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REPORT OF GEOTECHNICAL SUBSURFACE EXPLORATION
PROPOSED SEACREST COMMONS
WAXHAW HIGHWAY (HWY 75)
AND N. MARTIN LUTHER KING JR.
MONROE, NORTH CAROLINA

SUMMIT PROJECT NO. 4222.504

Prepared For:

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April 24, 2018

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141 Providence Road
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Subject: **Report of Geotechnical Subsurface Exploration**
Proposed Seacrest Commons
Waxhaw Highway (Hwy 75) and N. Martin Luther King Jr. Boulevard.
Monroe, North Carolina
SUMMIT Project No. 4222.504

Dear Mr. Shriver:

SUMMIT Engineering, Laboratory & Testing, P. C. (**SUMMIT**) has completed a geotechnical subsurface exploration for the Proposed Seacrest Commons site located off of Waxhaw Highway (Hwy 75) and N. Martin Luther King Jr. Boulevard. in Monroe, North Carolina. This exploration was performed in general accordance with our Proposal No. P2017-211-G, dated February 16, 2017. This report contains a brief description of the project information provided to us, general site and subsurface conditions revealed during our geotechnical subsurface exploration and our general recommendations regarding foundation design and construction.

SUMMIT appreciates the opportunity to be of service to you on this project. If you have any questions concerning the information presented herein or if we can be of further assistance, please feel free to call us at (704) 504-1717.

Sincerely yours,
SUMMIT

SUMMIT Engineering, Laboratory & Testing, P.C.
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EXECUTIVE SUMMARY

SUMMIT has completed a geotechnical subsurface exploration for the Proposed Seacrest Commons project. The purpose of this exploration was to obtain general information regarding the subsurface conditions and to provide geotechnical recommendations regarding foundation support of the proposed construction. This exploration consisted of twenty-eight (28) soil test borings (identified as B-1 through B-28). The approximate test locations are shown on the Figure 2 provided in Appendix 1. The following geotechnical engineering information was obtained as a result of the soil test borings:

- **Surface Materials –** Surficial organic soils (topsoil) was observed at the existing ground surface of the borings with thicknesses ranging from approximately 1 to 6 inches.

- **Existing Fill Soils -** Existing fill (disturbed) soils were encountered beneath the surface materials in all of the borings except for Borings B-1, B-14, B-19 and B-20. These fill soils were encountered to depths ranging from approximately 6 to 8 inches below the existing ground surface. When sampled, the existing fill soils generally consisted of lean clays (CL), elastic silts (MH) and sandy silts (ML). Please note that the fill soils encountered in borings are cultivated fill soils. Cultivated fill soil is a layer that was plowed and disturbed for agricultural purposes.

- **Residual Soils -** Residual (undisturbed) soils were encountered below the surface materials and/or existing fill soils and extended to either the maximum termination depth or partially weathered rock (PWR). These residual soils generally consisted of fat clays (CH), lean clays (CL), elastic silts (MH), sandy silts (ML), and silty sands (SM). The Standard Penetration Resistances (SPT N-values) in the residual soils ranged from 3 to greater than 50 bpf.

- **Partially Weathered Rock (PWR) and Auger Refusal –** Partially weathered rock (PWR) conditions were encountered in all of the borings except for Borings B-4, B-14, B-17 and B-22. PWR was encountered at approximate depths ranging from 1.5 to 12 feet below the existing ground surface. Auger refusal conditions were encountered in thirteen (13) of the borings at approximate depths ranging from 3.5 to 13.6 feet below the existing ground surface.

- **Groundwater Levels -** At the time of drilling, groundwater was observed in Boring B-9 at an approximate depth of 4 feet below the existing ground surface. After waiting more than 24 hours, water was observed in Boring B-4 at the top of the boring (Existing ground surface).

- **Foundation Support -** Based on the results of our borings, the proposed structures can be adequately supported on shallow foundations systems provided site preparation and compacted fill recommendation procedures outlined in this report are implemented concerning unsuitable soils such as existing fill (cultivated) soils, fat clays, and soils with N-values less than 7 bpf. An allowable net bearing pressure of up to 2,500 pounds per square foot (psf) can be used for design of the foundations bearing on approved undisturbed residual soils, or on structural fill compacted to at least 95 percent of its Standard Proctor maximum dry density.

- **Seismic Site Class –** We have evaluated the Seismic Site Classification for this project site in accordance with Chapter 16, Section 1613.5.2 of the 2012 North Carolina Building Code, Site Class Definitions using SPT N-Values. We recommend this project be designed using a Seismic Site Class of “C” (Very Dense Soil and Soft Rock) as defined in Table 1613.5.4 Site Class Definitions.

- **Special Construction Considerations:** Special considerations are warranted concerning existing fill soils (cultivated soils), fat clays, soils with SPT N-values less than 7 bpf, and difficult excavation. Dependent on final grades, the contractor can anticipate that some undercutting and/or foundation extension may be necessary through unsuitable soils if encountered during grading and construction. Should these soils be encountered during the grading and construction activities, these soils should be evaluated in the field by a Geotechnical Engineer-of-Record and/or his designee prior to remediation. Additional testing such as test pit excavations and/or hand auger borings may be required in order to further evaluate these soil conditions.

    - Existing Fill (Cultivated) Soils: The existing fill soils encountered in the borings are considered cultivated fill soils. Cultivated fill soil is a layer that was plowed and disturbed for agricultural purposes. Cultivated fill soils are not suitable for building/pavement support and are not suitable to be re-used as structural fill material due to the organics mixed in the soil. However, if approved by the Geotechnical Engineer of Record, these soils may be suitable as structural quality fill material if the organic content in the soil is less than 5% and/or blended with non-organic soils to reduce the organic content.

    - Fat Clays: High plasticity and moisture sensitive (fat clays) soils were encountered Borings B-1, B-5, B-6, B-9, B-11 and B-19 to approximate depths of 1.5 to 3 feet below the existing ground surface. Highly plastic soils can undergo significant changes in volume (shrink/swell behavior) with changes in moisture conditions. These soils typically provide poor subgrade support for pavements and foundations.

    - Soils with SPT N-values less than 7 bpf: Soils that exhibited SPT N-values less than 7 bpf are considered not suitable to support the proposed construction. The majority of these soil conditions were encountered in the upper 1.5 feet of the borings.

    - Difficult Excavation: The result of the borings indicated that the excavation of residual soils for will be possible with conventional excavating techniques. However, please note that partially weathered rock (PWR) conditions were encountered in most of the borings at depths ranging from 1.5 to 12 feet and auger refusal conditions were encountered in thirteen (13) of the borings at depths ranging from 3.5 to 13.6. Dependent on final grades and locations, excavations of PWR, auger refusal conditions may or will require specialized equipment and procedures.

Please note that the information provided in this executive summary is intended to be a brief overview of project information and recommendations from the geotechnical report. The information in the executive summary should not be used without first reading the geotechnical report and the recommendations described therein.

1.0 INTRODUCTION

1.1. Site and Project Description

The Proposed Seacrest Commons site is located off of Waxhaw Highway (Hwy 75) and N. Martin Luther King Jr. Boulevard. in Monroe, North Carolina. A vicinity map showing the project's general location is provided as Figure 1. The subject property is an approximately 106.7-acre tract of land. At the time of our field exploration, the subject site was mostly agricultural fields with some wooded areas, a creek and N. MLK Jr. Boulevard crosses the western portion of the site.

The Client (MT Land) provided **SUMMIT** a plan sheet titled "Street Tree Plan", prepared by R. Joe Harris & Associates, Inc. and dated October 23, 2017 that indicated the configurations of the proposed construction planned for this project. Based on the provided information, we understand the project is planned to include single and multi-family residential structures, paved roadways, underground utilities, and associated storm water structures.

At the time of report preparation, **SUMMIT** had not been provided structural details of the planned construction indicating proposed loads, foundation bearing elevations, or finished floor elevations. For this report, **SUMMIT** assumed the proposed structures will be supported on a shallow foundation system consisting of spread, strip, and/or combined footings and that wall loads will be on the order of 1 to 2 kips per foot. Also, grading plans were not available at the time of this report and we have assumed that maximum cut/fill depths will be on the order of 1 to 3 feet over the existing ground surface.

1.2. Purpose of Subsurface Exploration

The purpose of this exploration was to obtain general geotechnical information regarding the subsurface conditions and to provide general preliminary recommendations regarding the geotechnical aspects of site preparation and foundation design. This report contains the following items:

- General subsurface conditions,
- Boring logs and an approximate “Boring Location Plan”,
- Suitable foundation types,
- Allowable bearing pressures for design of shallow foundations,
- Anticipated excavation difficulties during site grading and/or utility installation,
- Remedial measures to correct unsatisfactory soil conditions during site development, as needed,
- Drainage requirements around structures and under floor slabs, as needed,
- Construction considerations,
- Pavement subgrade support guidelines,
- Seismic Site Classification.

2.0 EXPLORATION PROCEDURES

2.1. Field Exploration

SUMMIT visited the site on April 4, 5, and 6, 2018 and performed a geotechnical subsurface exploration that consisted of twenty-eight (28) soil test borings (identified as B-1 through B-28). The approximate locations of the borings are shown on the Figure 2 - "Boring Location Plan" provided in Appendix 1. The borings were located by professionals from our office using the provided plans, recreation-grade handheld GPS, existing topography, and aerial maps as reference. Since the boring locations were not surveyed, the location of the borings should be considered approximate.

The soil test borings were performed using an ATV-mounted CME 550X drill rig and extended to approximate depths of 3.5 to 15 feet below the existing ground surface. Hollow-stem, continuous flight auger drilling techniques were used to advance the borings into the ground. Standard Penetration Tests (SPT) were performed within the mechanical borings at designated intervals in general accordance with ASTM D 1586. The SPT "N" value represents the number of blows required to drive a split-barrel sampler 12 inches with a 140-pound hammer falling from a height of 30 inches. When properly evaluated, the SPT results can be used as an index for estimating soil strength and density. In conjunction with the penetration testing, representative soil samples were obtained from each test location and returned to our laboratory for visual classification and potential laboratory testing. Water level measurements were attempted at the termination of drilling. The results of these tests are presented on the individual boring logs provided in Appendix 2 at the respective test depth.

2.2. Laboratory Services

The collected soil samples were transported to **SUMMIT**'s laboratory to be visually examined and classified by a qualified geotechnical professional in general accordance with the Unified Soil Classification System (USCS) and ASTM D 2488. The results of visual classification are depicted on the Boring Logs provided in Appendix 2.

3.0 AREA GEOLOGY AND SUBSURFACE CONDITIONS

3.1. Physiography and Area Geology

The subject property is located in Monroe, North Carolina, which is located in the south central Piedmont Physiographic Province. The Piedmont Province generally consists of well-rounded hills and ridges which are dissected by a well-developed system of draws and streams. The Piedmont Province is predominantly underlain by metamorphic rock (formed by heat, pressure and/or chemical action) and igneous rock (formed directly from molten material) which were initially formed during the Precambrian and Paleozoic eras. The volcanic and sedimentary rocks deposited in the Piedmont Province during the Precambrian era were the host of the metamorphism and were generally changed to gneiss and schist. The more recent Paleozoic era had periods of igneous emplacement, with episodes of regional metamorphism resulting in the majority of the rock types seen today.

The topographic relief found throughout the Piedmont Province has developed from differential weathering of theses igneous and metamorphic rock formations. Ridges developed along the more easily weathered and erodible rock. Because of the continued chemical and physical weathering, the rocks in the Piedmont Province are generally covered with a mantle of soil that has weathered in-place from the parent bedrock below. These soils have variable thicknesses and are referred to as residual soils, as they are the result of in-place weathering. Residual soils are typically fine-grained and have a higher clay content near the ground surface because of the advanced weathering. Similarly, residual soils typically become more coarse-grained with increasing depth because of decreased weathering. As weathering decreases with depth, residual soils generally retain the overall appearance, texture, gradation and foliations of their parent rock.

3.2. Generalized Subsurface Stratigraphy

General subsurface conditions observed during our geotechnical exploration are described herein. For more detailed soil descriptions and stratifications at a particular field test location, the respective “Boring Logs”, provided in Appendix 2 should be reviewed. The horizontal stratification lines designating the interface between various strata represent approximate boundaries. Transitions between different strata in the field may be gradual in both the horizontal and vertical directions. Therefore, subsurface stratigraphy between test locations may vary.

3.2.1. Surface Materials

Surficial organic soils (topsoil) was observed at the existing ground surface of the borings with thicknesses ranging from approximately 1 to 6 inches. The surficial organic soil depths provided in this report and on the individual "Boring Logs" are based on observations of field personnel and should be considered approximate. Please note that the transition from surficial organic soils to underlying materials may be gradual, and therefore the observation and measurement of the surficial organic soil depth is subjective. Actual surficial organic soil depths should be expected to vary and generally increases with the amount of vegetation present over the site.

Surficial Organic Soil is typically a dark-colored soil material containing roots, fibrous matter, and/or other organic components, and is generally unsuitable for engineering purposes. **SUMMIT** has not performed any laboratory testing to determine the organic content or other horticultural properties of the observed surficial organic soils. Therefore, the phrase "surficial organic soil" is not intended to indicate suitability for landscaping and/or other purposes.

3.2.2. Alluvial Soils

Alluvial (water-deposited) soils were not encountered in any of the borings performed during this exploration. Alluvial soils are typically encountered in or near drainage features, gullies/ditches, creeks and in low-lying areas. Alluvial soils are generally loose and/or under-compacted and, as such, are typically unsuitable as bearing soils. Therefore, remediation may be required wherever alluvial soils are encountered during grading activities. If these soils are encountered during site grading activities, the extent of the alluvial soils should be evaluated in the field by the Geotechnical Engineer-of-Record or his qualified representative. Additional testing such as test pit excavations and/or hand auger borings may be required in order to further evaluate the alluvial soils.

3.2.3. Existing Fill Soils

Existing fill (disturbed) soils were encountered beneath the surface materials in all of the borings except for Borings B-1, B-14, B-19 and B-20. These fill soils were encountered to depths ranging from approximately 6 to 8 inches below the existing ground surface. When sampled, the existing fill soils generally consisted of lean clays (CL), elastic silts (MH) and sandy silts (ML). Please note that the existing fill soils encountered in the borings are cultivated fill soils. Cultivated fill soil is a layer that was plowed and disturbed for agricultural purposes. Typically, cultivated fill soils are not suitable for building/pavement support and are not suitable to be re-used as structural fill material due to the organics mixed in the soil. If these soils are encountered during the grading activities, the extent of the cultivated soils should be evaluated in the field by a Geotechnical Engineer-of-Record and/or an experienced staff professional. Additional testing such as test pit excavations and/or hand auger borings may be required in order to further evaluate these soil conditions.

If fill soils are encountered at other locations in the field during construction, the fill soils should be evaluated by the Geotechnical Engineer-of-Record, or his authorized representative, with respect to the criteria outlined in Section 5.0 – Construction Considerations.

3.2.4. Residual Soils

Residual (undisturbed) soils were encountered below the surface materials and/or existing fill soils and extended to either the maximum termination depth or partially weathered rock (PWR). These residual soils generally consisted of soft to stiff fat clays (CH), soft to very stiff lean clays (CL), firm to hard elastic silts (MH), firm to very hard sandy silts (ML), and medium dense to very dense silty sands (SM) with varying amount of rock fragments. The Standard Penetration Resistances (SPT N-values) in the residual soils ranged from 3 to greater than 50 bpf.

