGREGATE SUB-BASE.
REFER TO SPECIFICATIONS MANUAL.

LIGHT-DUTY ASPHALT PAVING

TYPICAL AT PARKING AREAS AND AT DRIVE AISLES THAT WILL NOT ACCOMMODATE HEAVY TRUCK TRAFFIC.
MINIMUM REQUIREMENTS:
3" HOT MIX ASPHALT PAVEMENT OVER 6" AGGREGATE SUB-BASE.
REFER TO SPECIFICATIONS MANUAL.

PAVING LEGEND | **C**

A. HOT MIX ASPHALT PAVING:

- SURFACE COARSE SHALL BE A MINIMUM 1-1/2" COMPACTED THICKNESS.
- INTERMEDIATE / BASE COARSE SHALL BE PER SITE-SPECIFIC SOILS CONDITIONS AND LOADING.

B. CRUSHED STONE SUB-BASE:

- AASHTO #53: TYPICAL.
- MINIMUM 3" -to- MAXIMUM 6" COMPACTED THICKNESS.

GENERAL NOTES | **A**

CONSULTANT'S SEAL

CONTRACT DATE:	XX.XX.XX
BUILDING TYPE:	X-XXXX
PLAN VERSION:	XXXX
SITE NUMBER:	XXX-XXX
STORE NUMBER:	XXXXX

YUM

123 MAIN STREET
ANYTOWN, USA 98765

SITE PAVING PLAN

C0.0

PLOT DATE: XX.XX.XX

SECTION 02743

HOT MIX ASPHALT PAVEMENT

PART 1 GENERAL

1.1 DESIGN REQUIREMENTS

A. Comply with applicable provisions for design, materials, fabrication, and installation (construction) of component parts in addition to requirements shown or specified herein.

B. Install pavement thicknesses, quantities, and locations of heavy duty and light duty asphalt pavements as recommended by the soils investigation report and as shown on the plan sheets.

1.2 REGULATORY REQUIREMENTS

A. Conform to all local standards and applicable codes and requirements for paving work on public and private property during the execution of this work.

B. Manufacture Hot Mix Asphalt (HMA) shall be manufactured from a state approved / certified HMA manufacturing facility.

1.3 TESTS REQUIRED of GENERAL CONTRACTOR

A. Test materials during production to validate and / or control the mix supplied and shall be included in the bid cost for providing these HMA items.

B. Submit Recent Quality Control testing of the mixture proposed to be used on the project to the Owner prior to acceptance of the proposed mix design.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Place HMA in acceptable weather conditions; avoid inclement weather.

B. Adhere to local requirements for temperature constraints however in no case shall the base asphalt be placed when the temperature is below 40^{o} and the surface asphalt when the temperature is below 45^{o}. Additionally, the forecast shall be for rising temperatures for both efforts.

1.5 SUBMITTALS

A. Approved vendor certificate for the state where work is being done.

B. Provide Quality Control manual for material production over-site and testing measures being performed both at the asphalt plant as well as on the job site.

C. List / Organizational Chart showing personnel responsible for use of equipment and actions of the crew on the grade while paving and compacting asphalt.

Mix Design Submittal Checklist

Project: _____ **Date:** _____

Supplier: _____ **Mix Design:** _____ Surface / Leveling / Base

Included	Missing	N/A	Required Information
			Contractor to select mix design method: (design shall be less than 24 months old)
			50 Blow Marshall
			50-Gyration Superpave
			Hveem, Low Volume
			Other, Engineers Approval Req'd Before Bidding
			Proper Authorizating Signature for Mix Design
			All Aggregate Types, Gradations & % Crush
			FAA >= 40%
			Plot (0.45 Power Graph) of Final Aggregate Blend
			Bulk Specific Gravity of All Aggregates and Final Blend (Gsb), **Include All Worksheets**
			Optimum Binder Content (Pb)
			Mix Voids at Optimum (Va)
			VMA at Optimum
			Bulk Specific Gravity of Mix at Optimum (Gmb)
			Theoretical Maximum Specific Gravity at Optimum (Gmm)
			Dust to Total AC Ratio
			All Design Data and Associated Design Curves
			Recent Quality Control Production Charts
			Other Information per Specifications

1.6 DEFINITIONS

A. Surface Course – The surface / wearing course shall be installed uniformly, to all finished lines and grades, smooth, durable, skid-resistant, impervious thus protecting lower layers, and stable. Workmanship of the finished surface course shall be of the highest industry standards possible prior to acceptance by the Owner. The surface course shall be built with a maximum aggregate particle size of between ½" and ¾". Surface course shall be a nominal 1-½" compacted thickness with no thickness less than 2-times the maximum aggregate particle size (MAS).

