



**ENVIRONMENTAL • GEOTECHNICAL
BUILDING SCIENCES • MATERIALS TESTING**

REPORT OF GEOTECHNICAL EXPLORATION

Proposed Burger King Restaurant
Buchanan Trail
Greencastle, PA

ATC Project No. 1011601117

Prepared For:

GPS Hospitality Partners II, LLC
2100 Riveredge Parkway, Suite 850
Atlanta, GA 30328

Prepared By:

ATC Group Services LLC
7606 Whitehall Executive Center Drive, Suite 800
Charlotte, NC 28273

January 5, 2018



ENVIRONMENTAL • GEOTECHNICAL
BUILDING SCIENCES • MATERIALS TESTING

7606 Whitehall Executive Center Drive, Suite
800 | Charlotte, NC 28273
+1 704 529 3200 www.atcgroupservices.com

January 5, 2018

Mr. Todd Jackson
GPS Hospitality Partners II, LLC
2100 Riveredge Parkway, Suite 850
Atlanta, GA 30328

RE: Report of Geotechnical Exploration
Proposed Burger King
Buchanan Trail
Greencastle, PA
ATC Project No. 1011601117

Dear Mr. Jackson:

ATC is pleased to submit this report providing engineering analysis for the proposed Commercial Development to be constructed at the above-referenced project location. This report, which details the results of our geotechnical exploration for the referenced project, summarizes the project information provided to us, describes the site and subsurface conditions encountered, and details our geotechnical recommendations for the project. The Appendix contains a Boring Location Plan and Soil Test Boring Logs.

We appreciate the opportunity to be of service to you for this phase of the project. If you have any questions concerning this report, please call us.

Respectfully Submitted,
ATC Group Services LLC

Joseph G. Schold, P.E. (NC)
Principal Geotechnical Engineer

David Schmidt, P.E.
Senior Geotechnical Engineer
Registered PA No. 73317

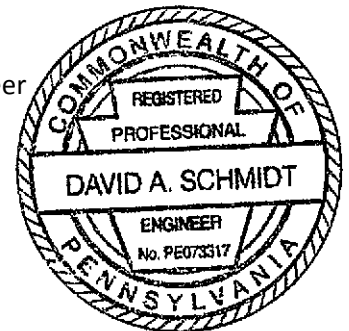


TABLE OF CONTENTS

1.0 INTRODUCTION..... 3

1.1 Project Information 3

1.2 Purpose and Scope of Exploration 3

2.0 EXPLORATION PROCEDURES AND FINDINGS 4

2.1 Exploration Procedures 4

2.2 Subsurface Conditions 5

3.0 FOUNDATION SUPPORT AND RECOMMENDATIONS 6

3.1 Site Preparation..... 6

3.2 Shallow Foundation Design Recommendations 6

3.3 Placement and Compaction 7

3.4 Site Excavations..... 8

3.5 Seismic Activity 8

3.6 Floor Slabs and Other Flatwork..... 8

3.7 Slope Stability..... 9

3.8 Groundwater Conditions and Control 9

3.9 Pavement Design and Construction Recommendations 10

4.0 CONSTRUCTION & GRADING CONSIDERATIONS..... 11

5.0 GENERAL REMARKS/REPORT LIMITATIONS..... 12

APPENDIX..... 13

APPENDIX

- Important Information about Your Geotechnical Report
- Soil Test Boring Location Plan
- Test Boring Logs
- Reference Notes for Boring Logs

1.0 INTRODUCTION

1.1 Project Information

The project site is situated on the north side of Buchanan Trail immediately west of the Keystone Car Wash in Greencastle, Pennsylvania. The site is currently unoccupied and grass covered. The planned construction at the site will include a single story restaurant structure with associated parking and drives. It is our understanding the planned construction for the site can be summarized as follows:

Project Details	
Single Story Commercial Structure	Masonry Block
Estimated Design Column Loads	Less than 20 Kips
Estimated Wall Loads	1 to 3 kips per foot
Design Traffic Loads	Light to Medium Duty
Anticipated Cuts and Fill	Less than 3 feet

1.2 Purpose and Scope of Exploration

The purpose of this exploration was to obtain subsurface data at the project site to provide geotechnical engineering recommendations for the project. Services performed under this agreement included the drilling of the soil test borings, laboratory testing, and preparation of a geotechnical engineering report. The subsurface investigation data obtained for this study and related plans are presented for the proposed structure, associated utilities, and parking facilities and drives.