3.2.5. Partially Weathered Rock and Auger Refusal

Partially weathered rock (PWR) conditions were encountered in all of the borings except for Borings B-4, B-14, B-17 and B-22. PWR was encountered at approximate depths ranging from 1.5 to 12 feet below the existing ground surface. PWR is defined as soil-like material exhibiting SPT N-values in excess of 100 bpf. When sampled, the PWR generally breaks down into sandy silts and silty sands with rock fragments.

Auger refusal conditions were encountered in thirteen (13) of the borings at approximate depths ranging from 3.5 to 13.6 feet below the existing ground surface. Auger refusal is defined as material that could not be penetrated by the drilling equipment used during our field exploration. Materials that might result in auger refusal include large boulders, rock ledges, lenses, seams or the top of parent bedrock. Core drilling techniques would be required to evaluate the character and continuity of the refusal material. However, rock coring was beyond the scope of this exploration and not performed.

The following table summarizes the location and approximate depths that PWR and auger refusal conditions were encountered in the borings performed for this exploration.

Summary Table of Partially Weathered Rock and Auger Refusal Depths

Boring	Partially Weathered Rock Approx. Depth, (feet)*	Auger Refusal Approx. Depth, (feet)*
B-1	12	13.6
B-2	5.5	---
B-3	12	---
B-5	5.5	---
B-6	2	6
B-7	3	6
B-8	3	13.6
B-9	3	5.5
B-10	5.5	12
B-11	12	---
B-12	1.5	---
B-13	5.5	---
B-15	5.5	8.6
B-16	3	---
B-18	3	6.1
B-19	5.5	13.5
B-20	1.5	3.5
B-21	12	---
B-23	1.5	8.6
B-24	5.5	---
B-25	1.5	8.6
B-26	3	8.6
B-27	5.5	---
B-28	1.5 to 3 and 5.5	---

*Depths were measured from the ground surface existing at the time drilling was performed.
“---“ When PWR or auger refusal conditions were not encountered in the borings.

3.2.6. Groundwater Level Measurements

At the time of drilling, groundwater was observed in Boring B-9 at an approximate depth of 4 feet below the existing ground surface. After waiting more than 24 hours, water was observed in Boring B-4 at the top of the boring (Existing ground surface).

It should be noted that groundwater levels tend to fluctuate with seasonal and climatic variations, as well as with some types of construction operations. Therefore, water may be encountered during construction at depths not indicated in the borings performed for this exploration.

4.0 EVALUATIONS AND RECOMMENDATIONS

4.1. General

Our preliminary evaluation and recommendations are based on the project information outlined previously and on the data obtained from the field and laboratory testing program. If the structural loading, geometry, or proposed building locations are changed or significantly differ from those outlined, or if conditions are encountered during construction that differ from those encountered by the borings, **SUMMIT** requests the opportunity to review our recommendations based on the new information and make the necessary changes.

Grading plan information with proposed foundation bearing elevations was not available for our review at the time of this report. Finish grade elevations of proposed construction in conjunction with the proposed foundation bearing elevation can have a significant effect on design and construction considerations. **SUMMIT** should be provided the opportunity to review the project grading plans prior to their finalization with respect to the recommendations contained in this report.

4.2. Shallow Foundation Recommendations

Based on the results of the soil test borings, and our assumptions regarding site grading and assumed structural building loads, the proposed structures can be adequately supported on shallow foundation systems provided site preparation and compacted fill recommendation procedures outlined in this report are implemented concerning unsuitable soils such as existing fill (cultivated) soils, fat clays, and soils with N-values less than 7 bpf. An allowable net bearing pressure of up to 2,500 pounds per square foot (psf) can be used for design of the foundations bearing on approved undisturbed residual soils, or on approved structural fill compacted to at least 95 percent of its Standard Proctor maximum dry density. Please refer to sections 4.6 and 5.0 of this report for more information.

Provided the procedures and recommendations outlined in this report are implemented and using the assumed loads, we have estimated a total settlement of less than 1 inch for footing design pressures of 2,500 psf.

To avoid punching type bearing capacity failure, we recommend wall foundation widths of 18 inches or more. Exterior foundations and foundations in unheated areas should be designed to bear at least 12 inches below finished grade for frost protection. To reduce the effects of seasonal moisture variations in the soils, for frost protection and for bearing capacity, it is recommended that all foundations be embedded at least 12 inches below the lowest adjacent grade.

All footing excavations and undercutting remediation operations should be evaluated by the Geotechnical Engineer-of-Record or his qualified representative to confirm that suitable soils are present at and below the proposed bearing elevation and that the backfill operations are completed with the recommendations of this report. This evaluation may include hand-auger and DCP testing. If evaluation with DCP testing encounters lower penetration resistances than anticipated or unsuitable materials are observed beneath the footing excavations, these bearing soils should be corrected per the Geotechnical Engineer-of-Record's recommendations.

4.3. Retaining Wall Recommendations

Design Parameters for backfill properties (i.e., friction angle, earth pressure coefficients) should use the values in the table below. These parameters are based on suitable soils with a minimum moist unit weight of 120 pcf. **SUMMIT** should be retained to test the actual soils used for construction to verify these design assumptions. To reduce long term creep or deflections to the wall system, desirable wall backfill soils should be used. These include non-plastic, granular soils (sands and gravels). However, these soils may not be available on site.

Soil Parameters for Wall Backfill

Backfill Type	Allowable Bearing Capacity (psf)	Friction Angle (deg)	Modulus of Subgrade Reaction (pci)	Active Earth Pressure Coefficient K_a	Passive Earth Pressure Coefficient Kp	Coefficient of Earth Pressure at Rest Ko	Slide Friction
Residuum	2,500	28°	200	0.361	2.77	0.531	0.4
Fill	2,500	24°	150	0.421	2.37	0.593	0.4

Soils classified as elastic silts (MH) and/or fat clays (CH) shall not be used for wall backfill or in the retained zone as shown in Table 1610.1 of the 2015 IBC. If on-site soils are used as backfill within the reinforced zone, the wall designer should address the need for wall drainage and the possibility of long-term, time-dependent movement or creep in their design.

At the time of report preparation, we were not provided retaining wall plans or specifications. Therefore, we request the opportunity to review the wall plans and specifications once they are finalized. Also, we recommend an external stability analysis (including global stability) of the proposed wall(s) be conducted once the site layout and wall geometry is complete.

4.4. Seismic Site Class

SUMMIT has evaluated the Seismic Site Classification for this project site in accordance with Chapter 16, Section 1613.5.2 of the 2012 North Carolina Building Code, Site Class Definitions using SPT N-Values. We recommend this project be designed using a Seismic Site Class of “C” (Very Dense Soil and Soft Rock) as defined in Table 1613.5.4 Site Class Definitions.

Design of the planned improvements should be performed in accordance with the requirements of the governing jurisdictions and applicable building codes. The table below presents the seismic design parameters for the project site in accordance with the 2006/09 IBC guidelines and adjusted maximum considered earthquake spectral response acceleration parameters as provided by a web-based program titled, “U.S. Seismic Design Maps” published by the United States Geological Survey.

2015 Seismic Design Criteria

Site Coefficients and Spectral Response Acceleration Parameters	**Values**
Site Class	C
Site Coefficient, F_a	1.200
Site Coefficient, F_v	1.685
Mapped Spectral Acceleration at 0.2-second Period, S_s	0.362 g
Mapped Spectral Acceleration at 1.0-second Period, S_1	0.115 g
Spectral Acceleration at 0.2-second Period Adjusted for Site Class, S_{MS}	0.434 g
Spectral Acceleration at 1.0-second Period Adjusted for Site Class, S_{M1}	0.194 g
Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	0.289 g
Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	0.130 g
Parameters for Latitude: 34.977473°N and Longitude: -80.579826 °W	

4.5. Low to Moderate Plasticity Moisture Sensitive Soils (CL and MH)

Low to moderate plasticity and moisture sensitive (lean clays and elastic silts) soils were encountered in approximately half of the borings. These materials, in their present state, are suitable for direct support of the foundation elements. However, these fined grained soils are susceptible to moisture intrusion and can become soft when exposed to weather and/or water infiltration. Consequently, some undercutting and/or reworking (drying) of the near-surface soils may be required depending upon the site management practices and weather conditions present during construction.

Should these materials be left in-place, special consideration should be given to providing positive drainage away from the structure and discharging roof drains a minimum of 5 feet from the foundations to reduce infiltration of surface water to the subgrade materials.

Note: Since Low to Moderate Plasticity and Moisture Sensitive Soils can become remolded (i.e., softened) under the weight of repeated construction traffic and changes in moisture conditions, these soils should be evaluated and closely monitored by the Geotechnical Engineer-of-Record or his qualified representative prior to and during fill placement. Additional testing and inspections of moisture sensitive soils may be warranted such as laboratory testing, field density (compaction) testing, hand auger borings with dynamic cone penetrometer (DCP) testing and/or test pit excavations.

4.6. High Plasticity Moisture Sensitive Soils (CH)

High plasticity and moisture sensitive (fat clays) soils were encountered Borings B-1, B-5, B-6, B-9, B-11 and B-19 to approximate depths of 1.5 to 3 feet below the existing ground surface. Highly plastic soils can undergo significant changes in volume (shrink/swell behavior) with changes in moisture conditions. These soils typically provide poor subgrade support for pavements and foundations.

The highly plastic materials encountered in the borings are typically not considered suitable for building or pavement subgrade support. Depending on final subgrade elevations, we recommend the highly plastic soils be undercut from beneath foundations and pavements so that the foundation elements bear on 3 feet or more of engineered fill and pavements are supported on 1½ feet or more of engineered fill, creating a separation between the foundation elements/pavements and the underlying highly plastic soils.

The presence of the high plasticity materials can adversely affect the performance of the foundation and pavement systems. Due to the presence of highly plastic soils at the project site, we recommend the following be implemented by the design team:

1. The high plasticity materials should be undercut from all structural and pavement areas. The undercut subgrades should be evaluated by a staff professional upon completion of undercut operations. Once the evaluation is completed and the subgrade appears suitable, structural fill should be placed to subgrade elevation.

2. Three (3) feet of separation should be provided between the high plasticity materials and foundations and one and one-half (1½) feet of separation on pavement areas. The separation material should consist of approved structural fill materials

3. Lime stabilization techniques could be utilized in order to lower the plasticity of the referenced soils in-place and minimize any undercut. These techniques should extend to a depth of at least 3 feet below finished floor elevation of the building and at least 1.5 feet on pavement areas. It should be noted that the success of lime stabilization techniques is highly dependent upon the means and methods utilized by the contractor.

4. If the expansive soils are not undercut from beneath the structures or adequate separation is not provided, the building foundations could be designed to either penetrate the expansive soils or should be designed to resist the differential volume and prevent structural damage. Slab-on-grades should be designed as structural slabs for the expansive soils in accordance with WRI/CRSI Design of Slab-on-Ground Foundations or PTI Design and Construction of Post-Tensioned Slabs-on-Ground.

4.7. Wet Weather Conditions

Contractors should be made aware of the moisture sensitivity of the near soils and potential compaction difficulties. If construction is undertaken during wet weather conditions, the surficial soils may become saturated, soft, and unworkable. The contractor can anticipate reworking and/or recompacting soils may be needed when excessive moisture conditions occur. Additionally, subgrade stabilization techniques, such as chemical (lime or lime-fly ash) treatment, may be needed to provide a more weather-resistant working surface during construction. Therefore, we recommend that consideration be given to construction during the dryer months.

Surface runoff should be drained away from excavations and not allowed to pond. Concrete for foundations should be placed as soon as practical after the excavation is made. That is, the exposed foundation soils should not be allowed to become excessively dry or wet before placement of concrete. Bearing soils exposed to moisture variations may become highly disturbed resulting in the need for undercutting prior to placement of concrete. If excavations must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, we recommend that a 2- to 4-inch-thick “mud-mat” of lean (2000 psi) concrete be placed on the bearing soils before work stops for the night.

4.8. Floor Slabs

Slab-on-grade floor systems may be supported on approved residual soils, or newly compacted fill, provided the site preparation and fill placement procedures outlined in this report are implemented. Depending upon the amount of cuts and/or fills, unsuitable soils such as existing fill soils (cultivated soils), fat clays, and soils with N-values less than 7 bpf may require remediation as described in Sections and 4.6 and 5.2. We recommend floor slabs be isolated from other structural components to allow independent movement of the slab and the building foundation elements.

Immediately prior to constructing a floor slab, the areas should be proof-rolled to detect any softened, loosened or disturbed areas that may have been exposed to wet weather or construction traffic. Areas that are found to be disturbed or indicate pumping action during the proof-rolling should be undercut and replaced with adequately compacted structural fill. This proof-rolling should be observed by the staff professional or a senior soils technician under his/her direction. Proof-rolling procedures are outlined in the “Site Preparation” section of this report.

SUMMIT recommends that special care be given to providing adequate drainage away from the building areas to reduce infiltration of surface water to the subgrade materials. If these materials are allowed to become saturated during the life of the slab section, a strength reduction of the materials may result causing a reduced life of the section.

4.9. Pavements Subgrade Preparation

The pavement sections can be adequately supported on approved non-high plasticity residual soils, or newly compacted fill, provided the site preparation and fill placement procedures outlined in this report are implemented. Immediately prior to constructing the pavement section, we recommend that the areas be proofrolled to detect any softened, loosened or disturbed areas that may have been exposed to wet weather or construction traffic. Areas that are found to be disturbed or indicate instability during the proofrolling should be undercut and replaced with adequately compacted structural fill or repaired as recommended by the Geotechnical Engineer. This proofrolling should be observed by the staff professional or a senior soils technician under his/her direction. Proofrolling procedures are outlined in the “Site Preparation” section of this report.

Due to prevalence of near surface moderate to high plasticity elastic silts and fat clays, remediation of pavement subgrade soils may be recommended (as determined by the Geotechnical Engineer during construction) including undercutting and replacement with additional NCDOT ABC stone. Alternatively, lime stabilization of pavement subgrade may be a more economical option and **SUMMIT** can provide lime stabilization mix design services if requested. This may be more pronounced depending on the time of the year and seasonal conditions at the time of pavement construction. We recommend contingency for some remediation efforts for the subgrade soils be considered during the planning stage.

4.10. Cut and Fill Slopes

Permanent project slopes should be designed with geometry of 3 horizontal to 1 vertical or flatter. The tops and bases of all slopes should be located 10 feet or more from structural limits and 5 feet or more from parking limits. Fill slopes should be properly compacted according to the recommendations provided in this report. In addition, fill slopes should be overbuilt and cut to finished grade during construction to achieve proper compaction on the slope face. All slopes should be seeded and maintained after construction and adhere to local, state and federal municipal standards, if applicable.

5.0 CONSTRUCTION CONSIDERATIONS

5.1. Abandoned Utilities/Structures

SUMMIT recommends that any existing utility lines and foundations be removed from within proposed building and pavement areas. The utility backfills and foundation material should be removed and the subgrade in the excavations should be evaluated by a geotechnical professional prior to fill placement. The subgrade evaluation should consist of visual observations, probing with a steel rod and/or performing hand auger borings with Dynamic Cone Penetrometer tests to evaluate their suitability of receiving structural fill. Once the excavations are evaluated and approved, they should be backfilled with adequately compacted structural fill. Excavation backfill under proposed new foundations should consist of properly compacted structural fill, crushed stone, flowable fill or lean concrete as approved by the Geotechnical Engineer-of-Record.

