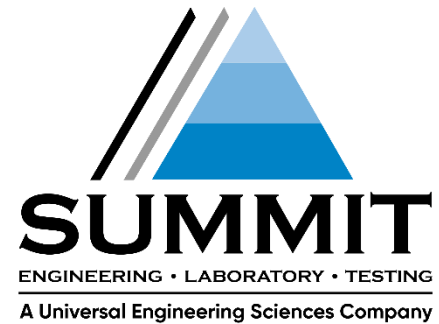


August 19, 2022

Mr. Hayes Christenbury  
LENNAR  
6701 Carmel Commons Road, Suite 425  
Charlotte, NC 28226  
Email: [Joseph.Christenbury@Lennar.com](mailto:Joseph.Christenbury@Lennar.com)



Subject:       **Estimated Seasonal High Water Table (ESHWT) Determinations  
Carolina Reserve Commons  
Charlotte Highway (Hwy 621)  
Indian Land, South Carolina  
SUMMIT Project No. 1506.G0277**

Dear Mr. Christenbury:

**SUMMIT** Engineering, Laboratory and Testing, Inc. (**SUMMIT**) is pleased to submit this letter summarizing our observations of the soil test borings as related to Estimated Seasonal High Water Table Elevation (ESHWT) determinations in the proposed stormwater BMP ponds to be constructed for the proposed project listed above. This report contains a brief description of the project information provided to us, general site and subsurface conditions revealed during this exploration.

#### **PURPOSE OF EXPLORATION**

The primary purpose of this exploration was to obtain information regarding the subsurface conditions in the proposed stormwater BMP ponds, assess the engineering characteristics of the subsurface materials, and determination of the estimated seasonal high water table mark (if evident).

This report contains the following items:

- Site Vicinity Map and Boring Location Plan,
- Summary of Test Boring Observations, visual soil classifications and descriptions,
- A general review of the subsurface soils and estimated seasonal high water table depth from existing ground surface (if evident),
- Groundwater level measurements.

### **EXPLORATION PROCEDURES**

**SUMMIT** visited the site on August 8<sup>th</sup> and 9<sup>th</sup>, 2022 and performed four (4) soil test borings (identified as SW-21 through SW-24) in the proposed stormwater BMP ponds. The approximate location of the boring is shown on Figure 2 – “Boring Location Plan” provided in Appendix 2. The client (LENNAR) provided **SUMMIT** a plan sheet titled “Conceptual Site Plan” prepared by MPV that indicated the approximate locations of the proposed stormwater BMP ponds. The borings were located by professionals from our office using the provided plan, 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. We recommend the actual boring location be surveyed to determine the actual boring location and existing ground elevation.

The soil test borings were performed using an ATV-mounted CME 550X drill rig. Borings SW-21, SW-22, SW-23, and SW-24 were extended to approximate depths of 7.3, 16, 16, and 6 feet below the existing ground surface, respectively. Hollow-stem, continuous flight auger drilling techniques were used to advance the boring into the ground. Standard Penetration Tests (SPT) were performed within the mechanical boring continuously to the termination depth in general accordance with ASTM D 1586. 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 the test location and returned to our laboratory for visual classification and potential laboratory testing. The soil samples collected were visually examined and classified in general accordance with ASTM D-2488. The Munsell Soil Color Charts (2009 Revision) were used to identify the hue, value, and chroma of soil samples. Water level

measurements were attempted at the termination of drilling. The classification symbols are depicted on the “Boring Log” provided in Appendix 2.

### **GENERALIZED SUBSURFACE STRATIGRAPHY**

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

Beginning from the ground surface, a layer of topsoil (surficial organic soils) was observed with thicknesses of approximately 3 inches. Beneath the topsoil layer, residual (undisturbed) soils were encountered that consisted of elastic silts (MH) and sandy silts (ML). Partially weathered rock (PWR) conditions were encountered in Boring SW-21 and SW-24 at approximate depth of 6 feet below the existing ground surface (bgs). Auger refusal conditions were encountered in Borings SW-21 and SW-24 at approximate depths of 7.3 and 6 feet bgs, respectively.

### **GROUNDWATER LEVEL MEASUREMENTS**

At the time of drilling, groundwater was not observed in the borings. After waiting more than 24 hours, water was not observed in the borings. It should also 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.