Scope of Services Summary
Description of the site and presentation of subsurface test boring data, including Boring Location Plan and Soil Test Boring Logs.
Depths, thicknesses, and composition of soil strata that will be impacted by the planned site construction.
Depths to encountered groundwater and soil strata that could affect the proposed construction.
Recommendations for control of groundwater in design and during construction.
Recommendations pertaining to site development including site preparation, earthwork construction, unsuitable soils, groundwater control, and excavation slopes.
Recommended Seismic Site Classification definition based on IBC code requirements.
Recommendations regarding shallow foundation design and construction, including bearing pressures and anticipated settlements.
Recommendation for the design and construction of light and heavy duty pavements.
Recommendations regarding the suitability of the on-site cut soils with regard to use on site for general grading, pavement construction, and utility backfill.

Our scope of services did not include recommendations for unsupported excavation slopes, stormwater management, erosion control, detailed cost or quantity estimates, final plan and specification documents, and construction observations and testing. Any statements in this report regarding odors, colors, or unusual or suspicious items or conditions are strictly for the information of the client.

2.0 EXPLORATION PROCEDURES AND FINDINGS

2.1 Exploration Procedures

ATC performed seven soil test borings, designated B-1 through B-7, within the general area of the planned site construction. The Standard Penetration Testing (SPT) borings extended to a maximum depth of 15 feet below the existing ground surface elevation. The boring locations were established in the field by ATC by measuring distances and estimating right angles from existing site features.

All soil sampling and standard penetration testing (SPT) were in general accordance with ASTM standard D 1586. The borings were advanced by hollow stem auger drilling techniques. The drilling was performed using an ATV BR-2540 drilling rig with a manual SPT hammer. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2.0-inch O.D., split-barrel sampler. The sampler was first seated 6 inches and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler the final foot was recorded and is designated the "standard penetration resistance." Because the sampler may be damaged by driving it a foot into very dense soils, it is driven a few inches into such materials and the penetration resistance is expressed as the number of hammer blows versus the depth of penetration, e.g. 100/3", 50/1", etc. Penetration resistance, when properly evaluated, is an index of the soil's strength, density, and foundation support capability.

Representative portions of the soil samples obtained with an automatic hammer and split-barrel sampler were sealed in glass jars and transported to our laboratory. In the laboratory, they were examined by a geotechnical engineer, classified in general accordance with the Unified Soil Classification System, and assigned laboratory testing. The soil descriptions and classifications are based on visual examination and should be considered approximate. The Soil Test Boring Records that present soil descriptions and graphically depict penetration resistance and observed groundwater levels are included in the report Appendix. The groundwater depths encountered during drilling operations are indicated on the soil test boring logs in the Appendix.

2.2 Subsurface Conditions

The subsurface materials encountered were classified using the Unified Soil Classification System (USCS). The soil test boring logs, which detail the subsurface conditions encountered in the borings, are included in the Appendix. The field portion of ATC's geotechnical exploration consisted of seven soil test borings to a maximum depth of 15 feet below the existing ground surface elevations. The subsurface conditions generally consisted of a layer of fill consisting of CLAY, sandy CLAY, and weathered rock materials to the boring termination and auger refusal depths noted on the boring logs. SPT blow counts in the subsurface soils ranged from 5 blows per foot to 50 blows for 3 inches of penetration indicating firm to hard consistency soil conditions.

Groundwater was not encountered during the site investigation. Generally, seasonal and yearly fluctuations of the water table should be expected with variations in precipitation, surface runoff, evaporation, pumping, and other similar factors.

3.0 FOUNDATION SUPPORT AND RECOMMENDATIONS

Soil data obtained during this subsurface exploration have been used to estimate the shearing strength and deformation characteristics for the subsurface soils encountered at the site. These parameters have been used as guidelines for foundation system design and to estimate potential settlement due to the anticipated site construction and foundation loading. The engineering analysis based on these parameters was performed in accordance with generally accepted engineering principles and practices.

3.1 Site Preparation

Based on the site conditions encountered during the site investigation, the subsurface materials appears suitable for the planned building construction planned for the site. All areas that will support floor slabs and pavements should be prepared as described herein. After rough grade has been established in cut areas and prior to placement of fill, the exposed subgrade should be inspected by the project geotechnical engineer or his representative, by probing and testing as needed.

However, it should be noted that a layer of approximately 2 feet of topsoil was encountered in the area of B-5. The lateral extent of these materials may extend beyond the boring. We recommended experienced geotechnical personnel be on site to evaluate and monitor the removal efforts of these materials at the time of construction.

In addition, shallow auger refusal materials were encountered in several of the borings performed at the site. Shallow rock conditions may also be encountered in unexplored areas of the site. Given the shallow encountered auger refusal conditions, the contractor should anticipate encountering rock during the "deeper" excavations planned for the site.

