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**ADDENDUM NO. 1
ITB 17-08**

**UTILITY INFRASTRUCTURE IMPROVEMENTS
FOR OCONEE INDUSTRY AND TECHNOLOGY PARK**

OPENING DATE: MARCH 13, 2018 AT 2:00 PM - UNCHANGED

This Addendum #1 contains answers to all questions received during the pre-bid meeting, on February 28, 2018 at 2:00pm. In addition, the Addendum contains revised Plan Sheets, Bid Form and Specification Sections along with clarifications for the plan and specification revisions. The Bidder shall include a copy of this Addendum No. 1 signed with the bid and acknowledge Addendum No.1 with date on the bid form.

PART I – CLARIFICATIONS:

During the pre-bid meeting, the section of the water and sewer improvements along the proposed realigned entrance roadway into the park (to be graded in the future), was the most prevalent topic of conversation. This section of water and sewer has been redesigned to follow the previous location of the entrance driveway which was graded with the mass grading improvements for OITP.

The revised utility lengths are: Sewer – 3,901 LF and Water – 2,659 LF

The last day for questions has been extended one day to close of business Wednesday, March 7, 2018.

PART II – QUESTIONS:

Question 1: Is the proposed stockpile area shown on the plans?

Answer 1: The water and sewer alignments have been revised to extend through the previously mass graded road bed. A stockpile area will not be required with the revised alignment.

Question 2: Can the engineer clarify the limits of the proposed grading work?

Answer 2: Additional grading is no longer required with the revised alignment.

Question 3: Will the Contractor be responsible for the Material Testing associated with earthwork?

Answer 3: No, Oconee County will contract directly with the Materials Testing company.

Question 4: Who is responsible for construction staking and surveying?

Answer 4: The Contractor is responsible for construction staking and surveying.

Question 5: Will the owner stake out the centerline of the proposed entrance roadway?

Answer 5: No, all surveying is to be provided by the contractor.

Question 6: Will the contractor be required to have a Grading License in addition to the Utility License?

Answer 6: No, the grading is considered ancillary to the utility work.

Question 7: Can the engineer consider submitting a partial Permit to Operate for the first section of the project to include the necessary water and sewer to serve the Tri-County Technical Site?

Answer 7: The engineer will submit a request for partial Permit to Operate for the section of the water and sewer improvements up to the Tri-County Technical College site, as required to tie in the Tri-County Technical College water and sewer utilities for operation of the facility. A second partial Permit to Operate will be submitted for the remainder of the water and sewer lines. The substantial and final completion periods have been revised to the following:

Phase 1 Substantial Completion (to TCTC) – 90 Days
Phase 2 Substantial Completion (remainder) – 60 Days
Final Completion – 30 Days

Question 8: Are special liners required on the sewer Pipe?

Answer 8: Sewer pipe is to have Protecto 401 liner on all pipe, including the steel creek crossing.

Question 9: Will electric boxes and lines in phase 2 area of the park be in the way?

Answer 9: Blue Ridge Electric Co-operative recently installed underground power inside the park to serve the Tri-County Technical College facility located on the School District of Oconee County's (SDOC) property. The majority of the underground power was installed inside the SDOC property line, a minimum of 4 feet offset from the property line. The only location where the power encroached within the Utility Infrastructure Improvements for OITP project limits was at the existing intersection of Oconee Business Parkway and Innovation Way near the tie in location for the water main. An overall exhibit of BREC's facilities within the park is included in this Addendum.

Question 10: Is there a geotechnical report for the project?

Answer 10: A geotechnical report was prepared by Terracon Consultants, Inc., for the overall Phase 2 Improvements for the Oconee Industry & Technology Park, dated April 8, 2017. A copy of the report is included in this Addendum.

Question 11: Who is responsible for permanent grassing?

Answer 11: The contractor is responsible for permanently grassing and stabilizing all disturbed areas for final completion. Also, please note that all existing swales that are disturbed for utility installations are to be regraded to the predeveloped conditions.

Question 12: Will an additional line item for unsuitable material be considered?

Answer 12: An additional line item for unsuitable has not been provided for the project. All work for unsuitable material is to be included in the unit price of the specific item to which it pertains. The OITP Phase 2 - Mass Grading Improvements project recently completed included 1,000,000 CY of earthwork and unsuitable material was not encountered.

Question 13: Will an additional line item for rock excavation be considered?

Answer 13: An add alternate line item has been added to the Bid Form for rock excavation. The quantity included is of an indeterminate quantity and is presented only to establish a unit price. The item may or may not be utilized in the construction of the project. No payment will be made for rock excavation without written authorization from Owner or Engineer prior to conducting the work and quantified in the field by the materials testing consultant. Specification Section 02205 – Rock Excavation for Water and Wastewater Infrastructure has been added to the Contract Documents and is included in this Addendum.

Question 14: Are any roadways anticipated to be constructed before starting the project?

Answer 14: The Tri-County Technical College driveway curb and gutter has already been poured. No other proposed roadways will be installed prior to the start of this project. The internal proposed roadways shown on the plans as by others will be let by SCDOT in June 2018.

Question 15: Is the contractor responsible for SWPPP inspections?

Answer 15: The Owner will be responsible for providing SWPPP inspections.

Question 16: Is the sewer pipe support at creek crossing to be cast in place or precast?

Answer 16: Pipe support can be either cast-in-place or precast. Footing and excavation for pipe support, included all operations associated with the creek crossing, are to be conducted outside of the Waters of the State (creek normal water level).

PART III – PLANS:

Plans Sheets G1.1, C1.1, C2.1, C2.2, C2.3, EC1.1 have been modified. Updates include:

G1.1 – Revised water and sewer alignments shown on Plan Index

C1.1 – Water and sewer alignments were revised at entrance to park to follow previously graded entrance roadway. Water tie-in point shifted and method of connection revised to tapping sleeve and valve.

C2.1 – Added notes on plans and profile for creek crossing and reference to detail. Revised water and sewer alignments. Add driveway crossing for sanitary sewer at Station 11+35. Water tie-in point shifted to Sheet C2.1. MH depths and pipe slopes revised.

C2.2 – Water and sewer alignments were revised at entrance to park to follow previously graded entrance roadway. Water tie-in point shifted and method of connection revised to tapping sleeve and valve. MH depths and pipe slopes revised. Casing pipe for Tri-County Technical College driveway at Station 5+30, revised installation method from open cut to jack & bore.

C2.3 – Water and sewer alignments revised for revisions at entrance. MH depths and pipe slopes revised.

EC1.1 – Erosion Control revisions for the shift in the water and sewer alignments.

C3.1 – Add Water-tight manhole detail. Shifted details to Sheet C3.2 to account for additional detail.

C3.2 – Shifted details to account for new detail on Sheet C3.1.

C3.3 – Added Sewer Pipe Support detail and revised creek crossing detail. Add Driveway Crossing Detail for the new crossing in Hwy 11. Shifted details to account for new details.

PART IV – CONTRACT DOCUMENTS:

SECTION 00021 – INVITATION TO BID:

Item No. 4 - The last day for questions has been revised from March 6, 2018 to **March 7, 2018.**

SECTION 00110 – INSTRUCTIONS TO BIDDERS:

Article 8 Bid Security – Section 8.1 – delete “ten percent” and replace with “five percent.”

SECTION 00313 – BID FORM:

Delete the previous Bid Form and replace with the revised Bid Form attached showing **Addendum No. 1** in the header footer in red text. **Note: This Bid Form must be the version submitted with the bid proposal.** The bid items and quantities were revised as described in Part III of the Addendum. Note that the earthwork bid item has been removed and rock excavation has been added.

The substantial completion for the portion of water and sewer to serve Tri-County Technical College has been set as 90 calendar days. Substantial Completion for completing the remainder of the project is 60 calendar days. Final Completion has been revised to 180 calendar days.

Bid Bond has been revised from a 10 percent to 5 percent.

SECTION 00411 – BID BOND:

Delete the previous Bid Bond Section and replace with the attached Bid Bond showing a 5% bid bond.

SECTION 00506 – STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:

Delete Sections 3.1 and 3.2 of Article 3 - Contract Times and replace with the following:

- 3.1 Two portions of Work will each be considered for Substantial Completion. The first portion will include the Work required to extend water and sewer service to Tri-County Technical College, tasks of which include but are not limited to sewer installation through MH 12, water installation through STA 5+30, connections of proposed utilities to existing utilities as required, proper installation of all materials as specified, successful performance and materials testing of installed pipe and other materials as specified, and submittal of redline record drawings by CONTRACTOR to ENGINEER. The second portion will include the Work required for the substantial completion of the remainder of the project. The first portion of

Work will be substantially completed within 90 days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions. The second period of Work will be substantially completed within 150 days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions. The Work in total will be completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions within 180 days after the date when the Contract Times commence to run.

- 3.2 *Liquidated Damages.* OWNER and CONTRACTOR recognize time is of the essence for this Agreement and OWNER and intended service customers of the proposed utilities will suffer financial loss if the Work is not completed within the times specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving the actual loss suffered by OWNER if the Work is not substantially complete on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree to liquidated damages for delay (but not as a penalty) the CONTRACTOR shall pay OWNER one-thousand dollars (\$1000.00) for each day expiring after the times specified in paragraph 3.1 for Substantial Completion until the Work is substantially complete. Liquidated damages as outlined will apply to either and both portions of Work considered for Substantial Completion as described in paragraph 3.1. After Substantial Completion, if CONTRACTOR shall neglect, refuse or fail to complete the remaining Work within the time specified in paragraph 3.1 for completion and readiness for final payment or any proper extension thereof granted by OWNER, CONTRACTOR, shall pay OWNER one-thousand dollars (\$1000.00) for each day expiring after the time specified in paragraph 3.1 for completion and readiness for final payment.

PART V – TECHNICAL SPECIFICATIONS:

SECTION 02205 – ROCK EXCAVATION FOR WATER AND WASTEWATER INFRASTRUCTURE:

Add attached Rock Excavation specification section to the Technical Specifications.

Enclosures:

Revised Section 00313 - Bid Form
Revised Section 00411 - Bid Bond
New Section 02205 – Rock Excavation
Blue Ridge Electric Exhibit
Geotechnical Report
Addendum No. 1 Revised Plans – Full Set

END ADDENDUM NO. 1

Dated: March 5, 2018

Please acknowledge receipt of Addendum by signing and attaching to your bid.

BY: _____ DATE: _____
(Contractor)

(Signature) (Title of Signing Officer)

DOCUMENT 00313

BID FORM

PROJECT IDENTIFICATION: Utility Infrastructure Improvements
for Oconee Industry and Technology Park

CONTRACT IDENTIFICATION AND NUMBER: 26231.0000

THIS BID IS SUBMITTED TO: Oconee County

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Bid Price and within the Bid Times indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
2. BIDDER accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the day of Bid opening, or for such longer period of time BIDDER may agree to in writing upon request of OWNER.
3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:
 - a. BIDDER has examined and carefully studied the Plans and Specifications for the work and contractual documents relative thereto, and has read all Technical Provisions, Supplementary Conditions, and General Conditions, furnished prior to the opening of Bids and can fulfill the requirements of the work to be performed.
 - b. BIDDER further acknowledges hereby receipt of the following Addenda:

ADDENDUM NO.	DATE

- c. BIDDER has visited the site and become familiar with and is satisfied as to the general, local and site conditions possibly affecting cost, progress, performance and furnishing of the Work;
- d. BIDDER is familiar with and is satisfied as to all federal, state, and local Laws and Regulations possibly affecting cost, progress, performance and furnishing of the Work.

- e. BIDDER has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structure at or contiguous to the site (except underground Facilities) have been identified in the Supplementary Conditions. BIDDER acknowledges such reports and drawings are not Contract Documents and may not be complete for BIDDER's purposes. BIDDER acknowledges OWNER and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bidding Documents with respect to Underground Facilities at or contiguous to the site. BIDDER has obtained and carefully studied (or assumes responsibility for having done so) all such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost progress, performance or furnishing of the work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by BIDDER and safety precautions and programs incident thereto. BIDDER does not consider any additional examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance and furnishing of the Work in accordance with the times, price and other terms and conditions of the Bidding Documents.
 - f. BIDDER is aware of the general nature of Work to be performed by Owner and others at the site relating to Work for which this Bid is submitted as indicated in the Bidding Documents.
 - g. BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the site, reports and drawings identified in the Bidding Documents and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
 - h. BIDDER has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies BIDDER has discovered in the Bidding Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.
 - i. This bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.
4. BIDDER will complete the Work in accordance with the Contract Documents for the following price(s):

BID PROPOSAL

CLEARING AND GRADING					
Item	Description	Quantity	Units	Unit Price	Total
1	Clearing	1	LS		
2	Grassing	1	LS		
3	Silt Fence	7,000	LF		
4	Sediment Tube	8	EA		
5	Rock Check Dam Replacement	12	EA		
6	Construction Entrance	2	EA		
Sub-Total, CLEARING AND GRADING					
WATER DISTRIBUTION SYSTEM					
7	10" DIP Water Main	2,660	LF		
8	16" Steel Casing Installed by Jack & Bore	67	LF		
9	16" Steel Casing Installed by Open Cut	214	LF		
10	10" Fittings	1	LS		
11	10" Gate Valve	6	EA		
12	Fire Hydrant Assembly	2	EA		
13	Connection to Existing System	3	EA		
Sub-Total, WATER DISTRIBUTION SYSTEM					
SANITARY SEWER SYSTEM					
14	8" DIP Gravity Sewer (0-6)	901	LF		
15	8" DIP Gravity Sewer (6-8)	490	LF		
16	8" DIP Gravity Sewer (8-10)	725	LF		
17	8" DIP Gravity Sewer (10-12)	431	LF		
18	8" DIP Gravity Sewer (12-14)	377	LF		
19	8" DIP Gravity Sewer (14-16)	164	LF		
20	8" DIP Gravity Sewer (16-18)	172	LF		
21	8" DIP Gravity Sewer (18-20)	288	LF		
22	8" DIP Gravity Sewer (20-22)	259	LF		
23	8" DIP Gravity Sewer (22-24)	52	LF		
24	8" Steel Gravity Sewer	47	LF		

Item	Description	Quantity	Units	Unit Price	Total
25	Doghouse Manhole Including Connection to Existing System	1	EA		
26	Standard Manhole (0-6)	4	EA		
27	Standard Manhole (6-8)	3	EA		
28	Standard Manhole (8-10)	0	EA		
29	Standard Manhole (10-12)	2	EA		
30	Standard Manhole (12-14)	5	EA		
31	Standard Manhole (14-16)	1	EA		
32	Standard Manhole (16-18)	1	EA		
33	Standard Manhole (18-20)	1	EA		
34	Standard Manhole (20-22)	0	EA		
35	Standard Manhole (22-24)	2	EA		
36	Additional for Water-Tight Frame & Cover	5	EA		
37	16" Steel Casing Installed by Jack & Bore	100	LF		
38	16" Steel Casing Installed by Open Cut	121	LF		
39	Creek crossing including all materials, concrete piers, pipe connections, and appurtenances necessary for elevated gravity sewer installation	1	LS		
40	Remove & Replace Concrete Driveway	25	LF		
41	Connect to Existing Sewer Service	1	EA		
Sub-Total, SANITARY SEWER SYSTEM					
TOTAL PROJECT - BASE BID					

ADDITIVE ALTERNATE					
Item	Description	Quantity	Units	Unit Price	Total
42	* Additional Stone Bedding - including removal and disposal of unsuitable material per Engineer	200	CY		
43	* Rock Excavation	200	CY		

*These items are of an indeterminate quantity and are presented only to establish a unit price. These items may or may not be utilized in the construction of the project. No payment will be made for these items without written authorization from Owner or Engineer.