### **ESTIMATED SEASONAL HIGH WATER TABLE**

ESHWT is defined as the shallowest depth to a wet soil layer as a result of “true” or “permanent” groundwater at any time during the year. The ESHWT is typically identified with a change in the color of the soil layer due to water staining (typically, gray redoximorphic depletions and mottling). Spots or blotches of different color or shades of color interspersed with a dominant color in soil, commonly referred to as mottling. Mottling is a historic indication for the presence of groundwater caused by intermittent periods of saturation and drying, and may be indicative of poor aeration and impeded drainage. Mottling is a “general indication of groundwater” flow through this layer, but it is not known whether the groundwater flow was recent.

### **CONCLUSIONS**

Based on our observations, ESHWT indicators were evident in soils sampled in Borings SW-22 and SW-23, and were not evident in soils sampled in Borings SW-21 and SW-24. Please note that even though ESHWT indicators were not evident in Borings SW-21 and SW-24, perched water conditions can develop above a low permeable material such as partially weathered rock (PWR). Perched water conditions differ from the “true” or “permanent” water table. A perched water table is water standing above an unsaturated zone and is often influenced by soil conditions, and occurrence of less permeable soils. Where the ESHWT is defined as the shallowest depth to a wet soil layer as a result of “true” or “permanent” groundwater at any time during the year. The BMP designer should take into consideration that perched water conditions may exist above the low permeable PWR stratum.

The following table summarizes the results of the borings and our observations.

**Summary Table of the Boring Results and Our Observations**

Test Location	Boring Depth (Feet) <sup>1</sup>	ESHWT Depth (Feet) <sup>1</sup>	GW Depth ATD (Feet) <sup>1</sup>	GW Depth After 24 Hours (Feet) <sup>1</sup>	Approx. PWR Depth (Feet) <sup>1</sup>	Approx. Auger Refusal Depth (Feet) <sup>1</sup>
SW-21	7.3	NE	NE	NE	6	7.3
SW-22	16	9	NE	NE	NE	NE
SW-23	16	9	NE	NE	NE	NE
SW-24	6	NE	NE	NE	6	6

<sup>1</sup> Depths from existing ground surface.

NE – Not Encountered in boring

The analyses 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.

## CLOSING

**SUMMIT** appreciates the opportunity to provide our professional services for you on this project. If you have any questions concerning the information in this proposal or if we may be of further service, please contact us at 704.504.1717.

Sincerely,

**SUMMIT ENGINEERING, LABORATORY & TESTING, INC.**



*L. Brian Cantrell*  
L. Brian Cantrell  
Geotechnical Dept. Manager

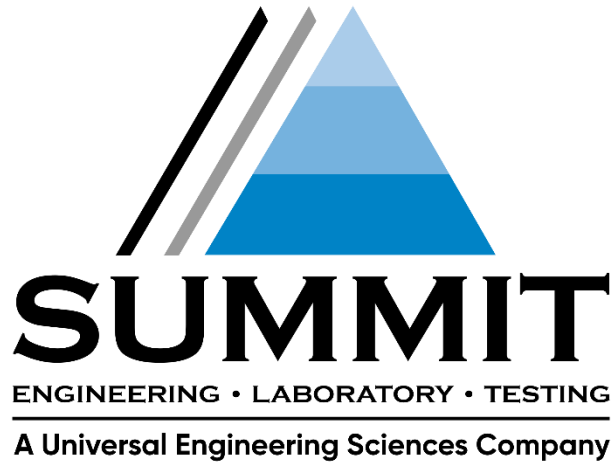


A handwritten signature in blue ink, appearing to read "C. Payne".

