



**REPORT OF PRELIMINARY
GEOTECHNICAL EXPLORATION**

**Golden Park Site
Buford, Hall County, Georgia
UES Project No: A24104.01546.000**

October 29, 2024

**Aiken Partners Real Estate
5500 Frederica Road
St. Simons Island, Georgia 31522**



October 29, 2024

Aiken Partners Real Estate

5500 Frederica Road
St. Simons Island, Georgia 31522

Attention: Mr. W. Jacob Aiken
Development/Sales Agent


Reference: Report of Preliminary Geotechnical Exploration
Golden Park Site
Buford, Hall County, Georgia
UES Project No: A24104.01546.000


Dear Jacob,

UES Professional Solutions 18, LLC (UES) has completed the geotechnical services for the project referenced above in general accordance with the scope of services outlined in UES Proposal Number: A24104.01546.00, dated September 23, 2024. The following report includes a summary of the project information and the findings from our subsurface investigation and evaluation.

We appreciate the opportunity to partner with you on this project. Our understanding of the subsurface conditions at the site will allow UES to enhance cohesion within the project team, streamlining the start of construction. We are fully prepared to provide the recommended construction and materials testing (CMT) and special inspection services outlined in this report. If you have any questions regarding the report or need more details about our CMT and special inspection services, feel free to contact the undersigned or Doug Coffey (CMT Principal) at dcoffey@teamues.com.

Sincerely,
UES Professional Solutions 18, LLC (UES)


Jacob E. McCord
Staff Geologist


Jeffrey M. Wold, P.E.
Principal Engineer

Copies Submitted Via Email: Addressee

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1.0 INTRODUCTION

1.1 Site Description

The approximate subject site is located off of Golden Parkway to the northwest of an existing commercial building complex in Buford, Hall County, Georgia. Based on our site reconnaissance, the site is primarily wooded with an existing detention pond and asphalt paving from the existing complex. In addition, there is an existing creek which traverses along the northwestern property line. Our representative also observed some scattered household trash and debris on the property.

Based on review of historic aerials, it appears that the site was wooded until the late 1990's when the site was significantly cleared and some grading activities occurred. The adjoining properties to the south appear to have been developed in the early 2000's while the subject site remained undeveloped and has since reforested.

The topographic information provided shows the elevation on site ranges from about ± 1178 feet in the south corner of the site near the existing asphalt driveway to a low of about ± 1120 feet in the northwestern portion of the site in the area of the existing creek.

1.2 Project Description

Our understanding of the project is based upon email correspondence and conversations with representatives of Aiken Partners Real Estate. The following files were provided via email:

- 20241004 Golden Parkway - DD set.pdf
- Updated layout.pdf

It is our understanding that the proposed development will consist of constructing a 61,200 square foot (SF) warehouse building (FFE of 1165.7 feet), a shared truck court area, employee parking areas, a bioretention pond and a detention pond. Based on the provided grading plan, we anticipate cuts and fills of up to ± 10 feet. No structural loading information was provided at the time of writing this report. Based on our experience with similar structures, we have assumed maximum column and wall loads of 125 kips and 4 kips per linear foot, respectively. Based on the provided grading plan, we anticipate cuts and fills of up to ± 10 feet will be required during site development.

1.3 Scope of Work

This report presents the results of our preliminary geotechnical exploration and evaluation performed for the Golden Park Site project in Buford, Hall County, Georgia. The purpose of this study was to perform a geotechnical exploration within the proposed area of development and provide preliminary recommendations for site design and construction. Our services were provided in general accordance with the scope of services outlined in UES Proposal Number: A24104.01546.000, dated September 23, 2024. Moreover, the services rendered by this firm included a site reconnaissance, clearing for drill rig access, drilling and sampling of ten (10) soil



test borings, two (2) infiltration test borings, engineering analyses of obtained information, and preparation of this report.

Specifically, our geotechnical report addresses the following:

- Description of existing conditions including Site Maps, Boring Location Plan, Boring Logs, and Subsurface Profiles.
- A description of the area and site geologic conditions.
- Preliminary recommendations for site preparation, excavation and grading, backfilling and compaction and suitability of on-site soils for use as structural fill.
- Groundwater conditions and recommendations for control of groundwater during construction.
- Excavation conditions and the presence of very dense materials, partially weathered rock, or rock and the degree of difficulty of excavation.
- Preliminary recommendations for foundation design and construction including allowable bearing pressure and settlements.
- Preliminary recommendations for subgrade preparation and slab-on-grade construction
- Temporary and permanent slope recommendations.
- Seismic information based on the International Building Code 2018.

Note: The scope of our geotechnical services did not include any environmental assessment or exploration for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site.



2.0 FIELD EXPLORATION AND LABORATORY PROGRAM

2.1 Field Exploration

The field exploration for this scope consisted of a site reconnaissance and performing ten (10) soil test borings and two (2) infiltration test borings within the proposed area of development. More specifically, the soil test borings were performed in the following locations:

- Proposed Warehouse Building: Five (5) soil test borings, designated as B-1 through B-5, were performed within the proposed warehouse building footprint and extended to termination depths of approximately 25 feet beneath the existing ground surface.
- Proposed Truck Court: Two (2) soil test borings, designated as B-6 and B-7, were performed within the proposed truck court and extended to termination depths of approximately 15 feet beneath the existing ground surface.
- Proposed Pavement Areas: Three (3) soil test borings, designated as B-8 through B-10, were performed within the proposed pavement areas and extended to termination depths of approximately 10 feet beneath the existing ground surface.

The boring locations were plotted on the provided site plan that was overlain onto Google Earth. The northing and easting of each soil test boring were estimated from Google Earth. Utilizing a Global Positioning System (GPS) device, a UES professional staked the location of each soil test boring. While the GPS device can locate points with a reasonable degree of accuracy, the precision can be affected by weather conditions, interference by external electromagnetic signals, available view of the horizon and other factors. The soil test boring locations should be considered accurate only to the degree implied by the method of location. If more precise locations are desired, we recommend that a professional surveyor be engaged to locate the borings. The location of each soil test boring is depicted on the Boring and Infiltration Location Plans included in the Appendix of this report as Figure 3.

The sampling and penetration procedures of the soil test borings were performed in general accordance with ASTM D-1586, using a power rotary drill. The standard penetration tests were accomplished by driving a standard 1-3/8" I.D. and 2" O.D. split spoon sampler with an automatic 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler a total of 18 inches, in 6-inch increments, was recorded. The Standard Penetration Test (SPT) value or "N" value is the summation of the last two 6-inch increments and is illustrated on the Boring Log Records adjacent to their corresponding depths, included in the Appendix. In very dense materials, the sample is driven a few inches rather than the 6-inch increment and the number of blows required versus the penetration depth is recorded.

The penetration resistance or SPT value is used as an index to derive soil parameters from various empirical correlations. Automatic hammers have higher efficiency than manual hammers, thus yielding lower standard penetration resistance values. We recognize this and account for it in our evaluation. However, the field-recorded penetration resistances and consistency terms based on the field values are presented on our test boring logs.



Upon completion of the subsurface borings, the bore holes were backfilled with soil cuttings. All recovered soil samples will be held in storage for up to sixty (60) days at the UES facility in Kennesaw, Georgia.

2.2 Laboratory Program

Representative portions of each recovered split-spoon sample were transported to our laboratory for further visual classification and testing. Using the Unified Soil Classification System (ASTM D-2487), the subsoil conditions are stratified and described in an illustrated form of soil profiles on the Boring Log Records included in the Appendix. The following laboratory tests were performed on one sample collected from each infiltration boring.

- Particle Size Distribution (ASTM D-422)
- Atterberg Limits Test (ASTM D-4318)
- Moisture Content (ASTM D-2216)

The results of the laboratory testing are provided in the Appendix.



3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Area Geology

Published information concerning the geology of the area indicates that the Site is located in the Piedmont Physiographic Province of Georgia. The Piedmont Physiographic Province is bounded on the northwest by the Blue Ridge Range of the Appalachian Mountains, and on the southeast by the leading edge of Coastal Plain sediments, commonly referred to as the "Fall Line". Numerous episodes of crystal deformation have produced varying degrees of metamorphism, folding and shearing in the underlying rock. The resulting metamorphic rock types in this area of the Piedmont are predominantly a series of Precambrian age schists and gneisses, with scattered granitic or quartzite intrusions.