TOTAL PROJECT – BASE BID FOR ALL ESTIMATED PRICES _____
 (Use words)

_____ (\$ _____)
 (Figures)

Unit Prices have been computed in accordance with paragraph 11.03.C of the General Conditions.

BIDDER acknowledges estimated quantities are not guaranteed and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities determined as provided, determined as provided in the Contract Documents.

5. BIDDER agrees two portions of Work will each be considered for Substantial Completion. The first portion will include the Work required to extend water and sewer service to Tri-County Technical College, tasks of which include but are not limited to sewer installation through MH 12, water installation through STA 5+30, connections of proposed utilities to existing utilities as required, proper installation of all materials as specified, successful performance and materials testing of installed pipe and other materials as specified, and submittal of redline record drawings by CONTRACTOR to ENGINEER. The second portion will include the Work required for the substantial completion of the remainder of the project. The first portion of Work will be substantially completed within 90 days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions. The second period of Work will be substantially completed within 150 days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions. The Work in total will be completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions within 180 days after the date when the Contract Times commence to run.
6. BIDDER accepts provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within times specified in the Agreement.
7. The following documents are attached to and made a condition of this Bid:
 - a. Required Bid Security in the form of 5 percent of the Bid Total Price.
8. The undersigned further agrees in case of failure on his/her part to execute the said contract and the Bond within 15 consecutive calendar days after written notice being given of the award of the contract, the check or bid bond accompanying this bid, and the monies payable thereon shall be paid into the funds of the Owner as liquidated damages for such failure, otherwise, the check or bid bond accompanying this proposal shall be returned to the undersigned.
9. Communications concerning this Bid shall be addressed to:

Attn: _____

- 10. Terms used in this Bid which are defined in the General Conditions or Instructions will have the meanings indicated in the General Conditions of Instructions.

SUBMITTED on _____, 20__.

CONTRACTOR'S NAME

ADDRESS:

BY: _____

State Utility Contractor License No. _____ SC

DOCUMENT 00411

BID BOND

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

Oconee County _____
415 S. Pine Street _____
Walhalla, SC 29691 _____

BID

BID DUE DATE: _____

PROJECT: Utility Infrastructure Improvements for Oconee Industry and Technology Park
Oconee County, SC

BOND

BOND NUMBER: _____ DATE: _____
(Not later than Bid Due Date)

PENAL SUM: _____
(5% of Bid Sum)

IN WITNESS WHEREOF, Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

SURETY

(Seal)
Bidder's Name and Corporate Seal

(Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

Attest: _____
Signature and Title

Note: (1) Above addresses are to be used for giving required notice.
(2) Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

PENAL SUM FORM

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents and Contract Documents.
3. This obligation shall be null and void if:
 - 3.1 Owner accepts Bidder's bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents and Contract Document, or
 - 3.2 All bids are rejected by Owner, or
 - 3.3 Owner fails to issue a notice of award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by bidder and, if applicable, consented to by Surety when required by paragraph 5 hereof.)
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of and any and all defenses based on arising out of any time extension to issue notice of award agreed to in writing by Owner and Bidder, provided that the time for issuing notice of award including extensions shall not in the aggregate exceed 120 days from Bid Due Date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in paragraph 4 above is received by Bidder and Surety, and in no case later than one year after Bid Due Date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notice required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent or representative who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of the Bond conflicts with any applicable provision of any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "bid" as used herein includes a bid, offer or proposal as applicable.

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SECTION 02205 – ROCK EXCAVATION FOR
WATER AND WASTEWATER INFRASTRUCTURE

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**SECTION 02205
ROCK EXCAVATION FOR
WATER AND WASTEWATER INFRASTRUCTURE**

PART 1 – GENERAL

1.1 RELATED SECTIONS

- A. Section 20110 – Site Clearing
- B. Section 03305 – Site Concrete
- C. Section 02731 – Wastewater Collection System

1.2 SCOPE

This specification covers the rock excavation requirements for the installation of water main, reuse water mains, sanitary sewers, force main, manholes, valve vaults/chambers, and associated appurtenances.

1.3 DEFINITIONS

- A. Common Excavation: Excavation of all material that can be excavated, transported, and unloaded using heaving ripping or that can be excavated and dumped into place or loaded onto hauling equipment by excavator equipped with attachments (shovel, bucket, backhoe, dragline, or clam shell) appropriate to the material type, character, and nature of the materials.
- B. Rock Excavation: Removal of all hard, compacted, or cemented materials that require blasting or the use of pneumatic table/hammering and in the opinion of the Engineer is incapable of being loosened with a track- type tractor with mounted heavy ripper equipment. The excavation and removal of isolated boulders or solid rock fragments larger than one cubic yard encountered in materials otherwise conforming to the definition of common excavation shall be classified as rock excavation. The presence of isolated boulders or solid rock fragments smaller than 1 cubic yard, or isolated in nature is not in itself sufficient cause to change the classification of the surrounding material.

For the purpose of these classifications, the following definitions shall apply:

Heavy Ripping equipment is a rear- mounted, heavy duty, single- tooth, ripping attachment mounted on a track type tractor with minimum mass of 35 tons, and having a power rating of at least 250 flywheel horsepower unless otherwise specified.

Hydraulic Hammer equipment is an additional wheeled or tracked excavator necessary for hydraulic fracturing of rock. The ripper is to be attached to the tractor in the most efficient parallelogram type recommended by the tractor/ripper manufacturer. The ripper and tractor must be in good class condition and operated by experienced personnel.

Isolated Boulder and Solid Rock shall be defined as solid boulders or pieces of rock exceeding one cubic yard in volume, and shall have not less than 3,000 psi of unconfined compressive strength (USC), and the production rate is less than 50 cubic yards per hour for continuous four hours using a minimum 300 HP excavator or ripper at full capacity.

Unclassified excavation is defined as the excavation of all materials encountered, including rock materials, regardless of their nature or the manner in which they are removed.

1.4 MEASUREMENT AND PAYMENT

1. Rock excavation to be paid at the contract unit price per cubic yard as excavated and disposed of properly, replaced with clean, suitable bedding and backfill.

1.5 QUALITY ASSURANCE

- A. Provide adequate survey control to avoid unauthorized over excavation.

1.5 WEATHER LIMITATIONS

- A. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.6 SEQUENCING AND SCHEDULING

- A. Clearing, Grubbing, and Stripping: Complete applicable Work specified in Section 02110, Site Clearing, prior to excavating.
- B. Excavation Support: When performing trench excavation in excess of five feet in depth, comply with Occupational Safety and Health Administration's (OSHA) trench safety standards, 29 CFR, s. 1926.650, Subpart P, "Excavation, Trenching, and Shoring", and all subsequent revisions or updates adopted by the Department of Labor and Employment Security. Ensure that trench boxes are wide enough to accommodate compaction and density testing. The excavation support system shall be designed by a professional Engineer registered in the State of South Carolina, other than the project Engineer of Record.

PART 2 – PRODUCTS

2.1 MATERIALS

Materials for backfilling shall conforming to the following requirements:

- A. SELECT EARTH BACKFILL: Fine, sound, loose earth containing optimum moisture content for compaction to 95 percent of maximum density, free from all wood, vegetable matter, debris, and other objectionable material, and having no scattered clods, stones, or broken concrete.

- B. COMMON EARTH BACKFILL: Sound. Loose earth containing optimum moisture content for compaction to 95 percent of maximum density, free from all wood, vegetable matter, debris, and other objectionable material, and having no scattered clods, stones, or broken concrete and pavement. Such backfill shall be placed a minimum of one foot above top of pipe.
- C. SAND: Natural or imported sand conforming to ASTM D1073.
- D. CRUSHED ROCK: Crushed Rock conforming to Class 6 aggregate as specified in the South Carolina Department of Transportation Standard Specifications.
- E. CLASS B CONCRETE: Class B concrete as specified in the Section entitled "Cast-In-Place Concrete" of these Specifications.

2.2 GENERAL

- A. Unless otherwise specified herein, earth backfill shall be compacted to not less than 95 percent of the maximum density at optimum water content as determined by AASHTO T- 99, Method A. Crushed stone and sand shall be compacted or consolidated to not less than 90 percent of the solid volume density as determined from the bulk specific gravity by AASHTO T- 84 and T- 85 and the dry weight of the aggregate.
- B. Material that is too dry for adequate compaction shall receive a prior admix of sufficient water to secure optimum moisture content. Material having excessive water content shall not be placed at any time.
- C. Unless otherwise specified herein, backfill material required to be compacted shall be placed in horizontal layers not to exceed six inches in thickness (before compaction) and compacted in place by ramming, tamping, or rolling. Compaction shall be accomplished by power driven tools and machinery wherever possible. Compaction and consolidation of sand and crushed rock backfill shall be accomplished using vibrating equipment in a manner acceptable to the Engineer.

PART 3 – EXECUTION

3.1 GENERAL

- A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.
- B. Surface water runoff should be prevented from entering trenches by temporary berms, swales, or other diversion methods.

- C. Where rock is encountered in trenches, excavate to remove boulders and stones to provide a minimum of six inches clearance between the rock and any part of the pipe or manhole.
- D. Where rock is encountered in trenches for pipelines, excavate to the minimum depth which will provide clearance below the pipe barrel of eight inches for pipe 21 inches in diameter and small and 12 inches for larger pipe, valves, and manholes. Remove boulders and stones to provide a minimum of six inches clearance between the rock and any part of the pipe, manhole or accessory.

3.2 UNCLASSIFIED EXCAVATION

- A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

3.3 TRENCH WIDTH

- A. Minimum Width of Trenches: Excavate trenches for pipes to the elevation of the bottom of the pipe or sub- base as specified on the Drawings. The width should be sufficient to provide adequate working room for pipe installation and connections.
- B. Wherever the prescribed maximum trench width is exceeded, the Contractor shall use the next higher Class or Type of bedding and haunching as shown on the Drawings for the full trench width as actually cut. The excessive trench width may be due to unstable trench walls, inadequate or improperly placed bracing and sheeting which caused sloughing, accidental over- excavation, necessitate by the size of the Contractor's tamping and compaction equipment, or other reasons beyond the control of the Owner or Engineer. Do not intentionally over- excavate without prior authorization of Engineer.

3.4 EMBANKMENT AND CUT SLOPES

- A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross- sections shown, with proper allowance for topsoil or slope protection, where shown.
- B. Remove stones and rock that exceed 3- inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes.
- C. Round tops of cut slopes in soil to not less than a 6- foot radius, provided such rounding does not extend offsite or outside easements and rights- of- way, or adversely impacts existing facilities, adjacent property, or completed Work.

3.5 STOCKPILING EXCAVATED MATERIAL

- A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.
- B. Confine stockpiles to within easements, rights- of- way, and accepted work areas. Do not obstruct roads or streets.

- C. Do not stockpile excavated material adjacent to trenches and other excavations, unless excavation side slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.
- D. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

3.6 USE OF EXCAVATED MATERIAL

- A. Suitable material from the specified excavations may be used in the construction of required earthfill or rockfill. The suitability of material for specific purposes is determined by the Engineer

3.7 DISPOSAL OF SPOIL

- A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill, offsite.
- B. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk as specified in Section 02110, Site Clearing, for clearing and grubbing debris.

3.8 BLASTING

- A. Blasting is prohibited.

3.9 OVER EXCAVATION

- A. Over excavation in rock
 - 1. The space below grade for pipe lines shall be backfilled to the proper grade with compacted layers of stone bedding or sand backfill conforming to the requirements specified herein for backfill. Where pipe sewers are constructed on concrete cradles, rock shall be excavated to the bottom of the cradle as shown on the Drawings.
 - 2. Rock under structures shall be excavated to lines and grades shown on the Drawings. Unless specified otherwise, where rock excavation has been carried below grade, the contractor shall backfill to grade with Class B concrete at his own expense.
 - 3. Where rock foundation is obtained at grade for over 50 percent of the area of any one structure, the portion of the foundation that is not rock shall be excavated below grade to reach a satisfactory foundation of rock. The portion below grade shall be backfilled with Class B Concrete made of materials and mix design by Engineer.
 - 4. Where rock foundation is obtained at grade for less than 50 percent of any one structure and satisfactory rock cannot be found over the remaining area by reasonable additional excavation, the rock shall be removed for a depth of 12 inches below grade and the space below grade shall be backfilled to the proper grade with compacted layers of

crushed rock conforming to the requirements specified herein for backfill.

5. Rock excavation for all structures and adjacent trenches under this Contract and any other rock excavation directed by the Engineer shall be completed before the construction of any structure is stated in the vicinity.
6. Over excavation in Earth is excavation in earth beyond the specified lines and grades shall be corrected by filling the resulting voids with accepted, compacted earth fill. The exception to this is that if the earth is to become the subgrade for riprap, rockfill, sand or gravel bedding, or drain fill, the voids may be filled with material conforming to the specifications for the riprap, rockfill, bedding, or drain fill. Before correcting an overexcavation condition, the contractor shall review the planned corrective action with the engineer and obtain acceptance of the corrective measures.

END OF SECTION



End of Project
STA.315+01.69

Existing UG crosses Drive
5' Depth at STA. 315+00

STA.121+08
@39' from EOP

STA.114+45
@59' from EOP

STA.111+08
@58' from EOP

STA.107+65
@57' from EOP

STA.104+58
@56' from EOP

STA.104+94
@55' from EOP
To Be Removed

STA.102+49
@52' from EOP

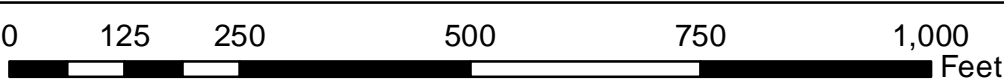
STA. 99+55
@48' from EOP

STA.97+36
@44.5' from EOP
Start of Project at STA.97+92.84

97+36
@44.5' EOP

Legend

- Existing Pole
- Existing OH Primary 7.2kV
- Existing UG Primary 7.2kV
- Existing UG Junction Box
- Proposed New Pole
- Retired Pole
- SCDOT_ROW



**Blue Ridge Electric Co-op
7.2kV OH&UG Facilities Layout
At O.I.T.P., Project ID# T036995
For SCDOT, (Overall)**

Geotechnical Engineering Report

Oconee Industrial & Technology Park
Oconee, South Carolina

April 8, 2017

Terracon Project No. 86175002

Prepared for:

Oconee County
Walhalla, South Carolina

Prepared by:

Terracon Consultants, Inc.
Greenville, South Carolina

Offices Nationwide
Employee-Owned

Established in 1965
terracon.com

Terracon

April 8, 2017

Oconee County
415 S Pine Street
Walhalla, SC 29691

Attn: Mr. Robyn Courtright
P: (864) 364 5298
E: rcourtright@oconeesc.com

Re: Geotechnical Engineering Report
Oconee Industrial & Technology Park
Oconee, South Carolina
Terracon Project No. 86175002

Dear Mr. Courtright:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. These services were performed in general accordance with our proposal number P86175002 dated January 24, 2017. This geotechnical engineering report presents the results of the subsurface exploration and provides preliminary geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs, and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,

Terracon Consultants, Inc.