Christian Payne  
Assistant Project Manager

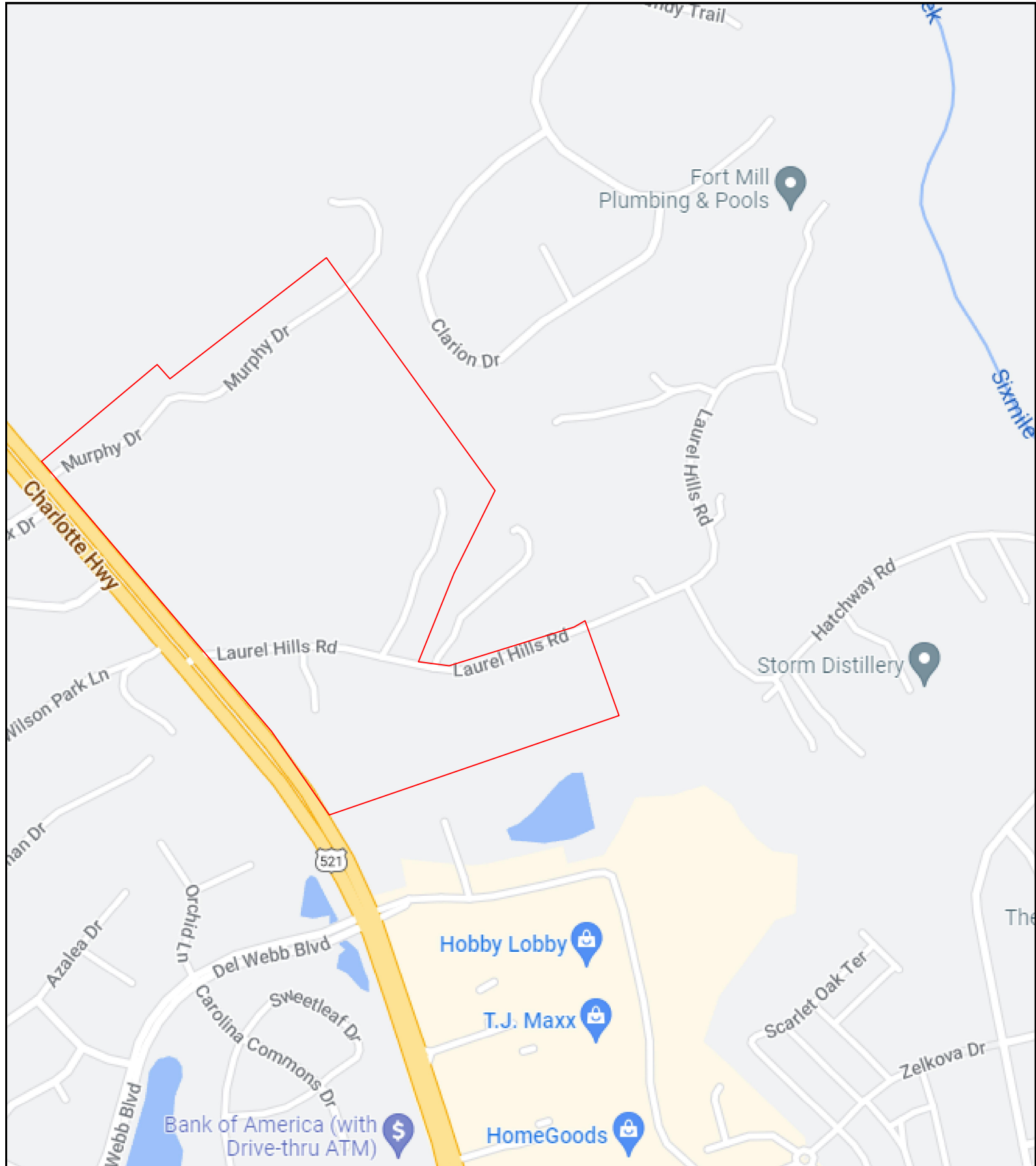
### LIST OF APPENDICES

- Appendix 1     Figure No. 1 – Site Vicinity Map
- Figure No. 2 – Boring Location Plan
- Appendix 2     Boring Logs