Based on the moisture content testing performed, the near surface materials appear to be at moisture contents near or above the estimated optimum moisture contents of the soils. The combination of heavy construction equipment traffic and excess surface moisture can create pumping and general deterioration of the near surface soils. The severity of this potential problem depends largely on the weather during construction. The contractor must exercise discretion when selecting equipment and the conditions under which the equipment is used.

3.2 Shallow Foundation Design Recommendations

Based on the site findings, the proposed structure may be supported on shallow foundations bearing on competent soils and may be proportioned based on an allowable net soil bearing pressure of 2,000 psf. The presented allowable bearing capacity includes a factor of safety of at least 3.0.

Description	Columns	Walls
Net allowable soil bearing pressure	2,000 psf	2,000 psf
Minimum dimensions	24 inches	18 inches
Minimum protective embedment	24 inches	24 inches

Approximate total settlement	<1 inches	<3/4 inches over 50 feet
------------------------------	-----------	--------------------------

The recommended net allowable soil bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. This bearing capacity assumes that any fill or soft soils, as noted herein and as encountered, will be undercut and replaced with compacted engineered fill in accordance with the recommendations provided herein. The extent of any required site undercutting should be determined in the field by experienced geotechnical personnel based on site conditions at the time of construction.

Resistance to lateral loads for shallow foundations will likely be provided by frictional resistance between the base of the concrete footings and the underlying structural fill. We recommend that an ultimate friction factor of 0.45 be used for the design. Additional resistance to lateral loads will be provided by passive pressure of the granular backfill adjacent to the perimeter of the footings. All backfill placed against the edge of the footings must be properly compacted as indicted herein and the upper 18 inches of soils be not be included in the passive pressure calculations.

3.3 Placement and Compaction

During fill placement, density tests should be performed by a soils technician to determine the degree of compaction and compliance with the project specifications. All fill should be placed and compacted in loose lifts not to exceed 12-inches. For under-floor areas, at least one field density test should be made per 2,500 square feet of compacted soil. In addition, a minimum of one density test per 50 feet of bearing wall and one density test in each column pad, or more often when requested by the engineer's representative, should be performed in the excavated footing areas to confirm compliance with project specifications.

All areas beneath floor slabs and footings should be compacted, to a depth of at least 24-inches, to a minimum dry density of 98 percent of the Standard Proctor maximum density determined in accordance with ASTM D-698. Fill placement and compaction operations should be monitored by the ATC project geotechnical engineer or his representative.

We anticipate that the site excavated soil will be suitable for use as fill and/or backfill given the subsurface materials encountered in this exploration. The on-site soils will likely require aeration and drying prior to reuse as structural fill based on the moisture contents of samples collected. High plasticity clays (CH), if encountered, are NOT recommended for reuse as structural fill. In general, any non-organic, naturally-occurring soils with a Liquid Limit (LL) less than 45 percent and a Plasticity Index (PI) less than 20 percent can be used for structural fill. The fill should contain no pieces whose greatest dimension is greater than two-thirds of the lift thickness being placed. If fill construction takes place during the winter months, fill should not be placed over frozen soil, nor should froze materials be used within the fill.

The fill should be placed in lifts of uniform thickness. The lift thickness should not exceed that which can be properly compacted throughout its entire depth with the equipment available, typically 6 to 8 inches for clayey soil. We recommend that structural fills supporting footings, floor slabs and pavement be compacted to at least 98 percent of the maximum Standard Proctor dry density (ASTM D-698). For proper and timely construction of the fills, the soils should be placed at or near the optimum moisture content as determined by the specified Proctor test.

Suitable equipment for either aerating or adding water should be available as the soil moisture and weather conditions dictate. In general, it is recommended that fills supporting structures extend a minimum of 10 feet beyond the exterior building lines.

3.4 Site Excavations

It is recommended that all foundation excavations be inspected by the geotechnical engineer of record or his representative to verify that any loose, soft, or otherwise undesirable material is removed and that the foundation will bear on satisfactory material.

If soft or loose pockets are encountered in the footing excavations, the material should be excavated and backfilled in accordance with recommendations in Section 3.3 Placement and Compaction, of this report. Soils exposed in foundation excavations should be protected from disturbance. Surface runoff water should be directed away from the excavation and not allowed to pond. If possible, all footing concrete should be poured the same day the excavation is made. If this is not practical, the footing excavation should be adequately protected. If foundations are not poured the same day the excavation is made, we recommend that an ATC geotechnical engineer or his representative re-examine the excavation to determine if disturbance has occurred.