B. Leveling Course – The course and location of the parking area that requires placement of a variable thickness of HMA to 'true up' the lot prior to placement of the surface course. This course has an 'MAS' no greater than that of the surface course.

C. Base Course – The lower courses of the pavement structure below the surface and leveling course with an 'MAS' of between ¾" and 1".

D. Tacking / Priming – The process of applying one coat of emulsified asphalt to all horizontal and vertical surfaces of either an existing pavement for an overlay or between lifts while building an improved or new structure (tacking), or upon the aggregate base (priming).

PART 2 PRODUCTS

2.1 MATERIALS

A. Tack Coat and Prime Coat: AASHTO M140 or M208 (Reference the Asphalt Institute MS-19 for Handling, Storage and Application criteria).

1. Prime Coat: Prime Coat materials of MS-2, CMS-2, or HFMS-2s.
2. Tack Coat: SS-1, SS-1h, CSS-1 or CSS-1h diluted with an equal amount of water, or agency acceptable product.

D. Performance Graded binder shall meet typical agency specification for low to medium volume roadways.

E. Aggregates, mineral filler, and asphalt binder shall meet or exceed the requirements of local specifications for asphalt pavements placed under this contract for qualities and types.

F. The coarse aggregate shall be sound, angular crushed stone, crushed gravel, or crushed slag as allowed by the local state agency. Coarse Aggregate fraction shall have a minimum of 75% crushed faces.

G. The fine aggregate shall be well graded, moderately sharp to sharp sands that will prevent tender mixes and scuffing from occurring. Fine Aggregate Angularity (AASHTO T-304, Method A), shall be >= 40%.

H. Base mixes shall have a minimum of 45% passing the #4 sieve.

I. Surface and leveling mixes shall have a minimum of 45% passing the #8 sieve.

L. Mix Designs shall include a breakdown factor, increase to minus #200, introduced during the design stage to mimic production values.

M. VMA is based on the aggregate bulk (dry) specific gravity, G_{sb}, as determined by AASHTO T-84 & T-85.

N. RAP may be used up to 20% in the HMA Binder and Surface Courses without approval by the engineer; mixes greater than 20% require engineer's approval. Use a softer grade of PG Binder per local requirements when using RAP.

2.2 HOT MIX ASPHALT (HMA)

A. All HMA mix designs shall be performed in accordance with the Asphalt Institute MS-2 and SP-2, current edition. The HMA mix designs developed shall meet the requirements of one of the following for compactive effort:

1. Marshall, 50-Blow,
2. Superpave, 50-Gyration, or
3. Hveem, Low Volume Mix.
4. Alternate design with the Engineers approval prior to time of bidding.

B. HMA Mix Designs shall be performed by qualified personnel with proven past experience and successes in the mix design and quality control of asphalt production. Resumes of the signing 'individual-in-charge' may be required by the Owner and shall be supplied if requested. The design shall meet the following requirements and be less than 24-months old. However, the mix design method used shall be the Contractors option, as stated previously, based on various methods which currently exist around the nation. A completed design shall require submittal of documentation as detailed, requested by the Owner in order for the producer to demonstrate knowledge of design and production criterion.

C. Bidding documents shall include the Contractors proposed Asphalt Mixture Design sheets. Ref. Mix Design Submittal Checklist sheet at the end of this document. Designs will be for HMA to be placed for each of the uses anticipated on each project; patching, base, leveling, and / or surface course. Different asphalt suppliers shall require different design submittals.