## APPENDIX 1

### Figures

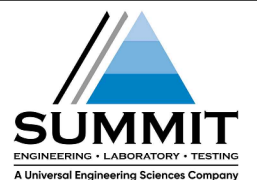


**Figure 1**  
**Site Location Plan**

**SCALE: NTS**

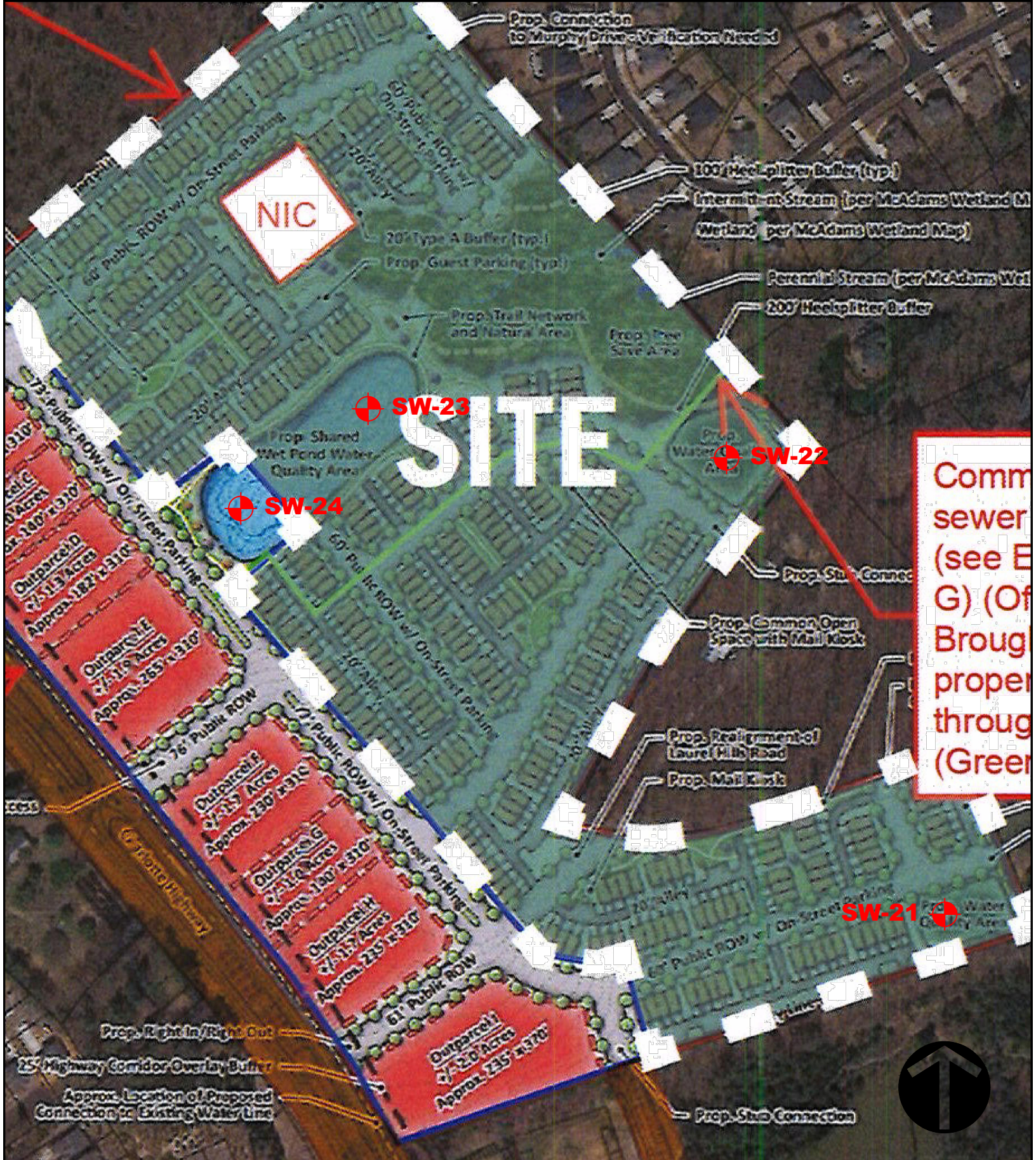
**Carolina Reserve Commons**  
**Charlotte Highway (Hwy 621)**  
**Indian Land, South Carolina**