3.5 Seismic Activity

Structural design considerations include those dynamic forces that are generated from seismic events and are not only dependent on the magnitude of the earthquake but also the types and properties of those soils that underlie the site. As such, the International Building Code (IBC) requires that a Seismic Site Class be assigned based upon the soils encountered in the upper one hundred (100) feet of the ground surface. Based on the results of our exploration, we calculate that the Seismic Site Class Definition of "D" for this site under the 2012 International Building Code (IBC). A more favorable Site Class may be achieved for the site based on the completion of shear wave velocity measurements, which requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope requested does not include the required 100 foot soil profile determination. The boring performed for this report extended to a maximum depth of 15 feet.

3.6 Floor Slabs and Other Flatwork

A proofroll should be completed within 24 hours prior to the placement of floor-slab concrete or underlying aggregate base materials. The exposed soil subgrade (including any newly placed engineered fill materials) should be proofrolled as outlined in this report. If areas of instability or significant deflection are noted, the areas will require undercutting and/or stabilization.

Depending on weather conditions and time constraints, soft or loose soils may be aerated by disking or dried by other methods, and then recompacted in-place. However, if it is not possible to improve the subgrade soils because of weather conditions or scheduling, it may be necessary to remove the unsuitable materials and replace them with crushed stone with the possible inclusion of a geogrid material.

It is recommended that slab-on-grade floors be supported on a minimum 4-inch thick layer of compacted granular base material. A vapor barrier can be placed immediately beneath the slab to facilitate the application of moisture sensitive floor coverings if desired. If curling of the slab edges is of greater concern, the vapor barrier can be placed below the granular base material.

The slab should include control joints to preclude random cracking. Particular attention should be paid to the placement of backfill against foundation walls where equipment access is difficult, as inadequate compaction at these locations may cause cracking of the edges and corners of the slab as a result of backfill settlement. The slab should be designed to be structurally independent of any building footings or walls and should be appropriately reinforced to support the loads proposed. Assuming that the slab subgrade is prepared in accordance with the recommendations of this report, a modulus of subgrade reaction (k) of 100 psi/inch may be used for the design of the slabs.

3.7 Slope Stability

Our exploration did not include a detailed analysis of slope stability for any temporary or permanent condition. We recommend temporary slopes no steeper than 2.0(H):1.0(V) and permanent slopes no steeper than 3.0(H):1.0(V) for construction in existing natural soils or new structural fill placed in accordance with our recommendations. In building areas, minimum top of slope setbacks of 10 feet and 5 feet are recommended, respectively. Slopes should be protected from erosion, and surface runoff should be diverted away from slopes. For erosion protection, a protective cover of grass or other vegetation should be established on permanent soil slopes as soon as possible.

3.8 Groundwater Conditions and Control

Depending on the seasonal conditions, there may be some seepage into excavations at shallower depths. The contractor is responsible to assure adequate groundwater control is in-place and functioning prior to the start of any work then allowing all work to be performed in a dry (free from flowing or standing water) condition. The contractor is responsible to establish the means and methods of groundwater control and to include all such items in his bid and scope of work.

In order to prevent adverse effects of groundwater to exposed subgrade materials, it has been our experience that groundwater levels when lowered and maintained at a depth of at least 3 feet below the limits of subgrade excavation and undercutting elevation typically provide a stable working platform.

Rainwater and runoff that accumulate in footing excavations can be pumped out of small dug sumps. Groundwater levels are subject to seasonal, climatic and other variations and may be different at other times and locations than those stated in this report. A site drainage scheme should be implemented and maintained at all times by the contractor to redirect all off site drainage away from the limits of construction. Ponding or standing water may result in softening of soils that will require additional remedial work to facilitate construction.

Installation of utilities below the water table will be problematic, requiring dewatering, if it is encountered. The contractor should be required to control this water such that the utilities can be constructed in the “dry”. The utility joints should be covered with a drainage fabric such as Mirafi 180N, or equivalent, which should extend at least 12 inches beyond each side of the joint.

3.9 Pavement Design and Construction Recommendations

Based upon our evaluation and analyses, the on-site soils should be acceptable for construction and support of an asphaltic concrete type pavement section after proper subgrade preparation as recommended in the site preparation section of this report. The subgrade should be compacted to a minimum depth of 12 inches to at least 98 percent of the Standard Proctor maximum dry density (ASTM D-698). The recommended pavement section are provided below.

Pavement	Flexible Pavement Structural Section
Standard Duty	1.5-inches Surface Course Asphaltic Concrete 1.75-inches Intermediate Course Asphaltic Concrete 6-inches Graded Aggregate Base Course
Heavy Duty	1.5-inches Surface Course Asphaltic Concrete 2.5-inches Intermediate Course Asphaltic Concrete 8-inches Graded Aggregate Base Course

4.0 CONSTRUCTION & GRADING CONSIDERATIONS

A review of the final plans should be conducted by ATC, and subsequently some of the comments and recommendations included in this report may require modifications. It is recommended that an ATC representative evaluate all exposed soils which are to support structural elements such as foundations, building pads, etc. Any soils containing organics observed during construction excavation activities should be removed and replaced with compacted engineered fill. Recommendations regarding construction monitoring are found in Section 3 of this report.