Surficial soils in the Piedmont Region are derived from residual products of the in-place weathering of the parent rock. The residual soils are sometimes overlain by alluvial soils, which were transported and deposited by flowing water, or by man placed filled materials. The underlying rocks are primarily metamorphic gneiss, schist, and granite. The residual soils are generally clayey silts near the ground surface underlain by sandy silts and silty sands.

The boundaries between zones of soil and bedrock can be erratic and poorly defined. A transitional zone termed "partially weathered rock" is normally found overlying bedrock. Partially weathered rock (PWR) is defined for engineering purposes as residual material with a standard penetration resistance exceeding 100 blows per foot (bpf). Boulders and rock lenses are sometimes encountered within the overlying PWR or soil matrix. Consequently, significant fluctuations in depths to material requiring difficult excavation techniques may occur over short horizontal distances.

3.2 Subsurface Conditions

Individual soil boring profiles are depicted in the Boring Log Records included in the Appendix. A Subsurface Profile Plate illustrating the subsurface soils encountered in the borings are also included in the Appendix. Baseline elevations shown on the subsurface profiles and boring log records were interpolated from the provided topographic site plan and should be considered approximate. Stratification lines represent the approximate boundaries between soil types. The actual transitions may be more gradual than depicted.

Underlying a surficial topsoil layer of approximately 3 inches, the soil test borings encountered fill materials, residual soils and partially weathered rock to their respective termination depths ranging from 10 to 25 feet beneath the existing ground surface. Topsoil thicknesses will vary across the site, with thicker topsoil generally present in low lying areas.

Fill materials, soils that have been disturbed/transported and deposited by human activities, was encountered in borings B-1, B-4, B-5 and B-9 beneath the surficial topsoil layer and extended to depths ranging from about 3 to 6 feet beneath the existing ground surface. Sampled fill materials were described as silty sand (SM) and clayey sand (SC) with SPT values ranging from 10 to 19 blows per foot (bpf).



Residual (virgin) soils, formed by in-place weathering of the parent rock, were encountered beneath the surficial layer or fill materials in all of the soil test borings and extended to the interface with partially weathered rock or the respective termination depth. The residual soils were described as silty sands (SM) and sandy silts (ML) with SPT values ranging from 9 to 65 bpf.

Partially weathered rock (PWR), locally defined as very dense soil/highly weathered rock with blow counts over 100 per foot, was encountered in boring B-2 at an initial contact depth of approximately 12 feet beneath the existing ground surface.

3.3 Groundwater Conditions

The measurement of the depth below the existing ground surface to the groundwater table was attempted immediately following the completion of each boring. Groundwater was not encountered in any of the soil test borings at the time of drilling.

Groundwater in this area will fluctuate in response to local variations of precipitation and temperature and may be different at other times and areas. In addition, perched water can develop over low permeability soil or rock strata. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

3.4 Infiltration Testing

During our field activities, two (2) infiltration tests, designated as I-1 and I-2, were performed to obtain infiltration rate data. The test locations are depicted on the Boring and Infiltration Location Plan provided in the Appendix of this report as Figure 3.

Preparation of the test holes consisted of excavating a 6-inch diameter borehole to requested depth using a drill rig, scratching the sides of the test hole with a sharp instrument, and removing loose soils from the test hole prior to insertion of the Aardvark Permeameter into the borehole.

The infiltration test was performed using an Aardvark Permeameter (Model 2840K2) and a digital scale to obtain automated hydraulic conductivity readings. Saturated hydraulic conductivity (K_{sat}) is an indicator of water flow rate in soil. The Aardvark is a constant-head permeameter, meaning that the depth of the water in the borehole does not change during the measurement period. The rate of water supplied corresponds to soil infiltration rate from the bottom and side surfaces of the borehole. Once a steady state flow rate is established in the borehole, computer software calculates K_{sat} automatically and the test is concluded. The K_{sat} was calculated using the Reynolds and Elrick Solution method in general conformance with the constant head test procedures outlined in the referenced Well Permeameter Method (USBR 7300-89).



The following table provides the results of our infiltration rate testing. It should be noted that these results are estimates of the infiltration rate at the locations and depths tested. Variations in soil conditions across the full extent of the proposed stormwater management pond may result in different infiltration rates. Changes in atmospheric conditions or site-specific conditions may also result in varied test results if additional tests are conducted at a later date.

Summary of Infiltration Testing

Test Hole No.	Date of Infiltration Testing	Approximate Boring Depth (ft.)	Soil Type	Ksat (in/hr)
I-1	10/14/2024	10	ML	0.21
I-2	10/14/2024	10	ML	0.40



4.0 EARTHWORK RECOMMENDATIONS

4.1 Site Preparation

Prior to the commencement of construction, all vegetation, topsoil, building foundations, utilities, and any other non-soil deleterious materials that fall within the limits of the proposed construction should be removed from the site. After the necessary clearing and stripping and prior to fill placement or at-grade construction, structure and pavement areas should be evaluated by a geotechnical engineer and proofrolled with a 20 to 30-ton loaded tandem-axle dump truck or other pneumatic-tired vehicle of similar size and weight. The purpose of the evaluation is to locate soft, weak, or excessively wet soils present at the time of construction.

Proofrolling should be performed after a suitable period of dry weather to avoid degrading an otherwise acceptable subgrade and to reduce the amount of undercutting/ remedial work required. Any unstable and/or unsuitable materials identified should be remediated as directed by the Geotechnical Engineer based on conditions observed during construction. Undercut and replacement and densification in-place are typical remediation methods.

Existing Fill Materials

Fill soils are those soils that have been placed or reworked by man in conjunction with past construction grading, underground utility installation, farming (cultivated) or other previous activity at the site. Fill can be composed of different soil types from various sources and can contain debris from building demolition, organics, topsoil, trash, etc. The engineering properties of the fill depend primarily on its composition, density, and moisture content.

Existing fill materials were encountered in borings B-1, B-4, B-5, and B-9 and extended to depths of about 3 to 6 feet beneath the existing ground surface. Fill depths/conditions can be expected to vary in unexplored locations. Fill documentation was not provided at the time of this report. However, the encountered fill materials appeared relatively clean and appeared to have been placed with some amount of compactive effort.

Due to the inherent variability of undocumented fill soils, the areas where exiting fill soils are present will likely need some amount of remedial work. Reworking will likely consist of a combination of undercutting and replacement and in-place densification. Again, after clearing and grubbing has been performed, we recommend that all at-grade areas and areas to be filled be thoroughly proofrolled with a heavy rubber-tired piece of construction equipment prior to the placement of any new fill materials. This important step is to help characterize the condition of the existing fills that might be left in-place. Materials assessed to be unstable (exhibit pumping, rutting, etc.) should be further densified, or undercut and replaced with engineered fill (or otherwise remediated as directed by the Geotechnical Engineer).

Existing Creek and Low-Lying Areas

Currently, the site contains low-lying areas adjacent to an existing creek along the northwestern border of the site. Based on the provided site plan, some fill placement is planned in the northwestern portions of the site for portions of the parking lot and slope behind it. Prior to at



grade construction, new fill placement, and/or MSE wall construction in these areas, we expect that stabilization of water-softened soils may be required. For building and wall areas, remedial work may include undercutting of the soft soils and replacing with crushed stone. In pavement and slope areas, remedial work may include partial undercutting and stabilization with fabric and stone. The extent of remedial work will depend on site conditions at the time of construction. Where water is present, it may be necessary to install temporary and/or permanent dewatering measures, such as a French drain, prior to fill placement. Additionally, slopes constructed within low lying areas may require toe stabilization to prevent sloughing of the slope.

4.2 Excavation Conditions

Partially weathered rock (PWR) was encountered in boring B-2 at an initial contact of approximately 12 feet beneath the existing ground surface, corresponding to approximate elevations ranging from 1158 feet. It does not appear that cuts of this magnitude will be necessary for development of this site. After comparison of the boring data and the proposed finished grade elevations, we do not anticipate that materials requiring difficult excavation techniques for removal will be encountered during mass grading operations.

