BUCK JONES WATER LINE REPLACEMENTS

RALEIGH WATER
RALEIGH, NORTH CAROLINA

SUBJECT: ADDENDUM NO. 1 **FEBRUARY 26, 2024**

To the Plans and Specifications for:
Buck Jones Water Line Replacement Project
Raleigh, N.C.

To: PROSPECTIVE PROPOSERS AND OTHER CONCERNED PARTIES

This ADDENDUM forms a part of the Contract Documents and modifies the original Bidding Documents as noted below. Bidders shall acknowledge receipt of the ADDENDUM in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

CHANGES TO FRONT END SPECIFICATIONS

Section 00010 – TABLE OF CONTENTS

Page 00010-1 to 00010-2	Remove the section entirely and replace it with Pages 00010-1 (Rev.1) to 00010-2 (Rev.1) included with this addendum.

CHANGES TO TECHNICAL SPECIFICATIONS

Appendices

Add the attached Appendices (Part 1 – Part 3) included with this addendum to the end of the Project Manual.

Part 1	NCDEQ Erosion & Sedimentation Control Letter of Approval
Part 2	Geotechnical Investigation Report - Falcon Engineering
Part 3	Vacuum Excavation Test Hole Report - GEL

FOR THE OWNER

CJS Conveyance, PLLC

NORTH CAROLINA PROFESSIONAL SEAL 030468 ENGINEER CHRISTOPHER L. WINDLEY

Chris Windley

Digitally signed by Chris Windley
Date: 2024.02.26 16:15:01-05'00'

BY:_____
Christopher L. Windley, P.E.

END OF DOCUMENT

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END OF DOCUMENT

APPENDIX

* This entire section is project-specific and may include the following attachments for the Contractor's information or use during bidding or construction (for example):

PART 1 NCDEQ Erosion & Sedimentation Control Letter of Approval

PART 2 (see attachment)- Geotechnical Investigation Report - Provided for information purposes only (not part of contract)

PART 3 (see attachment) – Vacuum Excavation Test Hole Report– Provided for information purposes only (not part of contract)

PART-1

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
DOUGLAS R. ANSEL
Interim Director

NORTH CAROLINA
Environmental Quality

August 25, 2023

LETTER OF APPROVAL

City of Raleigh
ATTN: William Wheeler, Director Raleigh Water
PO Box 590
Raleigh, NC 27513

RE: Project Name: Buck Jones Road Area Water Line Replacements
Acres Approved: 6.3
Project ID: WAKE-2024-006
County: Wake
City: Raleigh
Address: Norman Place
River Basin: Neuse
Stream Classification: C;NSW
Submitted By: Chris Windley, PE, CJS Conveyance
Date Received by LQS: July 28, 2023
Plan Type: New/Utility

Dear Mr. Wheeler:

This office has reviewed the subject erosion and sedimentation control plan. We find the plan to be acceptable and hereby issue this Letter of Approval. The enclosed Certificate of Approval must be posted at the job site. This plan shall expire three (3) years following the date of approval, if no land disturbing activity has been undertaken, as is required by Title 15A NCAC 4B .0129.

As of April 1, 2019, all new construction activities are required to complete and submit an electronic Notice of Intent (eNOI) form requesting a Certificate of Coverage (COC) under the NCG010000 Construction General Permit. After the form is reviewed and found to be complete, you will receive a link with payment instructions for the $100 annual permit fee. After the fee is processed, you will receive the COC via email. As the Financially Responsible Party shown on the FRO form submitted for this project, you MUST obtain the COC prior to commencement of any land disturbing activity. The eNOI form may be accessed at deq.nc.gov/NCG01. Please direct questions about the eNOI form to the Stormwater Program staff in the Raleigh central office. If the owner/operator of this project changes in the future, the new responsible party must obtain a new COC.

Title 15A NCAC 4B .0118(a) and the NCG01 permit require that the following documentation be kept on file at the job site:

1. The approved E&SC plan as well as any approved deviation.
2. The NCG01 permit and the COC, once it is received.
3. Records of inspections made during the previous 12 months.

Also, this letter gives the notice required by G.S. 113A-61.1(a) of our right of periodic inspection to ensure compliance with the approved plan.

North Carolina's Sedimentation Pollution Control Act is performance-oriented, requiring protection of existing natural resources and adjoining properties. If, following the commencement of this project, it is determined that the erosion and sedimentation control plan is inadequate to meet the requirements of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statute 113A-51 through 66), this office may require revisions to the plan and implementation of the revisions to ensure compliance with the Act.

Acceptance and approval of this plan is conditioned upon your compliance with Federal and State water quality laws, regulations, and rules. In addition, local city or county ordinances or rules may also apply to this land-disturbing activity. This approval does not supersede any other permit or approval.

Please note that this approval is based in part on the accuracy of the information provided in the Financial Responsibility Form, which you provided. You are requested to file an amended form if there is any change in the information included on the form. In addition, it would be helpful if you notify this office of the proposed starting date for this project.

Your cooperation is appreciated.

Sincerely,

Dylan Reinhardt
Assistant Regional Engineer
Land Quality Section

Enclosures: Certificate of Approval
NPDES NCG01 Fact Sheet

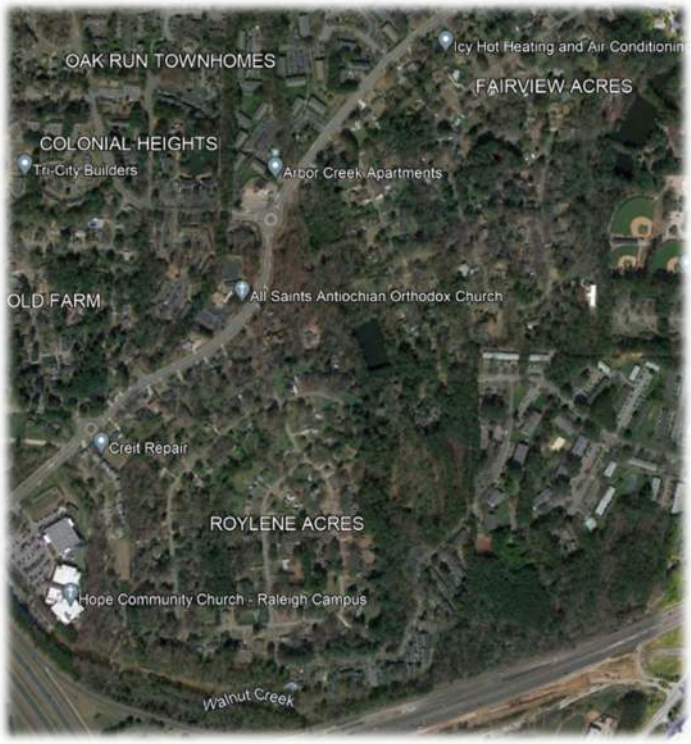
cc: Regional Office file
Chris Windley, PE, CJS Conveyance [electronic]

PART-2

GEOTECHNICAL REPORT OF SUBSURFACE INVESTIGATION

BUCK JONES RD AREA WATERLINE REPLACEMENTS

RALEIGH, NORTH CAROLINA



PREPARED FOR:
CJS CONVEYANCE, PLLC
320 S. ACADEMY STREET
CARY, NORTH CAROLINA 27511

PREPARED BY:
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
CARY, NORTH CAROLINA 27513

PROJECT NUMBER: G22029.00
JULY 15, 2022

July 15, 2022

Mr. Alex Biermann
abiermann@cjsconveyance.com
CJS Conveyance, PLLC
320 S. Academy St.
Cary, North Carolina 27511

Re: **Geotechnical Report of Subsurface Investigation**
Buck Jones Rd Area Waterline Replacements
Raleigh, North Carolina
Falcon Project No.: G22029.00

Dear Mr. Biermann:

As authorized, Falcon Engineering, Inc. (Falcon) has completed the subsurface investigation for the above referenced project. This subsurface investigation was conducted in June 2022. The opinions and observations rendered in this report are based solely on our site reconnaissance, performance of twenty-three (23) soil test borings, engineering evaluation of the data obtained, laboratory testing, and generally accepted geotechnical engineering practices and principles. Falcon appreciates the opportunity to have provided geotechnical engineering services to CJS Conveyance, PLLC (CJS) and Raleigh Water (City) for this project. If you have any questions concerning the contents of this report or need additional information, please do not hesitate to contact our office.

Sincerely,
FALCON ENGINEERING, INC.

Allan Paul, PE
Project Manager / Project Engineer

Jeremy R. Hamm, PE
Geotechnical Services Manager

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APPENDIX A

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APPENDIX C

SECTION 1: PROJECT INFORMATION

This report presents the field and laboratory test procedures and their results and geotechnical recommendations for the proposed project. Our investigation was performed in general accordance with the scope outlined in our proposal F2021-073 dated September 1, 2021.

1.1 PROJECT DESCRIPTION

Based on our conversations and provided electronic drawings and CAD files, it is our understanding the following apply to the project:

- Raleigh Water has selected CJS to provide engineering and design services for several waterline replacements in the Buck Jones Rd area of Raleigh, North Carolina.
- The project consists of replacing waterlines along Norman Pl, S Lakeside Dr, Jeffries St, Stockton Dr, and Barclay Dr.
- Pipe sizes are anticipated to be on the order of 8 inches in diameter for the majority of the project and consist of ductile iron.
- The project also consists of selective replacement of existing sanitary sewer pipe with new, 8-inch diameter DIP.

Should any of the above information or assumptions made by Falcon be inconsistent with the planned project, we request that you contact us immediately to allow us to make any necessary modifications to this report.

1.2 SITE DESCRIPTION

As depicted on the Site Vicinity Map in Appendix A of this report, the Project Corridor is located in Raleigh, North Carolina. The Project Corridor consists of existing public streets within a predominantly residential area. In addition to pavements, curbs, gutters, sidewalks, underground/overhead utilities, as well as trees are present within the corridors.

1.3 SITE GEOLOGIC DESCRIPTION

According to the *Geologic Map of North Carolina* (1985) and the *Geologic Map of the Cary 7.5-Minute Quadrangle, Wake and Durham Counties, North Carolina* (2016), the work areas are located in one (1) mapped unit of the Piedmont Physiographic Province of North Carolina.