Zhen Liu, Ph.D., E.I.T.
Staff Geotechnical Engineer



Nitin Dudani, P.E.
Senior Geotechnical Engineer

Enclosures
cc: 1 – Client (PDF)
1 – File



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EXECUTIVE SUMMARY

A geotechnical exploration has been performed for the proposed Oconee Industrial & Technology Park in Westminster, Oconee County, South Carolina. Terracon's geotechnical scope of work included the advancement of thirty seven (37) standard penetration test (SPT) borings to depths of 5 to 40 feet below the existing grade and three rock probes to depths of 22 to 50 feet below existing site grades. This report specifically addresses the preliminary recommendations for the proposed building and pavement areas.

Based on the information obtained from our subsurface exploration, the following geotechnical considerations were identified:

- n Borings for the proposed development encountered approximately 2 to 6 inches of topsoil, followed by undocumented fill to depths of 3 to 12 feet. The fill was underlain by very loose to very dense, silty/clayey sand, and very soft to hard, sandy silt/clay. Auger refusal was encountered in Boring B-4, B-5, and B-6 at depths of 21 to 28 feet. The records are not available to determine if the fill was placed in a controlled manner during grading.
- n The proposed buildings may be supported on existing fill, if it is assessed during construction and the risks associated with the fill as discussed herein are acceptable to the owner, native residual soils, or engineered fill extending to residual soils. As a preliminary recommendation, the shallow foundations may be designed with an allowable bearing pressure of 2,500 to 4,000 pounds per square foot (psf).
- n Groundwater was encountered in the boring B-22 at a depth of 15 feet at the time of field exploration. We do not anticipate that groundwater will affect construction activities, based on our current understanding of the proposed development.
- n The native soils typically appear suitable for use as general engineered fill; however, further testing should be performed during construction to assess specific conditions at that time.
- n In accordance with 2015 International Building Code (IBC), seismic site classification for this site is C.
- n This study is not intended for the actual design and construction of future development of the site. A more detailed geotechnical investigation with additional soil borings in the proposed building footprints and with the foundation analysis using actual loads will be required prior to the design and construction of the buildings.

Close monitoring of the construction operations discussed herein will be critical in achieving the design subgrade support. We therefore recommend that Terracon be retained to monitor this portion of the work.

Geotechnical Engineering Report

Oconee Industrial & Technology Park ■ Westminster, South Carolina
April 8, 2017 ■ Project No. 86175002



This geotechnical executive summary should be used in conjunction with the entire report for design and/or construction purposes. It should be recognized that specific details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **General Comments** should be read for an understanding of the report limitations.

GEOTECHNICAL ENGINEERING REPORT OCONEE INDUSTRIAL & TECHNOLOGY PARK WESTMINSTER, SOUTH CAROLINA

Terracon Project No. 86175002

April 8, 2017

1.0 INTRODUCTION

This report presents the results of our geotechnical engineering services performed for the proposed Oconee Industrial & Technology Park located off Highway 11 in Westminster, Oconee County, South Carolina. Terracon's geotechnical scope of work included the advancement of thirty seven (37) standard penetration test (SPT) borings to depths of 5 to 40 feet below the existing grades and three rock probes to depth of 22 to 50 feet below the existing site grades. Logs of the borings along with a vicinity map and boring location plan are included in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- n subsurface soil conditions
- n floor slab design and construction
- n groundwater conditions
- n seismic considerations
- n earthwork
- n pavement design and construction
- n Preliminary foundation design and construction

2.0 PROJECT INFORMATION

2.1 Project Description

ITEM	DESCRIPTION
Site layout	Refer to the Boring Location Plan (Exhibit A-2 in Appendix A)
Proposed construction	The development plans are to construct a speculative building in the Clinton-Adair Industrial Park.
Finished floor elevation	Not provided.
Maximum loads	Maximum wall loads = 3 to 6 kips / linear foot (assumed) Maximum column loads = 50 to 100 kips (assumed) Floor slabs < 300 psf (assumed)
Maximum allowable settlement	Maximum total: 1 inch Maximum differential: ¼ inch over 40 feet (assumed)

ITEM	DESCRIPTION
Grading	Based on the topographic drawing provided by Oconee County, we understand that the site will require up to 40 feet of cut or fill.
Traffic loading	No information provided.

2.2 Site Location and Description

ITEM	DESCRIPTION
Location	The site is located off Highway 11 in Westminster, Oconee County, South Carolina.
Current Ground Cover	Trees, grass, and bushes.
Existing Topography	The site is generally slopes down towards south.

3.0 SUBSURFACE CONDITIONS

3.1 Geology

The project site is located within the Piedmont Physiographic Province of South Carolina, an area underlain by ancient igneous and metamorphic rocks. The topography and relief of the Piedmont has developed from differential weathering of the igneous and metamorphic bedrock. The residual soils in this area are the product of in-place chemical weathering of rock. The typical residual soil profile consists of clayey soils near the surface where soil weathering is more advanced, underlain by sandy silts and silty sands that generally become harder with depth to the top of parent bedrock.

The boundary between soil and rock is not sharply defined due to variations in weathering and the presence of soft rock. The transition zone is locally termed as “partially weathered rock”. Partially weathered rock is defined for engineering purposes as residual material that can be drilled with soil boring methods, but exhibits standard penetration test (SPT) N-values exceeding 100 blows per foot (bpf). The depth to partially weathered rock occurs at irregular depths due to variations in degree of weathering and variations in the material composition of the rock.

3.2 Typical Profile

Based on the results of the borings, subsurface conditions on the project site can be generalized as follows:

Description	Approximate Depth to Bottom of Stratum (feet)	Material Encountered	SPT N value
Surface	2 to 6 inches	Topsoil	N/A
Stratum 1	3 to 12	Fill – very loose to medium dense, silty sand, and soft to very stiff, sandy silt/clay	1 to 21
Stratum 2	5 to 40, termination of boring	Residual – very loose to very dense, silty/clayey sand, and very soft to hard, sandy silt/clay	WOH - 68
Stratum 3	21 to 28, termination of boring	PWR – sampled as silty sand	100+
Stratum 4	Below 21 to 28 in boring B-4, B-5, and B-6	Bedrock	N/A

Specific conditions encountered at each boring location are indicated on the individual boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual. Details for each of the borings can be found on the boring logs included in Appendix A of this report.

3.3 Groundwater

The boreholes were observed while drilling and after completion for the presence and level of groundwater. Groundwater was observed at a depth of 15 feet in the boring B-22 while drilling, or for the short duration that the borings were allowed to remain open. However, this does not necessarily mean the borings terminated above groundwater. Due to the low permeability of the soils encountered in the borings, a relatively long time may be necessary for a groundwater level to develop and stabilize in a borehole in these materials. Longer term observations in piezometers or observation wells sealed from the influence of surface water are often required to define groundwater levels in materials of this type.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. In addition, perched water could develop in sand seams and layers overlying lower permeability clay soils or hard rock following periods of heavy or prolonged precipitation. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Preliminary Geotechnical Considerations

The following evaluation and recommendations are based upon our understanding of the proposed development and the results from the field exploration. If the above-described project conditions are incorrect or changed after this report, or subsurface conditions encountered during construction are significantly different from those reported, Terracon should be notified and these recommendations must be re-evaluated to make appropriate revisions. It is very important to note this is a preliminary report prepared for the purpose of site selection considerations and planning with no project specific information. It is anticipated that a detailed geotechnical evaluation will be performed for specific structures and load conditions during the actual design stage of the project. For this preliminary study, all borings were drilled to 40 feet or less.

Borings for the proposed buildings encountered approximately 2 to 6 inches of topsoil, followed by undocumented fill to depths of 3 to 12 feet below existing site grades. Residual soils consisting of very loose to very dense, silty/clayey sand, and very soft to hard, sandy silt/clay were encountered below undocumented fill. Auger refusal was encountered in borings B-4, B-5, and B-6. Depending on the grading plan and finished floor elevations, shallow bedrock removal may be required during footing excavations and underground utility installations.

Our findings indicate the proposed structures can be supported on a shallow, spread footing foundation system bearing on residual soils, engineered fill extending to residual soils, or existing fill if it is assessed during construction and the risks associated with the fill as discussed herein are acceptable to the owner. Preliminary settlement analysis was performed at each boring location by using the soil parameters obtained from the SPT borings and column loads of 50 to 100 kips. Based on the results of our settlement analysis, we estimated that the maximum total settlements would be up to 1 inch and differential settlements less than $\frac{3}{4}$ inches under the maximum column load of 50 to 100 kips using an allowable bearing capacity of 2,500 to 4,000 pounds per square foot (psf).

Details about the cut and fill slope height and inclination are not available at this time and our investigation did not include an analysis of slope stability for any temporary or permanent conditions. However, in the Piedmont Physiographic Province region up to 15 to 20-foot tall slopes are regularly built at inclinations of up to 2(H):1(V) and perform satisfactory if properly constructed. Shallow sloughing at the surface can occur when slopes are not properly constructed and/or exposed to inclement weather prior to placement of vegetative cover. Therefore, we recommend that fill slopes be over filled and cut back to develop an adequately compacted slope face rather than tracking in the slope face for compaction. In addition, a protective vegetative cover should be established on permanent slopes as soon as possible. If

steeper slopes are required for site development, stability analyses should be completed to design the grading plan.

The placement of up to 35 feet of fill and future building construction will exert substantial pressure at the bottom (in residual soils) and within the fill areas thus causing elastic (primary) and consolidated (secondary) settlement. Based on our calculations, the settlement within the fill will be around 2 to 3 inches and about ½ inch of secondary compression is expected from the fill. Settlement plates should be placed in building areas that are receiving more than 10 feet of fill prior to fill placement. The settlement plates will be used to measure settlement within fill and underlying material. The settlements plates should be surveyed at 1 days, 2 days, 4 days, 7 days, 14 days, 21 days and 28 days after the placement. We believe that the majority of primary settlement will occur in 28 days or less. The readings should be taken by a licensed surveyor and provided to the geotechnical engineers for review and evaluation. Based on these readings, we can assess when construction of superstructure can commence. Footings can be constructed during the waiting period. Terracon should review the settlement data and make determination if the primary settlement has finished. At that time, construction of the building can proceed on shallow foundation system. If there is substantial waiting between the fill placement and construction of the buildings, the settlement monitoring of the fill may not be required.

The on-site soils are suitable for use as structural fill under buildings and pavements if properly placed and compacted. Specific site preparation, material types, and compaction requirements will be provided in the final geotechnical engineering report.

4.2 Earthwork

The following presents recommendations for site and subgrade preparation, excavation and placement of engineered fills on the project. The recommendations presented for design and construction of earth supported elements including foundations, slabs and pavements are contingent upon following the recommendations outlined in this section.

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing during placement of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

4.2.1 Site Preparation

The micaceous silts soils encountered in the borings will be sensitive to disturbance from construction activity and water seepage. If precipitation occurs prior to or during construction, the near-surface silty soils could increase in moisture content and become more susceptible to

disturbance. Construction activity should be monitored, and should be curtailed if the construction activity is causing subgrade disturbance.

Proofrolling should be performed with heavy rubber tired construction equipment such as a loaded scraper or fully loaded tandem-axle dump truck. A geotechnical engineer or his representative should observe proofrolling to help locate unstable subgrade materials. Proofrolling should be performed after a suitable period of dry weather to avoid degrading an otherwise acceptable subgrade and to reduce the amount of undercutting / remedial work required. Unstable materials located should be stabilized as directed by the engineer based on conditions observed during construction. Undercut and replacement and densification in place are typical remediation methods.

4.2.2 Subgrade Evaluation

Based on the heavily wooded nature of the site, substantial disturbance of the subgrade should be expected to result from the removal of their stumps and root systems. Repair of these conditions will be necessary prior to fill placement. This may include re-compaction of the stripped subgrade, shallow undercutting and replacement of the removed materials in thin compacted lifts and the like, depending on the severity of the disturbance. Our engineer can aid in providing expeditious recommendations for subgrade repair during the subgrade evaluation process.

The near surface silty soils encountered in the borings will be sensitive to disturbance from construction activity and water seepage. If precipitation occurs prior to or during construction, the near-surface silty soils could increase in moisture content and become more susceptible to disturbance. Construction activity should be monitored, and should be curtailed if the construction activity is causing subgrade disturbance.

After stripping, the exposed subgrades in the at-grade areas and areas receiving fill should be proofrolled. Cut areas should be proofrolled after they have been excavated to their proposed subgrade levels. Proofrolling should be performed with heavy rubber tired construction equipment such as a fully loaded tandem-axle dump truck, scraper or similar piece of rubber tired equipment. A geotechnical engineer or his representative should observe proofrolling to help locate unstable subgrade materials. Proofrolling should be performed after suitable periods of dry weather to avoid degrading an otherwise acceptable subgrade and to reduce the amount of undercutting/ remedial work required. Unstable materials located should be stabilized as directed by the engineer based on conditions observed during construction. Undercut and replacement and densification in place are typical remediation methods.

4.2.3 Material Utilizations

We understand that the designers will try to develop a grading scheme that will balance the cut and fill quantities at the site. If so, the materials available for use will range from the shallow silts and sands to partially weathered rock/ bedrock. Given the range of materials, it is advisable to

develop a sequenced grading plan to best use the available on-site materials. Generally, this would include using the soils and the partially weathered rock (sampled as silty sands in the borings) as the surfacing in the structural areas. Partially weathered rock that can be broken down into pieces of about 6 inches or less can also be used as structural fill below the buildings and equipment foundations, though it should generally be limited to below three (3) feet of the subgrade level to limit the impact of such coarse material on shallow excavation activities associated with later construction activities such as plumbing and other conduit line installation. Larger graded partially weathered rock should be disposed in nonstructural areas.

Soil moisture content could vary considerably with weather conditions during construction. Drying or wetting of the soils may be necessary to achieve the recommended compaction criteria. Based on the boring data, the on-site overburden soils are predominantly silty/ clays soils and therefore are sensitive to changes in their moisture content. Strict moisture content control should be exercised during fill placement and compaction process.

The partially weathered rock should be compacted in thin lifts, as would structural fill. If it does not break down into smaller gradations compatible with in-place density testing, compaction should continue until no further movement or break-down is observed under the load of a large compactor, such as a CAT 815. Any areas that contain concentrations of coarse graded partially weathered rock should be mixed with structural fill to avoid void formation. We recommend that qualified geotechnical personnel be present during grading to provide guidance for material placement and to monitor the gradation of partially weathered rock placed as fill.

4.2.4 Excavation and Rippability Considerations

Based on the boring data, there is 2 to 60 feet of residual soils overlying partially weathered rock and bedrock. Removal of the shallow residual soils can likely be accomplished using self-loading or push-assisted scrapers. It is our experience that pre-loosening of the materials with a tractor-mounted ripper will be necessary to allow scraper loading for materials with SPT N-values greater than 30 blows per foot (bpf). Loosening of partially weathered rock will require the use of a large bulldozer such as a CAT D8T, equipped with a single-toothed ripper. Such equipment can also sometimes free relatively large boulders that cannot be removed by scrapers. Excavation of limited volumes of partially weathered rock may also be possible with large front-end loaders such as a CAT 963D.