Depths may vary at other locations. We note that the subsurface bedrock in this region has undergone differing rates of weathering, which often produces a considerable variation in depth to competent rock over short horizontal distances. It is also not unusual for lenses and boulders of hard rock and zones of partially weathered rock to be present within the soil mantle above the general bedrock level. Depending on design grades (particularly in confined excavations), areas requiring difficult excavation techniques may be necessary. Excavation techniques will vary based on the weathering of the materials, fracturing and jointing in the rock, and the overall stratigraphy of the feature. Excavation difficulty should be expected to increase with depth.

4.3 Groundwater and Drainage Considerations

As previously mentioned, groundwater was not encountered in any of the soil test borings at the time of drilling. Groundwater levels in this area will fluctuate in response to local variations of precipitation and temperature and may be different at other times and areas. Should groundwater be encountered during site development, the contractor should implement dewatering techniques to maintain groundwater levels a minimum of 2 to 3 feet below working subgrades.

Site drainage should be planned and maintained to promote drainage away from all improvements during and after construction. Moreover, permanent site drainage should be established to prevent subgrade soils beneath pavements and slabs from becoming saturated and to minimize potential distress. Surface drainage should be directed away from proposed building structures. All roof drains should be tied directly to a storm sewer by closed pipes. Landscape irrigation should also be minimized to reduce future maintenance problems. Additionally, maximum practical grades should be utilized to reduce the likelihood of ponding water on or adjacent to flatworks. Care should be taken to properly seal and maintain all flatwork that abuts building structures to minimize the intrusion of water.



4.4 Structural Fill

All structural fill should be free of organic materials debris, and particles larger than about 4 inches and moisture conditioned to maintain a moisture content within three percentage points above and below the optimum moisture contents as determined by the Standard Proctor tests (ASTM D-698).

All structural fill to be used on site should be evaluated and approved by the Geotechnical Engineer. The following guidelines are recommended:

- Maximum dry density (MDD) of at least 95 pounds per cubic foot (pcf) (ASTM D-698)
- Liquid limit (LL) not exceeding 40 percent
- Plastic index (PI) not exceeding 20 percent

Placement and Compaction Requirements

Structural fill should be placed in thin loose lifts not exceeding 8 inches in thickness and tested by a soil technician to evaluate the compaction percentage. We recommend that the following minimum level of compaction be achieved:

- **Building Areas** - Compact the fill to a minimum of 98 % of the soil's MDD. In cut areas, the subgrade should be proofrolled and if found unstable, it should be scarified and re-compacted to the same criteria.
- **Pavement Areas** - Compact the upper 18 inches of subgrade in fill areas and the upper 12 inches in cut areas to a minimum of 98 % of the soil's MDD and a minimum of 95 % of the soil's MDD value below this level.
- **Utility Trenches** - Compact the upper 18 inches of the subgrade to a minimum of 98 % of the soil's MDD and a minimum of 95 % of the soil's MDD below this level.

Suitability of On-Site Soils

The on-site residual soils and fill materials (free of topsoil/organics) are generally suitable for reuse as structural fill and placed in general accordance with the requirements specified in this report.

Additional laboratory tests including Standard Proctors (ASTM D-698), sieve analysis (ASTM D-6913) and Atterberg Limits Tests (ASTM D-4318) will be required during construction on the proposed fill soils to compare their characteristics to the specified criteria.



5.0 DESIGN RECOMMENDATIONS

5.1 Foundation Support

Based on boring data, assumed loading conditions, and after the completion of the recommended subgrade preparation, the proposed structure may be supported on a shallow foundation system.

- An allowable net bearing pressure of 3,000 pounds per square foot should be available for the design of the shallow foundation system bearing on residual soils, structural fill, or approved subgrade soils. If structural loads exceed those assumed in this report, foundation recommendations will need to be reviewed prior to construction.

To reduce the possibility of shear failure, wall and column foundations should be designed with a minimum width of 18 and 24 inches, respectively. For frost protection, exterior wall bearing and column foundations should be designed with a minimum embedment depth of 18 inches, while interior foundations should be designed with a minimum embedment depth of 12 inches. The embedment depth should be measured from the base of the foundation to lowest adjacent outside grade.

Bottoms of foundation excavations should be evaluated by a Geotechnical Engineer prior to placement of reinforcing steel and concrete to evaluate if adequate bearing materials are present and that all debris, mud, and loose, frozen or water-softened soils are removed. Any soft areas or organic laden materials encountered should be remediated under the direction of the Geotechnical Engineer (often undercut and replaced with structural fill or crushed stone).

Foundation excavations should be concreted as soon as practical after they are excavated. Water should not be allowed to pond in any excavation. If an excavation is left open for an extended period, a thin mat of lean concrete should be placed over the bottom to minimize damage to the bearing surface from weather or construction activities. Foundation concrete should not be placed on frozen or saturated subgrades.

Upon completion of the recommendations and based on the assumed loading conditions, we anticipate that total and differential settlement between column lines (approximate 50 foot spacing) will be less than 1-inch and ½-inch, respectively. Careful field control will contribute substantially to minimizing potential settlements.

5.2 Floor Support

Upon completion of the recommended site preparation, the building floor slabs may be directly supported on approved subgrade, residual soils and/or structural fill. Provided the slab subgrade is prepared in accordance with our recommendations and slab loads do not exceed 200 pounds per square foot, a subgrade modulus reaction (K) of 100 pounds per cubic inch (pci, pounds per square inch per inch of deflection) may be used for slab design.



If a higher modulus of subgrade reaction is required, then we recommend that a 6-inch layer of compacted crushed stone be placed underneath the concrete building slab. The 6 inches of crushed stone will provide a protective cover as well as a uniform working surface. The crushed stone should consist of crushed aggregate base meeting the requirements of GDOT Section 815. Slabs underlain by 6 inches of stone are expected to have a modulus of subgrade reaction (K) of 150 pci.

Please note the above referenced values are intended to reflect the elastic response of soil beneath a typical floor slab under light loads with a small load contact area often measured in square inches, such as loads from forklifts, automobile/truck traffic or lightly loaded storage racks. These values may not be applicable for heavy slab loads caused by bulk storage or tall storage racks, or for mat foundation design.

Expansion and contraction joints should be used to isolate all floor slabs from the load bearing walls and/or isolated columns. This will allow for possible differential movement and diminish the potential of cracking the floor slabs.

5.3 Slope Recommendations

Temporary Slope Recommendations

Temporary slopes not exceeding 10 feet in height for confined areas and constructed in the virgin soils or structural fill, should be configured no steeper than 1.5(H):1.0(V) provided no water is observed seeping from the sides of the excavation. These temporary slopes should be regularly monitored for signs of movement or unsafe conditions. Temporary slopes below the groundwater table will require shoring / bracing. Additionally, construction excavation should comply with OSHA Guidelines outlined in the Code of Federal Regulations Federal Register Volume 54, Number 209 (October 1989) "Construction Standards for Excavation, 29CFR Part 1926, Subpart P." Also, the contractor should have a designated "qualified engineer" as defined by OSHA on-site during the excavation to observe the slopes for signs of possible failure.

Proper management of groundwater seepage and surface water runoff around the excavations will also contribute to the stability of temporary slopes. Material removed from excavations should not be stockpiled within a distance of twenty (20) feet from the crest of temporary excavations. Furthermore, positive drainage should also be maintained with ditches or channels at the top and bottom of the slope. It is also very important to always keep these drainage channels free of dirt, debris and vegetation.

Permanent Slope Recommendation

Permanent slopes less than 20 feet in height and constructed in residual soils or structural fill that are placed in accordance with the recommendations outlined in this report should be constructed no steeper than 2(H):1(V). For slopes greater than 20 feet, the slopes may require to be constructed at a 2.5(H):1(V) configuration and/or include a 10-foot bench at mid-height of the slope. Therefore, slopes greater than 20 feet in height will require a slope stability analysis.

To prevent erosion and saturation of the slopes, we recommend that a trench drain/diversion ditch be constructed adjacent to and along the top of the embankment (sloping toward the



trench drain) to ensure that water drains away from the slope. Depending on site conditions, a toe drain or French drain may also be constructed at the toe of cut slopes to collect water seepage. A protective cover of grass or other vegetation should be established on the slopes as soon as possible for erosion protection.