- **Richland Creek Schist (CZrcs)** Silver-gray, white-gray, or tan-white fine to medium grained, layered, and well foliated schist, phyllonite, and fine-grained gneiss.

In addition to the primary mapped unit, thin bands of a secondary unit are present in the corridor:

- **White mica graphite schist (CZwgs)** Silver-gray to black-gray, fine to medium, well-foliated white mica, graphite, biotite (dark mica) and quartz.

1.4 TOPOGRAPHICAL DATA

Terrain models of each proposed work area were provided to us for our use. The terrain models were used to create topographic contour lines of the ground surface, interpolate surface elevations at boring locations, and to generate a ground surface line for subsurface profiles.

SECTION 2: PURPOSE AND SCOPE

Falcon has performed a geotechnical subsurface investigation for the proposed project. The purpose of this investigation is to provide a general characterization of existing onsite soils, rock, and groundwater conditions, earthmoving recommendations, discussion of pipe bedding and haunching, backfill selection and placement recommendations, site excavation considerations, and groundwater considerations.

The project was accomplished through completion of the following tasks:

- Site reconnaissance by Falcon's Geotechnical Engineering personnel.
- Performance of twenty-two (22) Standard Penetration Test (SPT) soil borings and one (1) hand auger boring.
- Visual-manual classification and stratification of the soil samples according to the Unified Soil Classification System (USCS).
- Laboratory testing of select soil samples collected from the borings.
- Analysis of field and laboratory test data and collected soil samples.
- Preparation of this formal engineering report summarizing the field and laboratory test results and our geotechnical recommendations for design and construction.

SECTION 3: FIELD INVESTIGATION

3.1 SITE RECONNAISSANCE AND PROJECT SET-UP

Boring coordinates were selected and provided by CJS in tabular format. Boring coordinates provided were uploaded to a handheld GPS unit capable of sub-meter accuracy and marked in the field. Falcon personnel contacted the North Carolina One-Call Center to request subscriber utilities be located and marked in and around the marked boring locations. Utilities were either marked in the field or noted to be specifically not in conflict with the boring locations prior to the beginning of our field investigation.

3.2 SOIL TEST BORINGS

On June 13th and 14th, 2022, one (1) hand auger boring was advanced approximately 8.0 feet below the existing pavement surface within the Project Corridor. Five (5) additional hand auger borings were attempted but encountered auger refusal before reaching the termination depth of 8.0 feet. Grab samples were collected at changes in strata. In-situ penetration testing was performed via Dynamic Cone Penetrometer (DCP) testing at approximate depths of 2.0, 4.0, and 6.0 feet below the pavement surface. DCP testing was performed in general accordance with ASTM STP 399 "Dynamic Cone for Shallow In-Situ Penetration Testing, Vane Shear and Cone Penetrations Resistance Testing of In-Situ Soils".

Between June 28th and 30h, 2022, twenty-two (22) Standard Penetration Test (SPT) soil borings advanced within the Project Corridor including the locations of the five (5) previously attempted hand auger borings. Falcon geotechnical field staff directed drilling at or near the staked/marked boring locations, adjusted as necessary to avoid marked underground utilities, overhead utilities and/or other obstructions at each boring location, and to accommodate traffic control operations. During the field investigation, *as-drilled* boring coordinates were collected with a handheld GPS unit capable of sub-meter accuracy.

SPT borings were advanced to a maximum depth of approximately 10.0 feet below the pavement surface by a CME 55 truck mounted drill rig equipped with hollow stem augers. SPT borings were performed in general accordance with ASTM D1586 "Penetration Test and Split-Barrel Sampling of Soils". Soil samples were obtained from soil borings at regular intervals using a split-barrel sampler and visually classified in accordance with the Unified Soil Classification System (USCS) by our geotechnical field staff. An automatic hammer was used to advance the sampler at each test interval. Two (2) bulk soil samples were obtained from auger cuttings.

Soil samples were sealed in moisture proof containers, labeled, and transported to our laboratory for further analysis.

SECTION 4: LABORATORY TESTING

All soil samples were reviewed and visually-manually classified in accordance with ASTM D2488 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)" and the Unified Soil Classification System (USCS) by our geotechnical staff. During review of the collected soil samples, a number of representative samples were selected for further analysis in Falcon's soils laboratory.

- Two (2) bulk samples (BS-#) were tested for natural moisture content (ASTM D2216), Atterberg limits (ASTM D4318), mechanical sieve analyses (ASTM D6913), and standard Proctor compaction (ASTM D698).
- Nine (9) split-spoon (SS-#) samples were tested for natural moisture content, Atterberg limits, and mechanical sieve analyses.
- Twelve (12) additional samples were tested for natural moisture content only.

Moisture content testing results are shown on the individual Test Boring Logs in Appendix B of this report. A summary of classification test results and bulk sample test results are shown in the tables below. Detailed soil laboratory testing results can be found in Appendix C of this report.

TABLE 4.1: SUMMARY OF LABORATORY INDEX TESTING

SAMPLE ID	BORING ID	DEPTH (FT)	NATURAL MOISTURE CONTENT (%)	PERCENT PASSING			ATTERBERG LIMITS			USCS SYMBOL
				#10	#40	#200	LL	PL	PI	
SS-02	B-02	1.5-2.0	24.7	94	90	70.1	54	48	6	MH
BS-01	B-03	1.0-6.0	20.3	98	94	71.6	38	38	NP	ML
SS-04	B-05	3.5-5.0	16.2	94	89	67.3	34	34	NP	ML
SS-05	B-06	1.0-2.5	20.7	77	72	51.9	43	23	20	CL
SS-07	B-08	3.5-5.0	15.8	74	68	49.0	42	21	21	SC
SS-09	B-10	3.5-5.0	29.4	89	86	76.6	76	44	32	MH
BS-02	B-13	1.0-5.0	19.2	94	88	61.7	45	25	20	CL
SS-13	B-15	1.0-2.5	12.4	99	94	61.9	21	13	8	CL
SS-15	B-17	1.0-2.5	14.4	81	72	52.8	49	25	24	CL
SS-17	B-19	1.0-2.5	26.0	97	93	80.8	69	33	36	CH
SS-20	B-22	3.5-5.0	25.2	95	90	70.6	55	38	17	MH

TABLE 4.2: SUMMARY OF BULK SAMPLE TESTING

SAMPLE ID	BORING ID	DEPTH (FT)	NATURAL MOISTURE CONTENT (%)	OPTIMUM MOISTURE CONTENT (%)	MAXIMUM DRY UNIT WEIGHT (PCF)	PERCENT PASSING #200	USCS SYMBOL
BS-01	B-03	1.0-6.0	20.3	19.1	104.1	71.6	ML
BS-02	B-13	1.0-5.0	19.2	17.5	110.7	61.7	CL

SECTION 5: SUBSURFACE CONDITIONS

5.1 SURFACE MATERIALS, SOIL, AND ROCK

Surface materials encountered in the borings primarily consist of bituminous concrete (asphalt pavement) underlain by aggregate base course (ABC stone). Asphalt was present at the ground surface in all twenty-three (23) locations explored and each location was underlain by ABC stone. Asphalt and ABC stone thicknesses ranged from 2 to 6 inches and 4 to 16 inches, respectively. Topsoil, concrete sidewalks, and concrete curbs and gutters are present within the Project Corridor as well but were not investigated. Pavement sections may vary in thickness and material type within the Project Corridor.

Fill soils are best described as man-placed deposits of materials used to raise or restore grades that typically include soil and rock but can sometimes consist of trash and debris. Fill was identified in four (4) unique borings extending approximately 2.1 to 3.0 feet below the current road surface. Boring B-06 was terminated at 10 feet below the road surface in fill and the total depth of fill is unknown at this location. We assume fill placed around boring B-06 is associated with construction of the culvert over the stream near this location. Recovered samples of fill were either visually-manually or laboratory classified as silty sand (SM), clayey sand (SC), lean clay (CL), and plastic clay (CH). Relative moisture of fill samples recovered indicates moist conditions. Fill likely exists elsewhere within the corridor(s), extending to various depths, in areas not explored.

Residual soils are formed from the in-place weathering of the parent bedrock. Residual soils were identified below surface materials or existing fill in twenty-two (22) borings. Recovered samples of residuum were either laboratory or visually-manually classified as clayey gravel (GC), silty sand (SM), clayey sand (SC), silt (ML), elastic silt (MH), lean clay (CL), or plastic clay (CH). Relative moisture contents of samples recovered indicates dry to moist conditions.

5.2 GROUNDWATER MEASUREMENTS

After each boring was drilled, the boreholes were inspected for the presence of groundwater, cave-in depths were recorded, and boreholes were backfilled with soil cuttings and asphalt cold patch. Immediate groundwater was not observed in any boring. Borehole cave-in depths are shown on the boring logs. Cave-in depths without observed groundwater may indicate the presence of trapped or static groundwater at or just below the level of cave-in especially where wet or saturated soils are noted on the boring logs.

5.3 VISUALIZATION OF SUBSURFACE DATA

The Legend to Soil and Rock Classification and Symbols can be used as a reference for symbols, common definitions, or other terminology used in textual/graphical representation of subsurface data. The Boring Location Plans were created by overlaying the alignments provided to us in CAD format over publicly available georeferenced aerial imagery. Subsurface conditions at each boring were compiled on to individual Test Boring Logs. Notable subsurface conditions are tabulated on the Summary of Subsurface Materials. These documents can be found in Appendix B of this report.

SECTION 6: GEOTECHNICAL RECOMMENDATIONS AND CONSIDERATIONS

A summary of geotechnical issues with the potential to impact design and construction are provided below. Detailed discussions of each of these issues are provided in the sections that follow.

- **Moisture sensitive soils** are present throughout the alignment. These soils are sensitive to damage from exposure to water. Earthmoving operations performed during the wet winter months (generally November to March) or during periods of inclement weather will be difficult and time consuming.
- **Most existing soils** within the proposed alignments will likely be suitable for use as structural fill/backfill provided they are low plasticity, free of debris, free of particles exceeding 4 inches in the longest dimension and are placed at suitable moisture contents.
- **Additional bedding** may be needed for pipes laid near boring B-06 due to the relatively soft consistency of the existing fill soils.