4.1 Construction Monitoring

It is strongly recommended that ATC be retained to provide a comprehensive construction-monitoring program when the project proceeds. This program would assist the owner in determining that the work is being carried out in general conformance with the plans and specifications and help avoid the potential of change orders and cost overruns. Construction monitoring includes testing of construction materials such as compacted fill and concrete and engineering observation during the site preparation, and paving construction phases of the project.

Monitoring and testing during the earthwork and paving construction phases is particularly important since assumptions and recommendations have been made based on the soil boring data. Confirmation that actual subsurface conditions are comparable to the assumed conditions is an essential part of the subsurface exploration process.

4.2 Pavement Monitoring

Monitoring of the asphalt pavement operations will be essential to the success of the project. It is recommended that the contractor's performance be evaluated during the paving process to determine if methods being utilized in the field are attaining results that meet the requirements of the project specifications. It is recommended that paving operations be monitored by an ATC representative. The representative can assist the paving contractor by performing nuclear density measurements, assisting in the establishment of a rolling pattern, and sampling in-place asphalt pavements. It is also recommended that a laboratory testing program be established to evaluate the conformity of the asphalt mix with regards to the project specifications and approved mix design. Typical lab testing should include pavement thickness measurements, asphalt bulk specific gravity, Marshall Density, maximum theoretical density, and extraction / gradation testing.

5.0 GENERAL REMARKS/REPORT LIMITATIONS

An inherent limitation of any geotechnical engineering exploration is that conclusions must be drawn on the basis of data collected at a limited number of locations. The recommendations provided in this report were developed from the information obtained from the test borings, which depict subsurface conditions only at the specific locations and at the particular time designated on the logs. Soil conditions at other locations and times may differ from conditions encountered at these boring locations. The nature and extent of variations between the borings may not become evident until construction. If variations then appear evident, the recommendations in this report may need to be re-evaluated.

This report has been prepared for, and may be relied upon by, GPS Hospitality Partners II, LLC, GPS Hospitality Holding Company, LLC, and Suntrust Bank. ATC's professional services have been performed, the findings obtained, and the recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied. ATC is not responsible for the independent conclusions, opinions or recommendations made by others based on the field exploration and laboratory test data presented in this report.

The scope of this geotechnical exploration did 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.

APPENDIX

Important Information about Your Geotechnical Report

Test Boring Location Plan

Soil Test Boring Logs

Reference Notes for Boring Logs

Important Information About Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ-sometimes significantly from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led

to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the express purpose of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your ASFE-Member Geotechnical Engineer For Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.



8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

Copyright 2004 by ASFE, Inc. Duplication, reproduction, or copying of this document, in whole or in part, by any means whatsoever, is strictly prohibited, except with ASFE's specific written permission. Excerpting, quoting, or otherwise extracting wording from this document is permitted only with the express written permission of ASFE, and only for purposes of scholarly research or book review. Only members of ASFE may use this document as a complement to or as an element of a geotechnical engineering report. Any other firm, individual, or other entity that so uses this document without being an ASFE member could be committing negligent or intentional (fraudulent) misrepresentation.



CLIENT GPS Hospitality
 PROJECT NAME Proposed Burger King
 PROJECT LOCATION Buchanan Trail
Greencastle, Pennsylvania

BORING # B-1
 JOB # 1011601117
 DRAWN BY JGS
 APPROVED BY JGS

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started 1/2/18 Hammer Wt. 140 lbs.
 Date Completed 1/2/18 Hammer Drop 30 in.
 Drill Foreman Allied Spoon Sampler OD 2 in.
 Inspector SM Rock Core Dia. NA in.
 Boring Method HSA Shelby Tube OD NA in.

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, N - blows/foot	Qu-psi Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Pocket Penetrometer, tsf	Remarks
FILL: Firm to stiff reddish brown CLAY with some sand			1	SS	X			10		23.9				
			2	SS	X			13						
		5	3	SS	X			14		32.2				
			4	SS	X			15						
		10		5	SS	X			8					
BORING TERMINATED	15.0	15												

Sample Type

- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

Depth to Groundwater

- Noted on Drilling Tools Dry ft.
- ⚡ At Completion (in augers) Dry ft.
- ⊕ At Completion (open hole) NA ft.
- ⏴ After NA hours NA ft.
- ⏵ After NA hours NA ft.
- ⚡ Cave Depth NA ft.