Trenches in overburden soils are customarily excavated using rubber-tired backhoes. Due to the partially weathered rock and rock at this site, it will likely be more practical to use large, tracked-mounted backhoes such as a CAT 325 to perform excavations. Such equipment is capable of excavating a significant thickness of partially weathered rock, depending on the bucket size and type of teeth.

We recommend that difficult excavation materials be defined in terms of equipment performance as follows:

- n Mass Rock – any material which cannot be excavated with a single tooth ripper drawn by a crawler tractor having a minimum draw pull rated at not less than 56,000 lbs. (CAT D-8 or equivalent) and occupying an original volume of at least 1 cubic yard or more.
- n Trench Rock – any material which cannot be excavated with a track mounted backhoe with a bucket curling force of not less than 20,760 lbs. (CAT 325 or equivalent) and occupying an original volume of at least ½ cubic yard or more.

Mass excavations and other excavations required for construction of this project must be performed in accordance with the United States Department of Labor, Occupational Safety and Health Administration (OSHA) guidelines (29 CFR 1926, Subpart P, Excavations) or other applicable jurisdictional codes for permissible temporary side-slope ratios and/or shoring requirements. The OSHA guidelines require daily inspections of excavations, adjacent areas and protective systems by a “competent person” for evidence of situations that could result in cave-ins, indications of failure of a protective system, or other hazardous conditions.

Construction site safety is the sole responsibility of the contractor who controls the means, methods and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean that Terracon is assuming any responsibility for construction site safety or the contractor's activities; such responsibility shall neither be implied nor inferred.

4.2.5 Material Types

Engineered fill should meet the following material property requirements:

Fill Type ¹	USCS Classification	Acceptable Location for Placement
Imported sandy silts/clays and silty/clayey sands	ML, CL, SC, SM (LL<45)	All locations and elevations
Granular soils	SW, SP, GW, GP	All locations and elevations
On-Site Soils	Varies	The on-site soils typically appear suitable for use as fill. Laboratory testing during construction will be required to confirm.

1. Controlled, compacted fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the geotechnical engineer for evaluation.

4.2.6 Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

Material Type and Location	Per the Standard Proctor Test (ASTM D 698)		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction	
		Minimum	Maximum
Acceptable soil or approved imported fill soils			
Beneath foundations and slabs	95	-2%	+3%
Beneath pavements	95	-2%	+3%
12 inches directly below pavements	98	-2%	+3%
	Per the Modified Proctor Test (ASTM D 1557)		
Aggregate base (beneath slabs)	95	-3%	+3%
Aggregate base (beneath pavements)	98	-3%	+3%

Engineered fill materials should be placed in horizontal, loose lifts not exceeding 9 inches in thickness and should be thoroughly compacted. Where light compaction equipment is used, as is customary within a few feet of retaining walls and in utility trenches, the lift thickness may need to be reduced to achieve the desired degree of compaction. Soils removed which will be used as engineered fill should be protected to aid in preventing an increase in moisture content due to rain.

4.2.7 Grading and Drainage

Effective positive drainage should be provided during construction and maintained throughout the life of the development to prevent an increase in moisture content of the foundation, pavement and backfill materials. Surface water drainage should be controlled to prevent undermining of fill slopes and structures during and after construction.

Gutters and downspouts that drain water a minimum of 10 feet beyond the footprint of the proposed structures are recommended. This can be accomplished through the use of splash-blocks, downspout extensions, and flexible pipes that are designed to attach to the end of the downspout. Flexible pipe should only be used if it is daylighted in such a manner that it gravity-drains collected water. Splash-blocks should also be considered below hose bibs and water spigots.

It is recommended that all exposed earth slopes be seeded to provide protection against erosion as soon as possible after completion. Seeded slopes should be protected until the vegetation is established.

4.2.8 Construction Considerations

Although the exposed subgrade is anticipated to be relatively stable upon initial exposure, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. The use of light construction equipment would aid in reducing subgrade disturbance. The use of remotely operated equipment, such as a backhoe, would be beneficial to perform cuts and reduce subgrade disturbance. Should unstable subgrade conditions develop, stabilization measures will need to be employed.

Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content prior to construction of floor slabs and pavements. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become frozen, desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and recompacted prior to floor slab and pavement construction.

Temporary excavations will probably be required during grading operations. The grading contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation; proof-rolling; placement and compaction of controlled compacted fills; backfilling of excavations into the completed subgrade, and just prior to construction of building floor slabs.

4.3 Preliminary Foundation Recommendations

In our opinion, the proposed building can be supported by shallow spread footing foundation system bearing on existing fill, if it is assessed during construction and the risks associated with the fill as discussed herein are acceptable to the owner, native residual soils, or engineered fill extending to residual soils. Preliminary design recommendations for shallow foundations for the proposed structure are presented in the following paragraphs.

4.3.1 Preliminary Design Recommendations

DESCRIPTION	<u>Column</u>	<u>Wall</u>
Net allowable bearing pressure ¹	2,500 to 3,500 psf	2,500 to 3,500 psf
Minimum dimensions	30 inches	24 inches
Minimum embedment below finished grade for frost protection ²	18 inches	18 inches
Approximate total settlement ³	Around 1 inch	Around 1 inch
Estimated differential settlement	Around ¾ inch between columns	Around ¾ inch over 40 feet
Ultimate Coefficient of sliding friction ⁴	0.35	

1. The recommended net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the foundation base elevations.
2. And to reduce the effects of seasonal moisture variations in the subgrade soils. For perimeter footings and footings beneath unheated areas.
3. The foundation settlement will depend upon the variations within the subsurface soil profile, the structural loading conditions, the embedment depth of the footings, the thickness of compacted fill, and the quality of the earthwork operations. The above settlement estimates have assumed that the maximum footing size is 6 feet for column footings and 3 feet for continuous footings.
4. The sides of the excavation for the spread foundation must be nearly vertical and the concrete should be placed neat against these vertical faces for the passive earth pressure values to be valid. If the loaded side is sloped or benched, and then backfilled, the allowable passive pressure will be significantly reduced. Passive resistance in the upper 24 inches of the soil profile should be neglected. If passive resistance is used to resist lateral loads, the base friction should be neglected.

The allowable foundation bearing pressures apply to dead loads plus design live load conditions. The design bearing pressure may be increased by one-third when considering total loads that include wind or seismic conditions. The weight of the foundation concrete below grade may be neglected in dead load computations. Interior footings should bear a minimum of 12 inches below finished grade. Finished grade is the lowest adjacent grade for perimeter footings and floor level for interior footings.

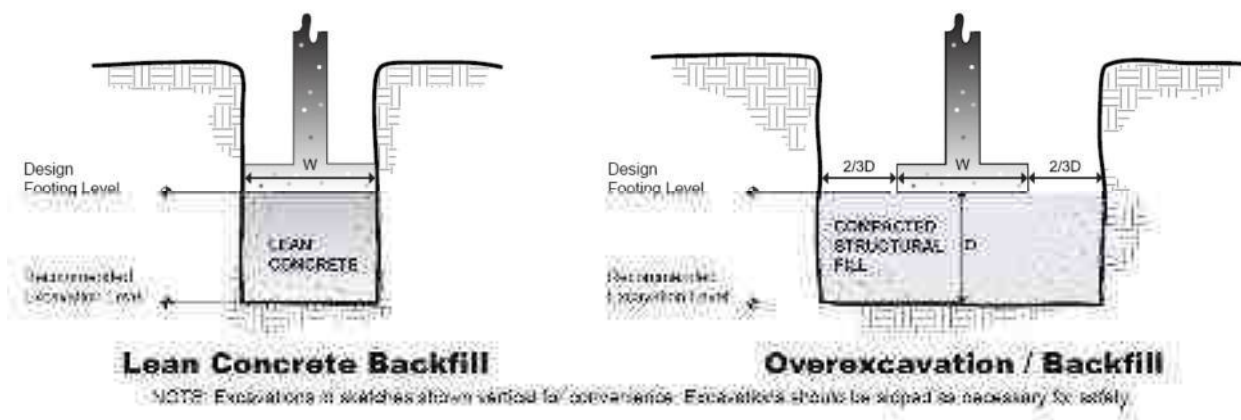
We also recommend that the building foundations be adequately reinforced to resist movement from potential differential settlement. Walls and slabs should incorporate control joints to minimize effects of differential settlement, particularly in the buildings where significant cut/fill transitions will occur.

Foundation excavations should be observed and evaluated by the geotechnical engineer. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

4.3.2 Construction Considerations

The base of all foundation excavations should be free of water and loose soil prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Should the soils at bearing level become excessively dry, disturbed or saturated, or frozen, the affected soil should be removed prior to placing concrete. We recommend using a lean concrete mud-mat over the bearing soils if the excavations must remain open for an extended period of time.

If unsuitable bearing soils are encountered in footing excavations, the excavations should be extended deeper to suitable soils and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. The footings could also bear on properly compacted backfill extending down to the suitable soils. Overexcavation for compacted backfill placement below footings should extend laterally beyond all edges of the footings at least 8 inches per foot of overexcavation depth below footing base elevation. The overexcavation should then be backfilled up to the footing base elevation with well-graded granular material placed in lifts of 9 inches or less in loose thickness and compacted to at least 98 percent of the material's maximum dry density (ASTM D 698). The overexcavation and backfill procedure is illustrated in the following figures for lean concrete or granular backfill.



4.4 Seismic Considerations

Code Used	Site Classification
2015 International Building Code (IBC) ¹	D ²

1. In general accordance with the *2015 International Building Code*, Table 1613.3.2.
2. The *2015 International Building Code (IBC)* requires a site soil profile determination extending a depth of 100 feet for seismic site classification. The current scope requested does not include the required 100 foot soil profile determination. Borings for the this study extended to a maximum depth of approximately 40 feet and this seismic site class definition considers that loose to medium dense silty sands (partially weathered rock) continues below the maximum depth of the subsurface exploration.

Due to the wooded areas, the preliminary borings were located in the access trails scattered over the site and may not represent the site class within the building footprints of future developments. We recommend the site class for building design be calculated using one of the following methods: 1) SPT N-values from borings planned within the proposed building footprints or 2) Shear wave velocity measurements obtained with an in-situ shear wave measurement (REMI or MASW).

4.5 Pavements

4.5.1 Subgrade Preparation

On most project sites, the site grading is accomplished relatively early in the construction phase. However, as construction proceeds, excavations are made into these areas, rainfall and surface water saturates some areas, heavy traffic from concrete trucks and other delivery vehicles disturbs the subgrade and many surface irregularities are filled in with loose soils to improve trafficability temporarily. As a result, the pavement subgrades, prepared early in the project should be carefully evaluated as the time for pavement construction approaches.

We recommend the moisture content and density of the top 12 inches of the subgrade be evaluated and the pavement subgrades be proofrolled within two days prior to commencement of actual paving operations. Areas not in compliance with the required ranges of moisture or density should be moisture conditioned and recompacted. Particular attention should be paid to high traffic areas that were rutted and disturbed earlier and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by removing and replacing the materials with properly compacted fills. If a significant precipitation event occurs after the evaluation or if the surface becomes disturbed, the subgrade should be reviewed by qualified personnel immediately prior to paving. The subgrade should be in its finished form at the time of the final review.

4.5.2 Design Considerations

Traffic patterns and anticipated loading conditions were not available at the time that this report was prepared. However, we anticipate that traffic loads will be produced primarily by automobile traffic and occasional delivery and trash removal trucks. The thickness of pavements subjected to heavy truck traffic should be determined using expected traffic volumes, vehicle types, and vehicle loads and should be in accordance with local, city or county ordinances.

Pavement thickness can be determined using AASHTO, Asphalt Institute and/or other methods if specific wheel loads, axle configurations, frequencies, and desired pavement life are provided. Terracon can provide thickness recommendations for pavements subjected to loads other than personal vehicle and occasional delivery and trash removal truck traffic if this information is provided.

Pavement performance is affected by its environmental conditions. The civil engineer should consider the following recommendations in the design and layout of pavements:

- n Final grade adjacent to parking lots and drives should slope down from pavement edges at a minimum 2%;
- n The subgrade and the pavement surface should have a minimum ¼ inch per foot slope to promote proper surface drainage;
- n Pavement drainage should be installed in surrounding areas anticipated for frequent wetting;
- n To reduce moisture migration to subgrade soils, all landscaped areas in or adjacent to pavements should be sealed;
- n Compacted, low permeability backfill should be placed against the exterior side of curb and gutter; and,
- n Curb, gutter and/or sidewalk should be placed directly on low permeability subgrade soils rather than on unbound granular base course materials.

4.5.3 Estimates of Minimum Pavement Thickness

As a minimum, we recommend the following pavement sections be considered for the proposed construction.

Typical Pavement Section Thickness (inches)						
Traffic Area	Alternative	Asphalt Concrete Surface Course	Asphalt Concrete Binder Course	Portland Cement Concrete ¹	Aggregate Base Course	Total Thickness
Light Duty (Car Parking)	PCC	--	--	5.0	4.0	9
	AC	2 ½		--	6	8 ½
Heavy Duty (Truck and Drive Areas)	PCC	--	--	6.0	4.0	10
	AC	2	3	--	8.0	13

Trash Container Pad and Delivery Pad ²	PCC	--	--	6 ½	4	10 ½
---	-----	----	----	-----	---	------

1. 4,000 psi at 28 days, 4-inch maximum slump and 5 to 7 percent entrained air, 6-sack min. mix.
2. PCC pavements are recommended for trash container pads, entrance and exit sections, and in any other areas subjected to heavy wheel loads and/or turning traffic.
3. The trash container pad should be large enough to support the container and the tipping axle of the collection truck.
4. A more frequent maintenance program may be required in the gravel road. Any areas showing distress and ruts should be repaired immediately.

The graded aggregate base should be compacted to a minimum of 98 percent of the material's modified Proctor (ASTM D-1557, Method C) maximum dry density. Where base course thickness exceeds 6 inches, the material should be placed and compacted in two or more lifts of equal thickness.

Adequate reinforcement and number of longitudinal and transverse control joints should be placed in the rigid pavement in accordance with ACI requirements. The joints should be sealed as soon as possible (in accordance with sealant manufacturer's instructions) to minimize infiltration of water into the soil.

4.5.4 Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section.

We recommend drainage be included at the bottom of the GAB layer at the storm structures to aid in removing water that may enter this layer. Drainage could consist of small diameter weep holes excavated around the perimeter of the storm structures. The weep holes should be excavated at the elevation of the GAB and soil interface. The excavation should be covered with No. 57 stone which is encompassed in Mirafi 140 NL or approve equivalent which will aid in reducing the amount of fines entering the storm system.