6.1 EARTHMOVING

6.1.1 STREET CUTS

The Contractor should be prepared to saw cut through asphalt in order to excavate new trenches and restore pavements in accordance with applicable City standards. Pavement materials removed from the alignment should be disposed in accordance with applicable local, state, and federal regulations.

6.1.2 ENGINEERING BEHAVIOR OF SOILS

After pavement removal, the onsite soils will be exposed to weather events. Extended periods of rain or intrusion of runoff may damage otherwise suitable site subgrades necessitating repair or remediation. Excessive degradation of fill soils can be mitigated by compacting near-surface lifts at, or wet of, optimum moisture and achieving at least 98 percent compaction.

Earthmoving operations performed during wet, winter months (November to March) will be difficult and time consuming (i.e., expensive) as it will require maintaining dry and stable excavations and drying of backfill soils. Traditional drying operations will be minimally effective during this time. Trench excavation spoils should be protected from rain events by covering with plastic sheeting or tarps.

6.2 SITE EXCAVATION

6.2.1 GENERAL EXCAVATION

Normal sized earth moving equipment such as rubber-tire backhoe and small to medium sized, track-mounted hydraulic excavators should be suitable to excavate the subsurface materials to the proposed depths.

6.2.2 BOULDERS, PWR, AND ROCK EXCAVATION

We do not anticipate difficult excavation for this project; however, the contract documents should define terms for demonstrating rock and for payment of rock excavation. Typically, a late-model, track-mounted hydraulic excavator, such as a CAT 330 or similar, equipped with rock teeth is used to classify rock excavation. Such a machine would likely be needed to remove PWR encountered in trench, pit, and manhole excavations but would likely struggle to remove material yielding blow counts higher than 50/0.3 blows per foot. Boulders larger than 0.75 cy should also be considered trench rock.

6.2.3 EXCAVATION SAFETY

All excavations deeper than 4 feet must conform to applicable sections of the Construction Industry Occupational Safety and Health Administration (OSHA) Standards (29CFR1926). In general, compliance will require either sloping back excavations or the use of trench boxes or temporary shoring systems, or some combination of both. The referenced (OSHA) standard should be reviewed for requirements regarding use of sloping and/or trench boxes. The shoring system(s) should be designed to resist lateral earth stresses from existing soils and any nearby structures, account for any adjacent roadways or other infrastructure, and include any surcharge loading for construction equipment or public traffic. Designs should include an appropriate hydrostatic pressure to account for rises in groundwater levels and/or water infiltrating the retained soils. The selected system should consider this condition and the design should address feasible penetration depth. Subsurface conditions, depth of excavations, and horizontal and vertical space constraints will dictate the design of the shoring system along with other considerations such as local availability of materials and equipment. It is the contractor's responsibility to design and construct stable, temporary excavations as part of their safety procedure in accordance with local, state, and federal safety regulations. Falcon does not assume responsibility for construction safety or the contractor's or other party's compliance with applicable safety or other regulations. In addition to OSHA standards, the Contractor's excavation safety plan should comply with any City standards and NCDOT requirements within an encroachment agreement. These agencies may require the use of active shoring (i.e. no trench boxes) especially in larger excavations.

6.3 FILL SELECTION, PLACEMENT, AND COMPACTION

6.3.1 MATERIAL SELECTION

Most of the soils encountered in the borings meet the requirements for Class II and Class IV soils classifications for bedding and backfilling per City standards. If rock fragments greater than 6 inches are encountered during excavation, they should be separated from the stockpile and removed from the site. If rock fragments between 2 and 6 inches in size are encountered during excavation, they should be separated from the initial backfill soils so that they are not inadvertently placed immediately against the new pipe. This material may be used in general trench backfill after initial backfilling is complete.

6.3.2 PIPE BEDDING

Per City standards/details, ductile iron pipe may be placed on flat trench bottoms with the pipe resting on stable, undisturbed earth. We anticipate that 6 inches of #67 stone may be needed for pipe bedding from station 19+50 to station 22+50 for both water and sewer pipes placed in this area in order to stabilize the relatively soft soil encountered in the nearby boring.

6.3.3 HAUNCHING, INITIAL BACKFILL, AND FINAL BACKFILL

We take no exception to the City standards/details for haunching, initial backfill and final backfill for pipes on this project.

6.3.4 PLACEMENT AND COMPACTION

Fill and backfill operations should be continuously monitored and documented. Per City standards/details, fill and backfill should be placed in 6-inch loose lifts (or thinner). We recommend using hand-guided compaction equipment in close proximity to the pipe so as to avoid damaging pipes. Fill and backfill should be placed and compacted to a uniform, maximum dry density as noted in accordance with the following:

TABLE 6.1: FILL AND BACKFILL REQUIREMENTS

LOCATION	MATERIAL RESTRICTIONS	COMPACTION REQUIREMENTS	MOISTURE REQUIREMENTS
Backfill beneath pavements	Class I, Class II, Class III, and Class IV soils per City standards	95% of maximum dry unit weight per ASTM D698/AASHTO T99	±2% of optimum moisture
Backfill outside of pavements	Class I, Class II, Class III, and Class IV soils per City standards	90% of maximum dry unit weight per ASTM D698/AASHTO T99	±2% of optimum moisture

Soil compaction should be tested in accordance with the sand cone, drive tube, or nuclear density gauge methods at the following minimum frequencies:

TABLE 6.2: MINIMUM COMPACTION TESTING FREQUENCIES

LOCATION	RESTRICTIONS
Trench backfill	One (1) test per lift, per 300 linear feet of backfill placed, per trench, per day

6.4 GROUNDWATER, DEWATERING, DRAINAGE

6.4.1 GROUNDWATER MECHANICS

Groundwater typically flows in the direction of surface water. Groundwater levels will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall. Consequently, excavations performed during the drier months of the year may yield more favorable groundwater conditions.

Groundwater was not observed in any open borehole immediately after drilling; however, trapped or perched groundwater may be present within existing fill soils especially in low-lying areas. The contractor should be prepared to control groundwater percolating into excavations by using mud pumps or submersible pumps.

6.4.2 SITE DRAINAGE, DIVERSION, AND DEWATERING

Most trenches will be excavated through existing pavements. Stormwater runoff may flow toward excavations in some areas. The Contractor should be prepared to sequence operations such that trenches are backfilled prior to rain events and/or maintain slightly sloping backfill to provide drainage toward sump areas. Surface water flows and any seeping groundwater in excavations can be intercepted by digging sump pits and placing submersible pumps surrounded by gravel to dewater excavations.

6.5 PAVEMENT SUBGRADE AND PATCHING

Per City standards/details, 3.0 inches of new surface course asphalt shall be underlain by a minimum of 12 inches of ABC stone. For temporary backfilling prior to paving, the upper 3 inches of the trench may be backfilled with ABC stone level with the surrounding pavement surface or up to 1 inch higher than the surrounding surface. We take no exception to the City's Standard Asphalt Pavement Patch Detail (drawing S-3) for this project.

SECTION 7: ADDITIONAL SERVICES

This Geotechnical Subsurface Investigation is intended to be a design level report. Therefore, as the project progresses through the remaining design phase, bidding, and construction, we would be pleased to provide a cost proposal to you in order to perform any or all of the following additional tasks:

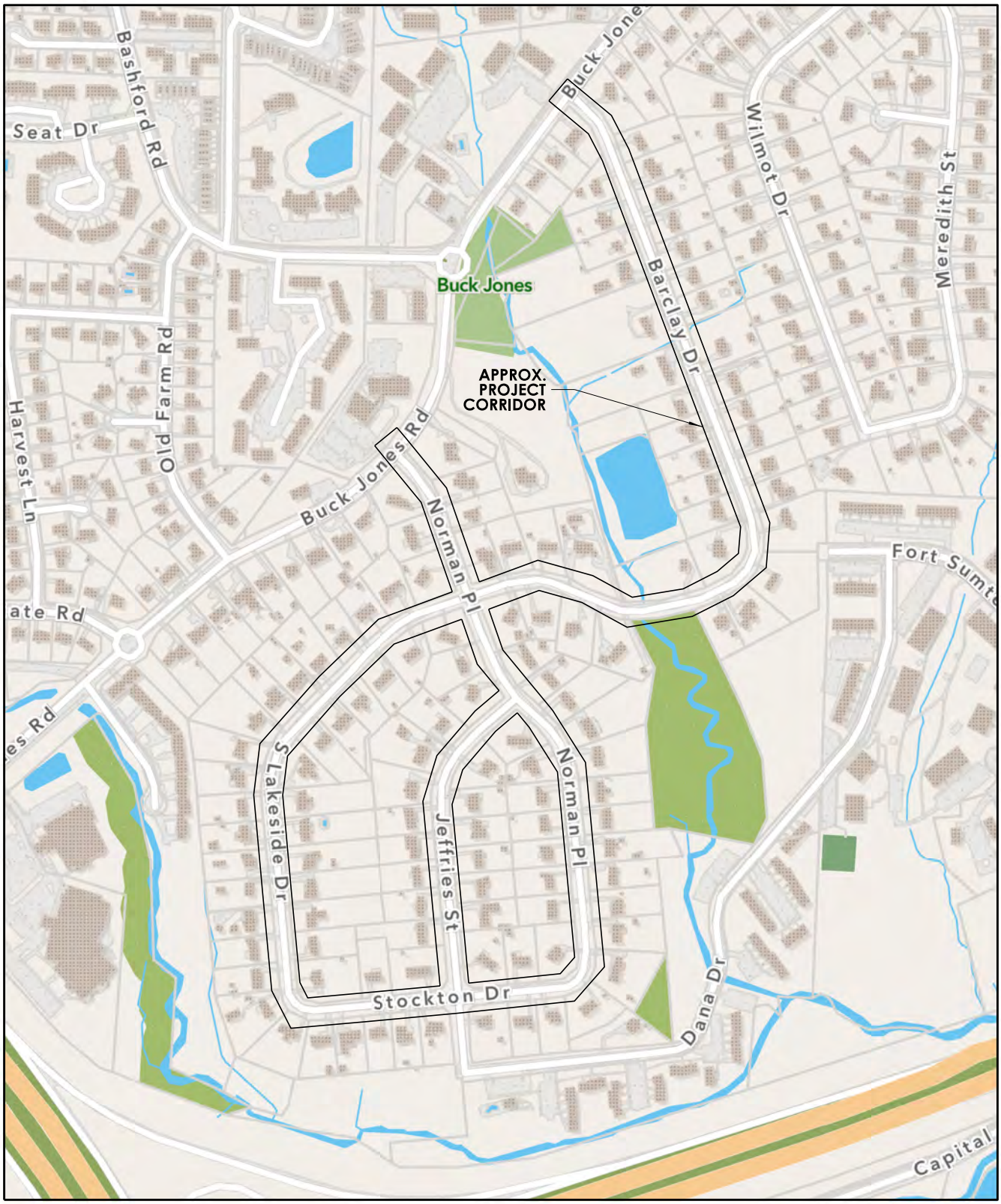
- Provide geotechnical consulting services during the remaining design phase and during bidding.
- Review relevant portions of the plans and specifications for compliance with this report.
- Provide Construction Materials Testing (CMT) services during the construction phase of the project.