Buildings should have a minimum setback of 10 feet from the slope shoulders. A minimum setback of 5 feet is recommended for the pavement curbs.

5.4 Seismic Design

Part of the International Building Code (IBC) procedure to evaluate seismic forces 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 Seismic Site Class for this project, we have interpreted the results of our soil test borings drilled within the project site and estimated appropriate soil properties below the base of the test borings to a depth of 100 feet, as permitted by the IBC.

- Based on the 2018 International Building Code (IBC), boring data, and the geological features of the Piedmont Physiographic Province of Georgia, it is our opinion that the Seismic Site Classification for the project site is “D”.

The associated soil profile name is “Stiff Soil Profile” (Chapter 20 of ASCE-7).

5.5 Additional Information/Supplemental Exploration

Once site and grading plans and loading information have been finalized, we recommend that a copy be forwarded to UES so that we may review them in relation to the encountered subsurface conditions during our field exploration. It is possible that additional geotechnical exploration will be recommended once project configuration, grading and structural loading have been finalized. The additional exploration will likely consist of additional soil borings, laboratory testing, and engineering analysis.

If Mechanically Stabilized Earth structures are required, additional soil test borings will be necessary for design purposes and foundation preparation recommendations. Also, the bearing pressure and soil parameters in this report should not be used for design of Mechanically Stabilized Earth structures.



6.0 QUALIFICATION OF RECOMMENDATIONS

This report has been prepared based on currently accepted geotechnical engineering principles and practices in the local area for the specific application of this project.

The analyses and recommendations presented in this report are based upon preliminary information and our understanding of the Site and the data obtained from our field exploration. If there are any revisions to the plans for this project, we should be permitted to evaluate if the recommendations must be modified. The nature and extent of variations between borings will not be evident until the course of construction. If such variations become evident, it may be necessary to submit supplementary recommendations.

Regardless of the thoroughness of a geotechnical study, there is always a possibility that subsurface conditions will be different from those at the boring locations; those conditions will not be as anticipated by the designers or contractors; or that the construction process will alter soil conditions. Therefore, the Geotechnical Engineer's representative should observe and confirm that the conditions indicated by the geotechnical exploration actually exist.

Once final design plans and specifications are complete, and loading criterion for each building has been determined, we recommend that UES be provided the opportunity to review the final design and specifications in order that earthwork and foundation recommendations are properly interpreted and implemented.

This report and all of the contents herein are issued exclusively for use by Aiken Partners Real Estate. No other person or entity may rely on this report without written authorization from UES Professional Solutions 18, LLC (UES). Any use, reliance on, or decisions to be made based on this report by a third party are the responsibilities of such third parties.



APPENDIX

Figure 1 – Site Vicinity Map

Figure 2 – Aerial View of Site

Figure 3 – Boring and Infiltration Location Plan

Subsurface Profile Plate

Boring Log Records (10)

Laboratory Results

Soil Classification Chart

Important Information about this Geotechnical-Engineering Report



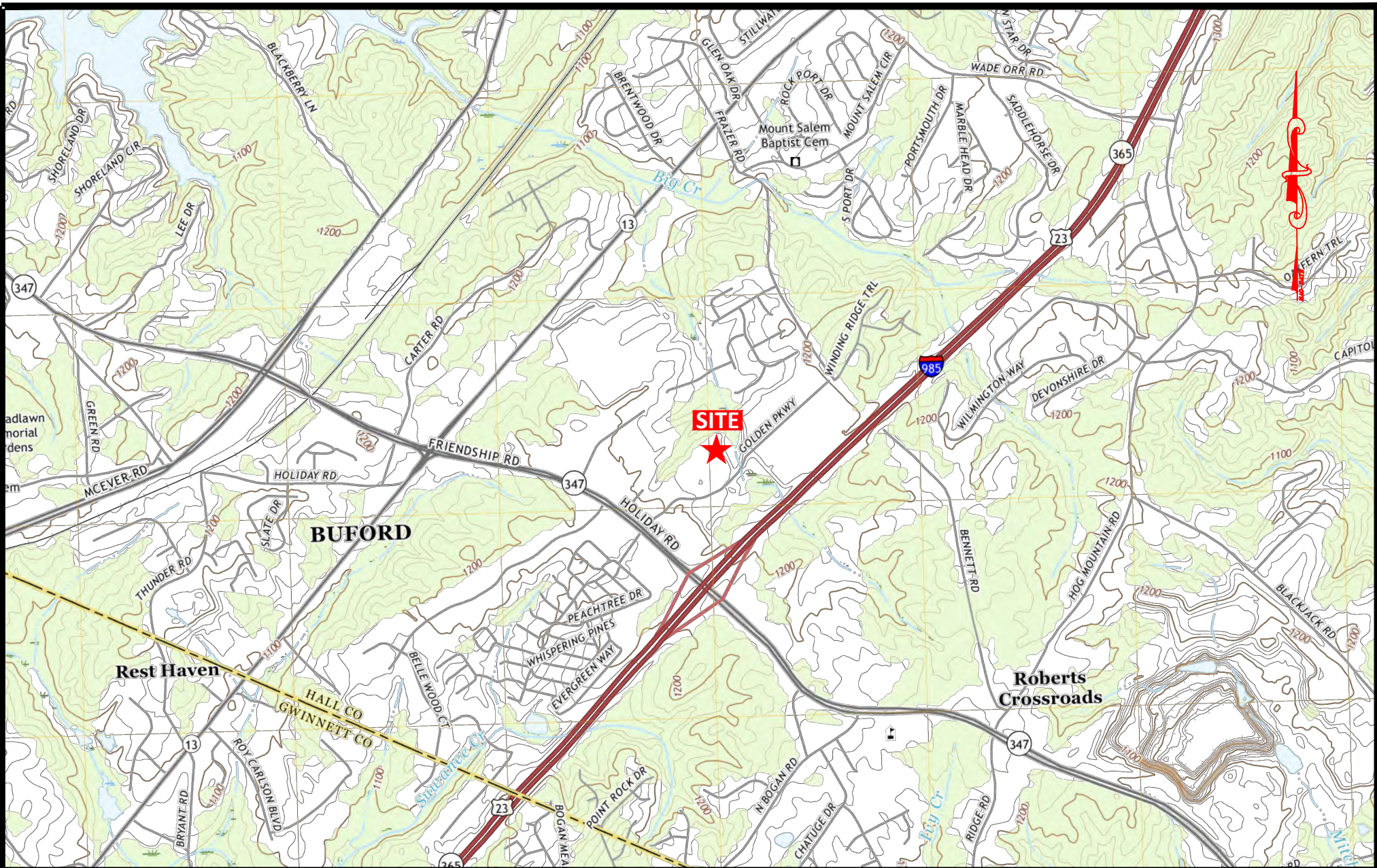


FIGURE 1: SITE VICINITY MAP



LEGEND

Source: USGS Topographic Map -
 Flowery Branch Georgia
 Quadrangles
 Scale: Not to Scale

PROJECT

Preliminary Geotechnical Exploration
 Golden Park Site
 Buford, Hall County, Georgia
 Project No.: A24104.01546.000