4.5.5 Pavement Maintenance

The pavement sections provided in this report represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Preventive maintenance should be planned and provided for through an on-going pavement management program to slow the rate of pavement deterioration, and to preserve the pavement investment. Preventive maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Prior to implementing any maintenance, additional engineering observation is recommended to determine the type and extent of preventive

maintenance. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A
FIELD EXPLORATION



Image Courtesy of
Google Earth™

Project Manager:	ND	Project No.	86175002
Drawn by:	MM	Scale:	N.T.S.
Checked by:	ND	File Name:	
Approved by:	ND	Date:	02/03/2017

Terracon
 Consulting Engineers & Scientists

72 Pointe Circle Greenville, South Carolina 29615
 PH. (864) 292-2901 FAX. (864) 292-6361



SITE LOCATION PLAN

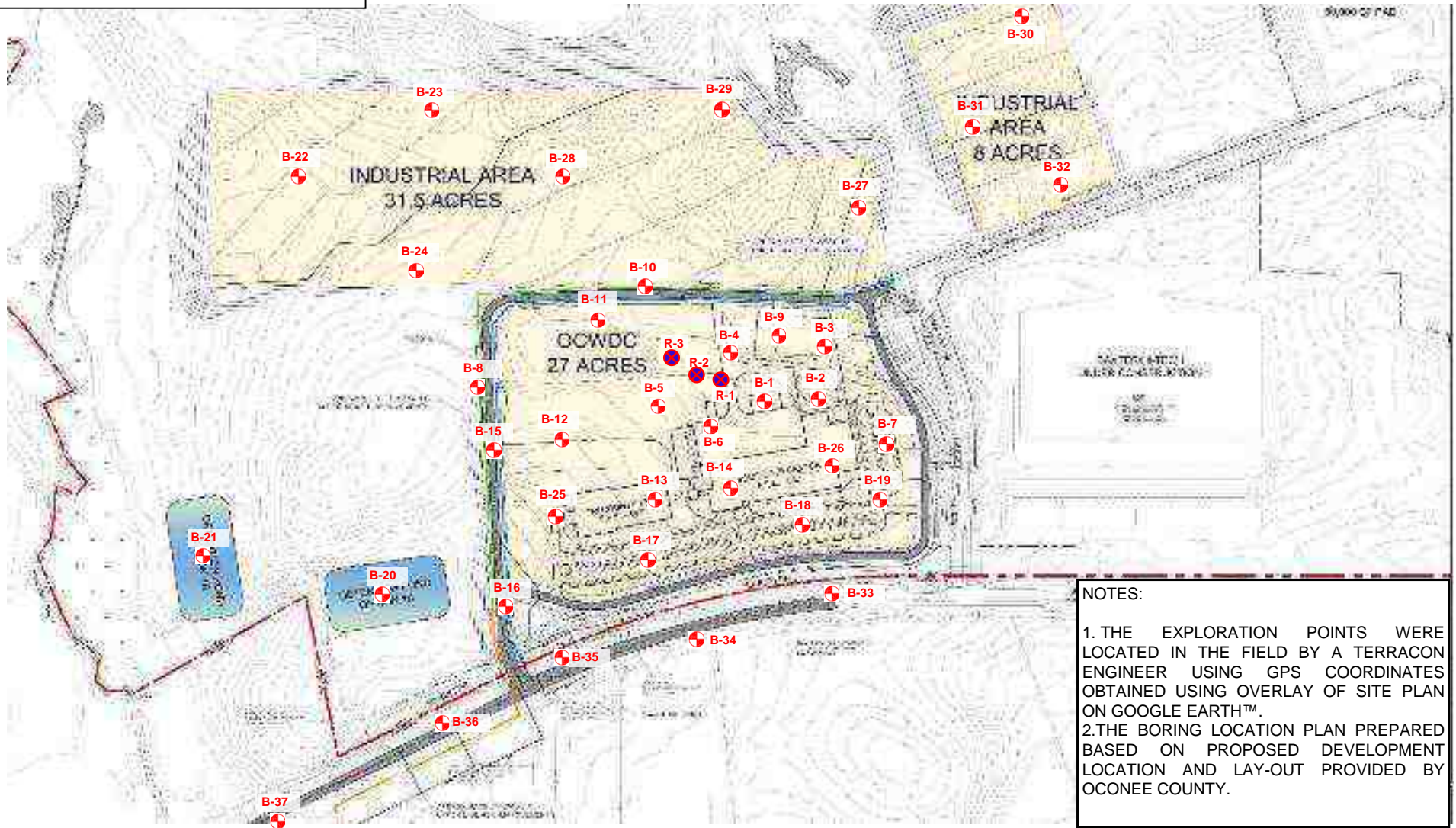
Oconee Industrial & Technology Park
 SC-11
 Westminster, South Carolina

Exhibit

A-1

LEGEND:

-  SPT BORING (APPROX. LOCATION)
-  ROCK PROBE (APPROX. LOCATION)



NOTES:

1. THE EXPLORATION POINTS WERE LOCATED IN THE FIELD BY A TERRACON ENGINEER USING GPS COORDINATES OBTAINED USING OVERLAY OF SITE PLAN ON GOOGLE EARTH™.
2. THE BORING LOCATION PLAN PREPARED BASED ON PROPOSED DEVELOPMENT LOCATION AND LAY-OUT PROVIDED BY OCONEE COUNTY.



DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager:	ND	Project No.	86175002
Drawn by:	MM	Scale:	N.T.S.
Checked by:	ND	File Name:	
Approved by:	ND	Date:	02/02/2017

Terracon
Consulting Engineers & Scientists

72 Pointe Circle Greenville, South Carolina 29615
PH. (864) 292-2901 FAX. (864) 292-6361

BORING LOCATION PLAN
Oconee Industrial & Technology Park SC-11 Westminster, Oconee County, South Carolina

Exhibit
A-2

Field Exploration Procedures

SPT and Soil Borings

The subsurface exploration consisted of drilling and sampling of thirty seven (37) standard penetration test (SPT) borings to depths of 5 to 40 feet below the existing grade and three rock probes to depths of 22 to 50 feet below existing site grades in the footprint of the planned Spec Building for preliminary information, pavement and pond areas.

All borings were located in the field by Terracon engineer based on the proposed structure location/ site plan provided by Thomas & Hutton, Inc. The boring depths were laid out in the field using GPS coordinates obtained using overlay of site map on Google Earth™ software. The locations of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

The borings were drilled using a truck-mounted rotary drill rig using continuous flight hollow-stem augers to advance the boreholes. Samples of the soil encountered in the borings were obtained using the split-barrel sampling procedures. In the split-barrel sampling procedure, the number of blows required to advance a standard 2-inch O.D. split-barrel sampler the last 12 inches of the typical total 18-inch penetration by means of a 140-pound conventional safety hammer with a free fall of 30 inches, is the standard penetration resistance value (SPT-N). This value is used to estimate the in-situ relative density of cohesionless soils and consistency of cohesive soils.

A safety hammer was used to advance the split-barrel sampler in the borings performed on this site. The safety hammer is operated by lifting and dropping the hammer using a cathead rope attached to the hammer. The safety hammer provides about 60 percent of the maximum free-fall energy.

The samples were tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further visual examination and classification. Information provided on the boring logs attached to this report includes soil descriptions, consistency evaluations, boring depths, sampling intervals, and groundwater conditions. The borings were backfilled with auger cuttings prior to the drill crew leaving the site.

A field log of each boring was prepared by the drill crew. These logs included visual classifications of the materials encountered during drilling as well as the driller's interpretation of the subsurface conditions between samples. Final boring logs included with this report represent the engineer's interpretation of the field logs and include modifications based on laboratory observation and tests of the samples.

BORING LOG NO. B-1

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69883° Longitude: -83.05275°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.3	TOPSOIL , 4 inches							
	FILL - SANDY LEAN CLAY (CL) , with roots, red, medium stiff			X	4-4-4 N=8		26	
3.0	FILL - SANDY ELASTIC SILT (MH) , red, very stiff			X	5-8-9 N=17			65-40-25
5.5	RESIDUAL-SANDY SILT (ML) , red, hard	5		X	8-11-15 N=26		27	
8.0	CLAYEY SAND (SC) , fine grained, orangish red, medium dense	10		X	5-7-8 N=15		20	
12.0	SILTY SAND (SM) , fine grained, pinkish brown and white, loose			X	4-3-3 N=6			
	fine grained, orangish brown and white, loose	20		X	2-3-3 N=6		10	
	fine grained, orangish brown and black, loose	25		X	4-4-4 N=8			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

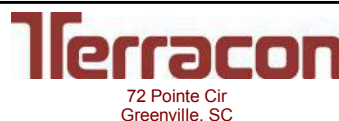
Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/16/2017

Boring Completed: 2/16/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-1

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69883° Longitude: -83.05275°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
DEPTH								
30	SILTY SAND (SM) , fine grained, pinkish brown and white, loose <i>(continued)</i> with mica, fine grained, orangish brown and black, very loose	30		X	2-2-1 N=3		41	
35	fine grained, orangish brown and dark gray, dense	35		X	17-24-25 N=49			
36.5		36.5						
40	SANDY SILT (ML) , with mica, orange to black, hard	40		X	7-12-18 N=30	8	24	
40.0	Boring Terminated at 40 Feet	40						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/16/2017

Boring Completed: 2/16/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-2

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.6993° Longitude: -83.05281°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
0.5	TOPSOIL , 6 inches							
3.0	FILL - SANDY FAT CLAY (CH) , with roots, red, stiff			X	4-4-5 N=9			59-26-33
5.5	FILL - SANDY ELASTIC SILT (ML) , red, very stiff			X	6-7-11 N=18			
8.0	RESIDUAL-SANDY SILT (ML) , red, very stiff			X	7-10-14 N=24			
	SILTY SAND (SM) , fine grained, orangish red, medium dense			X	4-5-9 N=14			
	fine grained, pinkish brown and white, loose			X	2-2-2 N=4			
	with mica, fine grained, light brown and pink, loose			X	3-3-3 N=6			
	fine grained, light brown and white, loose			X	9-4-3 N=7			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/17/2017

Boring Completed: 2/17/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW/GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-2

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.6993° Longitude: -83.05281°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
	SILTY SAND (SM) , fine grained, orangish red, medium dense <i>(continued)</i>							
	fine grained, reddish brown with black, loose	30		X	1-3-3 N=6			
	fine grained, gray and white, dense	35		X	19-17-28 N=45			
	fine grained, light orange and white, medium dense	40.0		X	5-7-15 N=22			
	Boring Terminated at 40 Feet	40						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/17/2017

Boring Completed: 2/17/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-3

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69939° Longitude: -83.05334°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.3	TOPSOIL , 4 inches							
3.0	FILL - SANDY LEAN CLAY (CL) , with roots and mica, red, medium stiff			X	3-4-4 N=8			
5.0	RESIDUAL-SILTY SAND (SM) , with mica, fine grained, red, loose	5		X	4-4-5 N=9			
10.0	fine grained, red, medium dense			X	4-5-5 N=10			
15.0	with mica, fine grained, dark red with black, loose	10		X	4-4-5 N=9			
20.0	with mica, fine grained, orangish red with black, medium dense	15		X	10-2-9 N=11			
25.0	with gravel, fine grained, orangish brown and gray, loose	20		X	5-3-3 N=6			
25.0	with mica, fine grained, orangish brown and black, loose	25		X	3-3-4 N=7			
	Boring Terminated at 25 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/16/2017

Boring Completed: 2/16/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW/GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-4

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69849° Longitude: -83.05333°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
0.4	TOPSOIL , 5 inches							
3.0	FILL - SANDY LEAN CLAY (CL) , red, medium stiff			X	3-4-3 N=7			47-21-26
5.5	FILL - SANDY SILT (ML) , red, stiff			X	4-5-7 N=12			
8.0	RESIDUAL-SANDY SILT (ML) , light red, very stiff			X	8-10-12 N=22			
10.0	SILTY SAND (SM) , fine grained, light red, medium dense			X	5-6-6 N=12			
15.0	with mica, fine grained, light red, loose			X	3-4-5 N=9			
20.0	fine grained, dark orangish brown with black, dense			X	10-12-22 N=34	18	38	
22.0	PARTIALLY WEATHERED ROCK-SAMPLED AS SILTY SAND (SM) , fine grained, orangish brown and white, very dense			X	27-50/5" N=50/5"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



72 Pointe Cir
Greenville, SC

Boring Started: 2/17/2017

Boring Completed: 2/17/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-4

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69849° Longitude: -83.05333°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
X	28.0							
	Auger Refusal at 28 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/17/2017

Boring Completed: 2/17/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-5

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69788° Longitude: -83.05263°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
0.3	TOPSOIL , 4 inches							
3.0	FILL - SANDY LEAN CLAY (CL) , with roots, red, medium stiff			X	3-4-4 N=8			
	RESIDUAL-SANDY SILT (ML) , with mica, red, stiff	5		X	4-6-7 N=13			
	with mica, light red, stiff			X	6-7-7 N=14			
	with mica, light red, stiff	10		X	6-6-8 N=14			
	with mica, reddish orange, medium stiff	15		X	3-4-2 N=6			
	with mica, orangish brown with white, hard	20		X	8-17-35 N=52			
	Auger Refusal at 21 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/20/2017

Boring Completed: 2/20/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW/GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-6

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69832° Longitude: -83.05248°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.4	TOPSOIL , 5 inches							
3.0	FILL - SANDY LEAN CLAY (CL) , with roots, red, medium stiff			X	4-4-4 N=8			68-31-37
8.0	RESIDUAL-SILTY SAND (SM) , with mica, fine grained, red, medium dense	5		X	5-6-8 N=14			
	with mica, fine grained, red, medium dense			X	8-9-8 N=17			
16.5	SANDY SILT (ML) , with mica, red with black, stiff	10		X	5-7-8 N=15			
	with mica, reddish orange with black, medium stiff			X	3-2-3 N=5			
23.0	SILTY SAND (SM) , fine grained, orangish brown and white, very dense	20		X	9-18-50 N=68			
	Auger Refusal at 23 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/20/2017

Boring Completed: 2/20/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW/GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-7

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69997° Longitude: -83.05234°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.4	TOPSOIL , 5 inches							
3.0	FILL - SANDY LEAN CLAY (CL) , with roots, red, stiff			X	4-5-7 N=12	10	23	
5.5	FILL - SILTY SAND (SM) , red, medium dense			X	4-5-7 N=12			
	RESIDUAL-SILTY SAND (SM) , fine grained, red, medium dense			X	7-10-8 N=18			
	fine grained, orangish red, loose			X	4-4-5 N=9			
	with mica, fine grained, pink and orange, medium dense			X	4-5-6 N=11			
	with mica, fine grained, pink with black, loose			X	4-4-4 N=8	7	17	
	with mica, fine grained, light pinkish brown, medium dense			X	4-5-5 N=10			
25.0	Boring Terminated at 25 Feet	25						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
No free water observed



Boring Started: 2/17/2017

Boring Completed: 2/17/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-10

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW/GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-8

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69615° Longitude: -83.05276°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
5.0	FILL - SANDY SILT (ML) , reddish brown, stiff	5		X	4-5-6 N=11			
	Boring Terminated at 5 Feet			X	5-6-7 N=13			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-9

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69892° Longitude: -83.05355°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.3	TOPSOIL , 4 inches							
	FILL - SANDY ELASTIC SILT (MH) , red, medium stiff to stiff				3-3-3 N=6			
5.5	RESIDUAL-SANDY SILT (ML) , light red, very stiff	5			5-6-8 N=14			61-45-16
	SILTY SAND (SM) , with mica, fine grained, orangish brown with black, loose				10-15-17 N=32			
8.0					4-4-5 N=9			
	fine grained, orangish red, medium dense				3-3-8 N=11			
15.0	PARTIALLY WEATHERED ROCK-SAMPLED AS SILTY SAND , fine grained, orangish brown and dark gray, very dense	15			3-50/5" N=50/5"			
	SILTY SAND (SM) , fine grained, orangish brown and white, very dense				18-14-46 N=60			
21.0								
25.0	Boring Terminated at 25 Feet	25						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