SECTION 8: CLOSURE

Recommendations and evaluations provided by Falcon are based on the project description as outlined herein. Modifications of our recommendations and evaluations may be required if there are changes to the proposed project. Recommendations in this report are based on data obtained from our subsurface field exploration and laboratory testing programs. The nature and extent of variations between borings may not become evident until construction, although more insight may be provided by additional field testing data.

Our professional services for this project have been performed in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made. Falcon appreciates this opportunity to have provided you with geotechnical engineering services for this project. If you have any questions regarding this report, please contact our office at 919.871.0800.

APPENDIX A



SHEET: SITE VICINITY MAP		**INVESTIGATED BY:**	RWL
PROJECT NAME: BUCK JONES RD WATERLINE REPLACEMENTS		**DRAWN BY:**	ASP
PROJECT NO.: G22029.00	**HORIZONTAL SCALE** 1"=500'	**CHECKED BY:**	JRH
PROJECT LOCATION: RALEIGH, NORTH CAROLINA		**DATE:**	2022-07-11

FALCON ENGINEERING
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
CARY, NC 27513
PHONE: 919.871.0800
www.falconengineers.com

APPENDIX B

LEGEND TO SOIL AND ROCK CLASSIFICATION AND SYMBOLS

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

SYMBOLS


BITUMINOUS CONCRETE (ASPHALT)


CONCRETE


AGGREGATE BASE COURSE


TOPSOIL


LOW-PLASTICITY ORGANIC SILT/CLAY (OL)


HIGH-PLASTICITY ORGANIC SILT/CLAY (OH)


PEAT (PT)


WELL-GRADED GRAVEL (GW)


POORLY-GRADED GRAVEL (GP)


SILTY GRAVEL (GM)


CLAYEY GRAVEL (GC)


WELL-GRADED SAND (SW)


POORLY-GRADED SAND (SP)


SILTY SAND (SM)


CLAYEY SAND (SC)


SILT (ML)


ELASTIC SILT (MH)


LEAN CLAY (CL)


PLASTIC CLAY (CH)


PARTIALLY WEATHERED ROCK


NON-CRYSTALLINE ROCK


CRYSTALLINE ROCK


COASTAL PAIN SEDIMENTARY ROCK


MAN PLACED FILL OR BACKFILL


ALLUVIAL SOILS


IMMEDIATE WATER LEVEL


STATIC WATER LEVEL

PIPE INVERT ELEVATION


AUGER PROBING


SPT BORING

SPT BORING WITH ROCK CORE


CONE PENETRATION TEST SOUNDING


HAND AUGER + TEST


ROD SOUNDING


TEST PIT

SPT N-VALUE

SS SPLIT SPOON SAMPLE

BS BULK SAMPLE

ST SHELBY TUBE SAMPLE

RS ROCK SAMPLE

FRACTURE SPACING

TERM	TERM
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	STANDARD PENETRATION BLOWS PER FOOT
VERY SOFT	0 TO 2
SOFT	3 TO 4
FIRM	5 TO 8
STIFF	9 TO 15
VERY STIFF	16 TO 30
HARD	31 TO 50
VERY HARD	OVER 50

RELATIVE DENSITY OF COHESIONLESS SOILS

RELATIVE DENSITY	STANDARD PENETRATION BLOWS PER FOOT
VERY LOOSE	0 TO 4
LOOSE	5 TO 10
MEDIUM DENSE	11 TO 30
DENSE	30 TO 50
VERY DENSE	OVER 51

WEATHERING

FRESH	Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer if crystalline.
VERY SLIGHT (V. SLI.)	Rock generally fresh, joints stained, some joints may show thin clay coatings if open, crystals on a broken specimens face shine brightly. Rock rings under hammer blows if of a crystalline nature.
SLIGHT (SLI.)	Rock generally fresh, joints stained and discoloration extends into rock up to 1 inch. Open joints may contain may contain clay. In granitoid rocks some occasional feldspar crystals are dull and discolored. Crystalline rock rings under hammer blows.
MODERATE (MOD.)	Significant portions of rock shows discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored, some show clay. Rock has dull sound under hammer blows and show significant loss of strength as compared with fresh rock.
MODERATE SEVERE (MOD. SEV.)	All rocks except quartz discolored or stained. In granitoid rocks, all feldspars and discolored and a majority show kaolinization. Rocks shows severe loss of strength and can be excavated with a geologist's pick. Rock gives "clunk" sonud when struck. If tested would yield spt refusal.
SEVERE (SEV.)	All rocks except quartz discolored or stained. Rock fabric clear and evident but reduced in strength to strong soil. In granitoid rocks all feldspars are kaolinized to some extent. Some fragments of strong rock usually remain. If tested, yields spt n-values > 100 bpf.
VERY SEVERE (V. SEV.)	All rocks except quartz discolored or stained. Rock fabric elements are discernible but the mass is effectively reduced to soil status, with only fragments of strong rock remaining. Saprolite is an example of rock weathered to a degree such that only minor vestiges of the original rock fabric remain. If tested, yields spt n-values < 100 bpf.
COMPLETE	Rock reduced to soil. Rock fabric not discernible or discernible only in small and scattered concentrations. Quartz may be present as dikes or stringers. Saprolite is also an example.

ROCK HARDNESS

VERY HARD	Cannot be scratched by knife or sharp pick. Breaking of hand specimens requires several hard blows of the geologist's pick.
HARD	Can be scratched by knife or pick only with difficulty. Hard hammer blows required to detach hand specimens.
MODERATELY HARD	Can be scratched by knife or pick. Gouges or grooves to 0.25 inches deep can be excavated by hard blow of a geologist's pick. Hand specimens can be detached with moderate blows.
MEDIUM HARD	Can be grooved or gouged 0.5 inches deep by firm pressure of knife or pick point. Can be excavated in small chips to pieces 1 inch maximum size by hard blows of the point of a geologist's pick.
SOFT	Can be grooved or gouged readily by knife or pick. Can be excavated in fragments from chips to several inches in size by moderate blows of a pick point. Small, then pieces can be broken by finger pressure.
VERY SOFT	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1 inch or more in thickness can be broken by finger pressure. Can be scratched readily by fingernail.

ROCK DEFINITION

Hard rock is non-coastal plain material that when tested, would yield spt refusal. An inferred rock line indicates the level at which non-coastal plain material would yield SPT refusal. SPTrefusal is penetration by a split-spoon sampler equal to or less than 0.1 foot per 50 blows. In non-coastal plain material, the transistion between soil and rock materials are typically divided as follows:

PARTIALLY WEATHERED ROCK (PWR)		Non-coastal plain material that yields SPT N-values > 100 blows per foot.
CRYSTALLINE ROCK (CR)		Fine to coarse grained, igneous and metaphorphic rock that would yield SPT refusal if tested. Rock type includes granite, gniess, gabbro, schist, etc.
NON-CRYSTALLINE ROCK (NCR)		Fine to coarse grained, metamorphic and non-coastal plain sedimentary rock that would yield SPT refusal if tested. Rock type includes phyllite, slate, sandstone, etc.
COASTAL PLAIN SEDIMENTARY ROCK (CP)		Coastal plain sediments cemented tinto rock but may not yield SPT refusal. Rocky type includes limestone, sandstone, cemeneted shell beds, etc.

ABBREVIATIONS

ABC	Aggregate base course	FIAD	Filled immediately after drilling	RES	Residuum
ALLUV	Allvuium	FOSS	Fossiliferous	SAP	Saprolitic
AR	Auger refusal	FRAC	Fractured	S	Soft
BC	Bituminous concrete (asphalt)	FRAGS	Fragments	SAT	Saturated
BLDR	Boulder	GR	Gravel	SD	Sand
BPF	Blows per foot	GS	Specific gravity	SDY	Sandy
BT	Boring terminated	GW	Groundwater	SED	Sediments
CALC	Calcareous	HR	Hard rock	SL	Silt, silty
CI	Caved-in	MED	Medium	SLI	Slightly
CL	Clay	MIC	Micaceous	SPT	Standard penetration test
CLY	Clayey	MOT	Mottled	SWR	Soft weathered rock
COB	Cobble	NS	No sample taken	TCR	Tricone refusal
CSE	Coarse	ORG	Organic	TS	Topsoil
DPT	Dynamic penetration test	PP	Pocket penetrometer	VST	Vane shear test
EST	Estimated	PWR	Partially weathered rock	V	Very
F	Fine	REF	Refusal	W/	With