5.2. Site Preparation

Based on the results of our borings, and dependent on final grades, the contractor can anticipate that some undercutting and/or foundation extension through existing fill (cultivated soils), fat clays, and soils with N-values less than 7 bpf may be required prior to building construction and/or fill placement. If these soils are encountered during the grading activities, the extent of the undercut required should be determined in the field by the Geotechnical Engineer-of-Record and/or an experienced staff professional. Additional testing such as test pit excavations and/or hand auger borings may be required in order to further evaluate these soil conditions.

Topsoil, organic laden/stained soils, and other unsuitable materials should be stripped/removed from the proposed construction limits. Stripping and clearing should extend 10 feet or more beyond the planned construction limits. Upon completion of the stripping operations, we recommend areas planned for support of foundations, floor slabs, parking areas and structural fill be proof-rolled with a loaded dump truck or similar pneumatic tired vehicle (minimum loaded weight of 20 tons) under the observations of a staff professional. After excavation of the site has been completed, the exposed subgrade in cut areas should also be proof-rolled. The proof-rolling procedures should consist of four complete passes of the exposed areas, with two of the passes being in a direction perpendicular to the proceeding ones. Any areas which deflect, rut or pump excessively during proof-rolling or fail to “tighten up” after successive passes should be undercut to suitable soils and replaced with compacted fill.

The extent of any undercut required should be determined in the field by an experienced staff professional or engineer while monitoring construction activity. After the proof-rolling operation has been completed and approved, final site grading should proceed immediately. If construction progresses during wet weather, the proof-rolling operation should be repeated after any inclement weather event with at least one pass in each direction immediately prior to placing fill material or aggregate base course stone. If unstable conditions are experienced during this operation, then undercutting or reworking of the unstable soils may be required.

5.3. Difficult Excavation

Based on the results of our soil test borings it appears that some of the excavations for footings and shallow utilities will be possible with conventional excavating techniques. The contractor can anticipate that the residual and existing fill soils can be excavated using pans, scrapers, backhoes, and front end loaders. However, dependent on final grades and locations, excavations of partially weathered rock (PWR) and auger refusal materials may or will require specialized equipment and procedures in order to excavate footings and shallow utilities within these areas and/or area of similar conditions.

Partially weathered rock (PWR) conditions were encountered in most of the borings at depths ranging from 1.5 to 12 feet and auger refusal conditions were encountered in thirteen (13) of the borings at depths ranging from 3.5 to 13.6 feet. The depth and thickness of partially weathered rock, boulders, and rock lenses or seams can vary dramatically in short distances and between the boring locations; therefore, soft/hard weathered rock, boulders or bedrock may be encountered during construction at locations or depths, between the boring locations, not encountered during this exploration.

The table below may be used as a quick reference for rippability of in-place materials.

Summary of Rippability Based on SPT N-Values

N-Values as Shown on Boring Logs	Description of N-Values	Anticipated Rippability
60 < N-Value	N-values less than 60 bpf	These materials may generally be excavated with heavy-duty equipment such as a Caterpillar D-8 with a single-shank ripper
60 < N-Value < 50/3”	N-values more than 60 bpf, but less than 50 blows per 3 inches of penetration	These materials are considered marginally excavatable, even with heavy-duty equipment.
50/3” < N-Value	N-values more than 50 blows per 3 inches of penetration	Blasting and/or removal with impact hammers is typically required to excavate these materials.
*This table is for general information only. Actual rippability is dependent upon many other factors as stated above.		

Care should be exercised during excavations for footings on rock to reduce disturbance to the foundation elevation. The bottom of each footing should be approximately level. When blasting is utilized for foundation excavation in rock, charges should be held above design grades. Actual grades for setting charges should be selected by the contractor and he should be responsible for any damage caused by the blasting. All loose rock should be carefully cleaned from the bottom of the excavation prior to pouring concrete. Footing excavations in which the rock subgrade has been loosened due to blasting should be deepened to an acceptable bearing elevation.

In our professional opinion, a clear and appropriate definition of rock should be included in the project specifications to reduce the potential for misunderstandings. A sample definition of rock for excavation specifications is provided below:

> *Rock is defined as any material that cannot be dislodged by a Caterpillar D-8 tractor, or equivalent, equipped with a hydraulically operated power ripper (or by a Cat 325 hydraulic backhoe, or equivalent) without the use of drilling and blasting. Boulders or masses of rock exceeding ½ cubic yard in volume shall also be considered rock excavation. This classification does not include materials such as loose rock, concrete, or other materials that can be removed by means other than*

drilling and blasting, but which for any reason, such as economic reasons, the Contractor chooses to remove by drilling and blasting.

5.4. Temporary Excavation Stability

Localized areas of soft or unsuitable soils not detected by our borings, or in unexplored areas, may be encountered once grading operations begin. Vertical cuts in these soils may be unstable and may present a significant hazard because they can fail without warning. Therefore, temporary construction slopes greater than 5 feet in height should not be steeper than two horizontal to one vertical (2H:1V), and excavated material should not be placed within 10 feet of the crest of any excavated slope. In addition, runoff water should be diverted away from the crest of the excavated slopes to prevent erosion and sloughing.

Should excavations extend below final grades, shoring and bracing or flattening (laying back) of the slopes may be required to obtain a safe working environment. Excavation should be sloped or shored in accordance with local, state and federal regulations, including OSHA (29 CFR Part 1926) excavation trench safety standards.

5.5. Structural Fill

Soil to be used as structural fill should be free of organic matter, roots or other deleterious materials. Structural fill should have a plasticity index (PI) less than 25 and a liquid limit (LL) less than 50 or as approved by the Geotechnical Engineer-of-Record. Compacted structural fill should consist of materials classified as either CL, ML, SC, SM, SP, SW, GC, GM, GP, or GW per ASTM D-2487 or as approved by the Geotechnical Engineer-of-Record. Off-site borrow soil should also meet these same classification requirements. Non-organic, low-plasticity on-site soils are expected to meet this criterion. However, successful reuse of the excavated, on-site soils as compacted structural fill will depend on the moisture content of the soils encountered during excavation. We anticipate that scarifying and drying of portions of the on-site soils will be required before the recommended compaction can be achieved. Drying of these soils will likely result in some delay.

All structural fill soils should be placed in thin (not greater than 8 to 12 inches) loose lifts and compacted to a minimum of 95 percent of the soil's Standard Proctor maximum dry density (ASTM D 698) at near optimum moisture content (±2%). The upper 1 foot of structural fill within the parking and drive areas should be compacted to a minimum of 100 percent of the soil's Standard Proctor maximum dry density (ASTM D 698) at near optimum moisture content. Some manipulation of the moisture content (such as wetting, drying) may be required during the filling operation to obtain the required degree of compaction. The manipulation of the moisture content is highly dependent on weather conditions and site drainage conditions. Therefore, the grading contractor should be prepared to both dry and wet the fill materials to obtain the specified compaction during grading. Sufficient density tests should be performed to confirm the required compaction of the fill material.

5.6. Suitability of Excavated Soils for Re-Use

Fat clays and existing fill (cultivated) soils are typically classified as “unsuitable” to use as structural fill materails. These soils may be utilized as non-structural fill and backfill at landscaped or non-pavement areas of the project. We recommend non-structural fill to be compacted to at least 92 percent of the soil’s Standard Proctor Maximum Dry Density to reduce settlement of the fill soils particularly over utility trenches.

Please note that, if approved by the Geotechnical Engineer-of-Record, the high plasticity (fat clays) soils encountered during general site grading can be mixed/blended and/or mixed with lower plasticity soils and used as structural fill. Also, the cultivated soils may be suitable as structural quality fill material if the organic content in the soil is less than 5% and/or blended with non-organic soils to reduce the organic content. We recommend that mixed soils be used below the top five (5) feet at deeper fill locations and adequate drainage be provided away from structural and pavement areas. The top five (5) feet should consist of materials classified as either CL, ML, SC, SM, SP, SW, GC, GM, GP or GW per ASTM D-2487 or as approved by the Geotechnical Engineer-of-Record. All fill soils should be placed in thin (not greater than 8 to 12 inches) loose lifts and compacted to a minimum of 95 percent of the soil’s Standard Proctor maximum dry density (ASTM D 698) at near optimum moisture content (±2%).

We assumed that the limits of the excavation will be stripped of existing pavements, above and below ground obstructions, stumps, root systems, and organic surface soils (topsoil) and discarded. The thickness of organic surface soils (topsoil) encountered at soil test boring locations are indicated on the soil test boring logs included in the Appendix of this report.

5.7. Engineering Services During Construction

As stated previously, the engineering recommendations provided in this report are based on the project information outlined above and the data obtained from field and laboratory tests. However, unlike other engineering materials like steel and concrete, the extent and properties of geologic materials (soil) vary significantly. Regardless of the thoroughness of a geotechnical engineering exploration, there is always a possibility that conditions between borings will be different from those at the boring locations, that conditions are not as anticipated by the designers, or that the construction process has altered the subsurface conditions. This report does not reflect variations that may occur between the boring locations. Therefore, conditions on the site may vary between the discrete locations observed at the time of our subsurface exploration.

The nature and extent of variations between the borings may not become evident until construction is underway. To account for this variability, professional observation, testing and monitoring of subsurface conditions during construction should be provided as an extension of our engineering services. These services will help in evaluating the Contractor's conformance with the plans and specifications. Because of our unique position to understand the intent of the geotechnical engineering recommendations, retaining us for these services will also allow us to provide consistent service through the project construction. Geotechnical engineering construction observations should be performed under the supervision of the Geotechnical Engineer-of-Record from our office who is familiar with the intent of the recommendations presented herein. This observation is recommended to evaluate whether the conditions anticipated in the design actually exist or whether the recommendations presented herein should be modified where necessary. Observation and testing of compacted structural fill and backfill should also be provided by our firm.

6.0 RELIANCE AND QUALIFICATIONS OF REPORT

This geotechnical subsurface exploration has been provided for the sole use of MT Land. This geotechnical subsurface exploration should not be relied upon by other parties without the express written consent of **SUMMIT** and MT Land.

The analyses and recommendations submitted in this report were based, in part, on data obtained from this exploration. If the above-described project conditions are incorrect or changed after the issuing of this report, or subsurface conditions encountered during construction are different from those reported, **SUMMIT** should be notified and these recommendations should be re-evaluated based on the changed conditions to make appropriate revisions. We have prepared this report according to generally accepted geotechnical engineering practices. No warranty, express or implied, is made as to the professional advice included in this report.

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APPENDIX 1 – Figures

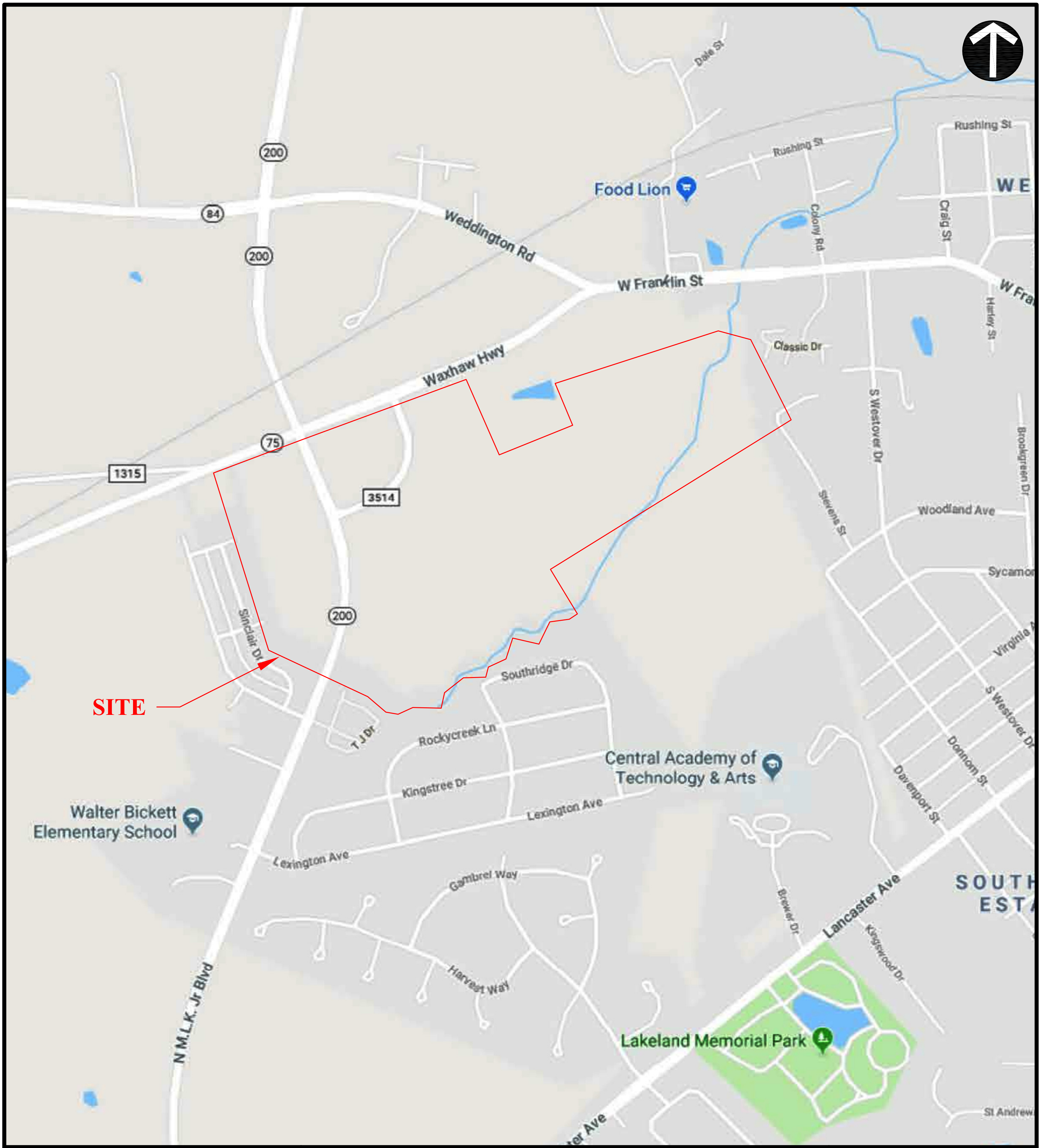

Figure 1
Site Vicinity Map

SCALE: NTS

Proposed Seacrest Commons
Waxhaw Highway (Hwy 75) and
N. Martin Luther Kings Jr. Boulevard
Monroe, North Carolina