FIGURE 2: AERIAL VIEW OF SITE



LEGEND

Source: Google Earth

Scale: Not to Scale

PROJECT

**Preliminary Geotechnical Exploration
Golden Park Site
Buford, Hall County, Georgia
Project No.: A24104.01546.000**

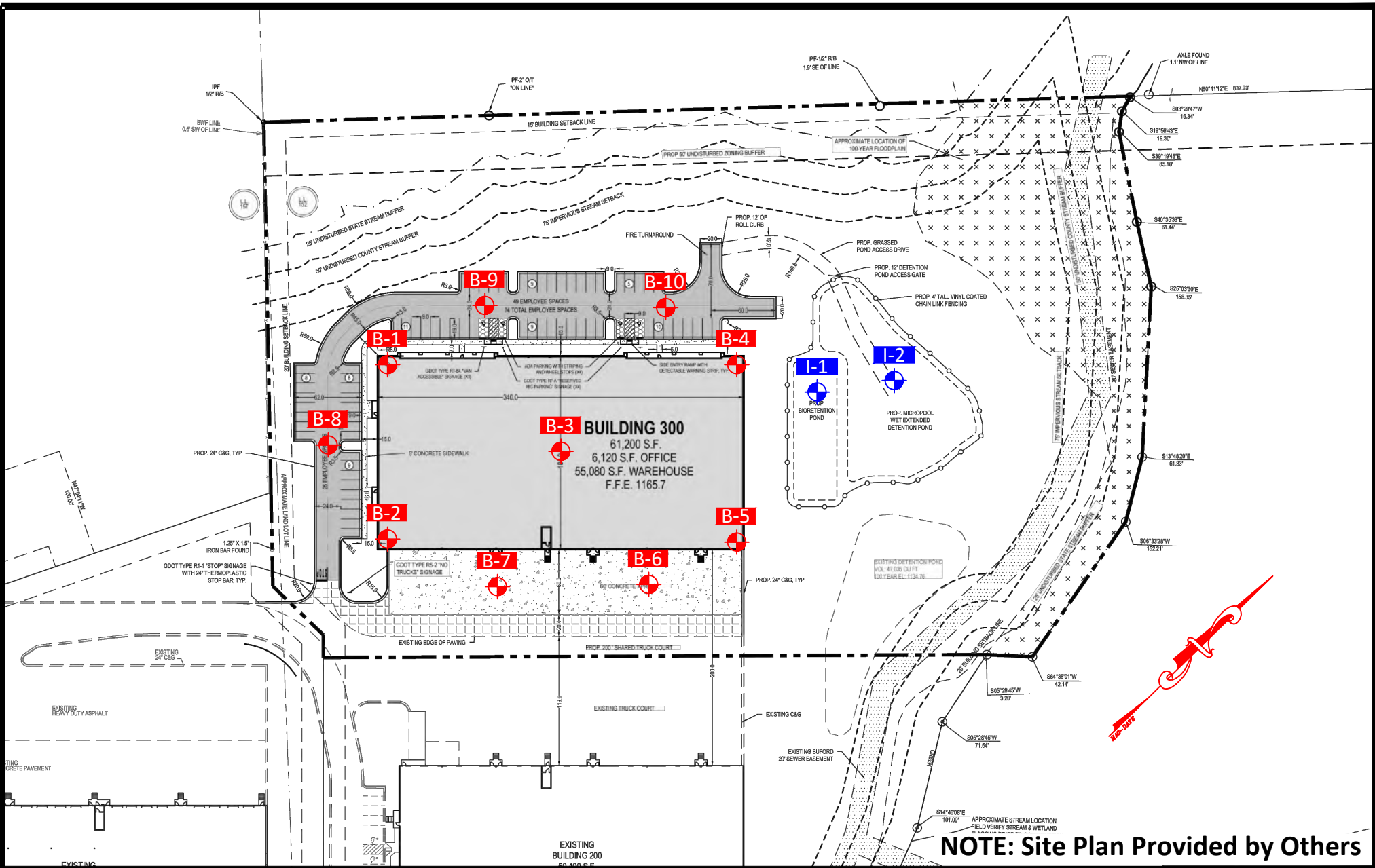




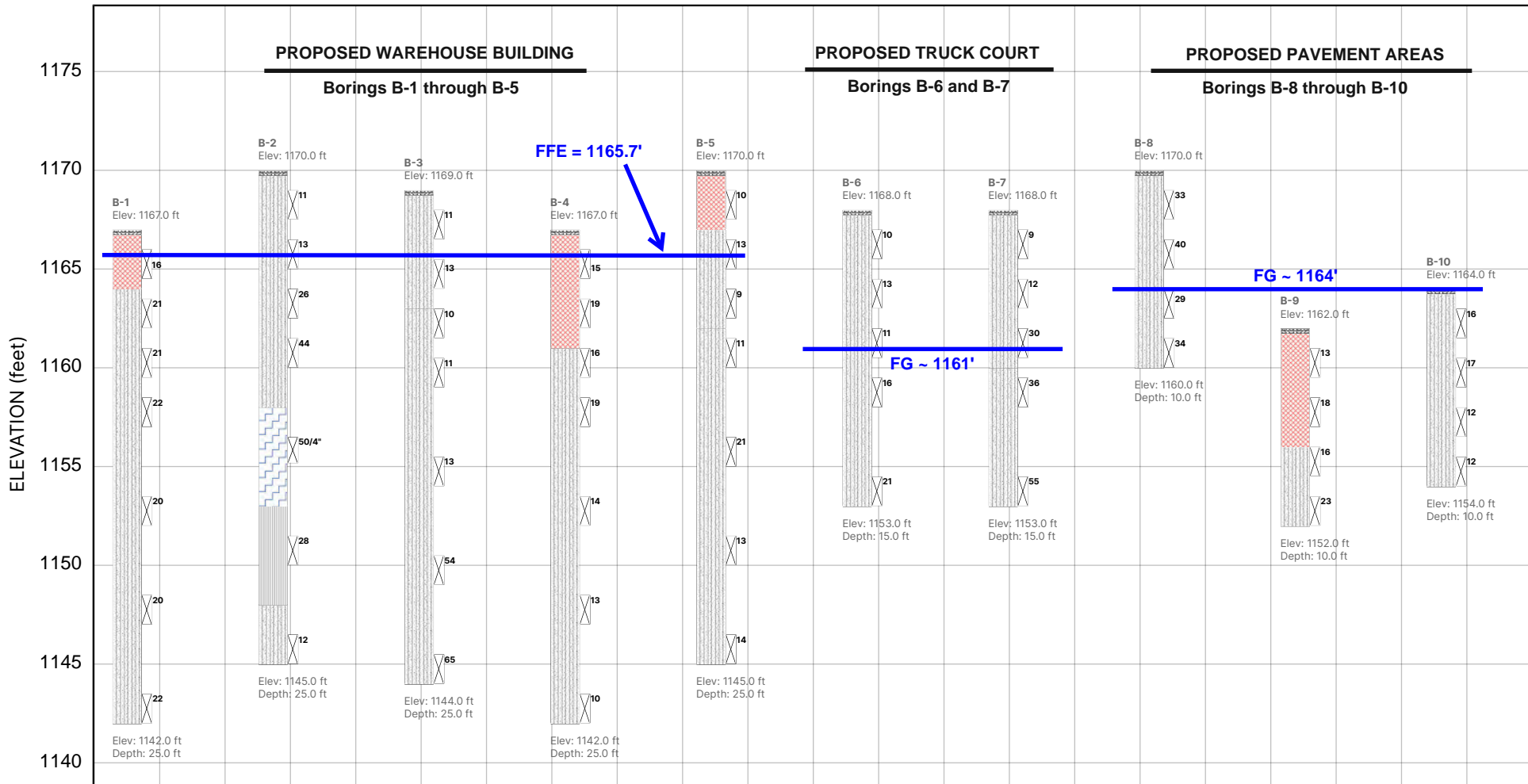
FIGURE 3: BORING AND INFILTRATION LOCATION PLAN



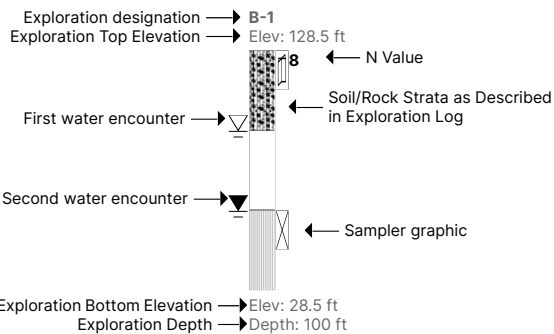
LEGEND

-  - Approximate Boring Locations
-  - Approximate Infiltration Locations

PROJECT
Preliminary Geotechnical Exploration
 Golden Park Site
 Buford, Hall County, Georgia
 Project No.: A24104.01546.000



EXPLORATION LOG LEGEND



LEGEND KEY

- Topsoil
- Fill Materials
- Silty Sand (SM)
- Partially Weathered Rock
- Sandy Silt (ML)