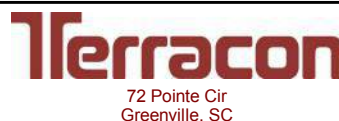
Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/17/2017

Boring Completed: 2/17/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-12

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-10

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69774° Longitude: -83.05405°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
0.4	TOPSOIL , 5 inches							
	RESIDUAL-SILTY SAND (SM) , fine grained, red, medium dense			X	4-5-6 N=11		28	
	with mica, fine grained, light red			X	5-7-8 N=15			
5.5	SANDY SILT (ML) , light red, very stiff	5		X	6-9-13 N=22		26	
	with mica, light red, stiff			X	6-6-7 N=13			
12.0	SILTY SAND (SM) , fine grained, light reddish orange, medium dense			X	5-6-6 N=12		19	
	fine grained, pinkish brown, loose			X	3-3-3 N=6			
	with mica, fine grained, pinkish brown, loose			X	4-4-5 N=9		13	
25.0	Boring Terminated at 25 Feet	25						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

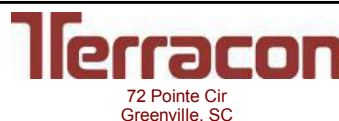
Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/17/2017

Boring Completed: 2/17/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-13

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-11

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69724° Longitude: -83.05363°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH 0.3 TOPSOIL , 3 inches							
	FILL - SILTY SAND (SM) , with roots, fine grained, brown, loose				4-4-5 N=9			
	fine grained, brown, loose	5			5-4-5 N=9			
	fine grained, brown, medium dense				6-7-7 N=14			
	fine grained, brown, medium dense	10			5-7-9 N=16			
	12.0 RESIDUAL-SILTY SAND (SM) , fine grained, brown, medium dense							
	with gravel, fine grained, pink and brown, medium dense	15			4-5-6 N=11			
		20			8-8-10 N=18			
	Boring Terminated at 20 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-14

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW/GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-12

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69698° Longitude: -83.05232°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.3	TOPSOIL , 3 inches							
	FILL - SANDY LEAN CLAY (CL) , with roots, red, stiff			X	3-4-6 N=10	9	23	
3.0	RESIDUAL-SANDY SILT (ML) , trace mica, orangish red, stiff							
	with mica, red, stiff	5		X	4-5-5 N=10			
				X	6-7-6 N=13			
8.0	SILTY SAND (SM) , with mica, fine grained, orangish red with black, loose							
10.0	Boring Terminated at 10 Feet	10		X	5-4-3 N=7			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/20/2017

Boring Completed: 2/20/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-15

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-13

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69785° Longitude: -83.05162°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.2	TOPSOIL , 2 inches							
	FILL - SILTY SAND (SM) , with roots, fine grained, red, medium dense			X	5-5-6 N=11	13	26	
	fine grained, red, medium dense			X	5-5-8 N=13			
5.5	RESIDUAL-SILTY SAND (SM) , fine grained, red, medium dense	5		X	7-8-8 N=16		26	
	fine grained, orangish brown with white, medium dense			X	5-5-5 N=10			
	fine grained, orangish brown with white, medium dense	10		X	7-8-8 N=16		14	
	with mica, fine grained, dark orangish brown, loose			X	2-3-3 N=6			
20.0	Boring Terminated at 20 Feet	20						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/21/2017

Boring Completed: 2/21/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-16

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-14

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.6985° Longitude: -83.0518°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
FILL - SILTY SAND (SM), with roots, fine grained, brown, medium dense				X	5-6-7 N=13			
	fine grained, brown, medium dense	5		X	6-6-8 N=14			
	fine grained, brown, medium dense			X	7-7-8 N=15			
	fine grained, brown, loose	10		X	3-4-5 N=9			
RESIDUAL-SILTY SAND (SM), fine grained, light brown, very loose				X	1-1-2 N=3			
	with mica, fine to medium grained, pinkish brown and white, loose	15		X	3-3-2 N=5			
	fine grained, tannish brown and black, very loose	25		X	WOH-1-1 N=2			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-17

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-14

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.6985° Longitude: -83.0518°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
	RESIDUAL-SILTY SAND (SM) , fine grained, light brown, very loose <i>(continued)</i>							
	with mica, fine grained, brown and light brown, loose			X	6-5-4 N=9			
	30.0 Boring Terminated at 30 Feet	30						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-17

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-15

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69632° Longitude: -83.05222°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
3.0	FILL - SANDY LEAN CLAY (CL) , with roots, red, stiff			X	5-5-5 N=10		27	
5	RESIDUAL-SILTY SAND (SM) , with mica, fine to coarse grained, red, medium dense			X	4-4-6 N=10			
	with mica, fine to coarse grained, red, medium dense			X	9-9-9 N=18		29	
	with mica, fine to coarse grained, orangish red, loose			X	4-4-4 N=8			
	with mica, fine grained, orangish brown and black, loose			X	4-3-4 N=7		29	
	with mica, fine grained, orangish brown and white, loose			X	3-3-4 N=7			
	fine grained, orangish brown, loose			X	4-4-4 N=8		13	
25.0	Boring Terminated at 25 Feet	25						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
<i>No free water observed</i>



Boring Started: 2/20/2017	Boring Completed: 2/20/2017
Drill Rig: Geoprobe 7822 DT	Driller: B. Burnett
Project No.: 86175002	Exhibit: A-18

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW/GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-16

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69642° Longitude: -83.05043°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
	FILL - SILTY SAND (SM) , fine grained, reddish brown, loose							
					3-3-3 N=6		19	
	fine grained, orangish brown, very loose				2-1-1 N=2			
		5						
	RESIDUAL-SILTY SAND (SM) , fine grained, orangish brown, loose				2-2-2 N=4		19	
	fine grained, orangish brown, loose				2-2-2 N=4			
		10						
	fine grained, orangish brown, loose				2-2-3 N=5		20	
		15						
	with mica, fine grained, orangish brown with white, loose				2-3-4 N=7			
		20						
	fine grained, orangish brown with white, medium dense				6-5-5 N=10		14	
		25						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

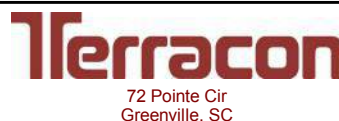
Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/21/2017

Boring Completed: 2/21/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-19

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW/GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-16

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69642° Longitude: -83.05043°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
DEPTH								
	RESIDUAL-SILTY SAND (SM) , fine grained, orangish brown, loose <i>(continued)</i>							
	with mica, fine grained, orangish brown with white, loose	30		X	3-4-5 N=9		14	
	with mica, fine grained, orangish brown and white, medium dense							
35.0	Boring Terminated at 35 Feet	35		X	4-5-6 N=11		14	

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/21/2017

Boring Completed: 2/21/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-19

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-17

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69778° Longitude: -83.05095°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
0.2	TOPSOIL , 2 inches							
	FILL - SANDY SILT (ML) , reddish brown, stiff			X	4-4-5 N=9			
	reddish brown, stiff	5		X	4-5-7 N=12			
5.5	FILL - SILTY SAND (SM) , fine to medium grained, reddish brown, medium dense			X	5-7-6 N=13			
	RESIDUAL-SILTY SAND (SM) , fine grained, brown, loose	8.0		X	3-3-3 N=6			
8.0								
10.0	Boring Terminated at 10 Feet	10						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-20

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-18

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69923° Longitude: -83.05136°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.3	TOPSOIL , 3 inches							
3.0	FILL - SANDY SILT (ML) , brown, stiff			X	4-6-8 N=14			
5.0	FILL - SILTY SAND (SM) , fine grained, brown, medium dense	5		X	4-5-5 N=10			
7.0	fine grained, brown, medium dense			X	6-7-8 N=15			
9.0	fine grained, brown, loose			X	5-4-3 N=7			
12.0	RESIDUAL-SILTY SAND (SM) , fine to coarse grained, light brown and white, loose			X	4-4-4 N=8			
15.0	fine to medium grained, light brown and white, loose			X	3-4-4 N=8			
20.0	Boring Terminated at 20 Feet	20						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-21

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW/GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-19

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69992° Longitude: -83.05169°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
0.5	TOPSOIL , 6 inches							
3.0	FILL - SANDY LEAN CLAY (CL) , red, stiff			X	5-6-8 N=14		25	
5.5	FILL - SILTY SAND (SM) , fine grained, red, medium dense			X	4-5-6 N=11			
12.0	RESIDUAL-SANDY SILT (ML) , orangish red, very stiff orangish red, stiff			X	6-7-9 N=16		30	
15.0	SILTY SAND (SM) , with mica, fine grained, dark pink and white, medium dense			X	5-6-6 N=12		16	
20.0	fine grained, dark pink and orange, medium dense			X	4-5-5 N=10			
25.0	fine grained, pinkish brown and white, loose			X	4-4-4 N=8		12	
Boring Terminated at 25 Feet		25						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/17/2017

Boring Completed: 2/17/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-22

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-20

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69531° Longitude: -83.05051°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.2	TOPSOIL , 2 inches							
3.0	FILL - SILTY SAND (SM) , red with black, medium dense			X	9-6-5 N=11			
5.5	RESIDUAL-SILTY SAND (SM) , fine grained, red with black, medium dense			X	13-13-12 N=25			
10.0	SANDY SILT (ML) , with mica, reddish orange with black, medium stiff			X	4-3-3 N=6			
	with mica, light brown with light pink, stiff			X	4-4-6 N=10			
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/21/2017

Boring Completed: 2/21/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-23

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-21

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69368° Longitude: -83.05086°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.3	TOPSOIL , 4 inches							
3.0	FILL - SANDY LEAN CLAY (CL) , dark red, soft			X	2-2-2 N=4		21	
5.5	FILL - SANDY SILT (ML) , red, medium stiff			X	2-4-4 N=8		23	
10.0	RESIDUAL-SANDY SILT (ML) , dark red, stiff red, stiff			X	6-5-4 N=9			
	Boring Terminated at 10 Feet			X	3-4-5 N=9		25	

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/21/2017

Boring Completed: 2/21/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-24

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-22

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69444° Longitude: -83.05518°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
0.3	TOPSOIL , 4 inches							
3.0	FILL - SANDY LEAN CLAY (CL) , red, medium stiff			X	4-4-4 N=8			
5.5	FILL - SANDY SILT (ML) , red, very stiff			X	6-7-9 N=16			
12.0	RESIDUAL-SANDY SILT (ML) , reddish orange, hard reddish orange with black, stiff			X	9-18-19 N=37			
15.0	SILTY SAND (SM) , fine grained, red and light orange, loose		▽	X	10-5-4 N=9	14	40	
20.0	fine to medium grained, orange and red, loose			X	3-3-2 N=5			NP
25.0	fine to medium grained, orange with black, loose			X	3-2-2 N=4			
25.0	Boring Terminated at 25 Feet			X	4-4-5 N=9			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

▽ At completion of drilling



Boring Started: 2/17/2017

Boring Completed: 2/17/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-25

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-23

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69567° Longitude: -83.0559°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
	0.3' TOPSOIL , 3 inches							
	FILL - SANDY SILT (ML) , dark reddish brown, stiff			X	5-6-7 N=13		28	
	red, stiff			X	8-7-7 N=14		28	
	5.0' Boring Terminated at 5 Feet	5						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/20/2017

Boring Completed: 2/20/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-26

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-24

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69557° Longitude: -83.05409°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.3	TOPSOIL , 4 inches							
3.0	FILL - SANDY LEAN CLAY (CL) , dark red, medium stiff			X	4-4-4 N=8	10	25	
5.0	FILL - SILTY SAND (SM) , with gravel, fine grained, red, medium dense			X	5-7-9 N=16			
	Boring Terminated at 5 Feet	5						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-27

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-25

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69691° Longitude: -83.05143°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.2	TOPSOIL , 2 inches							
3.0	FILL - SANDY SILT (ML) , red, stiff			X	6-6-9 N=15			
5.0	RESIDUAL-SANDY SILT (ML) , with mica, red, very stiff			X	8-9-10 N=19			
	Boring Terminated at 5 Feet	5						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-28

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-26

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69947° Longitude: -83.05202°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.3	TOPSOIL , 4 inches							
3.0	FILL - SANDY SILT (ML) , brown, stiff			X	4-7-7 N=14			
5.0	FILL - SILTY SAND (SM) , fine grained, brown, medium dense	5		X	4-5-6 N=11			
10.0	with roots, fine grained, brown, medium dense fine grained, brown, loose	10		X	5-6-7 N=13	11	27	
12.0	RESIDUAL-SILTY SAND (SM) , fine to coarse grained, tannish brown, loose							
15.0		15		X	3-4-3 N=7			
20.0	fine to medium grained, pinkish brown, loose	20		X	3-4-4 N=8			
25.0	with mica, fine to coarse grained, tannish brown, medium dense	25		X	6-5-6 N=11			
	Boring Terminated at 25 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-29

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-27

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69964° Longitude: -83.05499°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH 0.3 TOPSOIL , 4 inches							
	RESIDUAL-SILTY SAND (SM) , fine grained, red, medium dense			X	4-5-7 N=12			NP
	fine grained, light red with white, medium dense	5		X	4-6-5 N=11			
	fine grained, light orangish brown with white, medium dense			X	5-6-6 N=12			
	fine to medium grained, white, medium dense	10		X	33-8-5 N=13			
	with mica, fine grained, reddish orange with black, loose	15		X	1-2-2 N=4			
	fine grained, light brown and white, medium dense	20		X	3-8-10 N=18			
	fine grained, orangish brown with black, medium dense	25		X	9-4-5 N=9			
	Boring Terminated at 25 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
No free water observed



Boring Started: 2/20/2017

Boring Completed: 2/20/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-30

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW/GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-28

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69688° Longitude: -83.05525°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.3	TOPSOIL , 4 inches							
	FILL - SANDY LEAN CLAY (CL) , dark red, medium stiff			X	4-4-4 N=8			
	red, stiff	5		X	4-5-5 N=10			
5.5	RESIDUAL-SILTY SAND (SM) , fine to coarse grained, red and white, medium dense			X	3-5-17 N=22			
	fine grained, orangish red, medium dense			X	5-6-5 N=11			
10.0	Boring Terminated at 10 Feet	10						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/20/2017

Boring Completed: 2/20/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-31

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-29

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69836° Longitude: -83.05603°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
5.5	FILL - SILTY SAND (SM) , fine grained, reddish brown, loose fine grained, reddish brown, loose	5		X	4-2-3 N=5			
8.0	RESIDUAL-SILTY SAND (SM) , fine grained, reddish brown, loose SANDY SILT (ML) , red, medium stiff red and orange, very soft	10		X	3-3-4 N=7			
22.0	SANDY SILT (ML) , red, medium stiff red and orange, very soft orangish brown and white, medium stiff	15		X	3-4-5 N=9			42-25-17
25.0	SANDY SILT (ML) , red, medium stiff red and orange, very soft orangish brown and white, medium stiff	20		X	2-3-4 N=7			
28.0	SILTY SAND (SM) , fine grained, orange and white, loose	25		X	WOH-WOH-1 N=1			
30.0	SILTY SAND (SM) , fine grained, orange and white, loose	30		X	2-2-4 N=6			
32.0	SILTY SAND (SM) , fine grained, orange and white, loose	35		X	2-3-4 N=7			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/20/2017