SUMMIT Project No.: 4222.504

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3575 Centre Circle
Fort Mill, South Carolina 29715
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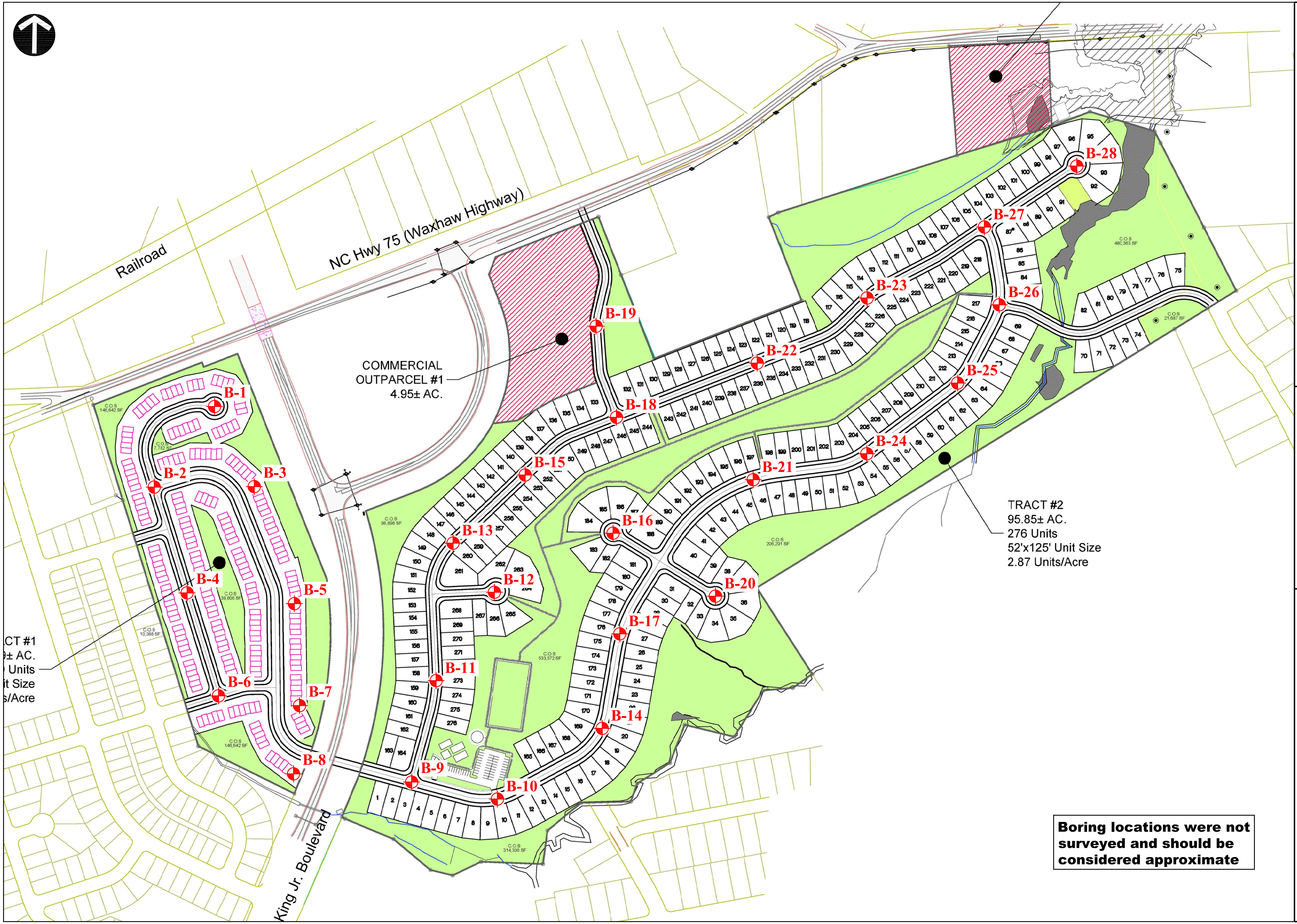

Boring locations were not surveyed and should be considered approximate

Proposed Seacrest Commons
Waxhaw Highway (Hwy 75) and
N. Martin Luther Kings Jr. Boulevard
Monroe, North Carolina

SUMMIT Project No.: 4222.504

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Figure 2
Boring Location Plan

⊕ Approx. Soil Test Boring Location

SCALE: NTS

APPENDIX 2 – Boring Logs

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KEY TO SYMBOLS

CLIENT MT Land
PROJECT NUMBER 4222.504
PROJECT NAME Proposed Seacrest Commons
PROJECT LOCATION Monroe, Nort Carolina

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

☐ BLANK

▨ CH: USCS High Plasticity Clay

▨ CL: USCS Low Plasticity Clay

▩ FILL: Fill (made ground)

▥ MH: USCS Elastic Silt

▥ MLS: USCS Sandy Silt

▥ SM: USCS Silty Sand

▒ TOPSOIL: Topsoil

▒ PWR: Partially Weathered Rock

SAMPLER SYMBOLS

⧗ Standard Penetration Test

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION
▽ Water Level at Time Drilling, or as Shown
▼ Water Level at End of Drilling, or as Shown
▼ Water Level After 24 Hours, or as Shown

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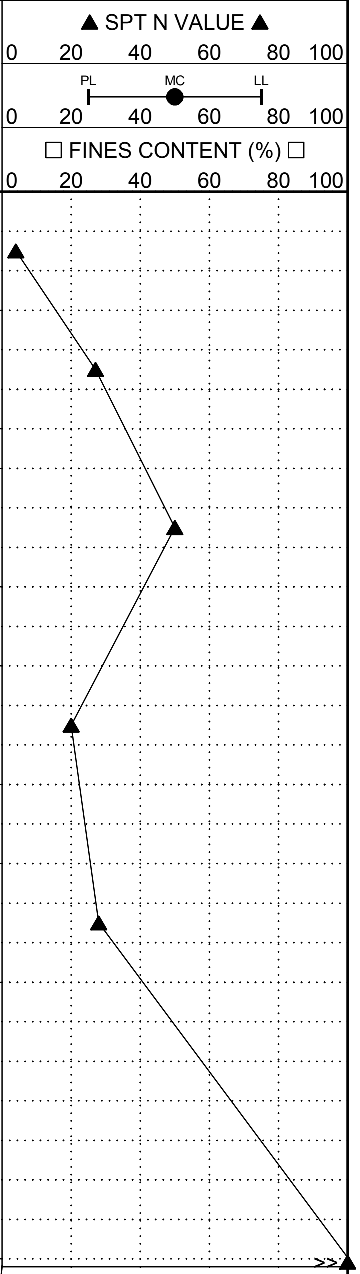
BORING NUMBER B-1

PAGE 1 OF 1

CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/4/18 **COMPLETED** 4/4/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 9' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 2" of Topsoil			
		(CH) RESIDUUM: Soft Moist Light Brown and Gray Fat CLAY	SPT 1		2-2-2 (4)
2.5		(ML) Very Stiff Light Brown, Olive Brown and Gray Sandy SILT with Rock Fragments	SPT 2		3-9-18 (27)
5.0		(ML) Hard Light Brown, Olive Brown and Gray Sandy SILT with Rock Fragments	SPT 3		13-29-21 (50)
7.5		(ML) Very Stiff Light Brown, Olive Brown and Gray Sandy SILT with Rock Fragments	SPT 4		10-10-10 (20)
10.0		9ft	SPT 5		7-14-14 (28)
12.5		(ML) Partially Weathered Rock (PWR) when sampled becomes Olive Brown and Gray Sandy SILT with Rock Fragments			
15.0		Bottom of Boring at 13.6 feet bgs, Auger Refusal	SPT 6		50 (50/1")



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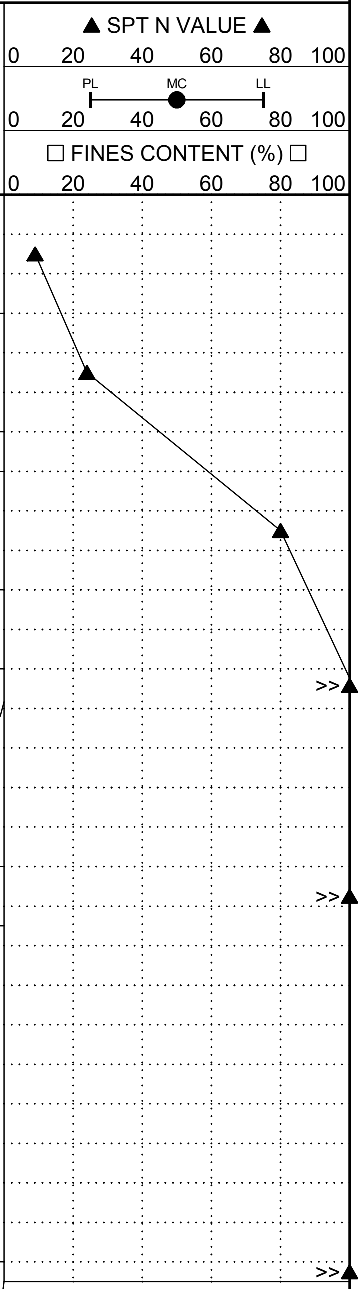
BORING NUMBER B-2

PAGE 1 OF 1

CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/4/18 **COMPLETED** 4/4/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 7.7' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
	Approx. 2" of Topsoil			
	(ML) FILL: (Cultivated Soils) Moist Grayish Brown Slightly Clayey Sandy SILT	SPT 1		2-3-6 (9)
	(ML) RESIDUUM: Stiff Olive Gray and Light Brown Sandy SILT with Rock Fragments			
2.5	(ML) Very Stiff Olive Gray and Light Brown Sandy SILT with Rock Fragments	SPT 2		4-6-18 (24)
5.0	(ML) Very Hard Olive Gray and Light Brown Sandy SILT with Rock Fragments	SPT 3		18-40-40 (80)
	(ML) Partially Weathered Rock (PWR) when sampled becomes Olive Brown and Gray Sandy SILT with Rock Fragments	SPT 4		50 (50/5")
7.5	7.7ft			
		SPT 5		33-50 (50/3")
10.0				
12.5				
		SPT 6		50 (50/3")
	Bottom of Boring at 13.8 feet bgs, Boring Terminated			
15.0				



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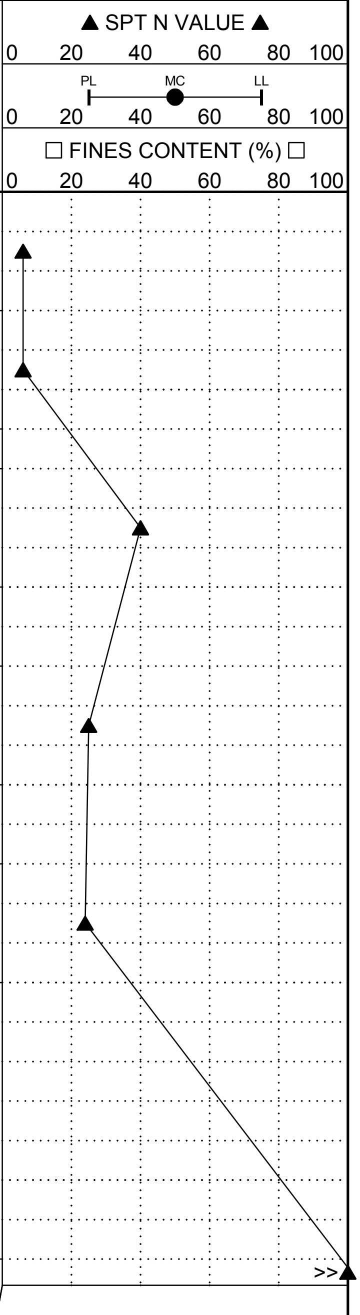
BORING NUMBER B-3

PAGE 1 OF 1

CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/4/18 **COMPLETED** 4/4/18
GROUND ELEVATION
HOLE SIZE 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 9.3' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
	Approx. 2" of Topsoil	SPT 1		2-2-4 (6)
	(ML) FILL: (Cultivated Soils) Moist Grayish Brown Slightly Clayey Sandy SILT			
2.5	(CL) RESIDUUM: Firm Moist Light Gray and Reddish Yellow Lean CLAY	SPT 2		3-3-3 (6)
5.0	(ML) Hard Brown and Olive Brown Sandy SILT with Rock Fragments	SPT 3		2-15-25 (40)
7.5	(ML) Very Stiff Olive Brown, Gray and White Sandy SILT with Rock Fragments and with Clay Seams	SPT 4		7-10-15 (25)
10.0	9.3ft	SPT 5		7-12-12 (24)
12.5	(ML) Partially Weathered Rock (PWR) when sampled becomes Olive Brown, Yellow and Black Sandy SILT with Rock Fragments	SPT 6		50 (50/4")
15.0	Bottom of Boring at 13.8 feet bgs, Boring Terminated			



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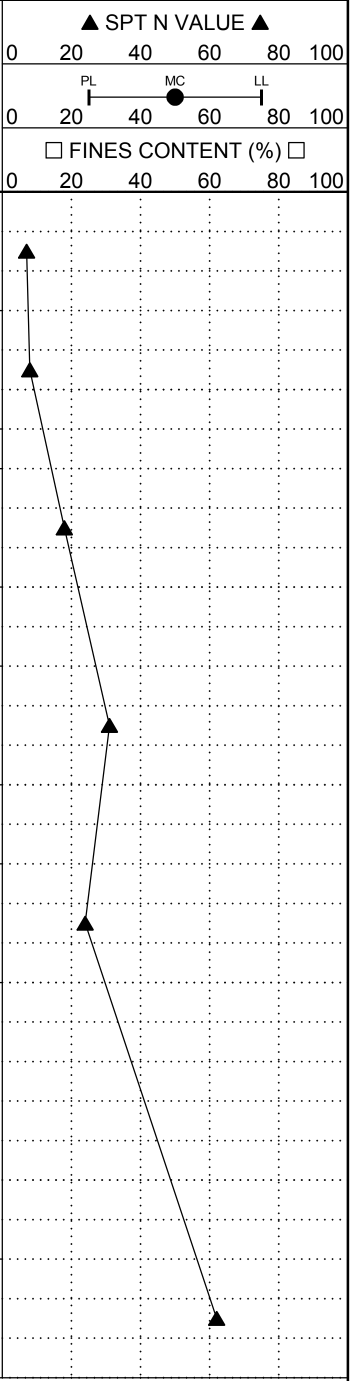
BORING NUMBER B-4

PAGE 1 OF 1

CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/5/18 **COMPLETED** 4/5/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 7' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 2" of Topsoil	SPT 1		3-3-4 (7)
		(ML) FILL: (Cultivated Soils) Moist Grayish Brown and Light Brown Slightly Clayey Sandy SILT			
		(ML) RESIDUUM: Firm Moist Light Brown and Yellow Slightly Clayey Sandy SILT			
2.5		(CL) Firm Moist Red and Yellow Lean CLAY	SPT 2		3-4-4 (8)
5.0		(CL) Very Stiff Red and Yellow Lean CLAY with Rock Fragments	SPT 3		3-8-10 (18)
7.5		(ML) Hard Brownish Gray and Olive Brown Slightly Clayey Slightly Sandy SILT with Rock Fragments 7ft	SPT 4		8-17-14 (31)
10.0		(ML) Very Stiff Brownish Gray, Olive Brown and Black Slightly Clayey Slightly Sandy SILT with Rock Fragments	SPT 5		9-11-13 (24)
12.5 15.0		(ML) Very Hard Gray, Red and Olive Gray Sandy SILT with Rock Fragments	SPT 6		13-30-32 (62)
		Bottom of Boring at 15 feet bgs, Boring Terminated			