D. All submitted HMA mix designs shall contain at a minimum the following information:

1. All Aggregate Gradations
2. Plot (0.45 power graph) of Final Aggregate Blend
3. Bulk Specific Gravity of All Aggregates and Final Blend (Gsb) including Work sheets for natural as well as reclaimed asphalt pavement (RAP).
4. Optimum % Asphalt Binder (Pb)
5. Mix Air Voids at Optimum (Va)
6. Bulk Specific Gravity of Mix at Optimum (Gmb)
7. Theoretical Maximum Specific Gravity at Optimum (Gmm)
8. Voids in the Mineral Aggregate (VMA) and Voids Filled with Asphalt (VFA)
9. Dust to total AC Ratio
10. All Design Data and associated Design Curves

E. Mix Design Method Requirements Table:

Measures	**Superpave**	**Marshall**	**Hveem**
Stability, lbs.	n/a	1,200 min.	30 min.
Flow, 0.01 in.	n/a	8 to 16	n/a
Swell, in.	n/a	n/a	0.030 max.
Air Voids @ optimum AC	3.5%	3.5%	3.5%
VMA (base mix)	13.0 min.	13.0 min.	13.0 min.
VMA (surface mix)	14.5 min.	14.5 min.	14.5 min.
VFA	70 to 80	70 to 80	70 to 80
Dust to total AC (design)	0.6 to 1.0	0.6 to 1.0	0.6 to 1.0
Dust to total AC (production)	0.8 to 1.2	0.8 to 1.2	0.8 to 1.2

PART 3 EXECUTION

3.1 INSPECTION

A. Verify compacted sub-grade or granular base is dry and ready to support paving equipment and imposed loads. Proof roll to check for unstable areas and remove and replace loose material.

B. Verify gradients and elevations of base are correct.

3.2 PREPARATION

A. Repair pavement failures and perform crack repair according to their respective specification requirements prior to installation of any HMA surface course.

B. Cold-milling and/or grinding may be necessary to ensure that the asphalt edges at concrete abutments such as approaches, sidewalks, curbing, and drainage basins have smooth transitions.

C. After site review, detail whether wedge milling is necessary to assure positive drainage and transition. Install leveling course, if required, on the project per the site details and quantities shown on the plan sheets.

D. Existing surfaces to receive HMA must be clean prior to the installation of any portion of the work. Clean the surface on which the asphalt concrete is to be placed, and keep it free of accumulations of materials that would, in the judgment of the Owner, contaminate the mixture, prevent bonding, or interfere with spreading operations. Methods used may include but not be limited to the use of a sweeper that can wet and vacuum the area free of dirt and debris, clay, and dust, or any other foreign material.

E. Any oil or grease spots shall be scraped and treated to prevent bleeding through the tack coat. Bad oil spills may require removal with a wire brush or other suitable tool. Maintain clean pavements prior to applying emulsified tack coat. When approved sub-grade or pavement courses previously constructed under the Contract become loosened, rutted, or otherwise defective, the Contractor must correct the deficiency according to the contract item or items involved before the spreading of a subsequent pavement course.

F. If shown on the plans, apply prime coat at the diluted rate of 0.30 gal / sy over newly placed aggregate base course prior to the installation of the base asphalt. Blotter sand may be used if the prime is applied at too heavy of an application rate to dry up the excess prime coat material.

G. Tack / Prime Coat Distributor Truck must have an insulated tank, heating system and a distributor capable of maintaining a uniform application of emulsified asphalt under pressure throughout the area to be paved. This requires a pump in good working order, full circulating spray bars, and free flowing nozzles. Small, isolated areas may be tacked with a wand.

H. Install tack / prime coat during appropriate weather conditions and protect the tack / prime coat from traffic so as not to wear and track. Allow each installation of the tack / prime coat to 'break', i.e. turn from brown to black prior to installation of the HMA.

3.3 PLACING ASPHALT PAVING

A. Placement shall not occur when weather is inclement. Adhere to local requirements for temperature constraints however in no case shall the base asphalt be placed when the temperature is below 40^{o} and the surface asphalt when the temperature is below 45^{o}. Additionally, the forecast shall be for rising temperatures for both efforts.

B. Detail and submit to the Owner a paving plan on the site plan sheet prior to placement of asphalt.

C. Apply tack coat at the diluted rate of 0.05 gal / sy over newly constructed asphalt leveling or base mixes, 0.10 gal / sy over existing asphalt pavements and 0.15 gal / sy over milled surfaces. The higher rate shall be used on dry and brittle surfaces. All vertical edges abutting proposed asphalt surfaces shall receive a tack coat. Excessive asphalt applications, drooling, or pooling shall be swept with a broom to ensure proper bonding of the HMA. Immediately install the HMA after the asphalt emulsion has 'broken'.