Boring Method

- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling



CLIENT GPS Hospitality
 PROJECT NAME Proposed Burger King
 PROJECT LOCATION Buchanan Trail
Greencastle, Pennsylvania

BORING # B-2
 JOB # 1011601117
 DRAWN BY JGS
 APPROVED BY JGS

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started 1/2/18 Hammer Wt. 140 lbs.
 Date Completed 1/2/18 Hammer Drop 30 in.
 Drill Foreman Allied Spoon Sampler OD 2 in.
 Inspector SM Rock Core Dia. NA in.
 Boring Method HSA Shelby Tube OD NA in.

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, N - blows/foot	Qu-psi Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Pocket Penetrometer, tsf	Remarks
FILL: Firm to stiff reddish brown CLAY with some sand			1	SS				10		30.7				
			2	SS				14						
		5	3	SS				5		28.1				
Very stiff brown CLAY with some gray sandy clay seams	8.5		4	SS				18						
	10													
AUGER REFUSAL	12.0													

Sample Type

- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

Depth to Groundwater

- Noted on Drilling Tools Dry ft.
- ⊕ At Completion (in augers) Dry ft.
- ⊖ At Completion (open hole) NA ft.
- ⏴ After NA hours NA ft.
- ⏵ After NA hours NA ft.
- ⊠ Cave Depth NA ft.

Boring Method

- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling



CLIENT GPS Hospitality
 PROJECT NAME Proposed Burger King
 PROJECT LOCATION Buchanan Trail
Greencastle, Pennsylvania

BORING # B-3
 JOB # 1011601117
 DRAWN BY JGS
 APPROVED BY JGS

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started 1/2/18 Hammer Wt. 140 lbs.
 Date Completed 1/2/18 Hammer Drop 30 in.
 Drill Foreman Allied Spoon Sampler OD 2 in.
 Inspector SM Rock Core Dia. NA in.
 Boring Method HSA Shelby Tube OD NA in.

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, N - blows/foot	Qu-psi Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Pocket Penetrometer, tsf	Remarks
SURFACE ELEVATION														
FILL: Very stiff brown CLAY with some gray sandy clay seams			1	SS				20		28.1				
PARTIALLY WEATHERED ROCK	3.5	4.0	2	SS				50/4"						
AUGER REFUSAL														

Sample Type

- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

Depth to Groundwater

- Noted on Drilling Tools Dry ft.
- ⚡ At Completion (in augers) Dry ft.
- ⊕ At Completion (open hole) NA ft.
- ⏴ After NA hours NA ft.
- ⏵ After NA hours NA ft.
- ⊠ Cave Depth NA ft.

Boring Method

- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling



CLIENT GPS Hospitality
 PROJECT NAME Proposed Burger King
 PROJECT LOCATION Buchanan Trail
Greencastle, Pennsylvania

BORING # B-4
 JOB # 1011601117
 DRAWN BY JGS
 APPROVED BY JGS

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started 1/2/18 Hammer Wt. 140 lbs.
 Date Completed 1/2/18 Hammer Drop 30 in.
 Drill Foreman Allied Spoon Sampler OD 2 in.
 Inspector SM Rock Core Dia. NA in.
 Boring Method HSA Shelby Tube OD NA in.

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, N - blows/foot	Qu-psi Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Pocket Penetrometer, tsf	Remarks
SURFACE ELEVATION														
FILL: Firm to very stiff reddish brown CLAY with some sand			1	SS				9		17.6				
			2	SS				16						
Stiff to very stiff reddish brown sandy CLAY	5.0	5	3	SS				14						
			4	SS				25		23.3				
BORING TERMINATED	10.0	10												

Sample Type

- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

Depth to Groundwater

- Noted on Drilling Tools Dry ft.
- ⚡ At Completion (in augers) Dry ft.
- ⊕ At Completion (open hole) NA ft.
- ⏴ After NA hours NA ft.
- ⏵ After NA hours NA ft.
- ⚠ Cave Depth NA ft.

Boring Method

- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling



CLIENT GPS Hospitality
 PROJECT NAME Proposed Burger King
 PROJECT LOCATION Buchanan Trail
Greencastle, Pennsylvania

BORING # B-5
 JOB # 1011601117
 DRAWN BY JGS
 APPROVED BY JGS

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started 1/2/18 Hammer Wt. 140 lbs.
 Date Completed 1/2/18 Hammer Drop 30 in.
 Drill Foreman Allied Spoon Sampler OD 2 in.
 Inspector SM Rock Core Dia. NA in.
 Boring Method HSA Shelby Tube OD NA in.