Boring Completed: 2/20/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-32

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-29

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69836° Longitude: -83.05603°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
	SILTY SAND (SM) , fine grained, orange and white, loose <i>(continued)</i>							
	fine grained, orangish brown and white, medium dense			X	4-4-6 N=10			
	30.0 Boring Terminated at 30 Feet	30						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/20/2017

Boring Completed: 2/20/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-32

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-30

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.70118° Longitude: -83.05714°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
	0.2' TOPSOIL , 2 inches							
	FILL - SILTY SAND (SM) , fine grained, red, medium dense			X	5-7-10 N=17		28	
	3.0' RESIDUAL-SILTY SAND (SM) , fine grained, orangish red, medium dense			X	5-6-7 N=13			
	5.5' SANDY SILT (ML) , light red, very stiff	5		X	6-7-9 N=16			
	reddish orange and black, stiff	10		X	4-4-5 N=9		19	
	reddish orange with black, medium stiff	15		X	3-4-3 N=7			
	pinkish brown and black, very stiff	20		X	5-5-9 N=14		13	
	Boring Terminated at 20 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/20/2017

Boring Completed: 2/20/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-33

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW/GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-31

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.70071° Longitude: -83.05586°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
0.2	TOPSOIL , 2 inches							
5.5	FILL - SILTY SAND (SM) , with roots, fine grained, brown, medium dense with roots, fine grained, brown, medium dense	5		X	4-5-6 N=11			
8.0	RESIDUAL-SILTY SAND (SM) , fine to medium grained, pink and light brown, loose			X	4-6-6 N=12			
10.0	SANDY SILT (ML) , tannish brown, medium stiff			X	4-3-3 N=6			
15.0	tannish brown with black, very soft			X	2-3-2 N=5			
17.5				X	WOH-WOH-WOH N=WOH			
20.0	with mica, purple and light brown to tan, stiff			X	3-4-5 N=9			
	Boring Terminated at 20 Feet	20						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/20/2017

Boring Completed: 2/20/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-34

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-32

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.70155° Longitude: -83.05524°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.5	TOPSOIL , 6 inches							
3.0	FILL - SANDY SILT (ML) , with roots, dark red, medium stiff			X	2-3-4 N=7			
5.0	RESIDUAL-SANDY SILT (ML) , with roots, red, stiff			X	4-5-9 N=14			
	Boring Terminated at 5 Feet	5						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/20/2017

Boring Completed: 2/20/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-35

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-33

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69945° Longitude: -83.05067°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
DEPTH								
5.5	RESIDUAL-SILTY SAND (SM) , fine to medium grained, pink and tan, loose fine to medium grained, pink and light brown, very loose	5		X	2-2-2 N=4			
10.0	SANDY SILT (ML) , tan and black, soft with mica, tan and black, medium stiff	10		X	2-2-2 N=4			
	Boring Terminated at 10 Feet			X	2-3-5 N=8			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-36

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-34

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69824° Longitude: -83.05009°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
	DEPTH							LL-PL-PI
	RESIDUAL-SILTY SAND (SM) , fine grained, brown and black, loose			X	3-3-3 N=6			
	with mica, fine grained, light brown, loose	5		X	2-2-2 N=4			
	fine grained, tannish brown and black, loose			X	2-2-2 N=4			
	fine grained, dark brown and black, loose			X	4-3-3 N=6			
	10.0 Boring Terminated at 10 Feet	10						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-37

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-35

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69698° Longitude: -83.04987°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.4	TOPSOIL , 5 inches							
3.0	FILL - SILTY SAND (SM) , with mica, fine grained, red with light brown, loose			X	2-3-3 N=6			
3.0	FILL - SANDY SILT (ML) , red, medium stiff			X	3-3-3 N=6			
	reddish brown with black, stiff	5		X	5-5-5 N=10			
	reddish brown, very soft			X	WOH-WOH-1 N=1			
10.0	Boring Terminated at 10 Feet	10						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-38

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-36

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.69582° Longitude: -83.04912°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
	DEPTH							
0.3	TOPSOIL , 4 inches							
3.0	FILL - SILTY SAND (SM) , with mica, fine grained, red and light brown, loose			X	2-2-2 N=4			
5.5	FILL - SANDY SILT (ML) , red, medium stiff			X	2-3-3 N=6			
8.0	FILL - SANDY LEAN CLAY (CL) , dark red, stiff			X	3-4-5 N=9			
10.0	FILL - SILTY SAND (SM) , fine to medium grained, brown with orange, medium dense			X	5-6-6 N=12			
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-39

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

BORING LOG NO. B-37

PROJECT: Oconee Industrial & Technology Park

CLIENT: Oconee County
Walhalla, SC

SITE: SC-11
Westminster, SC

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.6944° Longitude: -83.04795°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)	ATTERBERG LIMITS
								LL-PL-PI
DEPTH								
0.5	TOPSOIL , 6 inches							
3.0	FILL - SILTY SAND (SM) , with mica, fine grained, red and brown, loose			X	4-4-4 N=8			
5.5	FILL - SANDY SILT (ML) , dark reddish brown, stiff			X	4-4-5 N=9			
8.0	FILL - SANDY LEAN CLAY (CL) , dark reddish brown, stiff			X	5-5-6 N=11			
10.0	FILL - SILTY SAND (SM) , with gravel, fine to medium grained, light orangish brown with white, medium dense			X	4-6-10 N=16			
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" Hollow Stem

See Exhibit A-3 for description of field procedures

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
No free water observed



Boring Started: 2/24/2017

Boring Completed: 2/24/2017

Drill Rig: Geoprobe 7822 DT

Driller: B. Burnett

Project No.: 86175002

Exhibit: A-40

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 06145030 LOG 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 3/6/17

Rock Probe Records

Project Name: Oconee Industrial & Technology Park

Project Number: 86175002

Logged by: ZL



Probe No.	Surface Elevation (feet)	Location		Depth of Bedrock (feet)
		Latitude	Longitude	
R-1	approximately 883	34.69842	-83.05292	50 ft, no bedrock
R-2	approximately 882	34.69821	-83.05302	Rock @ 22 feet
R-3	approximately 878	34.69793	-83.05319	35 ft, no bedrock

APPENDIX B
LAB TESTING

Geotechnical Engineering Report

Oconee Industrial & Technology Park ■ Westminster, South Carolina

April 8, 2017 ■ Project No. 86175002



LABORATORY TESTING DESCRIPTION

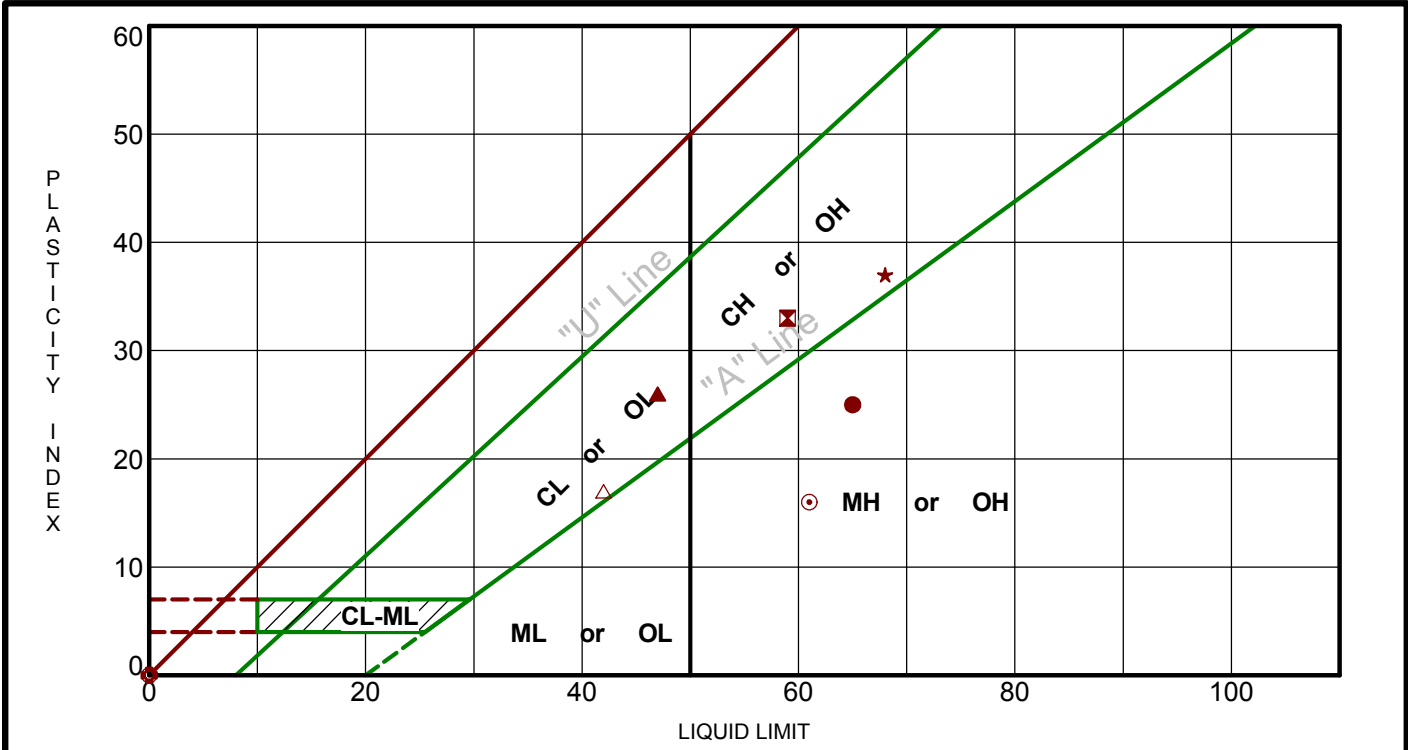
Samples retrieved during the field exploration were taken to the laboratory for further observation by the project geotechnical engineer and were classified in accordance with the Unified Soil Classification System (USCS) described in Appendix C. At that time, the field descriptions were confirmed or modified as necessary and an applicable laboratory testing program was formulated to determine engineering properties of the subsurface materials.

Laboratory tests were conducted on selected soil samples and the test results are presented in this appendix. Laboratory tests were performed in general accordance with the applicable ASTM, local or other accepted standards. The selected soil samples were tested for the following engineering properties:

- n Atterberg Limits Tests (ASTM D4318)
- n Grain Size Distribution Tests (ASTM D6913)
- n Natural Moisture Content Tests (ASTM D2216)
- n Rock Compressive Strength Tests (ASTM D7012)

ATTERBERG LIMITS RESULTS

ASTM D4318



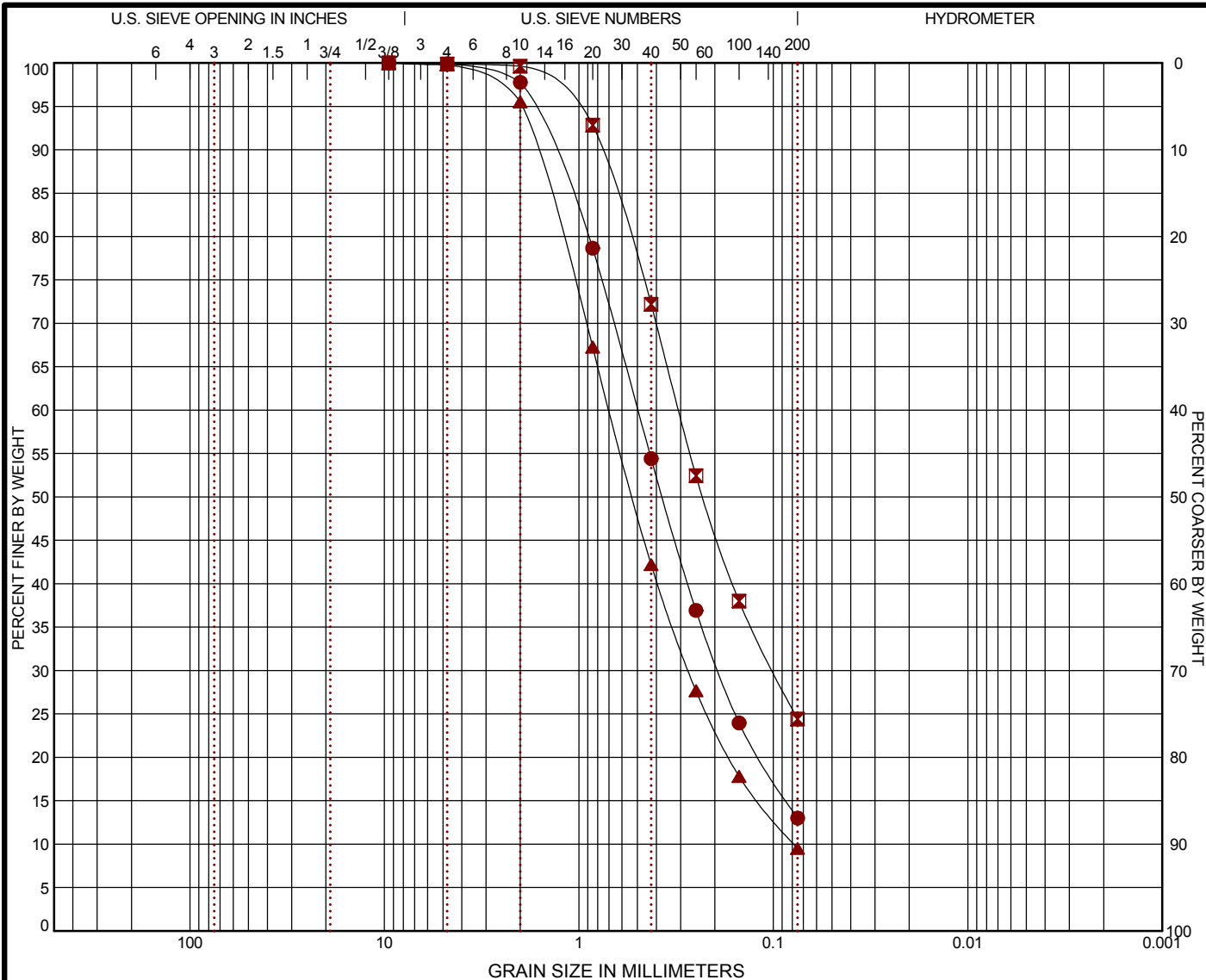
LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 2/28/17

Boring ID	Depth	LL	PL	PI	Fines	USCS	Description
● B-1	3.5 - 5	65	40	25			
⊠ B-2	1 - 2.5	59	26	33			
▲ B-4	1 - 2.5	47	21	26			
★ B-6	1 - 2.5	68	31	37			
⊙ B-9	3.5 - 5	61	45	16			
⊕ B-22	13.5 - 15	NP	NP	NP			
○ B-27	1 - 2.5	NP	NP	NP			
△ B-29	6 - 7.5	42	25	17			