D. Trucks shall have smooth, clean and tight metal beds that do not have mixture sticking to the truck bed and from which the entire quantity of HMA can be discharged smoothly into the spreading equipment. Trucks shall have a tarp and insulation as needed to protect the asphalt mixture from wind, rain and cold temperatures. Trucks for hauling asphalt mixture shall be in good, safe working condition.

E. Surface course longitudinal joints shall run with the traffic pattern. Therefore, pulling across the driving lanes shall not be allowed unless express permission is given by the Owner.

F. The entire parking lot surface course shall be paved on the same day. The timing and process should be discussed with and approved by the Owner before proceeding with the work.

G. Paving Equipment must be capable of placing, spreading and finishing courses of HMA to the specified thicknesses. HMA shall be free of marks, segregation and be placed to the required uniform elevation with a smooth texture not showing tearing, shoving, or gouging. Auger extensions are required if segregation occurs while pavers are extended beyond the basic screed width. Paving Equipment shall be LeeBoy or ProPaver type or the equivalent. Hand work shall be minimized to ensure the best possible finished surface.

H. Place Hot Mix Asphalt at a minimum temperature of 250 degrees F.

I. Rolling shall start as soon as the HMA can be compacted without displacement. Rolling shall continue until the HMA is thoroughly compacted and all roller marks have disappeared. Compact the HMA to a minimum in-place density of 92.0% of the Theoretical Maximum Specific Gravity, G_{mm}.

J. Rollers shall conform to the manufacturer's specifications for all ballasting. At least one vibratory roller shall be required for each project. Rollers shall be of good condition and capable of compacting the HMA to the minimum in-place density required by this specification.

K. For asphalt repairs work at an existing site, Work in such a manner as to not unduly limit parking or access to the site by customers or employees. Maintain access to at least 50% of usable parking spaces during paving.

3.4 CONSTRUCTION JOINTS

A. Minimize construction, longitudinal and transverse joints left open for an extended period of time.

B. Construct parking swale longitudinal joint by paving in a hot fashion with a temperature of not less than 180^{o}F to ensure maximum performance.

C. Compact all joints to provide for a neat, uniform and tightly bonded joint that will meet both surface tolerances and density requirements.

D. Cut true construction or transverse joints if the material has cooled to less than 180^{o}F prior to the placement of the next pass to ensure the best performing joint possible.

3.5 TOLERANCES

A. Smoothness shall meet the requirements of no greater than 1/4" in 10 ft. for base and leveling courses and 3/16" in 10 ft. for surface course.

B. Thickness of the overall mat shall be within 1/4" of the specified compacted plan thickness at all locations. The average thickness shall meet the plan thickness shown. The yield for the day and for the entire site shall meet calculated theoretical based on 92% of G_{mm} supplied from the Contractors mix design and daily test values. This item shall be calculated by the Contractor and supplied to YUM as final parking lot documentation prior to final payment.

C. Deficient areas shall be defined, removed and replaced, or adjusted to the Design Thickness, by methods approved by the Owner's Representative.

D. Completed HMA placement must be laid in order to allow positive drainage away from buildings and towards drainage outlets. Any ponding of water is not acceptable and shall require replacement at the Contractor's expense. Flood the lot as directed by the Owner to determine positive drainage acceptability.

3.6 FIELD QUALITY CONTROL

A. Hot Mix Asphalt (HMA) shall be manufactured from a state approved / certified HMA manufacturing facility. Work consists of one or more courses of HMA constructed on a prepared foundation. The asphalt concrete consists of a mixture of uniformly graded aggregate and specified type and grade of asphalt binder. The manufacturing facility shall be capable of producing HMA in accordance with the following requirements and all applicable local agency specifications on an ongoing and consistent basis.

B. Ensuring uniform material is produced and selecting the vendor for these asphalt projects will require timely submittal of documents and qualifications to the satisfaction of the Owner. Contractor / material supplier shall demonstrate the existence of the following documents:

1. Approved vendor certificate for the state where work is being done.
2. Quality Control manual for material production over-site and testing measures being performed both at the asphalt plant as well as on the job site.
3. List / Organizational Chart showing personnel responsible for use of equipment and actions of the crew on the grade while paving and compacting asphalt.