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, N - blows/foot	Qu-psi Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Pocket Penetrometer, tsf	Remarks
2 feet Organic Laden Soil (Topsoil)	2.0	1	1	SS				8		21.2				
FILL: Stiff reddish brown CLAY with some sand			2	SS				11						
	5.0	3	3	SS				12						
			4	SS				13		28.9				
BORING TERMINATED	10.0	10												

Sample Type

- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

Depth to Groundwater

- Noted on Drilling Tools Dry ft.
- ⊕ At Completion (in augers) Dry ft.
- ⊖ At Completion (open hole) NA ft.
- ⏴ After NA hours NA ft.
- ⏵ After NA hours NA ft.
- ⊞ Cave Depth NA ft.

Boring Method

- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling



CLIENT GPS Hospitality
 PROJECT NAME Proposed Burger King
 PROJECT LOCATION Buchanan Trail
Greencastle, Pennsylvania

BORING # B-6
 JOB # 1011601117
 DRAWN BY JGS
 APPROVED BY JGS

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started 1/2/18 Hammer Wt. 140 lbs.
 Date Completed 1/2/18 Hammer Drop 30 in.
 Drill Foreman Allied Spoon Sampler OD 2 in.
 Inspector SM Rock Core Dia. NA in.
 Boring Method HSA Shelby Tube OD NA in.

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, N - blows/foot	Qu-psi Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Pocket Penetrometer, tsf	Remarks
FILL: Stiff brown and reddish brown CLAY with some sand			1	SS				15		23.3				
PARTIALLY WEATHERED ROCK	3.3													
AUGER REFUSAL	3.5		2	SS				50/3"						

Sample Type

- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

Depth to Groundwater

- Noted on Drilling Tools Dry ft.
- ⚡ At Completion (in augers) Dry ft.
- ⊕ At Completion (open hole) NA ft.
- ⏴ After NA hours NA ft.
- ⏵ After NA hours NA ft.
- ⚡ Cave Depth NA ft.

Boring Method

- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling



CLIENT GPS Hospitality
 PROJECT NAME Proposed Burger King
 PROJECT LOCATION Buchanan Trail
Greencastle, Pennsylvania

BORING # B-7
 JOB # 1011601117
 DRAWN BY JGS
 APPROVED BY JGS

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started 1/2/18 Hammer Wt. 140 lbs.
 Date Completed 1/2/18 Hammer Drop 30 in.
 Drill Foreman Allied Spoon Sampler OD 2 in.
 Inspector SM Rock Core Dia. NA in.
 Boring Method HSA Shelby Tube OD NA in.

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, N - blows/foot	Qu-psi Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Pocket Penetrometer, tsf	Remarks
FILL: Very stiff brown CLAY with some gray sandy clay seams			1	SS				10		19.0				
			2	SS				12						
		5	3	SS				26						
PARTIALLY WEATHERED ROCK	8.5		4	SS				50/4"						
BORING TERMINATED	10.0	10												

Sample Type

- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

Depth to Groundwater

- Noted on Drilling Tools Dry ft.
- ⚡ At Completion (in augers) Dry ft.
- ⊕ At Completion (open hole) NA ft.
- ⏴ After NA hours NA ft.
- ⏵ After NA hours NA ft.
- ⚡ Cave Depth NA ft.

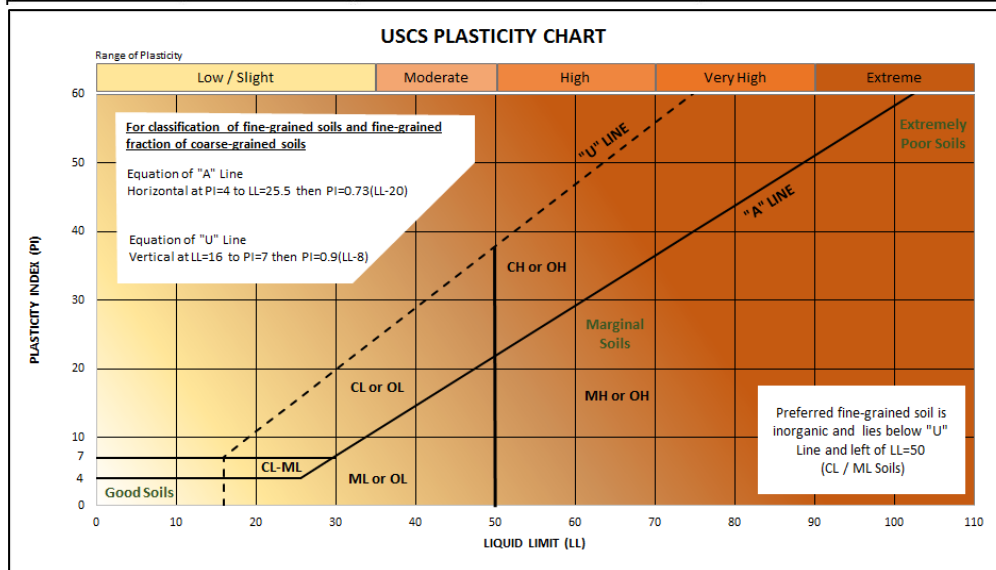
Boring Method

- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling

SOIL DESCRIPTIONS BASED ON THE UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