**SUMMIT Project No.: 1506.G0277**



3575 Centre Circle  
Fort Mill, South Carolina 29715  
(803) 504-1717



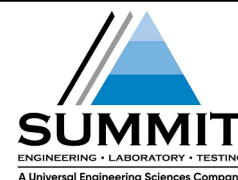


**Figure 2**  
**Boring Location Plan**

 **Approx. Soil Test Boring Location**

**Carolina Reserve Commons**  
**Charlotte Highway (Hwy 621)**  
**Indian Land, South Carolina**

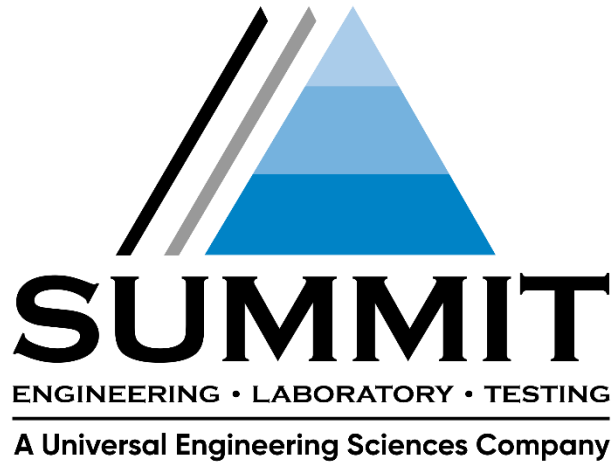
**SUMMIT Project No.: 1506.G0277**



3575 Centre Circle  
Fort Mill, South Carolina 29715  
(803) 504-1717

**SCALE: NTS**





## APPENDIX 2

### Boring Logs



SUMMIT ENGINEERING  