Golden Park Site
Buford, Hall County, Georgia

SUBSURFACE PROFILE PLATE





PROJECT NAME Golden Park Site
DATE COMPLETED 10/03/2024
DRILLING CONTRACTOR Dodd Drilling
DRILLING METHOD Hollow Stem Auger
CAVE IN N/A

PROJECT NUMBER A24104.01546.000
PROJECT LOCATION Buford, Hall County, Georgia
LOGGED BY Jacob McCord
ELEVATION 1167'
INITIAL GW N.E. **24 HR GW** N/A

Elevation (ft)	Depth (ft)	Graphic Log	USCS	Materials Description	Sample Number	Blow Counts (N-Value)	Uncorrected N-Value	Moisture Content (%)	Liquid Limit	Plasticity Index	Minus #200
1167											
				TOPSOIL: 3 inches 0.3							
1165				FILL: Medium dense, brown, silty SAND (SM), trace mica 3.0	S-1	5-8-8 (16)	16				
				RESIDUUM: Medium dense, brown, silty SAND (SM), trace mica	S-2	6-9-12 (21)	21				
1160	5				S-3	6-10-11 (21)	21				
					S-4	6-11-11 (22)	22				
1155	10		SM								
					S-5	7-9-11 (20)	20				
1150	15										
					S-6	8-9-11 (20)	20				
1145	20										
					S-7	7-9-13 (22)	22				
	25			Boring terminated at 25'							
	30										

NOTES:



PROJECT NAME Golden Park Site
DATE COMPLETED 10/03/2024
DRILLING CONTRACTOR Dodd Drilling
DRILLING METHOD Hollow Stem Auger
CAVE IN N/A

PROJECT NUMBER A24104.01546.000
PROJECT LOCATION Buford, Hall County, Georgia
LOGGED BY Jacob McCord
ELEVATION 1170'
INITIAL GW N.E. **24 HR GW** N/A

Elevation (ft)	Depth (ft)	Graphic Log	USCS	Materials Description	Sample Number	Blow Counts (N-Value)	Uncorrected N-Value	Moisture Content (%)	Liquid Limit	Plasticity Index	Minus #200
1170				TOPSOIL: 3 inches							
				RESIDUUM: Medium dense to dense, tan-brown, silty SAND (SM), trace mica	S-1	5-5-6 (11)	11				
					S-2	5-6-7 (13)	13				
1165	5		SM		S-3	9-11-15 (26)	26				
					S-4	9-18-26 (44)	44				
1160	10										
				PARTIALLY WEATHERED ROCK: Sampled as very dense, brown, silty SAND (SM), trace mica	S-5	12-27-50/4" (100)	50/4"				
1155	15										
				RESIDUUM: Very stiff, orange, sandy SILT (ML)	S-6	8-13-15 (28)	28				
1150	20		ML								
				Medium dense, brown, silty SAND (SM), trace mica	S-7	21-2-10 (12)	12				
1145	25		SM								
				Boring terminated at 25'							
	30										

NOTES:



PROJECT NAME Golden Park Site
DATE COMPLETED 10/03/2024
DRILLING CONTRACTOR Dodd Drilling
DRILLING METHOD Hollow Stem Auger
CAVE IN N/A

PROJECT NUMBER A24104.01546.000
PROJECT LOCATION Buford, Hall County, Georgia
LOGGED BY Jacob McCord
ELEVATION 1169'
INITIAL GW N.E. **24 HR GW** N/A

Elevation (ft)	Depth (ft)	Graphic Log	USCS	Materials Description	Sample Number	Blow Counts (N-Value)	Uncorrected N-Value	Moisture Content (%)	Liquid Limit	Plasticity Index	Minus #200
1169				TOPSOIL: 3 inches							
				RESIDUUM: Medium dense, tan, silty SAND (SM), trace mica	S-1	6-4-7 (11)	11				
1165	5				S-2	6-6-7 (13)	13				
				Loose to medium dense, tan, silty SAND (SM), trace mica	S-3	3-4-6 (10)	10				
1160	10				S-4	3-5-6 (11)	11				
			SM								
1155	15				S-5	4-6-7 (13)	13				
				Very dense, brown, silty SAND (SM), trace mica	S-6	15-22-32 (54)	54				
1150	20				S-7	16-25-40 (65)	65				
1145	25			Boring terminated at 25'							

NOTES:



PROJECT NAME Golden Park Site **PROJECT NUMBER** A24104.01546.000
DATE COMPLETED 10/03/2024 **PROJECT LOCATION** Buford, Hall County, Georgia
DRILLING CONTRACTOR Dodd Drilling **LOGGED BY** Jacob McCord
DRILLING METHOD Hollow Stem Auger **ELEVATION** 1167'
CAVE IN N/A **INITIAL GW** ▽ N.E. **24 HR GW** ▼ N/A

Elevation (ft)	Depth (ft)	Graphic Log	USCS	Materials Description	Sample Number	Blow Counts (N-Value)	Uncorrected N-Value	Moisture Content (%)	Liquid Limit	Plasticity Index	Minus #200
1167											
				TOPSOIL: 3 inches							
			SC	FILL: Medium dense, red-tan, clayey SAND (SC)	S-1	6-6-9 (15)	15				
				Medium dense, red-tan, silty SAND (SM)	S-2	6-8-11 (19)	19				
	5										
				RESIDUUM: Medium dense to loose, tan-orange, silty SAND (SM), trace mica	S-3	5-8-8 (16)	16				
					S-4	6-8-11 (19)	19				
	10										
			SM		S-5	4-6-8 (14)	14				
	15										
					S-6	5-5-8 (13)	13				
	20										
					S-7	4-4-6 (10)	10				
	25			Boring terminated at 25'							
	30										

NOTES:



PROJECT NAME Golden Park Site
DATE COMPLETED 10/03/2024
DRILLING CONTRACTOR Dodd Drilling
DRILLING METHOD Hollow Stem Auger
CAVE IN N/A

PROJECT NUMBER A24104.01546.000
PROJECT LOCATION Buford, Hall County, Georgia
LOGGED BY Jacob McCord
ELEVATION 1168'
INITIAL GW N.E. **24 HR GW** N/A

Elevation (ft)	Depth (ft)	Graphic Log	USCS	Materials Description	Sample Number	Blow Counts (N-Value)	Uncorrected N-Value	Moisture Content (%)	Liquid Limit	Plasticity Index	Minus #200	
1168				TOPSOIL: 3 inches								
				RESIDUUM: Loose to medium dense, tan, silty SAND (SM), trace mica	S-1	4-4-6 (10)	10					
1165	5		SM		S-2	4-6-7 (13)	13					
1160	10		SM		S-3	5-6-5 (11)	11					
					S-4	5-8-8 (16)	16					
1155	15				S-5	6-9-12 (21)	21					
	15	Boring terminated at 15'										

NOTES:



PROJECT NAME Golden Park Site
DATE COMPLETED 10/03/2024
DRILLING CONTRACTOR Dodd Drilling
DRILLING METHOD Hollow Stem Auger
CAVE IN N/A

PROJECT NUMBER A24104.01546.000
PROJECT LOCATION Buford, Hall County, Georgia
LOGGED BY Jacob McCord
ELEVATION 1168'
INITIAL GW N.E. **24 HR GW** N/A

Elevation (ft)	Depth (ft)	Graphic Log	USCS	Materials Description	Sample Number	Blow Counts (N-Value)	Uncorrected N-Value	Moisture Content (%)	Liquid Limit	Plasticity Index	Minus #200
1168				TOPSOIL: 3 inches							
				RESIDUUM: Loose to medium dense, brown, silty SAND (SM), trace mica	S-1	4-4-5 (9)	9				
1165	5				S-2	5-5-7 (12)	12				
			SM		S-3	13-15-15 (30)	30				
1160	10			Dense to very dense, tan, silty SAND (SM), trace mica	S-4	18-15-21 (36)	36				
1155	15				S-5	20-30-25 (55)	55				
	15.0			Boring terminated at 15'							

NOTES:



PROJECT NAME Golden Park Site
DATE COMPLETED 10/03/2024
DRILLING CONTRACTOR Dodd Drilling
DRILLING METHOD Hollow Stem Auger
CAVE IN N/A