ASTM D 2487 and D 2488




Major Division		Group Symbol	Letter Symbol	Group Name*
Coarse Grained Soils Less Than 50 Percent Passing the # 200 Sieve	GRAVEL - Percent GRAVEL > percent SAND	Gravel with < 5% Fines	GW	Well Graded GRAVEL
		Gravel with Between 5 and 15% Fines	GP	Poorly Graded GRAVEL
		Gravel with ≥ 15% Fines	GW-GM	Well Graded GRAVEL with silt
			GW-GC	Well Graded Gravel with clay
			GP-GM	Poorly Graded GRAVEL with silt
			GP-GC	Poorly Graded GRAVEL with clay
	SAND - Percent SAND ≥ percent GRAVEL	Sand with < 5% Fines	GM	Silty GRAVEL
			GC	Clayey GRAVEL
		Sand with Between 5 and 15% Fines	GC-GM	Silty, Clayey GRAVEL
			SW	Well Graded SAND
			SP	Poorly Graded SAND
			Sand with ≥ 15% Fines	SW-SM
		SW-SC		Well Graded SAND with clay
		Fine Grained Soils 50 percent or more Passing the # 200 Sieve	SILT and CLAY	Liquid Limit Less Than 50
SP-SC	Poorly Graded SAND with clay			
SM	Silty SAND			
Liquid Limit 50 or Greater	SC			Clayey SAND
	SC-SM			Silty, Clayey SAND
	ML			SILT
Highly Organic Soils			CL	Lean CLAY
			CL-ML	SILTY CLAY
			OL	Organic SILT, CLAY, or SILTY CLAY
			CH	Fat CLAY
* Additional Modifiers	Coarse Grained Soils	with silt or clay	5 to 12 % Silt or Clay by weight	
		Silty or Clayey	more than 12 % Silt or Clay by weight	
	Fine Grained Soils	with sand or gravel	15 to 29 % Sand or Gravel by weight	
		Sandy or Gravelly	30 % or more Sand or Gravel by weight	



Sample Type Indicator

- = Split Spoon
- = Shelby Tube
- = Rock Core
- = Bag Sample

KEY TO SYMBOLS AND CLASSIFICATIONS

<p> </p> <p>•</p> <p>100/2"</p> <p>AX,BX,NX</p> <p>65%</p> <p>RQD</p> <p>U</p> <p>A</p> <p>C</p> <p>GS</p> <p>T</p> <p>P</p> <p>V</p> <p></p> <p></p> <p></p>	<p>Undisturbed sample recovered</p> <p>Standard Penetration Resistance (ASTM D 1587)</p> <p>Number of blows (100) to drive the spoon a number of inches (2)</p> <p>Core barrel sizes that obtain cores 1-1/8, 1-5/8, and 2-1/8 inches in diameter respectively</p> <p>Percentage of rock core recovered</p> <p>Rock quality designation</p> <p>Unit weight test performed</p> <p>Atterberg limits test performed</p> <p>Consolidation test performed</p> <p>Grain size test performed</p> <p>Triaxial shear test performed</p> <p>Permeability test performed</p> <p>Field shear test performed</p> <p>Caved Level</p> <p>Water table at least 24-hours after drilling</p> <p>Water table one hour or less after drilling</p>
---	---

CORRELATION OF PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY

	No. of Blows, N	Approximate Relative Density
SANDS	0-4	Very Loose
	5-10	Loose
	11 – 30	Medium Dense
	31 – 50	Dense
	50+	Very Dense
SILTS AND CLAYS	0 – 2	Very Soft
	2 – 4	Soft
	5 – 8	Firm
	9 – 15	Stiff
	16 – 30	Very Stiff
	30+	Hard

Soil sampling and standard penetration testing performed in accordance with ASTM D 1586. The standard penetration resistance is the number of blows of a 140 pound hammer falling 30 inches to drive 2-inch o.d., 1.4-inch i.d., split barrel sampler one foot. Core drilling in accordance with ASTM D 2113. The undisturbed sampling procedure is described by ASTM D 1587. Soil and rock samples will be discarded 30 days after the date of the final report unless otherwise directed.