PROJECT: Oconee Industrial & Technology Park SITE: SC-11 Westminster, SC	72 Pointe Cir Greenville, SC	PROJECT NUMBER: 86175002 CLIENT: Oconee County Walhalla, SC EXHIBIT: B-2
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GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	B-1	13.5 - 15	0.0	0.1	86.9		13.0		
☒	B-2	28.5 - 30	0.0	0.1	75.4		24.4		
▲	B-4	8.5 - 10	0.0	0.2	90.3		9.5		

GRAIN SIZE	PERCENT FINER		
	●	☒	▲
D ₆₀	0.499	0.306	0.695
D ₃₀	0.19	0.1	0.272
D ₁₀			0.078
COEFFICIENTS			
C _c			1.36
C _u			8.89

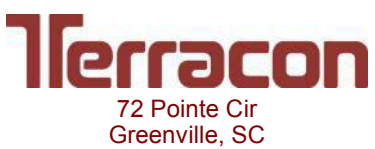
SIEVE (size)	PERCENT FINER		
	●	☒	▲
	-	-	-

<p>SOIL DESCRIPTION</p> <p>●</p> <p>☒</p> <p>▲</p>	<p>REMARKS</p> <p>●</p> <p>☒</p> <p>▲</p>
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LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS 1 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 2/28/17

PROJECT: Oconee Industrial & Technology Park

SITE: SC-11
Westminster, SC



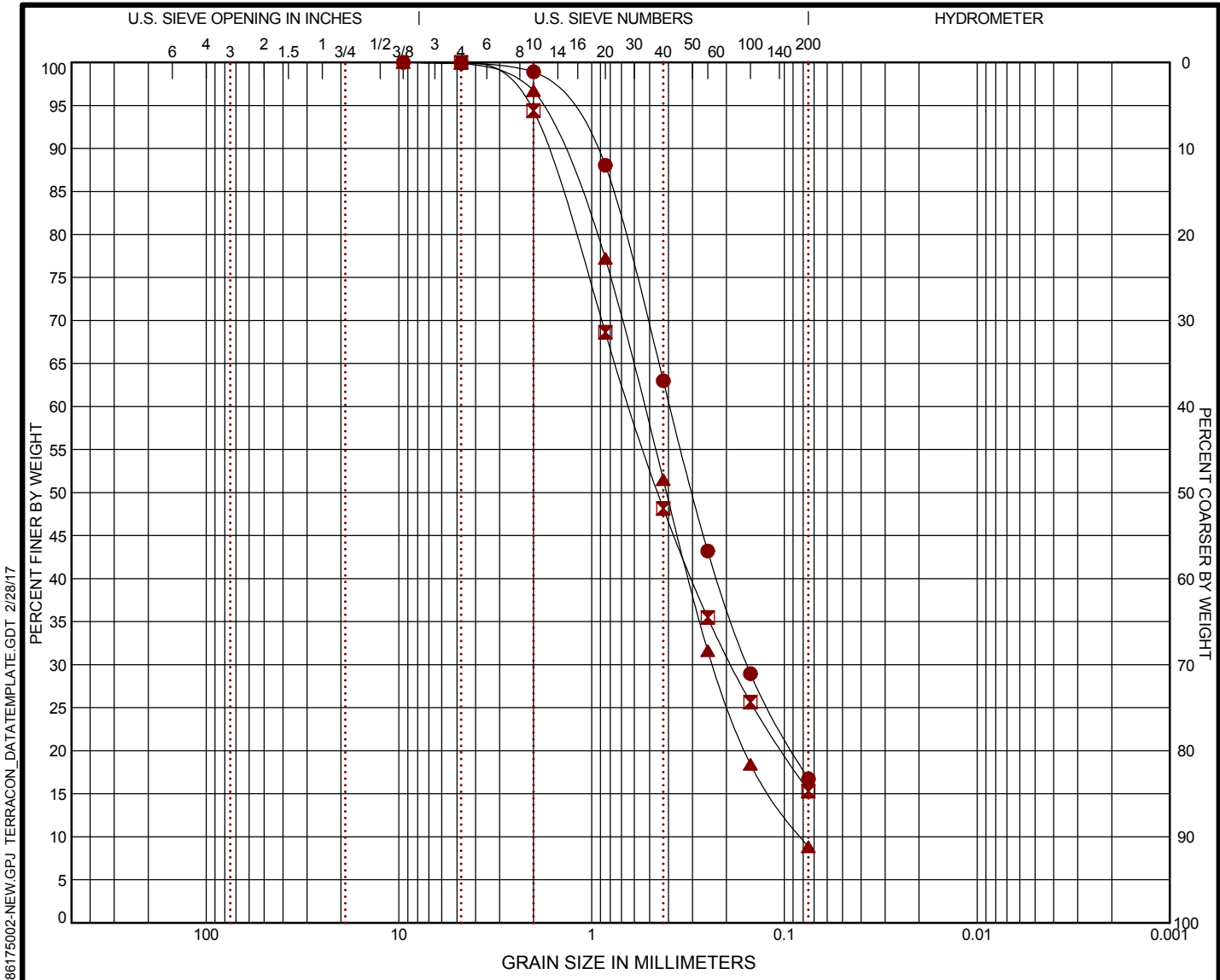
PROJECT NUMBER: 86175002

CLIENT: Oconee County
Walhalla, SC

EXHIBIT: B-3

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	B-6	18.5 - 20	0.0	0.1	83.2		16.7		
☒	B-7	6 - 7.5	0.0	0.0	84.7		15.3		
▲	B-15	3.5 - 5	0.0	0.1	91.1		8.8		

GRAIN SIZE	PERCENT FINER		
	●	☒	▲
D ₆₀	0.392	0.635	0.534
D ₃₀	0.156	0.188	0.235
D ₁₀			0.082
COEFFICIENTS			
C _c			1.26
C _u			6.55

SIEVE (size)	PERCENT FINER		
	●	☒	▲
	-	-	-

<p>SOIL DESCRIPTION</p> <p>●</p> <p>☒</p> <p>▲</p>	<p>REMARKS</p> <p>●</p> <p>☒</p> <p>▲</p>
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LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS 1 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 2/28/17

PROJECT: Oconee Industrial & Technology Park

SITE: SC-11
Westminster, SC



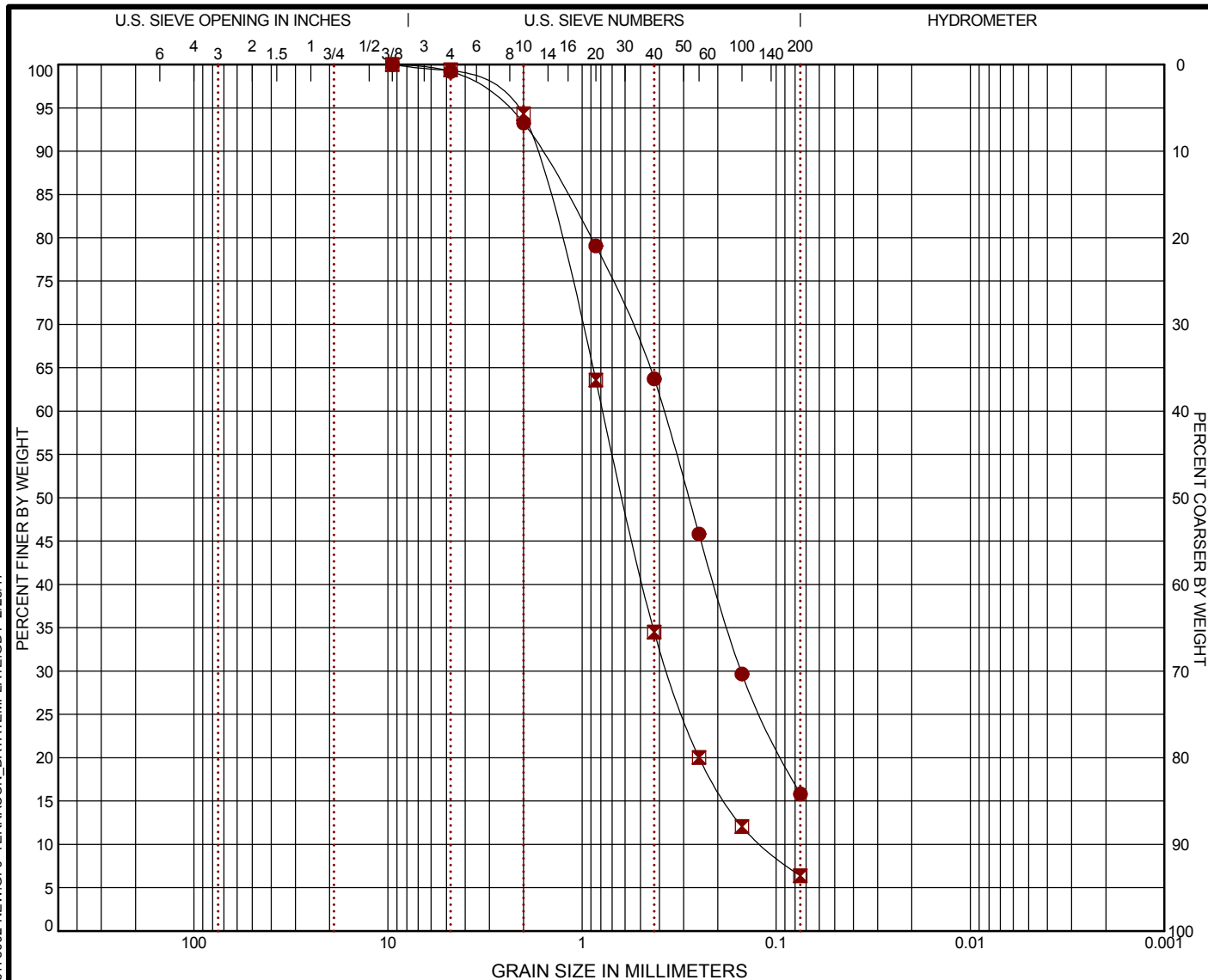
PROJECT NUMBER: 86175002

CLIENT: Oconee County
Walhalla, SC

EXHIBIT: B-4

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY			
	coarse	fine	coarse	medium	fine				

BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-27	23.5 - 25	0.0	0.8	83.4		15.8		
☒ B-29	1 - 2.5	0.0	0.6	93.0		6.4		

<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">GRAIN SIZE</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">●</td> <td style="text-align: center;">☒</td> </tr> <tr> <td>D₆₀</td> <td>0.381 0.781</td> </tr> <tr> <td>D₃₀</td> <td>0.152 0.36</td> </tr> <tr> <td>D₁₀</td> <td>0.117</td> </tr> <tr> <th colspan="2" style="text-align: center;">COEFFICIENTS</th> </tr> <tr> <td>C_c</td> <td>1.42</td> </tr> <tr> <td>C_u</td> <td>6.68</td> </tr> </tbody> </table>	GRAIN SIZE		●	☒	D ₆₀	0.381 0.781	D ₃₀	0.152 0.36	D ₁₀	0.117	COEFFICIENTS		C _c	1.42	C _u	6.68	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 10%;">SIEVE (size)</th> <th colspan="3" style="width: 80%;">PERCENT FINER</th> </tr> <tr> <th style="width: 25%;">●</th> <th style="width: 25%;">☒</th> <th style="width: 25%;">-</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> </tbody> </table>	SIEVE (size)	PERCENT FINER			●	☒	-		-	-	-	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;"> SOIL DESCRIPTION ● ☒ </td> </tr> <tr> <td style="padding: 5px;"> REMARKS ● ☒ </td> </tr> </table>	SOIL DESCRIPTION ● ☒	REMARKS ● ☒
GRAIN SIZE																															
●	☒																														
D ₆₀	0.381 0.781																														
D ₃₀	0.152 0.36																														
D ₁₀	0.117																														
COEFFICIENTS																															
C _c	1.42																														
C _u	6.68																														
SIEVE (size)	PERCENT FINER																														
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SOIL DESCRIPTION ● ☒																															
REMARKS ● ☒																															












PROJECT: Oconee Industrial & Technology Park SITE: SC-11 Westminster, SC	<p style="color: red; font-weight: bold;">Terracon</p> 72 Pointe Cir Greenville, SC	PROJECT NUMBER: 86175002 CLIENT: Oconee County Walhalla, SC EXHIBIT: B-5
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LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS 1 86175002-NEW.GPJ TERRACON_DATATEMPLATE.GDT 2/28/17

APPENDIX C
SUPPORTING DOCUMENTS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING			WATER LEVEL		Water Initially Encountered	FIELD TESTS	(HP) Hand Penetrometer	
	Auger	Split Spoon			Water Level After a Specified Period of Time		(T) Torvane	
					Water Level After a Specified Period of Time		(b/f) Standard Penetration Test (blows per foot)	
	Shelby Tube	Macro Core		Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.			(PID) Photo-Ionization Detector	
							(OVA) Organic Vapor Analyzer	
								
Grab Sample	No Recovery							

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS	RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
	Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength, Qu, tsf	Standard Penetration or N-Value Blows/Ft.
Very Loose	0 - 3	0 - 6	Very Soft	less than 0.25	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	0.25 to 0.50	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	0.50 to 1.00	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	1.00 to 2.00	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	2.00 to 4.00	15 - 30	19 - 42
			Hard	> 4.00	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification		
				Group Symbol	Group Name ^B	
Coarse Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3$ ^E	GW	Well-graded gravel ^F	
			$Cu < 4$ and/or $1 > Cc > 3$ ^E	GP	Poorly graded gravel ^F	
		Gravels with Fines: More than 12% fines ^C	Fines classify as ML or MH	GM	Silty gravel ^{F,G,H}	
			Fines classify as CL or CH	GC	Clayey gravel ^{F,G,H}	
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines ^D	$Cu \geq 6$ and $1 \leq Cc \leq 3$ ^E	SW	Well-graded sand ^I	
			$Cu < 6$ and/or $1 > Cc > 3$ ^E	SP	Poorly graded sand ^I	
		Sands with Fines: More than 12% fines ^D	Fines classify as ML or MH	SM	Silty sand ^{G,H,I}	
			Fines Classify as CL or CH	SC	Clayey sand ^{G,H,I}	
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	$PI > 7$ and plots on or above "A" line ^J	CL	Lean clay ^{K,L,M}	
			$PI < 4$ or plots below "A" line ^J	ML	Silt ^{K,L,M}	
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay ^{K,L,M,N}
			Liquid limit - not dried			Organic silt ^{K,L,M,O}
	Silts and Clays: Liquid limit 50 or more	Inorganic:	PI plots on or above "A" line	CH	Fat clay ^{K,L,M}	
			PI plots below "A" line	MH	Elastic Silt ^{K,L,M}	
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay ^{K,L,M,P}
			Liquid limit - not dried			Organic silt ^{K,L,M,Q}
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat	

- ^A Based on the material passing the 3-in. (75-mm) sieve
- ^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
- ^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
- ^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay
- ^E $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
- ^F If soil contains $\geq 15\%$ sand, add "with sand" to group name.
- ^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

- ^H If fines are organic, add "with organic fines" to group name.
- ^I If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.
- ^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
- ^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
- ^L If soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.
- ^M If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.
- ^N $PI \geq 4$ and plots on or above "A" line.
- ^O $PI < 4$ or plots below "A" line.
- ^P PI plots on or above "A" line.
- ^Q PI plots below "A" line.