PROJECT NUMBER A24104.01546.000
PROJECT LOCATION Buford, Hall County, Georgia
LOGGED BY Jacob McCord
ELEVATION 1170'
INITIAL GW N.E. **24 HR GW** N/A

Elevation (ft)	Depth (ft)	Graphic Log	USCS	Materials Description	Sample Number	Blow Counts (N-Value)	Uncorrected N-Value	Moisture Content (%)	Liquid Limit	Plasticity Index	Minus #200
1170											
				TOPSOIL: 3 inches							
				RESIDUUM: dense and medium dense, brown, silty SAND (SM), trace mica	S-1	15-15-18 (33)	33				
1165	5		SM		S-2	20-22-18 (40)	40				
					S-3	15-14-15 (29)	29				
1160	10				S-4	14-14-20 (34)	34				
				Boring terminated at 10'							

NOTES:



PROJECT NAME Golden Park Site **PROJECT NUMBER** A24104.01546.000
DATE COMPLETED 10/03/2024 **PROJECT LOCATION** Buford, Hall County, Georgia
DRILLING CONTRACTOR Dodd Drilling **LOGGED BY** Jacob McCord
DRILLING METHOD Hollow Stem Auger **ELEVATION** 1162'
CAVE IN N/A **INITIAL GW** N.E. **24 HR GW** N/A

Elevation (ft)	Depth (ft)	Graphic Log	USCS	Materials Description	Sample Number	Blow Counts (N-Value)	Uncorrected N-Value	Moisture Content (%)	Liquid Limit	Plasticity Index	Minus #200
1162											
				TOPSOIL: 3 inches							
				FILL: Medium dense, tan-brown, silty SAND (SM), trace mica	S-1	4-6-7 (13)	13				
1160					S-2	5-9-9 (18)	18				
	5		SM								
				RESIDUUM: Medium dense, tan, silty SAND (SM), trace mica	S-3	6-8-8 (16)	16				
1155					S-4	6-10-13 (23)	23				
	10			Boring terminated at 10'							
	15										
	20										
	25										
	30										

NOTES:



PROJECT NAME Golden Park Site
DATE COMPLETED 10/03/2024
DRILLING CONTRACTOR Dodd Drilling
DRILLING METHOD Hollow Stem Auger
CAVE IN N/A

PROJECT NUMBER A24104.01546.000
PROJECT LOCATION Buford, Hall County, Georgia
LOGGED BY Jacob McCord
ELEVATION 1164'
INITIAL GW N.E. **24 HR GW** N/A

Elevation (ft)	Depth (ft)	Graphic Log	USCS	Materials Description	Sample Number	Blow Counts (N-Value)	Uncorrected N-Value	Moisture Content (%)	Liquid Limit	Plasticity Index	Minus #200
1164											
				TOPSOIL: 3 inches							
				RESIDUUM: Medium dense, tan, silty SAND (SM), trace mica	S-1	10-8-8 (16)	●				
1160	5		SM		S-2	12-7-10 (17)	●				
					S-3	7-7-5 (12)	●				
1155	10				S-4	5-5-7 (12)	●				
	10.0			Boring terminated at 10'							

NOTES:

Soil Classification Test

Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4318

Laboratory ID# 1534

Report Date: 10/18/2024

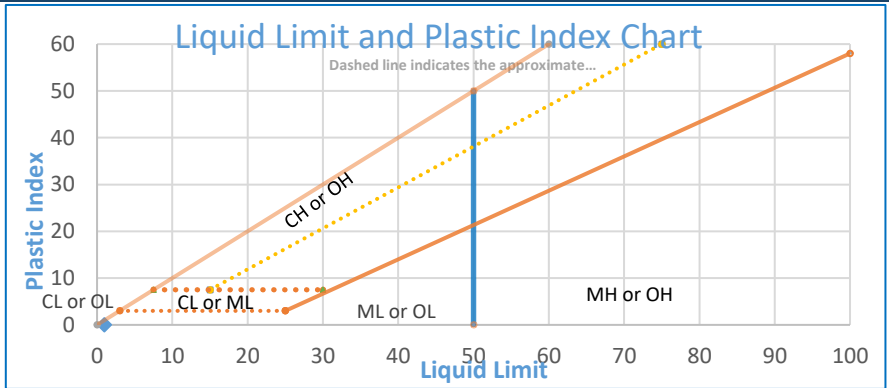
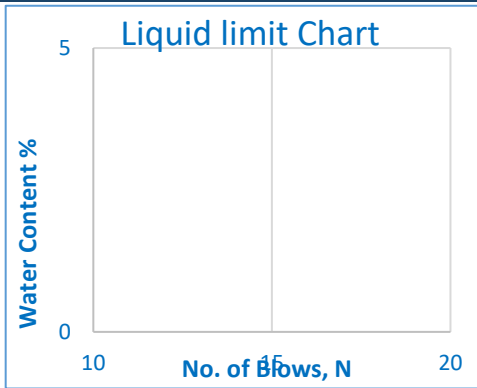
Project Name: GEO-Golden Park Site
Client Name: Aiken Partners Real Estate
Location: Infiltration Test Hole I-1

Project Number: A24104.01546.000
Sample Number: I-1
Depth: 10 feet

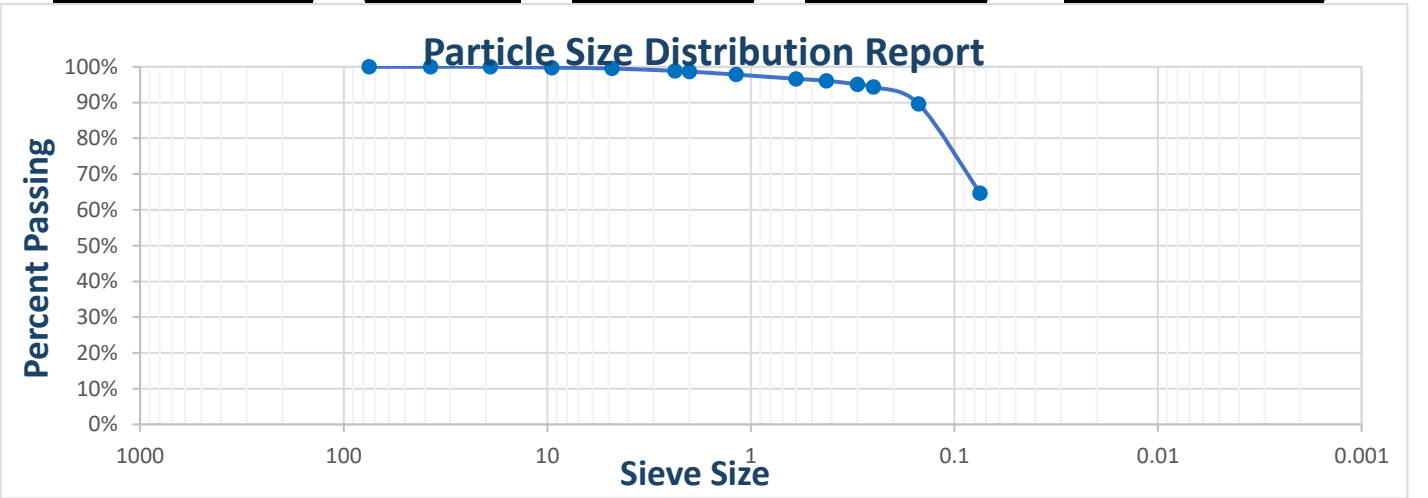
Material Classification

Material Color Description: Brown **Moisture content:** 21.7 **Organic content:** N/A
Classification USCS: ML - Sandy Silt **AASHTO:** A-4

Test Results



Liquid Limit Method	Liquid Limit	Plastic Limit	Plastic Index	Material retained on #40 Sieve
Multi Point	NP	NP	NP	3.92 %



Gravel		Sand			Silts and Clays
Coarse	Fine	Coarse	Medium	Fine	Passing the #200
3" to 3/4"	3/4" to #4	#4 to #10	#10 to #40	#40 to #200	#200
0.0%	0.5%	0.9%	2.6%	31.4%	64.7%