C. Calibrated equipment and qualified personnel must be accessible at all times during the construction of this HMA. The Contractor shall provide the necessary equipment, materials, and labor to complete the job acceptable to the Owner. Variations in the size and amount of equipment will depend on the size of the area being paved.

D. It is imperative that all documents list a 'Person-in-Charge' who is responsible for the over-site of the previously listed activities. This individual will be the point of contact for the Owner and they shall work with the Owner to ensure timely project completion and specification compliance. This individual shall be knowledgeable in all aspects of asphalt design, production, and installation and shall be an employee of the company holding the contract with the Owner, even if the HMA is being produced and supplied by a separate vendor.

E. Daily maximum theoretical specific gravity values must be made available to the Contractors density technician for verifying in-place density within four hours of start of production.

F. Asphalt content, gradation, and bulk specific gravity (G_{mb}) testing shall be done a minimum of once every 400 tons of HMA supplied or every third day for low tonnages that when added together successively do not equal 400 tons.

G. Acceptable average measures are made by use of a correlated nuclear density gauge, Pavement Quality Indicator or PaveTracker (non-nuclear) or by cutting (4) cores per lift, per day and testing per AASHTO T-166, Method C. Additional testing shall be performed on any given day once 400 tons of asphalt is placed.

H. Any average in-place density measure for surface course mixtures that is less than required for the day will result in a reduction in HMA pay equal to the following chart. After reaching the 30% reduction mark the pavement shall be removed and replaced by the Contractor or left in place with no compensation due the Contractor. Base and leveling installation of asphalt shall meet local DOT specifications for in-place density measures. Surface course longitudinal joints shall be measured 6" from the joint, centered upon core or density gauge, and shall meet the mat density requirements minus 2.0% at a minimum. Base and leveling course longitudinal joint density measures shall achieve between 95% - 102% of maximum achievable individually, with an average of 98% on any given day.

In-Place Density Pay Schedule, Surface Course Mat Density

Pay Factors, % (percent)	In-Place Density, % Maximum Theoretical Specific Gravity, G_{mm}
100	> 92.0%
100 – 0.5 for each 0.1% below 92.0%	91.0% to 92.0%
95 – 1.0 for each 0.1% below 91.0%	90.0% to 91.0%
85 – 1.5 for each 0.1% below 90.0%	89.0% to 90.0%

I. Process Control testing shall be in accordance with state standards for frequency and methods where the work being performed is done with a minimum of testing meeting the above QC requirements.

J. Protect the HMA until such time that traffic can be placed upon the properly compacted asphalt and show no signs of deformation.

K. If excessive segregation is occurring during placement operations, the Contractor will investigate the cause(s) and make appropriate changes to the satisfaction of the Owner.

3.7 WORK TIMELINES

A. HMA Full-depth pavements: After placing base asphalt and immediately prior to placing the surface asphalt inspect the entire pavement for low spots, damaged areas, segregated materials, and testing measures taken. Remove and replace any and all deficient sections to meet these specification requirements prior to continuing with work. These efforts shall not delay the overall progress of construction nor delay the opening of the facility.

B. Overlays (a/k/a Resurfacing): The pavement repairs, overlay, and striping shall be accomplished in such a manner as not to unduly limit parking or access to the site by customers or employees.

1. There shall never be less than 50% of the usable parking spaces available unless work is performed during off hours or when completion of work is possible prior to hours of operation.

2. Every attempt should be made to complete the surface course placement process in one continuous placement with no cold joints.
3. The timing and process should be discussed with the Owner before proceeding with the work.

3.8 SITE SPECIFIC IDENTIFICATION

A. Remove and store bumper blocks and other lot accessories during operations, reinstall after work is completed, and replace any and all broken bumper blocks.

B. Remove all waste materials from the site and dispose of according to local ordinances.

C. Complete all work in compliance with ADA requirements.

D. Notify Owner and Store Manager when store traffic can return to lot.

E. Supply Owner with Notarized Certificate of Compliance and total (tons, cu. yds., number) used for all products supplied to the project for each pay item.

F. Supply Owner with yield calculations for all products used on the project. (Example: placement of 1,300 sq. yds. of Hot Mix Asphalt,1-3/4" compacted thickness will require 128 tons when the unit weight = 150 pcf.)

References:
Asphalt Institute, Lexington, KY
National Asphalt Pavement Association, Lantham, MD

END OF SECTION