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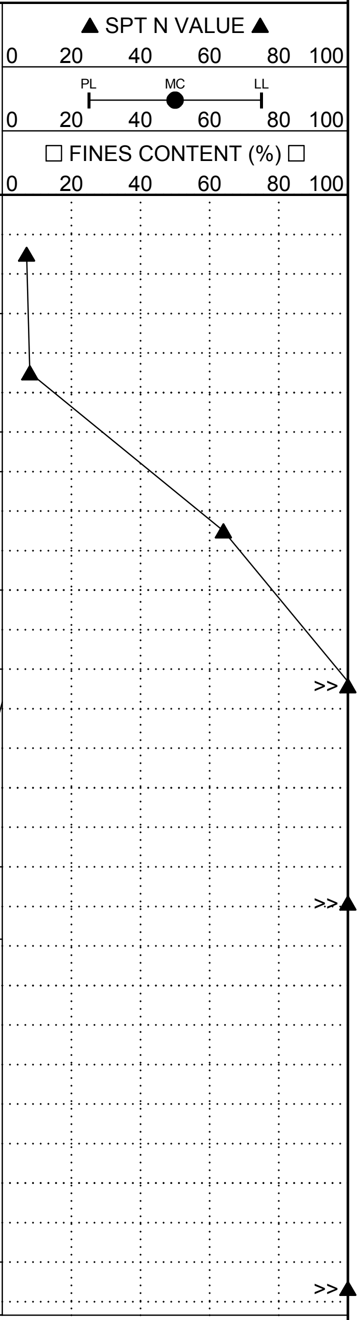
BORING NUMBER B-5

PAGE 1 OF 1

CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/4/18 **COMPLETED** 4/4/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 9.2' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
	Approx. 2" of Topsoil (ML) FILL: (Cultivated Soils) Moist Grayish Brown Slightly Clayey Sandy SILT (CH) RESIDUUM: Firm Moist Light Brown and Gray Fat CLAY	SPT 1		2-3-4 (7)
2.5		SPT 2		4-4-4 (8)
5.0	(ML) Very Hard Olive Brown and Gray Sandy SILT with Rock Fragments	SPT 3		7-28-36 (64)
7.5	(ML) Partially Weathered Rock (PWR) when sampled becomes Olive Brown and Gray Sandy SILT with Rock Fragments	SPT 4		50 (50/5")
10.0	(ML) Partially Weathered Rock (PWR) when sampled becomes Olive Brown and Gray Sandy SILT with Rock Fragments and with a Clay Seam 9.2ft	SPT 5		35-50 (50/5")
12.5		SPT 6		19-50 (50/2")
15.0	Bottom of Boring at 14.2 feet bgs, Boring Terminated			



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BORING NUMBER B-6

PAGE 1 OF 1

CLIENT MT Land

PROJECT NAME Proposed Seacrest Commons

PROJECT NUMBER 4222.504

PROJECT LOCATION Monroe, Nort Carolina

DATE STARTED 4/5/18 **COMPLETED** 4/5/18

GROUND ELEVATION **HOLE SIZE** 6 inches

DRILLING CONTRACTOR SUMMIT

GROUND WATER/CAVE-IN:

DRILLING METHOD Hollow Stem Auger

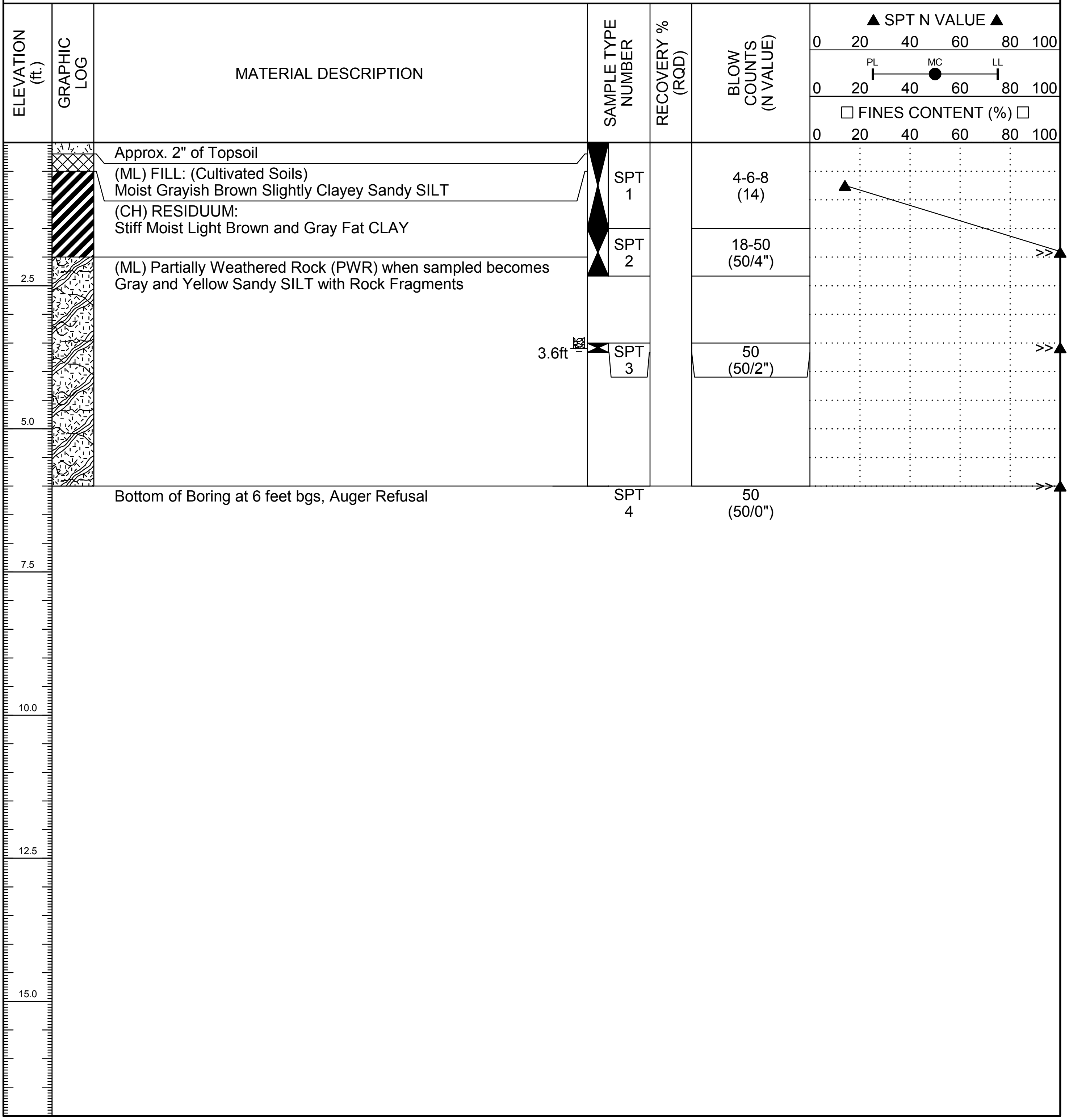
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 3.6' bgs

LOGGED BY Roy Smith **CHECKED BY** T. Costner

AT END OF DRILLING ---

NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location

AFTER DRILLING ---



ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 2" of Topsoil			
		(ML) FILL: (Cultivated Soils) Moist Grayish Brown Slightly Clayey Sandy SILT	SPT 1		4-6-8 (14)
		(CH) RESIDUUM: Stiff Moist Light Brown and Gray Fat CLAY	SPT 2		18-50 (50/4")
2.5		(ML) Partially Weathered Rock (PWR) when sampled becomes Gray and Yellow Sandy SILT with Rock Fragments			
		3.6ft	SPT 3		50 (50/2")
5.0					
		Bottom of Boring at 6 feet bgs, Auger Refusal	SPT 4		50 (50/0")

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BORING NUMBER B-7

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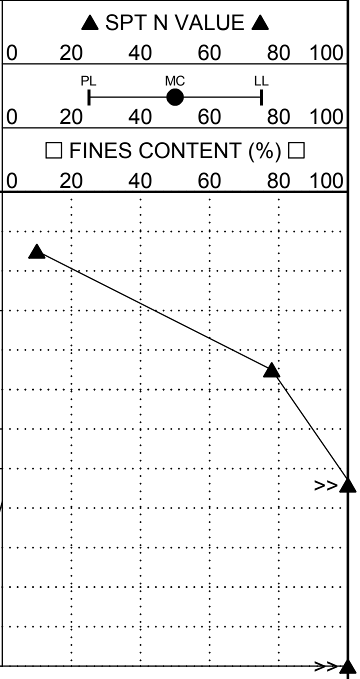
CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/5/18 **COMPLETED** 4/5/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 4' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 2" of Topsoil			
		(ML) FILL: (Cultivated Soils) Moist Grayish Brown Slightly Clayey Sandy SILT	SPT 1		3-5-5 (10)
		(ML) RESIDUUM: Stiff Moist Light Gray and Yellow Slightly Clayey Slightly Sandy SILT			
2.5		(ML) Very Hard Olive Brown and Yellow Sandy SILT with Rock Fragments	SPT 2		20-32-46 (78)
5.0		(ML) Partially Weathered Rock (PWR) when sampled becomes Olive Brown and Yellow Sandy SILT with Rock Fragments 4ft	SPT 3		50 (50/5")
7.5 10.0 12.5 15.0		Bottom of Boring at 6 feet bgs, Auger Refusal	SPT 4		50 (50/0")



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BORING NUMBER B-8

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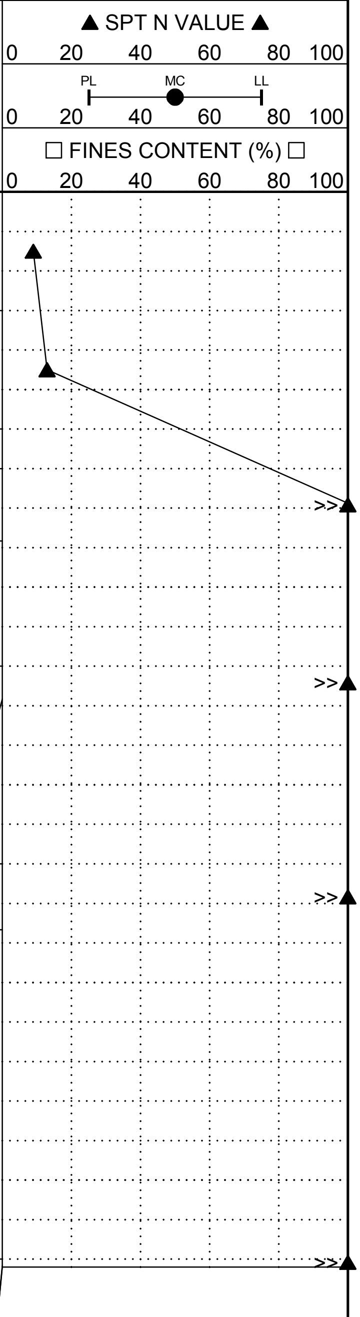
CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/5/18 **COMPLETED** 4/5/18
GROUND ELEVATION ______ **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 7.6' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 2" of Topsoil			
		(ML) FILL: (Cultivated Soils) Moist Grayish Brown Slightly Clayey Sandy SILT	SPT 1		3-4-5 (9)
		(MH) RESIDUUM: Stiff Moist Red and Gray Elastic SILT			
2.5		(MH) Stiff Moist Red and Yellow Elastic SILT	SPT 2		4-6-7 (13)
		(ML) Partially Weathered Rock (PWR) when sampled becomes Olive Gray and Yellow Sandy SILT with Rock Fragments	SPT 3		32-50 (50/5")
5.0					
			SPT 4		50 (50/5")
7.5		7.6ft			
			SPT 5		32-50 (50/4")
10.0					
12.5					
		Bottom of Boring at 13.6 feet bgs, Auger Refusal	SPT 6		50 (50/1")
15.0					



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BORING NUMBER B-9

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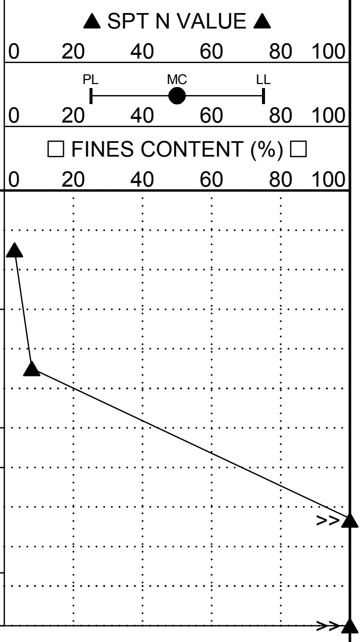
CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/5/18 **COMPLETED** 4/5/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
▽ **AT TIME OF DRILLING** 4.00 ft GW ATD / Caved in Depth @ 4.8' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
▼ **AT END OF DRILLING** 0.00 ft GW After 24 Hrs - Top of Boring
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 2" of Topsoil 0ft ▼			
		(ML) FILL: (Cultivated Soils) Moist Grayish Brown and Gray Slightly Clayey Sandy SILT with Rock Fragments	SPT 1		1-1-2 (3)
		(CH) RESIDUUM: Soft Moist Light Brown and Gray Fat CLAY	SPT 2		3-4-4 (8)
2.5		(CL) Firm Wet Light Gray and Yellow Lean CLAY with Rock Fragments			
		(ML) Partially Weathered Rock (PWR) when sampled becomes Olive Brown and Gray Sandy SILT with Rock Fragments 4ft ▽ 4.8ft	SPT 3		3-11-50 (50/4")
5.0					
		Bottom of Boring at 5.5 feet bgs, Auger Refusal	SPT 4		50 (50/0")
7.5					
10.0					
12.5					
15.0					



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BORING NUMBER B-10

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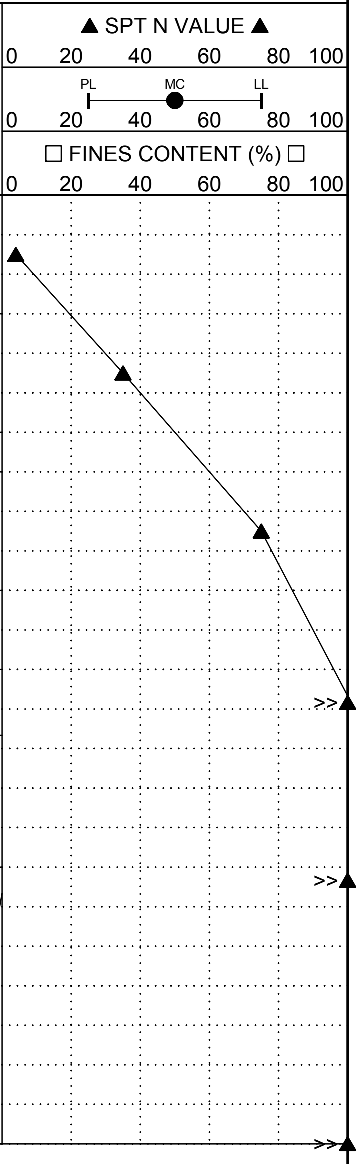
CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/5/18 **COMPLETED** 4/5/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 5.6' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 2" of Topsoil			
		(ML) FILL: (Cultivated Soils) Moist Grayish Brown Lean CLAY	SPT 1		2-2-2 (4)
		(CL) RESIDUUM: Soft Moist Gray and Light Gray Lean CLAY			
2.5		(ML) Hard Olive Gray and Light Gray Sandy SILT with Rock Fragments	SPT 2		11-15-20 (35)
5.0		(ML) Very Hard Olive Gray and Light Gray Sandy SILT with Rock Fragments and with Clay Seam	SPT 3		15-25-50 (75)
7.5		(SM) Partially Weathered Rock (PWR) when sampled becomes Olive Brown and Gray Silty SAND with Rock Fragments 5.6ft	SPT 4		32-50 (50/4")
10.0			SPT 5		50 (50/4")
12.5		Bottom of Boring at 12 feet bgs, Auger Refusal	SPT 6		50 (50/0")
15.0					