Performed By <u>Grant Ayers</u>	Reviewed By <u>Raymond Delarosa</u>	Reviewed Date <u>10/21/2024</u>
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Soil Classification Test

Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4318

Laboratory ID# 1535

Report Date: 10/18/2024

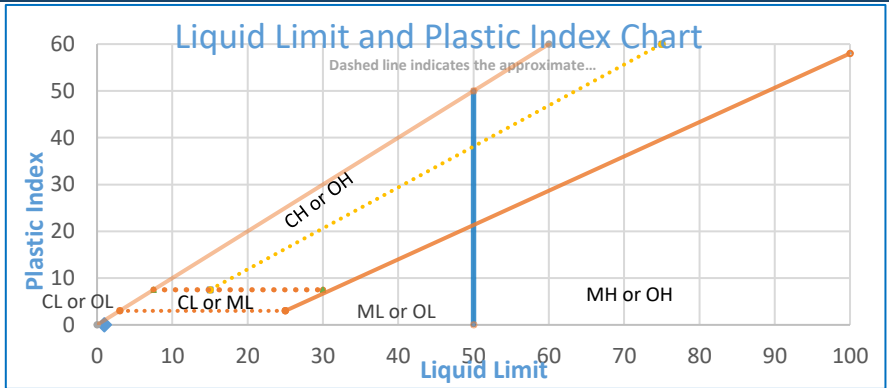
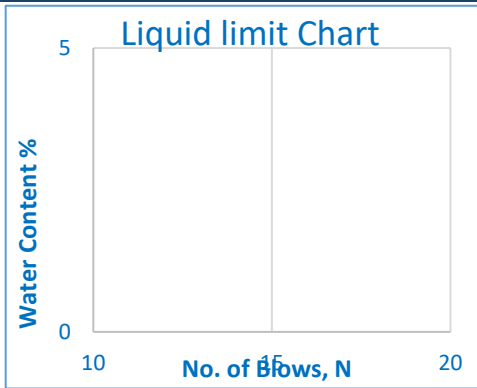
Project Name: GEO-Golden Park Site
Client Name: Aiken Partners Real Estate
Location: Infiltration test hole I-2

Project Number: A24104.01546.000
Sample Number: I-2
Depth: 10 feet

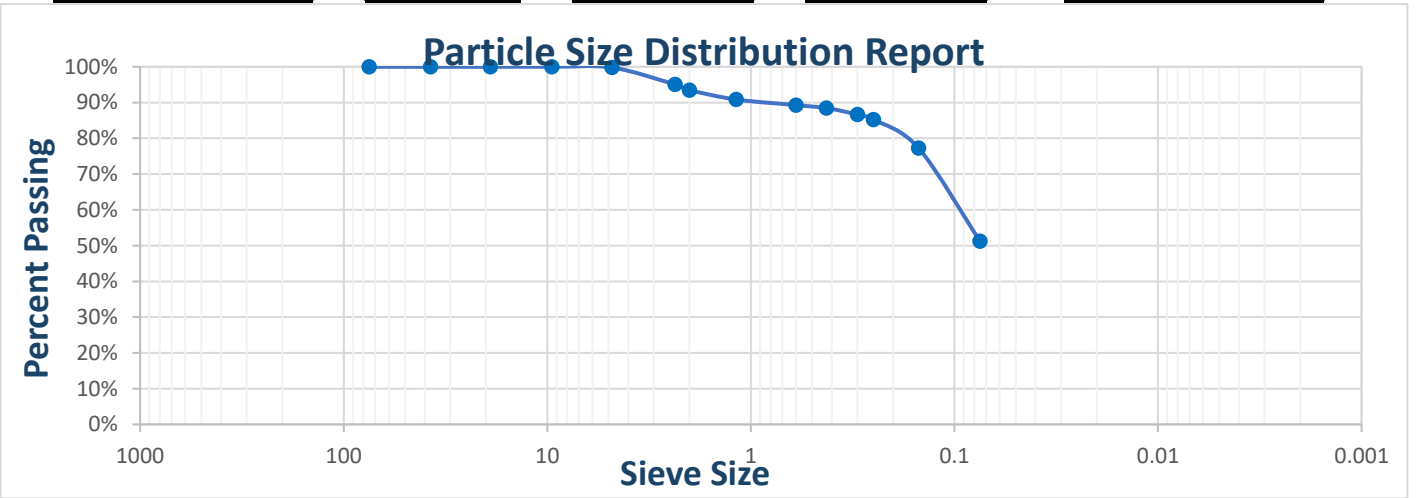
Material Classification

Material Color Description: Tan **Moisture content:** 13.7 **Organic content:** N/A
Classification USCS: ML - Sandy Silt **AASHTO:** A-4

Test Results



Liquid Limit Method	Liquid Limit	Plastic Limit	Plastic Index	Material retained on #40 Sieve
Multi Point	NP	NP	NP	11.56 %



Gravel		Sand			Silts and Clays
Coarse	Fine	Coarse	Medium	Fine	Passing the
3" to 3/4"	3/4" to #4	#4 to #10	#10 to #40	#40 to #200	#200
0.0%	0.2%	6.3%	5.0%	37.2%	51.2%

Performed By <u>Grant Ayers</u>	Reviewed By <u>Raymond Delarosa</u>	Reviewed Date <u>10/22/2024</u>
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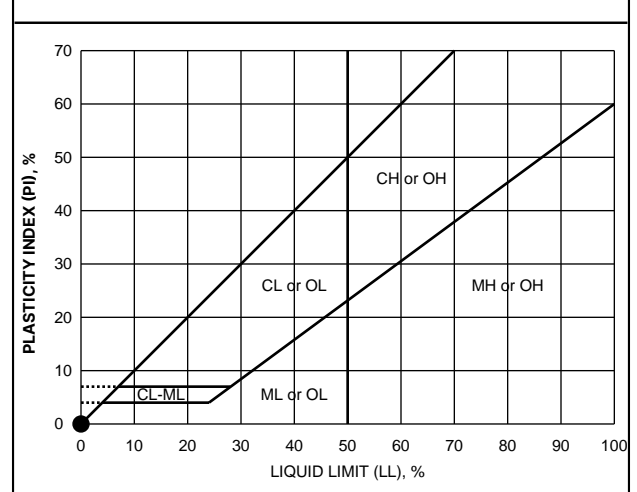
SOIL CLASSIFICATION CHART PER ASTM D 2488

PRIMARY DIVISIONS			SECONDARY DIVISIONS	
			GROUP SYMBOL	GROUP NAME
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	GRAVEL more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL
			GP	poorly-graded GRAVEL
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GW-GM	well-graded GRAVEL with silt
			GP-GM	poorly-graded GRAVEL with silt
			GW-GC	well-graded GRAVEL with clay
			GP-GC	poorly-graded GRAVEL with clay
		GRAVEL with FINES more than 12% fines	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND 50% or more of coarse fraction retained on No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND
			SP	poorly-graded SAND
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SW-SM	well-graded SAND with silt
			SP-SM	poorly-graded SAND with silt
			SW-SC	well-graded SAND with clay
			SP-SC	poorly-graded SAND with clay
		SAND with FINES more than 12% fines	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	SILT and CLAY liquid limit less than 50%	INORGANIC	CL	lean CLAY
			ML	SILT
			CL-ML	silty CLAY
		ORGANIC	OL (PI > 4)	organic CLAY
			OL (PI < 4)	organic CLAY
	SILT and CLAY liquid limit 50% or more	INORGANIC	CH	fat CLAY
			MH	elastic SILT
		ORGANIC	OH (plots on or above 'A'-line)	organic CLAY
			OH (plots below 'A'-line)	organic SILT
		Highly Organic Soils		PT

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		> 12"	> 12"	Larger than basketball-sized
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock-salt-sized to pea-sized
	Medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	< 0.0029"	Flour-sized and smaller

PLASTICITY CHART



APPARENT DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26

Important Information about This Geotechnical-Engineering Report

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

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering 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 given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- 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;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the 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. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be, and, in general, if you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying it.* A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may

perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include 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 personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old*.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration*. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists*.



Telephone: 301/565-2733

e-mail: info@geoprofessional.org www.geoprofessional.org