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CPAYNE@SUMMIT-COMPANIES.COM

## KEY TO SYMBOLS

CLIENT Lennar

PROJECT NAME Carolina Reserve Commons

PROJECT NUMBER 1506.G0277

PROJECT LOCATION Indian Land, South Carolina

### LITHOLOGIC SYMBOLS (Unified Soil Classification System)



BLANK



MH: USCS Elastic Silt



MLS: USCS Sandy Silt



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



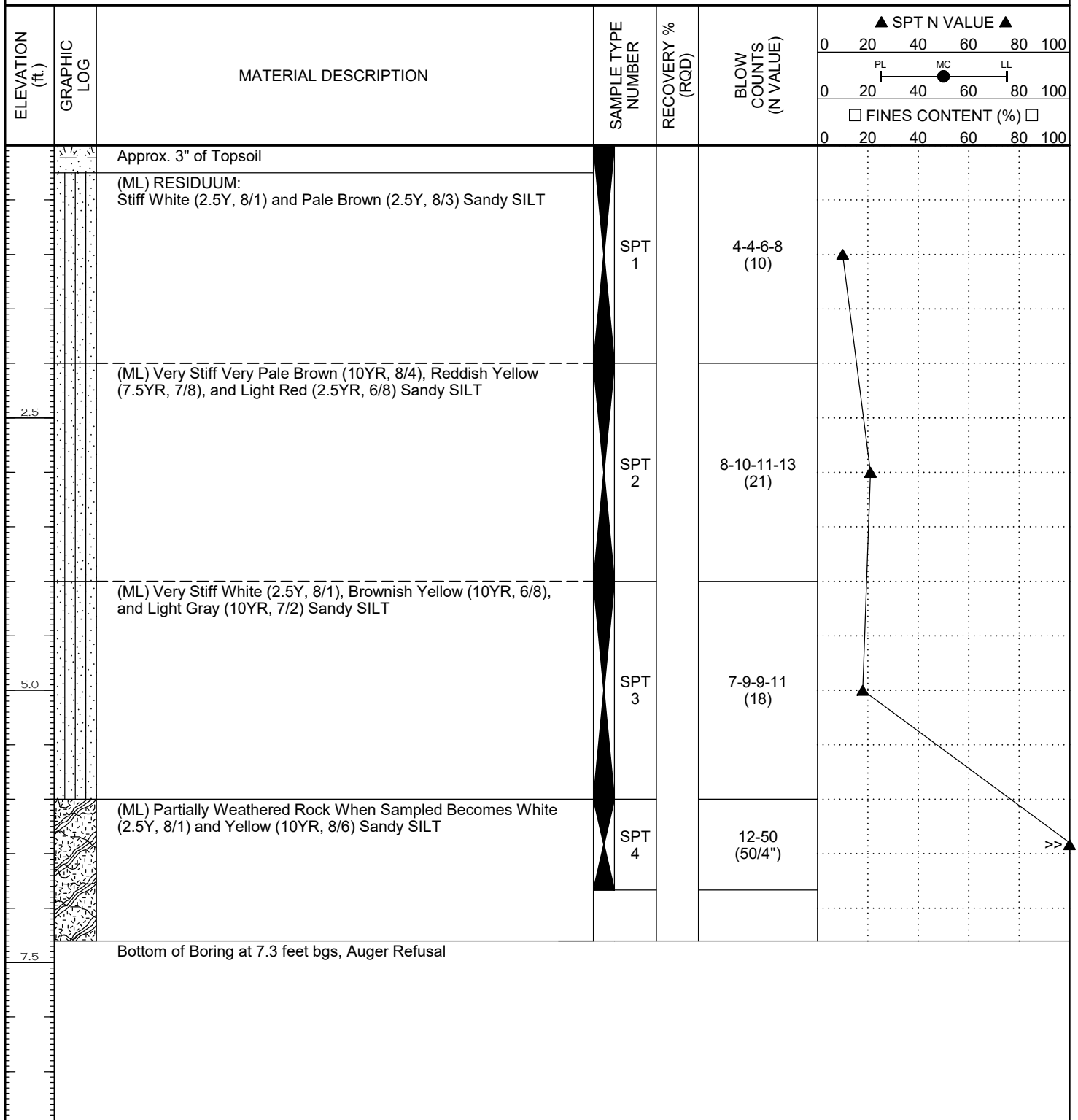
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# BORING NUMBER SW-21