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CLIENT MT Land

PROJECT NAME Proposed Seacrest Commons

PROJECT NUMBER 4222.504

PROJECT LOCATION Monroe, Nort Carolina

DATE STARTED 4/5/18 **COMPLETED** 4/5/18

GROUND ELEVATION **HOLE SIZE** 6 inches

DRILLING CONTRACTOR SUMMIT

GROUND WATER/CAVE-IN:

DRILLING METHOD Hollow Stem Auger

AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 7.8' bgs

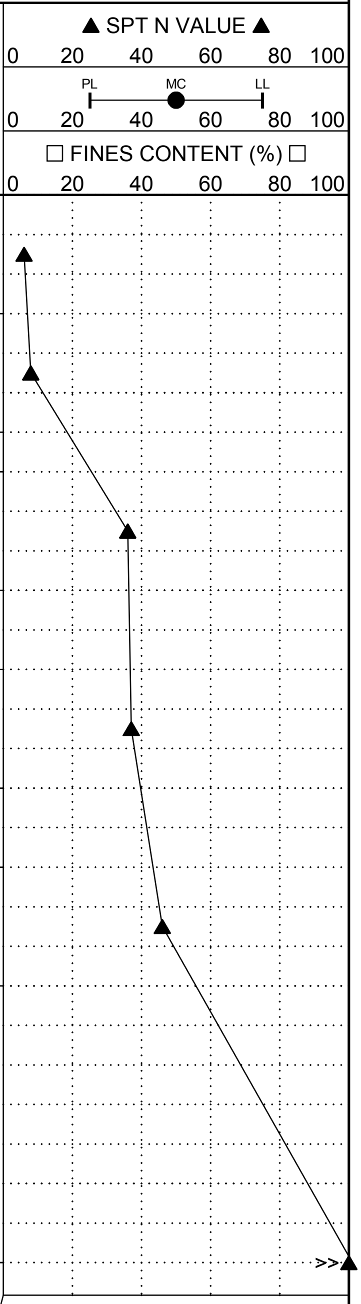
LOGGED BY Roy Smith **CHECKED BY** T. Costner

AT END OF DRILLING ---

NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location

AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 2" of Topsoil			
		(ML) FILL: (Cultivated Soils) Moist Grayish Brown and Light Brown Slightly Clayey Slightly Sandy SILT	SPT 1		3-3-3 (6)
2.5		(CH) Firm Moist Olive Gray and Gray Fat CLAY	SPT 2		3-4-4 (8)
		(ML) Hard Brownish Gray and Light Brown Sandy SILT with Rock Fragments and with Clay Seams			
5.0			SPT 3		3-12-24 (36)
7.5			SPT 4		8-15-22 (37)
		7.8ft			
10.0			SPT 5		10-22-24 (46)
12.5		(ML) Partially Weathered Rock (PWR) when sampled becomes Olive Brown and Gray Sandy SILT with Rock Fragments	SPT 6		50 (50/0")
		Bottom of Boring at 13.9 feet bgs, Boring Terminated			
15.0					



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CLIENT MT Land

PROJECT NAME Proposed Seacrest Commons

PROJECT NUMBER 4222.504

PROJECT LOCATION Monroe, Nort Carolina

DATE STARTED 4/5/18 **COMPLETED** 4/5/18

GROUND ELEVATION **HOLE SIZE** 6 inches

DRILLING CONTRACTOR SUMMIT

GROUND WATER/CAVE-IN:

DRILLING METHOD Hollow Stem Auger

AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 7.6' bgs

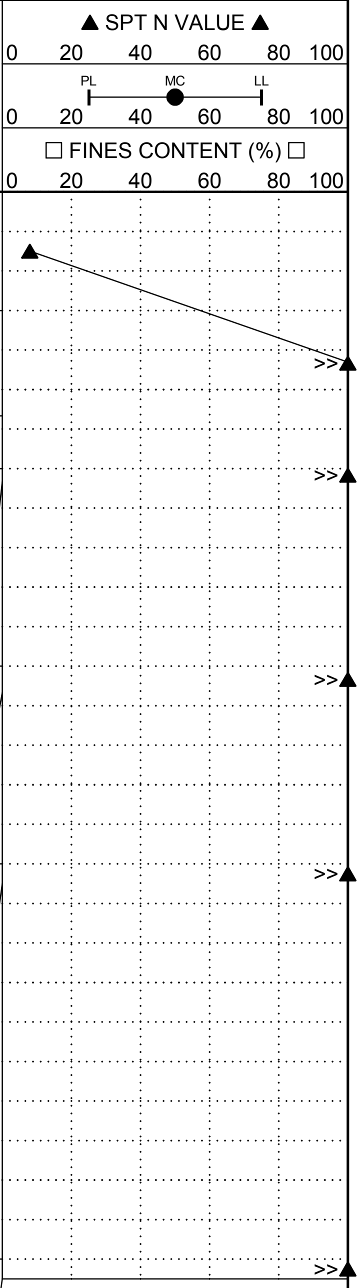
LOGGED BY Roy Smith **CHECKED BY** T. Costner

AT END OF DRILLING ---

NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location

AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 1" of Topsoil			
		(CL) FILL: (Cultivated Soils) Moist Grayish Brown and Light Gray Lean CLAY	SPT 1		3-4-4 (8)
		(CL) RESIDUUM: Firm Moist Light Gray Lean CLAY			
		(ML) Partially Weathered Rock (PWR) when sampled becomes Yellow and Olive Brown Sandy SILT with Rock Fragments	SPT 2		39-39-50 (50/4")
2.5					
		(ML) Partially Weathered Rock (PWR) when sampled becomes Grayish Brown, Gray and Yellow Sandy SILT with Rock Fragments	SPT 3		50 (50/2")
5.0					
			SPT 4		50 (50/4")
7.5		7.6ft			
			SPT 5		50 (50/3")
10.0					
12.5					
		Bottom of Boring at 13.8 feet bgs, Boring Terminated	SPT 6		50 (50/3")
15.0					



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CLIENT MT Land

PROJECT NAME Proposed Seacrest Commons

PROJECT NUMBER 4222.504

PROJECT LOCATION Monroe, Nort Carolina

DATE STARTED 4/5/18 **COMPLETED** 4/5/18

GROUND ELEVATION **HOLE SIZE** 6 inches

DRILLING CONTRACTOR SUMMIT

GROUND WATER/CAVE-IN:

DRILLING METHOD Hollow Stem Auger

AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 7.4' bgs

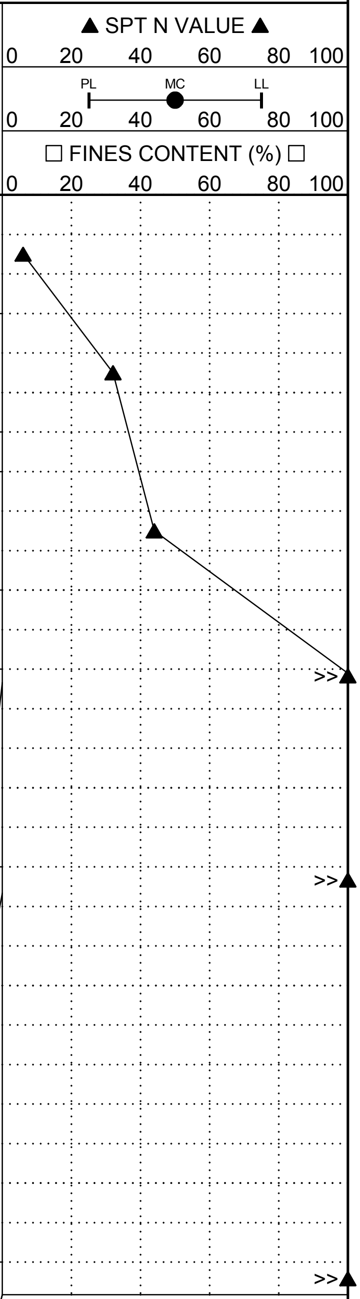
LOGGED BY Roy Smith **CHECKED BY** T. Costner

AT END OF DRILLING ---

NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location

AFTER DRILLING ---

ELEVATION (ft.)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
	Approx. 1" of Topsoil			
	(ML) FILL: (Cultivated Soils) Moist Grayish Brown Slightly Clayey Sandy SILT	SPT 1		4-4-2 (6)
	(ML) RESIDUUM: Firm Moist Brownish Gray and Gray Slightly Clayey Sandy SILT			
2.5	(ML) Hard Olive Brown and Light Gray Sandy SILT with Rock Fragments and with Clay Seams	SPT 2		7-12-20 (32)
5.0	(ML) Hard Olive Brown, Yellow and Gray Sandy SILT with Rock Fragments	SPT 3		12-12-32 (44)
	(SM) Partially Weathered Rock (PWR) when sampled becomes Yellow and Brownish Gray Sandy SILT with Rock Fragments	SPT 4		50 (50/2")
7.5	7.4ft			
		SPT 5		50 (50/4")
10.0				
12.5		SPT 6		50 (50/5")
15.0	Bottom of Boring at 13.9 feet bgs, Boring Terminated			



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CLIENT MT Land

PROJECT NAME Proposed Seacrest Commons

PROJECT NUMBER 4222.504

PROJECT LOCATION Monroe, Nort Carolina

DATE STARTED 4/5/18 **COMPLETED** 4/5/18

GROUND ELEVATION **HOLE SIZE** 6 inches

DRILLING CONTRACTOR SUMMIT

GROUND WATER/CAVE-IN:

DRILLING METHOD Hollow Stem Auger

AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 7.4' bgs

LOGGED BY Roy Smith **CHECKED BY** T. Costner

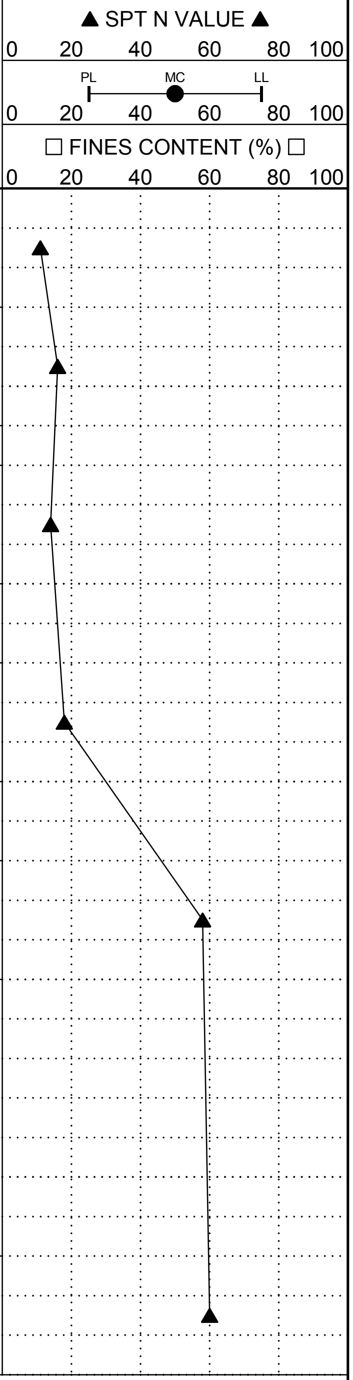
AT END OF DRILLING ---

NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location

AFTER DRILLING ---

ELEVATION (ft.)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
	Approx. 4" of Topsoil			
	(MH) RESIDUUM: Stiff Moist Red Elastic SILT	SPT 1		4-5-6 (11)
2.5	(MH) Very Stiff Moist Red Elastic SILT	SPT 2		6-7-9 (16)
5.0	(ML) Stiff Moist Red and Gray Slightly Clayey Slightly Sandy SILT	SPT 3		3-6-8 (14)
7.5	(ML) Very Stiff Moist Red and Gray Slightly Clayey Slightly Sandy SILT 7.4ft	SPT 4		6-7-11 (18)
10.0	(ML) Very Hard Grayish Brown and Brown Slightly Clayey Sandy SILT with a trace of Rock Fragments	SPT 5		8-22-36 (58)
12.5				
15.0		SPT 6		14-34-26 (60)

Bottom of Boring at 15 feet bgs, Boring Terminated



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CLIENT MT Land

PROJECT NAME Proposed Seacrest Commons

PROJECT NUMBER 4222.504

PROJECT LOCATION Monroe, Nort Carolina

DATE STARTED 4/9/18 **COMPLETED** 4/9/18

GROUND ELEVATION **HOLE SIZE** 6 inches

DRILLING CONTRACTOR SUMMIT

GROUND WATER/CAVE-IN:

DRILLING METHOD Hollow Stem Auger

AT TIME OF DRILLING --- GW NE ATD

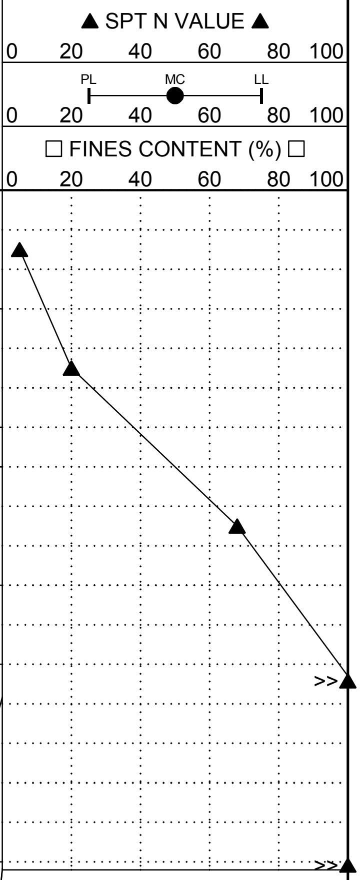
LOGGED BY Roy Smith **CHECKED BY** T. Costner

AT END OF DRILLING ---

NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location

AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 1" of Topsoil			
		(CL) FILL: (Cultivated Soils) Moist Grayish Brown and Light Gray Lean CLAY	SPT 1		2-2-3 (5)
		(CL) RESIDUUM: Firm Moist Gray and Light Gray Lean CLAY			
2.5		(ML) Very Stiff Brownish Gray and Olive Yellow Sandy SILT with Rock Fragments	SPT 2		4-9-11 (20)
5.0		(ML) Very Hard Brownish Gray, Olive and Olive Yellow Sandy SILT with Rock Fragments	SPT 3		30-38-30 (68)
7.5		(ML) Partially Weathered Rock (PWR) when sampled becomes Olive and Brownish Gray Sandy SILT with Rock Fragments	SPT 4		50 (50/5")
		Bottom of Boring at 8.6 feet bgs, Auger Refusal	SPT 5		50 (50/1")
10.0					
12.5					
15.0					