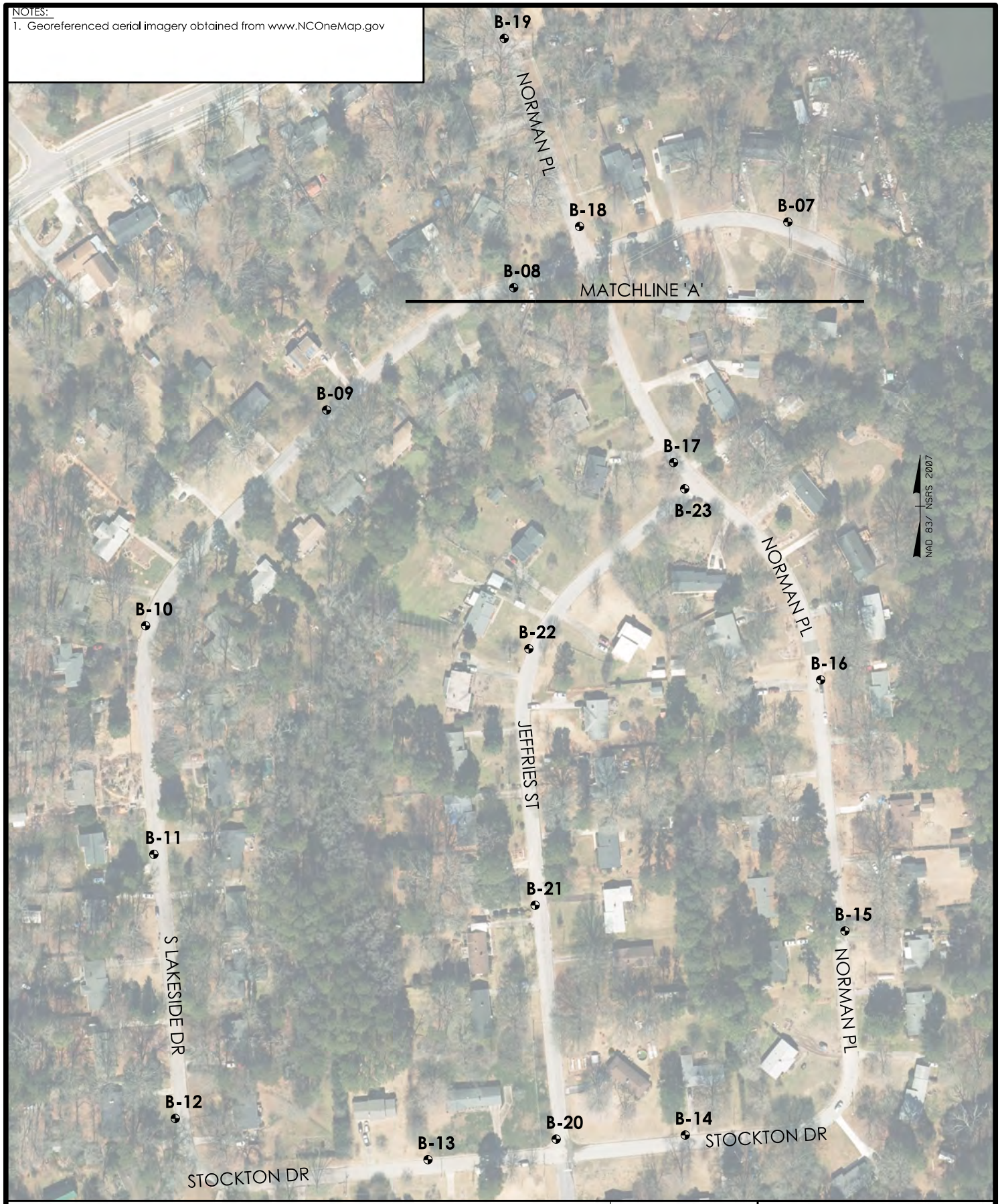
TERMS AND DEFINITIONS

- ALLUVIUM: soils which have been transported and deposited by water.
- AQUIFER: a water bearing formation or strata.
- ARENACEOUS: applied to rocks that have been derived from sand or that contain sand. Argillaceous: applied to all rocks or substances composed of clay minerals, or having a notable proportion of clay in their composition, as shale/slate/etc.
- ARTESIAN: groundwater that is under sufficient pressure to rise above the level at which it is encountered, but which does not necessarily rise to or above the ground surface
- CALCAREOUS: soils which contain appreciable amounts of calcium carbonate.
- COLLUVIUM: rock fragments mixed with soil deposited by gravity on a slope or bottom of a slope.
- CORE RECOVERY: total length of all material recovered in the core barrel divided by total length of core run and expressed as a percentage.
- DIKE: a tabular body of igneous rock that cuts across the structure of adjacent rocks or cuts massive rock.
- DIP: the angle at which a stratum or any planar feature is inclined from the horizontal.
- DIP DIRECTION: the direction or bearing of the horizontal trace of the line of dip, measured clockwise from north.
- FAULT: a fracture or fracture zone along which there has been displacement of the sides relative to one another parallel to the fracture.
- FILL: man-made deposits of natural soils or rock products and waste materials.
- FISSLE: a property of splitting along closely spaced parallel planes.
- FLOAT: rock fragments on surface near their original position and dislodged from parent material.
- FLOOD PLAIN: land bordering a stream, built of sediments deposited by the stream.
- FORMATION: a mappable geologic unit that can be recognized and traced in the field.
- JOINT: fracture in rock along which no appreciable movement has occurred.
- LEDGE: a shelf-like ridge or projection of rock whose thickness is small compared to its lateral extent.
- LENS: a body of soil or rock that thins out in one or more directions.
- MOTTLED: irregularly marked with spots of different colors. Mottling in soils usually indicates poor aeration and lack of good drainage.
- PERCHED WATER: water maintained above the normal groundwater level by the presence of an intervening impervious stratum.
- RESIDUUM: soil formed in place by weathering of the parent rock.
- ROCK QUALITY DESIGNATION (RQD): a measure of rock quality described by: total length of rock segments equal to or greater than 4 inches divided by the total length of core run and expressed as a percentage.
- SAPROLITE: residual soil which retains the relic structure or fabric of the parent rock.
- SILL: an intrusive body of igneous rock of approximately uniform thickness and relatively thin compared with its lateral extend, which has been emplaced parallel to the bedding or schistosity of the intruded rocks.
- SLICKENSIDE: polished and striated surface that results from friction along a fault or slip plane.
- STANDARD PENETRATION TEST (SPT): number of blows of a 140 pound hammer falling 30 inches required to produce a penetration of 1 foot (N-value or blows per foot) into soil with a 2 in outside diameter split spoon sampler. SPT refusal is less than 0.1 foot penetration with 50 blows.
- STRATA CORE RECOVERY: total length of strata material recovered divided by total length of stratum and expressed as a percentage.
- STRATA ROCK QUALITY DESIGNATION: a measure of rock quality described by total length of rock segments within a stratum equal to or greater than 4 inches divided by the total length of strata and expressed as a percentage.
- STRATUM: a section of a formation consisting of the same kind of material throughout.
- TOPSOIL: surface soils usually containing organic material.

NOTES:
1. Georeferenced aerial imagery obtained from www.NCOneMap.gov

SHEET: BORING LOCATION PLAN			**INVESTIGATED BY:** JH/RL	FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 CARY, NC 27513 PHONE: 919.871.0800 www.falconengineers.com
PROJECT NAME: BUCK JONES RD WATERLINE REPLACEMENTS			**DRAWN BY:** ASP	
PROJECT NO.: G22029.00	**HORIZONTAL SCALE**	1"=200'	**CHECKED BY:** JRH	
PROJECT LOCATION: RALEIGH, NORTH CAROLINA			**DATE:** 2022-07-14	

NOTES:
1. Georeferenced aerial imagery obtained from www.NCOneMap.gov



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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-01	**BORING LOCATION** 0+68 1 ft Right 1			**DEPTH**	
ELEVATION (ft) 416.4	**NORTHING (ft)** 738420	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/28/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079826	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/28/2022	**DATE COMPLETED** 6/28/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									416.4		0.0
									416.3	**BITUMINOUS CONCRETE** 2 inches	0.2
	1.0								415.7	**AGGREGATE BASE COURSE** 7 inches	0.8
415		3	5	7	12	15.4%	SS-01			**RESIDUUM** Red, SILT (ML) with Mica	
	3.5										
		5	5	5	10	Dry					
	6.0								410.9		5.5
410		2	2	7	9	Moist				Red - Orange, Sandy, SILT (ML) with Mica	
	8.5										
		2	4	5	9	Moist			406.4		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
405											
400											
395											

Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Lane, R.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-02	**BORING LOCATION** 4+40 0 ft 1			**DEPTH**	
ELEVATION (ft) 425.0	**NORTHING (ft)** 738104	**DRILL MACHINE**		**DATE**	6/13/2022
TOTAL DEPTH (ft) 8.0	**EASTING (ft)** 2080004	**DRILLER**		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/13/2022	**DATE COMPLETED** 6/13/2022	**DRILL METHOD** Hand Auger		**HAMMER TYPE**	15 lb Hammer

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 1.75 in	1.75 in	1.75 in	AVERAGE BLOWS, Nc (0 5 10 15 20 25)	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)
									425.0		0.0
									424.8	**BITUMINOUS CONCRETE** 2 inches	0.2
									424.2	**AGGREGATE BASE COURSE** 8 inches	0.8
	2.0	13	18	15	16	24.7%	S-02			**RESIDUUM** Red, ELASTIC SILT (MH) with Mica	
	4.0	14	15	16	15	Dry					
420	6.0	13	15	17	16	Dry			419.0		6.0
										Red, Sandy, SILT (ML) with Mica	
									417.0		8.0
										Hand Auger Terminated at 8.0 feet Below Current Ground Surface in RESIDUUM	
415											
410											
405											

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Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-03	**BORING LOCATION** 8+39 3 ft Left 1			**DEPTH**	
ELEVATION (ft) 410.2	**NORTHING (ft)** 737730	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/28/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2080143	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/28/2022	**DATE COMPLETED** 6/28/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									410.2		0.0
									409.9	**BITUMINOUS CONCRETE** 3 inches	0.3
	1.1								409.1	**AGGREGATE BASE COURSE** 9 inches	1.1
		3	4	7	11	Dry				**RESIDUUM** Red and Gray, Sandy, SILT (ML) with Mica	
	3.5										
		4	5	6	11	Moist	BS-01				
405	6.0										
		2	4	5	9	Moist					
	8.5								402.2		8.0
		3	8	11	19	Moist				Red and Black, Sandy, SILT (ML) with Mica	
									400.2		10.0
400										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
395											
390											

Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina	**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR**	**STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements			**HOLE**	Dry	FIAD
BORING NO. B-04	**BORING LOCATION** 12+32 1 ft Right 1		**DEPTH**		
ELEVATION (ft) 410.5	**NORTHING (ft)** 737363	**DRILL MACHINE** CME 55 TRUCK	**DATE**	6/28/2022	
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2080284	**DRILLER** Campbell, T.	**SURFACE WATER DEPTH (ft)**	N/A	
DATE STARTED 6/28/2022	**DATE COMPLETED** 6/28/2022	**DRILL METHOD** Hollow Augers	**HAMMER TYPE** Automatic		