PAGE 1 OF 1

CLIENT Lennar  
PROJECT NUMBER 1506.G0277  
DATE STARTED 8/8/22 COMPLETED 8/8/22  
DRILLING CONTRACTOR SUMMIT  
DRILLING METHOD Hollow Stem Auger  
LOGGED BY C. Whitener CHECKED BY N. Sacks  
NOTES See Figure 2 "Boring Location Plan" for Approx. Boring Location

PROJECT NAME Carolina Reserve Commons  
PROJECT LOCATION Indian Land, South Carolina  
GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 6 inches  
GROUND WATER/CAVE-IN:  
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth NE  
AT END OF DRILLING --- GW NE > 24 hrs  
AFTER DRILLING ---





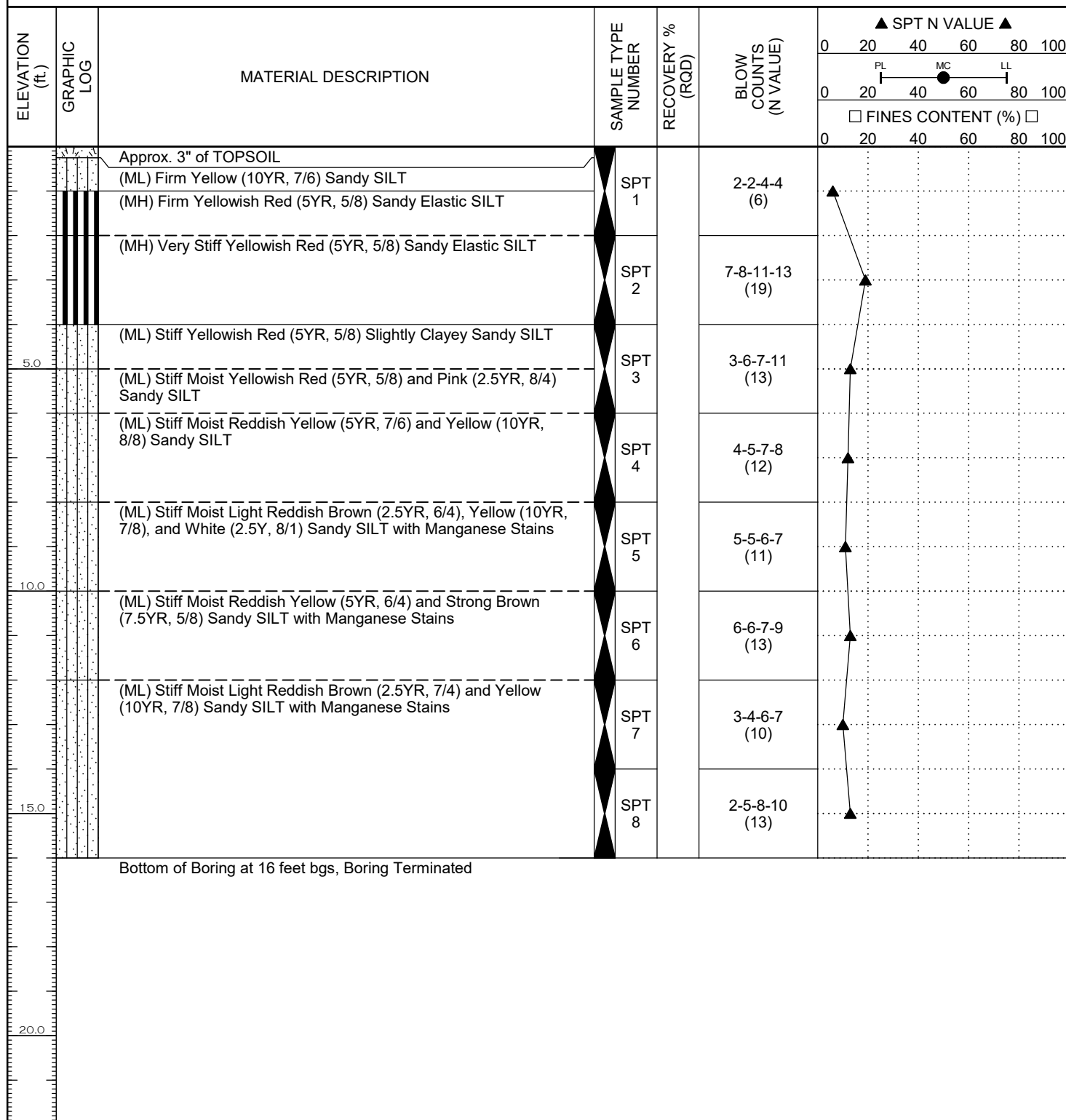
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# BORING NUMBER SW-22

PAGE 1 OF 1

CLIENT Lennar  
PROJECT NUMBER 1506.G0277  
DATE STARTED 8/8/22 COMPLETED 8/8/22  
DRILLING CONTRACTOR SUMMIT  
DRILLING METHOD Hollow Stem Auger  
LOGGED BY C. Whitener CHECKED BY N. Sacks  
NOTES See Figure 2 "Boring Location Plan" for Approx. Boring Location

PROJECT NAME Carolina Reserve Commons  
PROJECT LOCATION Indian Land, South Carolina  
GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 6 inches  
GROUND WATER/CAVE-IN:  
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth NE  
AT END OF DRILLING --- GW NE > 24 hrs  
AFTER DRILLING ---