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BORING NUMBER B-16

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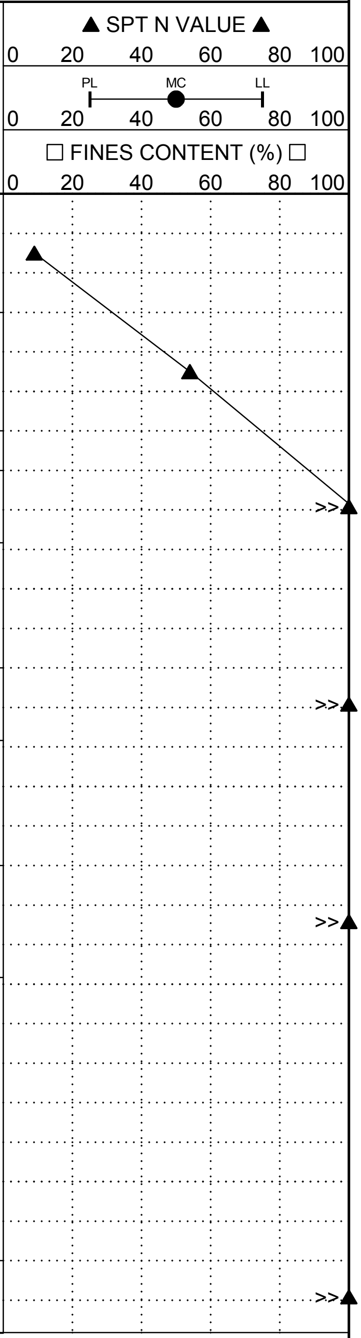
CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/5/18 **COMPLETED** 4/5/18
GROUND ELEVATION
HOLE SIZE 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 7.1' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 1" of Topsoil	SPT 1		3-4-5 (9)
		(MH) FILL: (Cultivated Soils) Moist Reddish Brown Sandy Elastic SILT			
		(MH) RESIDUUM: Stiff Red Elastic SILT			
2.5		(SM) Very Dense White, Yellow and Light Gray Silty SAND with Rock Fragments	SPT 2		20-26-28 (54)
		(SM) Partially Weathered Rock (PWR) when sampled becomes Light Gray and Yellow Silty SAND with Rock Fragments	SPT 3		40-50 (50/5")
5.0					
		7.1ft	SPT 4		38-50 (50/5")
7.5					
			SPT 5		15-26-50 (50/5")
10.0					
12.5					
			SPT 6		26-50 (50/5")
		Bottom of Boring at 14.4 feet bgs, Boring Terminated			
15.0					



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BORING NUMBER B-17

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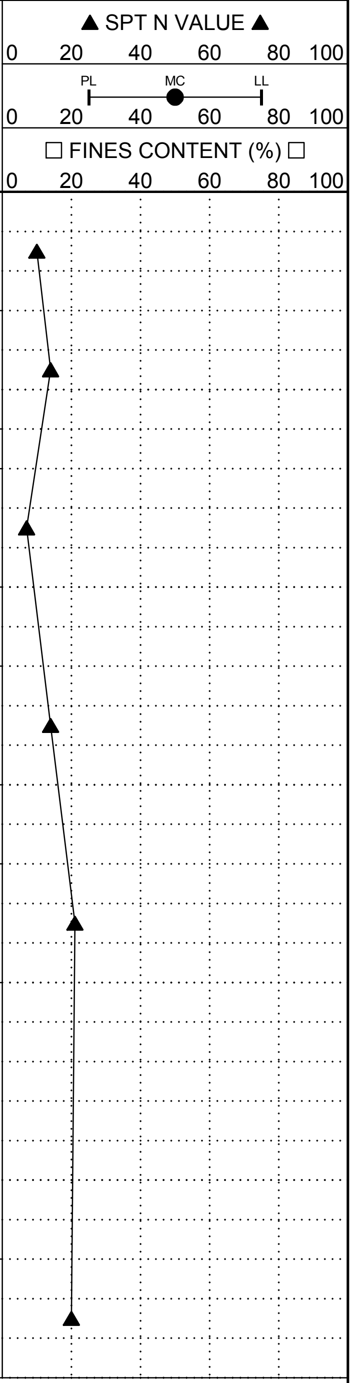
CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/5/18 **COMPLETED** 4/5/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 7.4' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 1" of Topsoil	SPT 1		3-5-5 (10)
		(MH) FILL: (Cultivated Soils) Moist Reddish Brown Sandy Elastic SILT			
		(MH) RESIDUUM: Stiff Red Elastic SILT			
2.5		(CL) Stiff Moist Red and White Lean CLAY	SPT 2		5-6-8 (14)
5.0		(CL) Firm Moist Red and White Lean CLAY	SPT 3		3-3-4 (7)
7.5		(CL) Stiff Moist Dark Red and White Lean CLAY 7.4ft	SPT 4		4-6-8 (14)
10.0		(ML) Very Stiff Olive Slightly Clayey Slightly Sandy SILT	SPT 5		4-9-12 (21)
12.5 15.0		(ML) Very Stiff Olive Gray Slightly Clayey Slightly Sandy SILT	SPT 6		8-9-11 (20)
		Bottom of Boring at 15 feet bgs, Boring Terminated			



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CLIENT MT Land

PROJECT NAME Proposed Seacrest Commons

PROJECT NUMBER 4222.504

PROJECT LOCATION Monroe, Nort Carolina

DATE STARTED 4/6/18 **COMPLETED** 4/6/18

GROUND ELEVATION **HOLE SIZE** 6 inches

DRILLING CONTRACTOR SUMMIT

GROUND WATER/CAVE-IN:

DRILLING METHOD Hollow Stem Auger

AT TIME OF DRILLING --- GW NE ATD

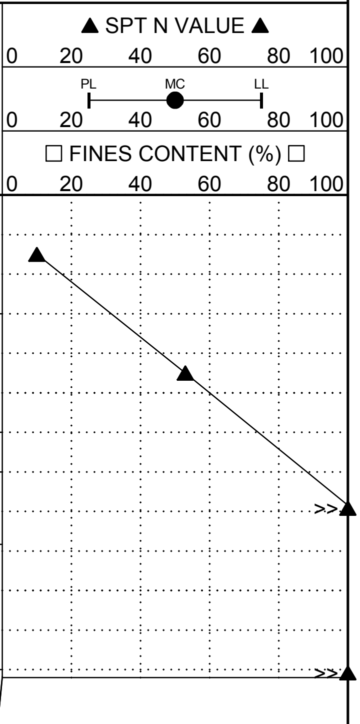
LOGGED BY Roy Smith **CHECKED BY** T. Costner

AT END OF DRILLING ---

NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location

AFTER DRILLING ---

ELEVATION (ft.)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
	Approx. 1" of Topsoil			
	(ML) FILL: (Cultivated Soils) Moist Light Brown Slightly Clayey Sandy SILT	SPT 1		3-4-6 (10)
	(MH) RESIDUUM: Stiff Moist Brownish Yellow Elastic SILT			
2.5	(ML) Very Hard Dark Gray and Olive Gray Sandy SILT with Rock Fragments	SPT 2		11-29-24 (53)
	(ML) Partially Weathered Rock (PWR) when sampled becomes Brownish Gray and Brownish Yellow Sandy SILT with Rock Fragments	SPT 3		30-50 (50/5")
5.0				
	Bottom of Boring at 6.1 feet bgs, Auger Refusal	SPT 4		50 (50/1")
7.5				
10.0				
12.5				
15.0				



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PROJECT NAME Proposed Seacrest Commons

PROJECT NUMBER 4222.504

PROJECT LOCATION Monroe, Nort Carolina

DATE STARTED 4/6/18 **COMPLETED** 4/6/18

GROUND ELEVATION **HOLE SIZE** 6 inches

DRILLING CONTRACTOR SUMMIT

GROUND WATER/CAVE-IN:

DRILLING METHOD Hollow Stem Auger

AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 8' bgs

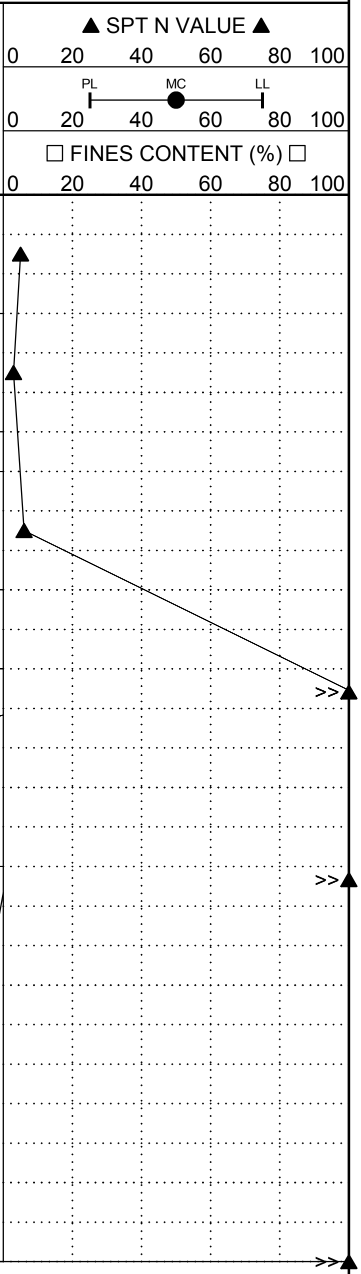
LOGGED BY Roy Smith **CHECKED BY** T. Costner

AT END OF DRILLING ---

NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location

AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 1" of Topsoil			
		(CH) RESIDUUM: Firm Moist Light Brown and Gray Fat CLAY	SPT 1		2-2-3 (5)
2.5		(CH) Soft Wet Light Brown and Gray Fat CLAY	SPT 2		2-1-2 (3)
5.0		(CL) Firm Moist Light Gray and Light Brown Lean CLAY	SPT 3		2-2-4 (6)
7.5 10.0 12.5		(ML) Partially Weathered Rock (PWR) when sampled becomes Reddish Yellow and Light Gray Sandy SILT with Rock Fragments 8ft	SPT 4 SPT 5		40-50 (50/1") 50 (50/4")
15.0		Bottom of Boring at 13.5 feet bgs, Auger Refusal	SPT 6		50 (50/0")



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BORING NUMBER B-20

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CLIENT MT Land

PROJECT NAME Proposed Seacrest Commons

PROJECT NUMBER 4222.504

PROJECT LOCATION Monroe, Nort Carolina

DATE STARTED 4/6/18 **COMPLETED** 4/6/18

GROUND ELEVATION **HOLE SIZE** 6 inches

DRILLING CONTRACTOR SUMMIT

GROUND WATER/CAVE-IN:

DRILLING METHOD Hollow Stem Auger

AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 2.5' bgs

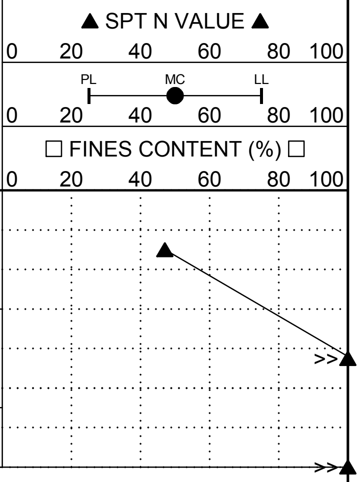
LOGGED BY Roy Smith **CHECKED BY** T. Costner

AT END OF DRILLING ---

NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location

AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 1" of Topsoil			
		(MH) RESIDUUM: Hard Red Elastic SILT with Rock Fragments	SPT 1		5-17-30 (47)
2.5		(SM) Partially Weathered Rock (PWR) when sampled becomes Light Olive Brown and Brownish Gray Silty SAND with Rock Fragments 2.5ft	SPT 2		23-42-50 (50/3")
		Bottom of Boring at 3.5 feet bgs, Auger Refusal	SPT 3		50 (50/0")
5.0					
7.5					
10.0					
12.5					
15.0					



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CLIENT MT Land

PROJECT NAME Proposed Seacrest Commons

PROJECT NUMBER 4222.504

PROJECT LOCATION Monroe, Nort Carolina

DATE STARTED 4/6/18 **COMPLETED** 4/6/18

GROUND ELEVATION **HOLE SIZE** 6 inches

DRILLING CONTRACTOR SUMMIT

GROUND WATER/CAVE-IN:

DRILLING METHOD Hollow Stem Auger

AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 6.3' bgs

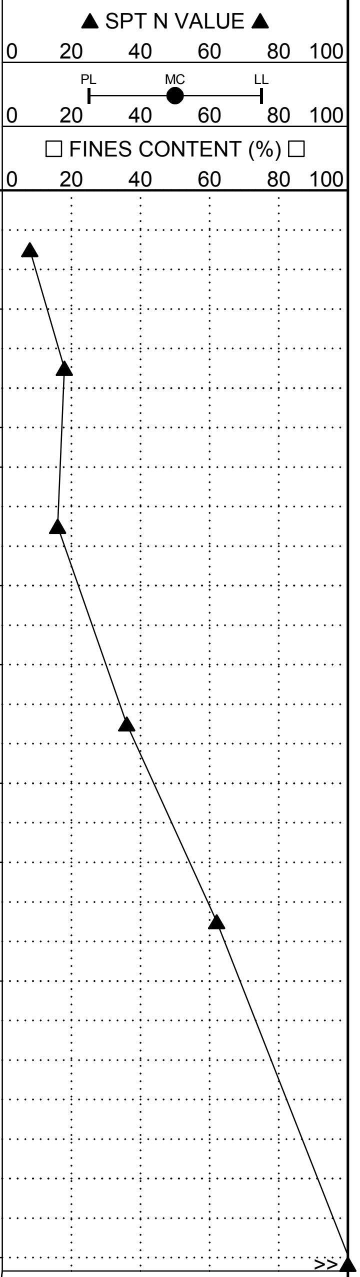
LOGGED BY Roy Smith **CHECKED BY** T. Costner

AT END OF DRILLING ---

NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location

AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 2" of Topsoil	SPT 1		3-4-4 (8)
		(ML) FILL: (Cultivated Soils) Moist Grayish Brown and Light Brown Slightly Clayey Slightly Sandy SILT			
		(CL) RESIDUUM: Firm Moist Light Gray Lean CLAY	SPT 2		5-7-11 (18)
2.5		(CL) Very Stiff Moist Light Gray and Yellow with Rock Fragments			
			SPT 3		7-8-8 (16)
5.0					
		(ML) Hard Olive Brown Sandy SILT with Rock Fragments			
		6.3ft	SPT 4		12-14-22 (36)
7.5					
		(ML) Very Hard Olive Brown and Gray Sandy SILT with Rock Fragments	SPT 5		12-30-32 (62)
10.0					
12.5		(ML) Partially Weathered Rock (PWR) when sampled becomes Yellow, Gray and Olive Brown Sandy SILT with Rock Fragments			
			SPT 6		50 (50/2")
		Bottom of Boring at 13.7 feet bgs, Boring Terminated			
15.0					



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CLIENT MT Land

PROJECT NAME Proposed Seacrest Commons

PROJECT NUMBER 4222.504

PROJECT LOCATION Monroe, Nort Carolina

DATE STARTED 4/6/18 **COMPLETED** 4/6/18

GROUND ELEVATION **HOLE SIZE** 6 inches

DRILLING CONTRACTOR SUMMIT

GROUND WATER/CAVE-IN:

DRILLING METHOD Hollow Stem Auger

AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 7.5' bgs

LOGGED BY Roy Smith **CHECKED BY** T. Costner

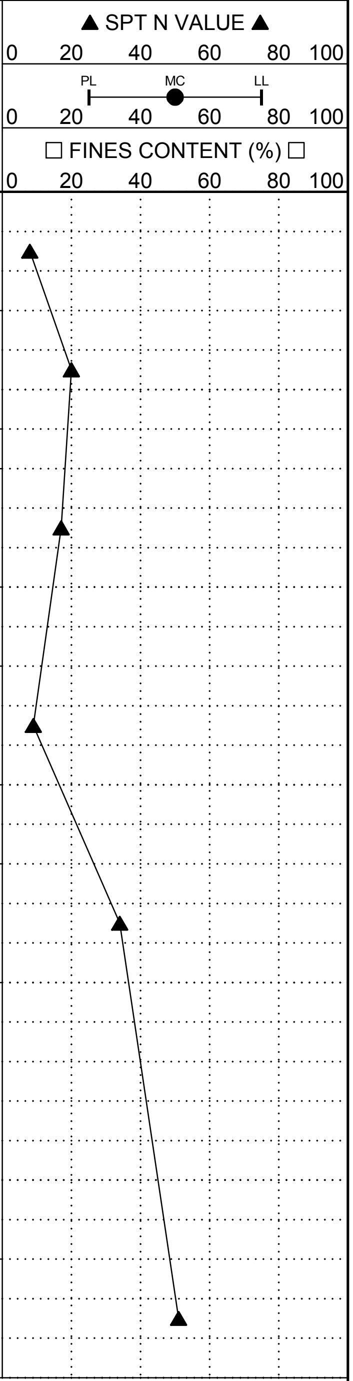
AT END OF DRILLING ---

NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location

AFTER DRILLING ---

ELEVATION (ft.)	MATERIAL DESCRIPTION
	Approx. 1" of Topsoil
	(ML) FILL: (Cultivated Soils) Moist Brownish Red Slightly Clayey Slightly Sandy SILT
	(MH) RESIDUUM: Firm Moist Red Elastic SILT
2.5 5.0	(MH) Very Stiff Red Elastic SILT
7.5	(CL) Stiff Moist Red Lean CLAY 7.5ft
10.0	(ML) Hard Brownish Yellow and Yellow Slightly Clayey Slightly Sandy SILT with a trace of Rock Fragments
12.5 15.0	(ML) Very Hard Brownish Gray, Olive and Yellow Slightly Clayey Slightly Sandy SILT with a trace of Rock Fragments
	Bottom of Boring at 15 feet bgs, Boring Terminated

SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
SPT 1		4-4-4 (8)
SPT 2		4-9-11 (20)
SPT 3		5-8-9 (17)
SPT 4		3-4-5 (9)
SPT 5		8-12-22 (34)
SPT 6		11-23-28 (51)



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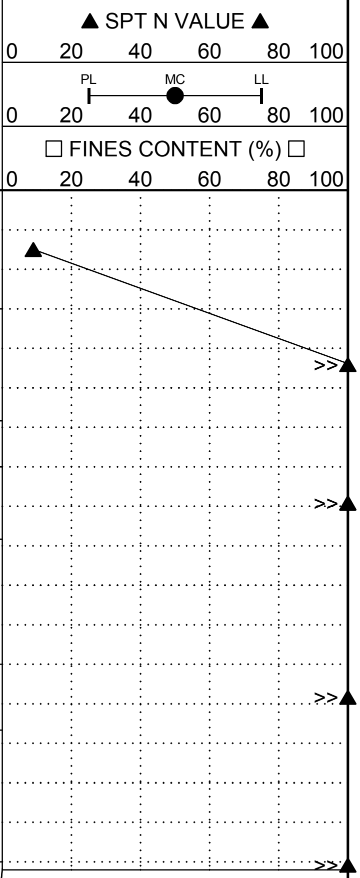
CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/6/18 **COMPLETED** 4/6/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 6.2' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
Approx. 2" of Topsoil			
(ML) FILL: (Cultivated Soils) Moist Yellowish Brown Slightly Clayey Slightly Sandy SILT	SPT 1		4-4-5 (9)
(ML) RESIDUUM: Stiff Moist Brownish Yellow and Yellow Slightly Clayey Slightly Sandy SILT			
(ML) Partially Weathered Rock (PWR) when sampled becomes Red and Yellow Slightly Clayey Slightly Sandy SILT with a trace of Rock Fragments	SPT 2		19-34-50 (50/5")
	SPT 3		22-50 (50/5")
6.2ft	SPT 4		21-50 (50/4")
(ML) Partially Weathered Rock (PWR) when sampled becomes Gray and White Sandy SILT with Rock Fragments	SPT 5		50 (50/1")
Bottom of Boring at 8.6 feet bgs, Auger Refusal			

ELEVATION (ft.)

2.5
5.0
7.5
10.0
12.5
15.0



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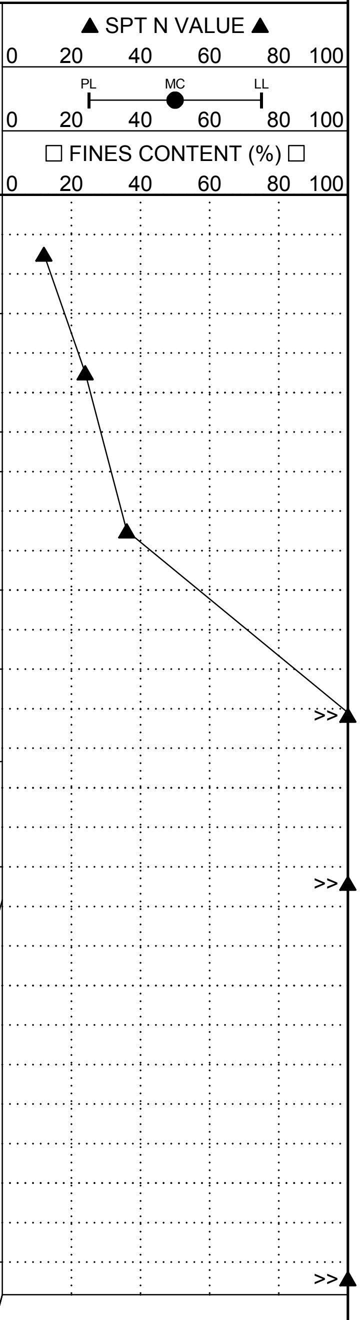
CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/6/18 **COMPLETED** 4/6/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 6.9' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
	Approx. 2" of Topsoil	SPT 1		4-6-6 (12)
	(ML) FILL: (Cultivated Soils) Moist Red Slightly Clayey Sandy SILT with Rock Fragments			
	(ML) RESIDUUM: Stiff Moist Red Slightly Clayey Sandy SILT with Rock Fragments			
2.5	(ML) Very Stiff Red and Yellow Slightly Clayey Sandy SILT with Rock Fragments	SPT 2		11-11-13 (24)
5.0	(ML) Hard Dark Grayish Brown and Red Slightly Clayey Sandy SILT with a Clay Seam	SPT 3		7-14-22 (36)
7.5	(ML) Partially Weathered Rock (PWR) when sampled becomes Olive Brown and Gray Sandy SILT with Rock Fragments 6.9ft	SPT 4		8-32-50 (50/2")
10.0		SPT 5		50 (50/5")
12.5		SPT 6		50 (50/5")
15.0	Bottom of Boring at 13.9 feet bgs, Boring Terminated			



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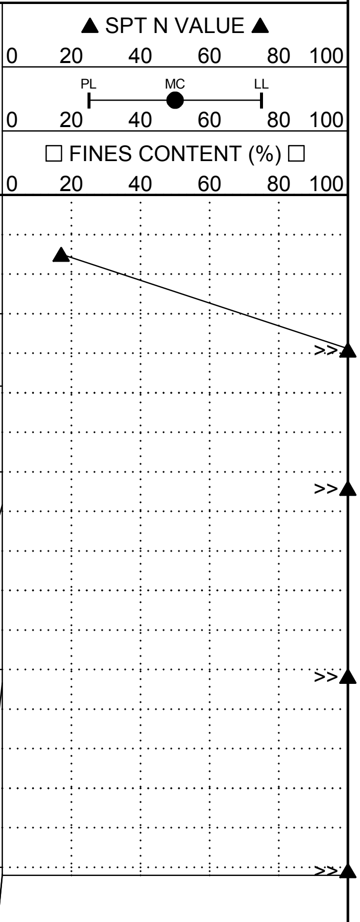
CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/6/18 **COMPLETED** 4/6/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 6.2' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 1" of Topsoil			
		(ML) FILL: (Cultivated Soils) Moist Reddish Brown Slightly Clayey Sandy SILT with Rock Fragments	SPT 1		5-7-10 (17)
		(ML) RESIDUUM: Very Stiff Red Slightly Clayey Slightly Sandy SILT with Rock Fragments	SPT 2		42-50 (50/5")
2.5		(SM) Partially Weathered Rock (PWR) when sampled becomes Gray and Light Gray Silty SAND with Rock Fragments			
			SPT 3		50 (50/5")
5.0					
		(ML) Partially Weathered Rock (PWR) when sampled becomes Gray and Light Gray Sandy SILT with Rock Fragments			
		6.2ft	SPT 4		50 (50/2")
7.5					
		Bottom of Boring at 8.6 feet bgs, Auger Refusal	SPT 5		50 (50/1")
10.0					
12.5					
15.0					



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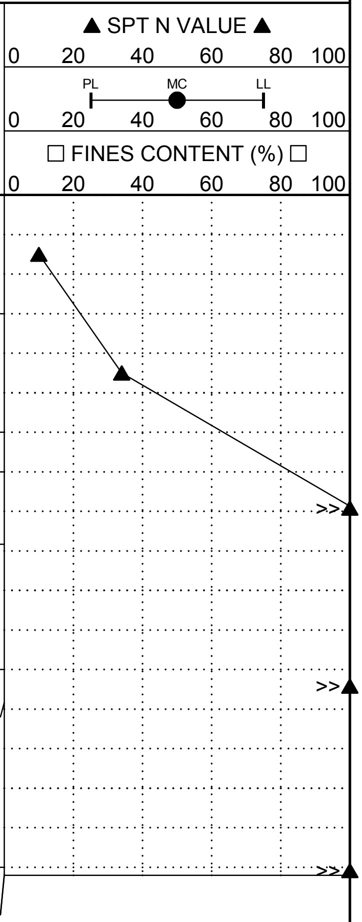
CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/6/18 **COMPLETED** 4/6/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 5' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
Approx. 2" of Topsoil			
(ML) FILL: (Cultivated Soils) Moist Reddish Brown Slightly Clayey Slightly Sandy SILT	SPT 1		4-4-6 (10)
(MH) RESIDUUM: Stiff Brownish Red Elastic SILT			
(ML) Hard Red Slightly Clayey Slightly Sandy SILT with a trace of Rock Fragments	SPT 2		18-13-21 (34)
(ML) Partially Weathered Rock (PWR) when sampled becomes Yellow Sandy SILT with Rock Fragments	SPT 3		32-50 (50/5")
5ft			
(ML) Partially Weathered Rock (PWR) when sampled becomes Brownish Yellow and Yellow Sandy SILT with Rock Fragments	SPT 4		50 (50/5")
Bottom of Boring at 8.6 feet bgs, Auger Refusal	SPT 5		50 (50/1")

ELEVATION (ft.)
2.5
5.0
7.5
10.0
12.5
15.0



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BORING NUMBER B-27

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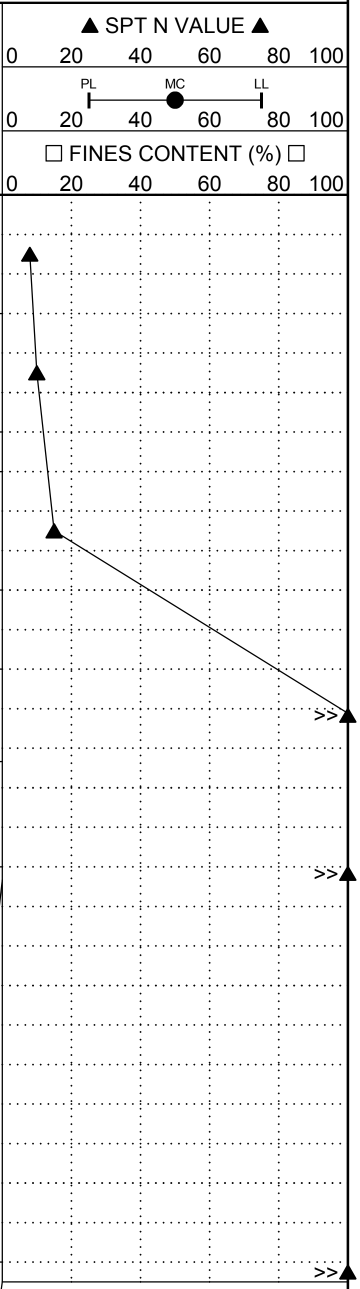
CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/6/18 **COMPLETED** 4/6/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 7.3' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
		Approx. 2" of Topsoil			
		(ML) FILL: (Cultivated Soils) Moist Reddish Brown Slightly Clayey Slightly Sandy SILT	SPT 1		3-4-4 (8)
		(MH) RESIDUUM: Firm Moist Brownish Red Elastic SILT			
2.5		(MH) Stiff Moist Red and Reddish Yellow Elastic SILT	SPT 2		3-5-5 (10)
5.0		(CL) Stiff Red and Yellow Lean CLAY with a trace of Rock Fragments	SPT 3		2-5-10 (15)
7.5		(ML) Partially Weathered Rock (PWR) when sampled becomes Brownish Gray and Light Brown Sandy SILT with Rock Fragments 7.3ft	SPT 4		15-34-50 (50/2")
10.0		(SM) Partially Weathered Rock (PWR) when sampled becomes Light Gray Silty SAND with Rock Fragments	SPT 5		50 (50/2")
12.5		(ML) Partially Weathered Rock (PWR) when sampled becomes Yellow and Light Gray Sandy SILT with Rock Fragments	SPT 6		50 (50/3")
15.0		Bottom of Boring at 13.8 feet bgs, Boring Terminated			



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BORING NUMBER B-28

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CLIENT MT Land
PROJECT NAME Proposed Seacrest Commons
PROJECT NUMBER 4222.504
PROJECT LOCATION Monroe, Nort Carolina
DATE STARTED 4/6/18 **COMPLETED** 4/6/18
GROUND ELEVATION **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SUMMIT
GROUND WATER/CAVE-IN:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth @ 7.4' bgs
LOGGED BY Roy Smith **CHECKED BY** T. Costner
AT END OF DRILLING ---
NOTES Refer to Figure 2 "Boring Location Plan" for Approx. Boring Location
AFTER DRILLING ---

ELEVATION (ft.)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
	Approx. 2" of Topsoil			
	(ML) FILL: (Cultivated Soils) Moist Reddish Brown Slightly Clayey Slightly Sandy SILT	SPT 1		3-4-5 (9)
	(MH) RESIDUUM: Stiff Brownish Red Elastic SILT			
2.5	(ML) Partially Weathered Rock (PWR) when sampled becomes Light Gray and Yellow Sandy SILT with Rock Fragments	SPT 2		20-37-50 (50/4")
5.0	(ML) Very Hard Light Gray and Yellow Slightly Clayey Sandy SILT with Rock Fragments	SPT 3		25-28-42 (70)
7.5	(ML) Partially Weathered Rock (PWR) when sampled becomes Light Gray and Yellow Sandy SILT with Rock Fragments 7.4ft ⊠	SPT 4		30-50 (50/5")
10.0 12.5	(ML) Partially Weathered Rock (PWR) when sampled becomes Brownish Gray and Yellow Sandy SILT with Rock Fragments	SPT 5 SPT 6		27-41-50 (50/3") 38-50 (50/4")
15.0	Bottom of Boring at 14.3 feet bgs, Boring Terminated