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									410.5		0.0
									410.4	**BITUMINOUS CONCRETE** 2 inches	0.2
									409.7	**AGGREGATE BASE COURSE** 6 inches	0.8
410	1.0	3	5	8	13	23.4%	SS-03			**RESIDUUM** Red, Sandy, SILT (ML) with Rock Fragments, Mica	
	3.5	3	6	7	13	Moist			407.5	Red - Brown, Sandy, LEAN CLAY (CL) with Mica	3.0
405	6.0	3	4	8	12	Moist			405.0	Red - Brown and Gray, Sandy, SILT (ML) with Mica	5.5
	8.5	3	5	6	11	Moist			400.5		10.0
400										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
395											
390											

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Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-05	**BORING LOCATION** 16+49 1 ft Left 1			**DEPTH**	
ELEVATION (ft) 404.0	**NORTHING (ft)** 736974	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/28/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2080432	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/28/2022	**DATE COMPLETED** 6/28/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									404.0		0.0
									403.7	**BITUMINOUS CONCRETE** 3 inches	0.3
	1.0								403.0	**AGGREGATE BASE COURSE** 8 inches	1.0
		3	4	8	12	Moist				**RESIDUUM** Red, LEAN CLAY (CL) with Rock Fragments, Mica	
	3.5										
400		6	6	8	14	16.2%	SS-04		399.5		4.5
										Tan - Brown, Sandy, SILT (ML) with Mica	
	6.0										
		4	6	9	15	Moist					
	8.5										
395		5	9	12	21	Moist			394.0		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
390											
385											
380											

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PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-06	**BORING LOCATION** 21+68 20 ft Left 1			**DEPTH**	
ELEVATION (ft) 382.3	**NORTHING (ft)** 736689	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/28/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2080104	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/28/2022	**DATE COMPLETED** 6/28/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									382.3		0.0
									381.9	**BITUMINOUS CONCRETE** 5 inches	0.4
										AGGREGATE BASE COURSE 15 inches	
	1.7								380.6		1.7
380		2	2	3	5	Moist	SS-05			**FILL** Brown and Gray, LEAN CLAY (CL) with Rock Fragments	
	3.5								379.0		3.3
		5	7	10	17	Moist				Brown and Gray, CLAYEY SAND (SC) with Rock Fragments	
	6.0								376.8		5.5
		1	1	2		Moist				Brown and Gray, Sandy, LEAN CLAY (CL) with Rock Fragments	
375					3					**Cave-in**	
	8.5										
		1	1	2	3	Moist			372.3		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
370											
365											
360											

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PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-07	**BORING LOCATION** 25+52 3 ft Left 1			**DEPTH**	
ELEVATION (ft) 414.9	**NORTHING (ft)** 736771	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/28/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079755	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/28/2022	**DATE COMPLETED** 6/28/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									414.9		0.0
									414.6	**BITUMINOUS CONCRETE** 3 inches	0.3
	1.0								414.2	**AGGREGATE BASE COURSE** 5 inches	0.7
		7	11	10	21	Moist				**RESIDUUM** Red - Brown and Tan, Sandy, SILT (ML) with Mica, Rock Fragments	
	3.5										
		3	6	8	14	16.7%	SS-06				
410									409.4		5.5
	6.0									Red - Brown and Tan, SILTY SAND (SM) with Mica, Rock Fragments	
		6	10	12	22	Moist					
	8.5									**Cave-in**	
		5	9	12	21	Moist					
405									404.9		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
400											
395											

Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-08	**BORING LOCATION** 30+03 2 ft Left 1			**DEPTH**	
ELEVATION (ft) 429.5	**NORTHING (ft)** 736669	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/28/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079328	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/28/2022	**DATE COMPLETED** 6/28/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. / DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION / GROUNDWATER READINGS	Depth (ft)
									429.5		0.0
									429.1	**BITUMINOUS CONCRETE** 5 inches	0.4
	1.0								428.6	**AGGREGATE BASE COURSE** 6 inches	0.9
		4	4	5	9	15.8%	SS-07			**RESIDUUM** Red, CLAYEY SAND (SC) with Mica, Rock Fragments	
	3.5								426.5		3.0
		4	8	12	20	Moist				Red, Sandy, SILT (ML) with Mica, Quartz Fragments	
425	6.0										
		4	6	6	12	Moist					
	8.5										
		4	5	8	13	Moist			419.5		10.0
420										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
415											
410											

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Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-09	**BORING LOCATION** 33+60 1 ft Left 1			**DEPTH**	
ELEVATION (ft) 411.5	**NORTHING (ft)** 736479	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/28/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079037	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/28/2022	**DATE COMPLETED** 6/28/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									411.5		0.0
	1.0								411.2	**BITUMINOUS CONCRETE** 3 inches	0.3
									410.7	**AGGREGATE BASE COURSE** 6 inches	0.8
410		2	3	3	6	Moist			409.5	**RESIDUUM** Brown, Sandy, LEAN CLAY (CL) with Rock Fragments	2.0
	3.5								408.5	Red, LEAN CLAY (CL)	3.0
		4	8	16	24	10.2%	SS-08			Red Tan and Gray, Sandy, SILT (ML) with Mica, Quartz Fragments	
	6.0										
405		10	16	20	36	Moist				Cave-in	
	8.5										
		10	13	17	30	Moist			401.5		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
400											
395											
390											

Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-10	**BORING LOCATION** 38+03 3 ft Right 1			**DEPTH**	
ELEVATION (ft) 394.2	**NORTHING (ft)** 736143	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/28/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2078755	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/28/2022	**DATE COMPLETED** 6/28/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									394.2		0.0
	1.0								393.7	**BITUMINOUS CONCRETE** 6 inches	0.5
									393.4		0.8
		4	5	6						**AGGREGATE BASE COURSE** 3 inches	
					11	29.4%	SS-09			**RESIDUUM** Brown, Sandy, ELASTIC SILT (MH) trace Rock Fragments	
	3.5								391.2		3.0
		4	8	8						Red - Brown, Sandy, SILT (ML) with Mica, Rock Fragments	
390					16	Moist					
	6.0										
		3	6	6							
					12	Moist					
	8.5									**Cave-in**	
		3	4	6							
385						Moist					
					10				384.2		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
380											
375											

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-11	**BORING LOCATION** 41+61 2 ft Right 1			**DEPTH**	
ELEVATION (ft) 381.1	**NORTHING (ft)** 735787	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/29/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2078768	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/29/2022	**DATE COMPLETED** 6/29/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									381.1		0.0
									380.7	**BITUMINOUS CONCRETE** 5 inches	0.4
									380.2	**AGGREGATE BASE COURSE** 6 inches	0.9
380	1.0	3	15	10	25	Moist				**FILL** Brown and Gray, Sandy, PLASTIC CLAY (CH) with Gravel	
	3.5	3	5	6	11	29.3%	SS-10		378.1	**RESIDUUM** Tan, SILT (ML) trace Mica	3.0
375	6.0	4	4	7	11	Moist				**Cave-in**	
	8.5	4	5	6	11	Moist			371.1		10.0
370										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
365											
360											

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-12	**BORING LOCATION** 45+73 3 ft Left 1			**DEPTH**	
ELEVATION (ft) 373.7	**NORTHING (ft)** 735376	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/29/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2078801	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/29/2022	**DATE COMPLETED** 6/29/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									373.7		0.0
									373.3	**BITUMINOUS CONCRETE** 5 inches	0.4
	1.0								372.9	**AGGREGATE BASE COURSE** 5 inches	0.8
		4	4	7	11	13.1%	SS-11			**RESIDUUM** Tan, LEAN CLAY (CL)	
	3.5								370.7	Tan, SILTY SAND (SM)	3.0
370		4	23	33	56	Dry					
	6.0								368.2	Brown, Sandy, SILT (ML)	5.5
		3	3	5	8	Moist				Cave-in	
	8.5										
365		4	4	8	12	Dry			363.7		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
360											
355											
350											

Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-13	**BORING LOCATION** 50+57 18 ft Right 1			**DEPTH**	
ELEVATION (ft) 376.1	**NORTHING (ft)** 735312	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/29/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079195	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/29/2022	**DATE COMPLETED** 6/29/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									376.1		0.0
									375.8	**BITUMINOUS CONCRETE** 3 inches	0.3
									375.4	**AGGREGATE BASE COURSE** 5 inches	0.7
375	1.0	2	4	8	12	19.2%	BS-02			**RESIDUUM** Red, LEAN CLAY (CL)	
	3.5	4	9	12	21	Moist			373.1	Red Tan and Gray, Sandy, LEAN CLAY (CL)	3.0
370	6.0	5	5	6	11	Moist				**Cave-in**	
	8.5	4	5	7	12	Dry			368.1	Gray, Sandy, SILT (ML)	8.0
									366.1	Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	10.0
365											
360											
355											

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina	**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR**	**STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements			**HOLE**	Dry	FIAD
BORING NO. B-14	**BORING LOCATION** 22+98 20 ft Left 2		**DEPTH**		
ELEVATION (ft) 382.9	**NORTHING (ft)** 735351	**DRILL MACHINE** CME 55 TRUCK	**DATE**	6/29/2022	
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079595	**DRILLER** Campbell, T.	**SURFACE WATER DEPTH (ft)**	N/A	
DATE STARTED 6/29/2022	**DATE COMPLETED** 6/29/2022	**DRILL METHOD** Hollow Augers	**HAMMER TYPE** Automatic		

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									382.9		0.0
									382.6	**BITUMINOUS CONCRETE** 3 inches	0.3
	1.0								382.3	**AGGREGATE BASE COURSE** 3 inches	0.6
		3	5	7	12	Moist				**RESIDUUM** Red, Sandy, LEAN CLAY (CL) with Rock Fragments	
380	3.5	8	11	14	25	15.6%	SS-12				
	6.0	3	9	17	26	Dry			377.4	Red - Orange and Brown, Sandy, SILT (ML) with Mica, Rock Fragments	5.5
375	8.5									**Cave-in**	
		6	11	19	30	Dry			372.9		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
370											
365											
360											

Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina	**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR**	**STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements			**HOLE**	Dry	FIAD
BORING NO. B-15	**BORING LOCATION** 17+60 1 ft Right 2		**DEPTH**		
ELEVATION (ft) 389.9	**NORTHING (ft)** 735668	**DRILL MACHINE** CME 55 TRUCK	**DATE**	6/29/2022	
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079844	**DRILLER** Campbell, T.	**SURFACE WATER DEPTH (ft)**	N/A	
DATE STARTED 6/29/2022	**DATE COMPLETED** 6/29/2022	**DRILL METHOD** Hollow Augers	**HAMMER TYPE** Automatic		

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									389.9		0.0
									389.5	**BITUMINOUS CONCRETE** 5 inches	0.4
									389.2	**AGGREGATE BASE COURSE** 4 inches	0.7
	1.0	4	5	5	10	12.4%	SS-13			**RESIDUUM** Gray to Tan, Sandy, LEAN CLAY (CL) trace Rock Fragments	
	3.5	4	4	9	13	Moist					
385									384.4		5.5
	6.0	4	6	9	15	Moist				Red - Tan and Gray, LEAN CLAY (CL)	
										Cave-in	
	8.5	3	5	7		Dry			381.9		8.0
										Red - Tan and Gray, Sandy, SILT (ML)	
380					12				379.9		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
375											
370											

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-16	**BORING LOCATION** 13+68 0 ft Left 2			**DEPTH**	
ELEVATION (ft) 408.3	**NORTHING (ft)** 736059	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/29/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079806	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/29/2022	**DATE COMPLETED** 6/29/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									408.3		0.0
									408.0	**BITUMINOUS CONCRETE** 4 inches	0.3
									407.7	**AGGREGATE BASE COURSE** 4 inches	0.6
	1.0	3	4	6	10	Moist				**RESIDUUM** Brown, Sandy, LEAN CLAY (CL)	
405	3.5	6	22	17	39	8.6%	SS-14		405.3	Red, CLAYEY GRAVEL (GC)	3.0
	6.0	15	8	10	18	Dry			402.8	Red, Sandy, LEAN CLAY (CL) with Rock Fragments	5.5
400	8.5	3	7	9	16	Dry			400.3	Red, SILT (ML) Saprolitic	8.0
									398.3	Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	10.0

Cave-in

395

390

385

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Hill, J.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-17	**BORING LOCATION** 9+38 1 ft Right 2			**DEPTH**	
ELEVATION (ft) 420.6	**NORTHING (ft)** 736397	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/29/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079577	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/29/2022	**DATE COMPLETED** 6/29/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									420.6		0.0
420									420.3	**BITUMINOUS CONCRETE** 4 inches	0.3
	1.0								419.9	**AGGREGATE BASE COURSE** 4 inches	0.7
		6	7	12	19	14.4%	SS-15			**RESIDUUM** Red, Sandy, LEAN CLAY (CL) with Quartz Fragments	
	3.5										
		3	11	34	45	Moist					
415	6.0								415.1	Red, Sandy, SILT (ML) with Quartz Fragments	5.5
		4	8	11	19	Dry				Cave-in	
	8.5										
		4	8	12	20	Dry			410.6		10.0
410										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
405											
400											

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Lane, R.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-18	**BORING LOCATION** 5+36 1 ft Left 2			**DEPTH**	
ELEVATION (ft) 433.0	**NORTHING (ft)** 736764	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/29/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079430	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/29/2022	**DATE COMPLETED** 6/29/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									433.0		0.0
									432.7	**BITUMINOUS CONCRETE** 4 inches	0.3
									432.4	**AGGREGATE BASE COURSE** 4 inches	0.6
	1.0									**RESIDUUM** Red, Sandy, LEAN CLAY (CL)	
		4	9	11	20	Moist					
430	3.5										
		3	6	6	12	17.3%	SS-16				
	6.0									Cave-in	
		5	9	11	20	Dry			427.5		5.5
425	8.5									Tan Orange and White, Sandy, SILT (ML) Saprolitic	
		5	9	14	23	Dry			423.0		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
420											
415											
410											

Vertical Scale: 1"=3'

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PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Lane, R.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-19	**BORING LOCATION** 2+20 9 ft Left 2			**DEPTH**	
ELEVATION (ft) 438.2	**NORTHING (ft)** 737056	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/29/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079313	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/29/2022	**DATE COMPLETED** 6/29/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									438.2		0.0
									437.7	**BITUMINOUS CONCRETE** 6 inches	0.5
									437.4	**AGGREGATE BASE COURSE** 4 inches	0.8
	1.0	5	8	12	20	26.0%	SS-17			**RESIDUUM** Red, PLASTIC CLAY (CH) with Sand	
435	3.5	8	8	8	16	Dry			435.2	Tan to White, Sandy, SILT (ML) Saprolitic	3.0
	6.0	2	4	5	9	Dry			432.7	Tan, Sandy, SILT (ML) **Cave-in**	5.5
430	8.5	5	6	8	14	Dry			428.2	Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	10.0
425											
420											
415											

Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Lane, R.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-20	**BORING LOCATION** 11+53 1 ft Right 3			**DEPTH**	
ELEVATION (ft) 378.9	**NORTHING (ft)** 735344	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/29/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079394	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/29/2022	**DATE COMPLETED** 6/29/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									378.9		0.0
									378.5	**BITUMINOUS CONCRETE** 5 inches	0.4
	1.0								378.1	**AGGREGATE BASE COURSE** 5 inches	0.8
		5	3	3		Moist				**FILL** Gray, SILTY SAND (SM)	
	3.5				6				375.9		3.0
375		7	8	10	18	23.6%	SS-18			**RESIDUUM** Red, Sandy, LEAN CLAY (CL)	
	6.0								373.4		5.5
		4	6	9		Dry				Tan and Orange, Sandy, SILT (ML) with Mica, Rock Fragments, Saprolitic	
					15					**Cave-in**	
	8.5										
370		5	10	11	21	Dry			368.9		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
365											
360											
355											

Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Lane, R.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-21	**BORING LOCATION** 7+87 2 ft Right 3			**DEPTH**	
ELEVATION (ft) 388.8	**NORTHING (ft)** 735708	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/30/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079361	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/30/2022	**DATE COMPLETED** 6/30/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									388.8		0.0
									388.5	**BITUMINOUS CONCRETE** 4 inches	0.3
	1.0								388.1	**AGGREGATE BASE COURSE** 4 inches	0.7
		2	3	4	7	Moist			386.8	**FILL** Gray and Tan, Sandy, LEAN CLAY (CL)	2.0
	3.5									**RESIDUUM** Tan - Orange, Sandy, LEAN CLAY (CL)	
385		2	3	5	8	16.6%	SS-19				
	6.0								383.3		5.5
		3	5	10	15	Moist				Red Orange and Tan, Sandy, LEAN CLAY (CL) trace Rock Fragments	
	8.5								380.8	**Cave-in**	8.0
380		3	5	7	12	Dry				Red Orange and Tan, Sandy, SILT (ML) trace Rock Fragments	
									378.8		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
375											
370											
365											

Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina		**LOGGED BY** Lane, R.	**GROUND WATER**	**0 HOUR** / **STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements				**HOLE**	Dry / FIAD
BORING NO. B-22	**BORING LOCATION** 3+86 3 ft Left 3			**DEPTH**	
ELEVATION (ft) 403.0	**NORTHING (ft)** 736107	**DRILL MACHINE** CME 55 TRUCK		**DATE**	6/30/2022
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079352	**DRILLER** Campbell, T.		**SURFACE WATER DEPTH (ft)**	N/A
DATE STARTED 6/30/2022	**DATE COMPLETED** 6/30/2022	**DRILL METHOD** Hollow Augers		**HAMMER TYPE**	Automatic

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									403.0		0.0
									402.7	**BITUMINOUS CONCRETE** 4 inches	0.3
									402.4	**AGGREGATE BASE COURSE** 4 inches	0.6
	1.0	6	7	8	15	Moist				**RESIDUUM** Red and Orange, Sandy, ELASTIC SILT (MH) with Rock Fragments	
400	3.5	4	9	13	22	25.2%	SS-20				
	6.0	4	9	11	20	Dry				Cave-in	
395	8.5	6	28	29	57	Dry			395.0	White and Red, CLAYEY GRAVEL (GC)	8.0
									393.0	Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	10.0
390											
385											
380											

01 TEST BORING LOG G22029.00.GPJ FALCON FORMAT.GDT 7/14/22

Vertical Scale: 1"=3'

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TEST BORING LOG

PROJECT NO. G22029.00	**PROJECT LOCATION** Raleigh, North Carolina	**LOGGED BY** Lane, R.	**GROUND WATER**	**0 HOUR**	**STATIC**
PROJECT NAME Buck Jones Rd Waterline Replacements			**HOLE**	Dry	FIAD
BORING NO. B-23	**BORING LOCATION** 0+33 2 ft Right 3		**DEPTH**		
ELEVATION (ft) 418.9	**NORTHING (ft)** 736356	**DRILL MACHINE** CME 55 TRUCK	**DATE**	6/30/2022	
TOTAL DEPTH (ft) 10.0	**EASTING (ft)** 2079594	**DRILLER** Campbell, T.	**SURFACE WATER DEPTH (ft)**	N/A	
DATE STARTED 6/30/2022	**DATE COMPLETED** 6/30/2022	**DRILL METHOD** Hollow Augers	**HAMMER TYPE** Automatic		

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	0.5 ft	BLOWS PER FOOT 0 20 40 60 80 100	MOISTURE	LAB NO. DEPTH	LOG	Elev. (ft)	SOIL AND ROCK DESCRIPTION GROUNDWATER READINGS	Depth (ft)
									418.9		0.0
									418.6	**BITUMINOUS CONCRETE** 4 inches	0.3
									418.2	**AGGREGATE BASE COURSE** 5 inches	0.7
	1.0	4	6	9	15	28.8%	SS-21			**RESIDUUM** Red, Sandy, LEAN CLAY (CL)	
	3.5	5	9	14	23	Dry			415.9	Red - Orange, LEAN CLAY (CL) Saprolitic	3.0
415	6.0	3	7	9	16	Dry			413.4	Red - Orange, Sandy, SILT (ML) with Mica, Saprolitic	5.5
	8.5	4	6	8	14	Dry				**Cave-in**	
410									408.9		10.0
										Boring Terminated at 10.0 feet Below Current Ground Surface in RESIDUUM	
405											
400											
395											

Vertical Scale: 1"=3'