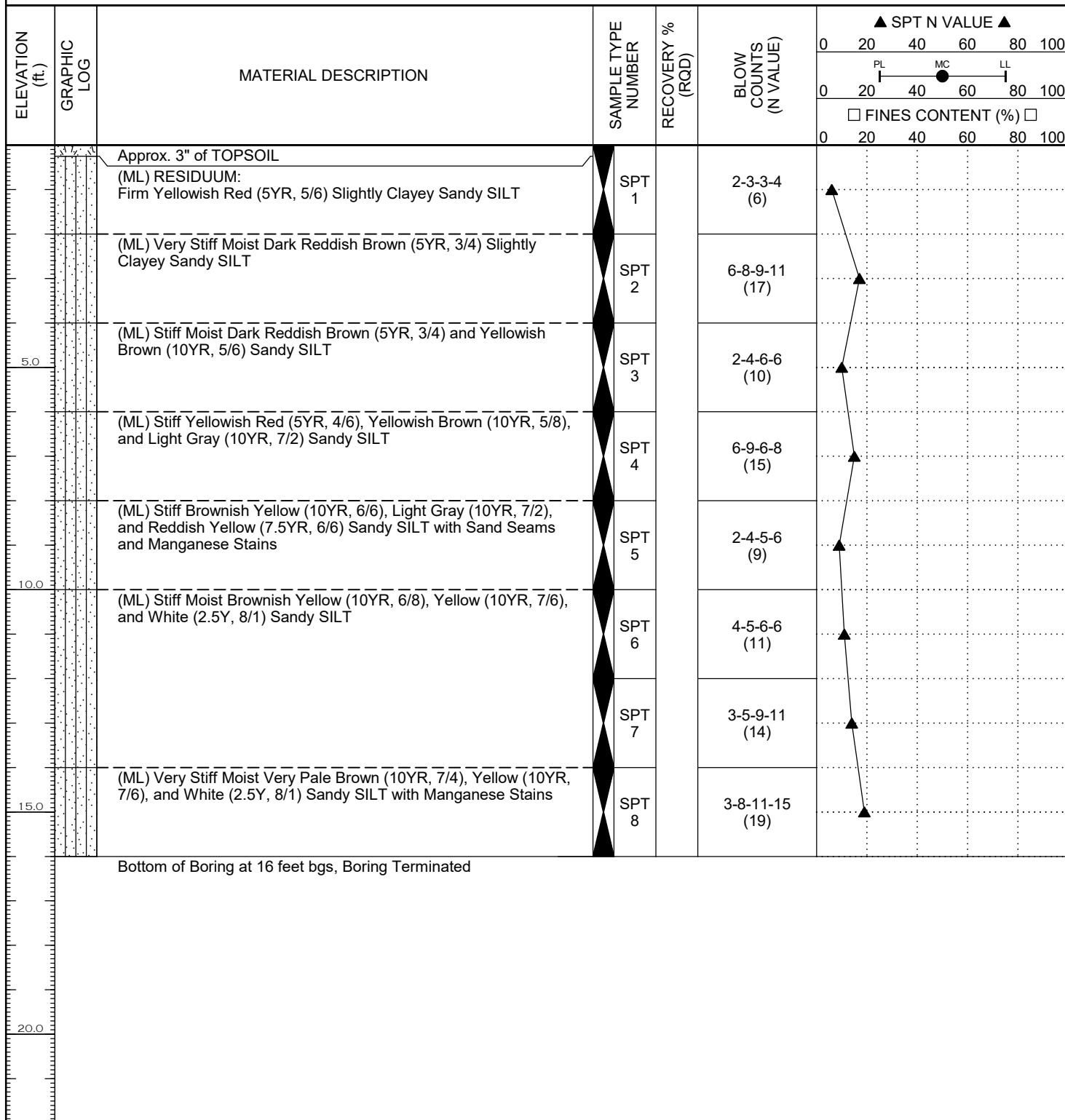
SUMMIT ENGINEERING  
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FORT MILL, SC 29715  
704-504-1717  
CPAYNE@SUMMIT-COMPANIES.COM

# BORING NUMBER SW-23

PAGE 1 OF 1

CLIENT Lennar  
PROJECT NUMBER 1506.G0277  
DATE STARTED 8/9/22 COMPLETED 8/9/22  
DRILLING CONTRACTOR SUMMIT  
DRILLING METHOD Hollow Stem Auger  
LOGGED BY C. Whitener CHECKED BY N. Sacks  
NOTES See Figure 2 "Boring Location Plan" for Approx. Boring Location

PROJECT NAME Carolina Reserve Commons  
PROJECT LOCATION Indian Land, South Carolina  
GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 6 inches  
GROUND WATER/CAVE-IN:  
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth NE  
AT END OF DRILLING --- GW NE > 24 hrs  
AFTER DRILLING ---





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# BORING NUMBER SW-24

PAGE 1 OF 1

CLIENT Lennar  
PROJECT NUMBER 1506.G0277  
DATE STARTED 8/10/22 COMPLETED 8/10/22  
DRILLING CONTRACTOR SUMMIT  
DRILLING METHOD Hollow Stem Auger  
LOGGED BY C. Whitener CHECKED BY N. Sacks  
NOTES See Figure 2 "Boring Location Plan" for Approx. Boring Location

PROJECT NAME Carolina Reserve Commons  
PROJECT LOCATION Indian Land, South Carolina  
GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 6 inches  
GROUND WATER/CAVE-IN:  
AT TIME OF DRILLING --- GW NE ATD / Caved in Depth NE  
AT END OF DRILLING --- GW NE > 24 hrs  
AFTER DRILLING ---