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SUMMARY OF SUBSURFACE MATERIALS

Project No.: G22029.00

Project Name: Buck Jones Rd Waterline Replacements

Project Location: Raleigh, North Carolina

Boring			Surface Thickness (in)				Fill Thickness (ft)	Alluvium Thickness (ft)	Coastal Deposit		Residuum		PWR		Rock		Groundwater			
ID	Depth	Elev.	Asphalt		Agg. Base				Depth (ft)	Elev. (ft)	Depth (ft)	Elev. (ft)	Depth (ft)	Elev. (ft)	Depth (ft)	Elev. (ft)	0-hour		24-hour	
																	Depth	Elev.	Depth	Elev.
B-01	10.0	415.6	2		7						**0.8**	**414.8**					Dry	---	FIAD	---
B-02	8.0	425.0	2		8						**0.8**	**424.2**					Dry	---	FIAD	---
B-03	10.0	410.0	3		10						**1.1**	**408.9**					Dry	---	FIAD	---
B-04	10.0	410.4	2		8						**0.8**	**409.6**					Dry	---	FIAD	---
B-05	10.0	403.9	3		9						**1.0**	**402.9**					Dry	---	FIAD	---
B-06	10.0	382.6	5		16		8.3										Dry	---	FIAD	---
B-07	10.0	412.8	4		5						**0.7**	**412.1**					Dry	---	FIAD	---
B-08	10.0	430.8	5		6						**0.9**	**429.9**					Dry	---	FIAD	---
B-09	10.0	411.7	4		6						**0.8**	**410.9**					Dry	---	FIAD	---
B-10	10.0	395.1	6		4						**0.8**	**394.3**					Dry	---	FIAD	---
B-11	10.0	381.0	5		6		2.1				**3.0**	**378.0**					Dry	---	FIAD	---
B-12	10.0	373.8	5		5						**0.8**	**373.0**					Dry	---	FIAD	---
B-13	10.0	376.2	4		5						**0.7**	**375.5**					Dry	---	FIAD	---
B-14	10.0	383.0	4		4						**0.6**	**382.4**					Dry	---	FIAD	---
B-15	10.0	389.8	5		4						**0.7**	**389.1**					Dry	---	FIAD	---
B-16	10.0	408.3	4		4						**0.6**	**407.7**					Dry	---	FIAD	---
B-17	10.0	420.3	4		5						**0.7**	**419.6**					Dry	---	FIAD	---
B-18	10.0	432.9	4		4						**0.6**	**432.3**					Dry	---	FIAD	---
B-19	10.0	438.3	6		4						**0.8**	**437.5**					Dry	---	FIAD	---
B-20	10.0	378.7	5		5		2.2				**3.0**	**375.7**					Dry	---	FIAD	---
B-21	10.0	388.7	4		5		1.3				**2.0**	**386.7**					Dry	---	FIAD	---
B-22	10.0	403.1	4		4						**0.6**	**402.5**					Dry	---	FIAD	---
B-23	10.0	419.4	4		5						**0.7**	**418.7**					Dry	---	FIAD	---

Bold text denotes the origin strata of termination or refusal.

APPENDIX C

FALCON ENGINEERING, INC.
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SUMMARY OF SOIL INDEX TESTING

Project Number: G22029.00

Project Name: Buck Jones Rd Waterline Replacements

Project Location: Raleigh, North Carolina

Sample ID	Boring ID	Depth (ft)	Natural Moisture Content (%)	Percent Passing			Atterberg Limits			Percent Organics	Symbol	
				#10	#40	#200	LL	PL	PI		USCS	AASHTO
BS-01	B-03	1.0 - 6.0	20.3	98	94	71.6	38	38	NP	-	ML	A-4
BS-02	B-13	1.0 - 5.0	19.2	94	88	61.7	45	25	20	-	CL	A-7-6
SS-01	B-01	1.0 - 2.5	15.4							-		
SS-02	B-02	1.5 - 2.0	24.7	95	90	70.1	54	48	6	-	MH	A-5
SS-03	B-04	1.0 - 2.5	23.4							-		
SS-04	B-05	3.5 - 5.0	16.2	94	89	67.3	34	34	NP	-	ML	A-4
SS-05	B-06	1.0 - 2.5	20.7	77	72	51.9	43	23	20	-	CL	A-7-6
SS-06	B-07	3.5 - 5.0	16.7							-		
SS-07	B-08	1.0 - 2.5	15.8	74	68	49.0	42	21	21	-	SC	A-7-6
SS-08	B-09	3.5 - 5.0	10.2							-		
SS-09	B-10	1.0 - 2.5	29.4	89	86	76.6	76	44	32	-	MH	A-7-5
SS-10	B-11	3.5 - 5.0	29.3							-		
SS-11	B-12	1.0 - 2.5	13.1							-		
SS-12	B-14	3.5 - 5.0	15.6							-		
SS-13	B-15	1.0 - 2.5	12.4	99	94	61.9	21	13	8	-	CL	A-4
SS-14	B-16	3.5 - 5.0	8.6							-		
SS-15	B-17	1.0 - 2.5	14.4	81	72	52.8	49	25	24	-	CL	A-7-6
SS-16	B-18	3.5 - 5.0	17.3							-		
SS-17	B-19	1.0 - 2.5	26.0	97	93	80.8	69	33	36	-	CH	A-7-5
SS-18	B-20	3.5 - 5.0	23.6							-		
SS-19	B-21	3.5 - 5.0	16.6							-		
SS-20	B-22	3.5 - 5.0	25.2	95	90	70.6	55	38	17	-	MH	A-7-5
SS-21	B-23	1.0 - 2.5	28.8							-		

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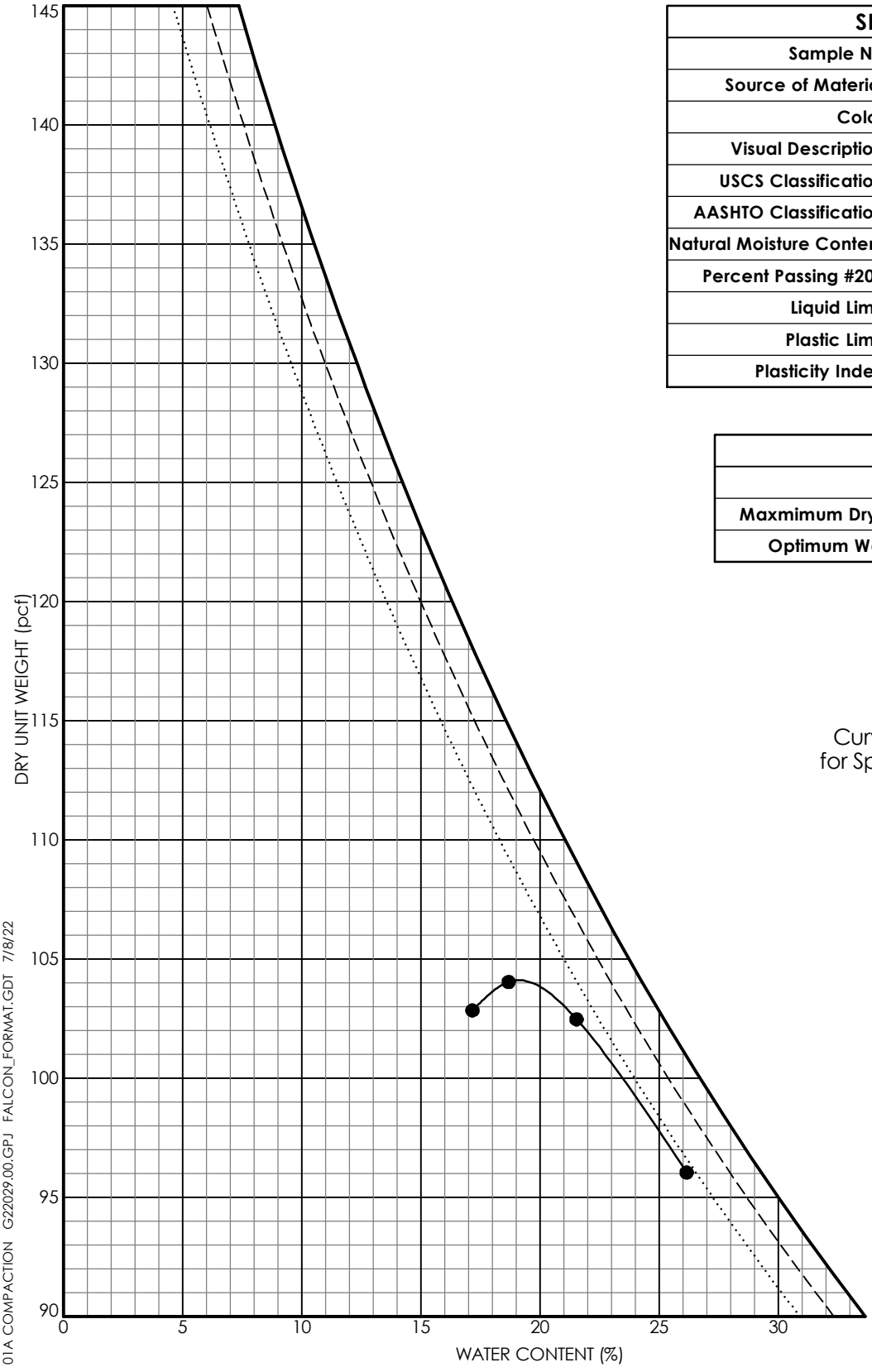
LABORATORY COMPACTION TEST RESULTS

Project No.: G22029.00
Project Name: Buck Jones Rd Waterline Replacements
Project Location: Raleigh, North Carolina



SPECIMEN DATA	
Sample No:	BS-01
Source of Material:	B-03
Color:	Weak Red
Visual Description:	
USCS Classification:	SILT with SAND(ML)
AASHTO Classification:	A-4
Natural Moisture Content:	20.3 %
Percent Passing #200:	71.6 %
Liquid Limit:	38
Plastic Limit:	38
Plasticity Index:	NP

TEST RESULTS	
Test Method:	ASTM D698 Method A
Maxmimum Dry Unit Weight:	104.1 pcf
Optimum Water Content:	19.1 %

Curves of 100% Saturation
for Specific Gravity Equal to:

— 2.8
– – 2.7
····· 2.6

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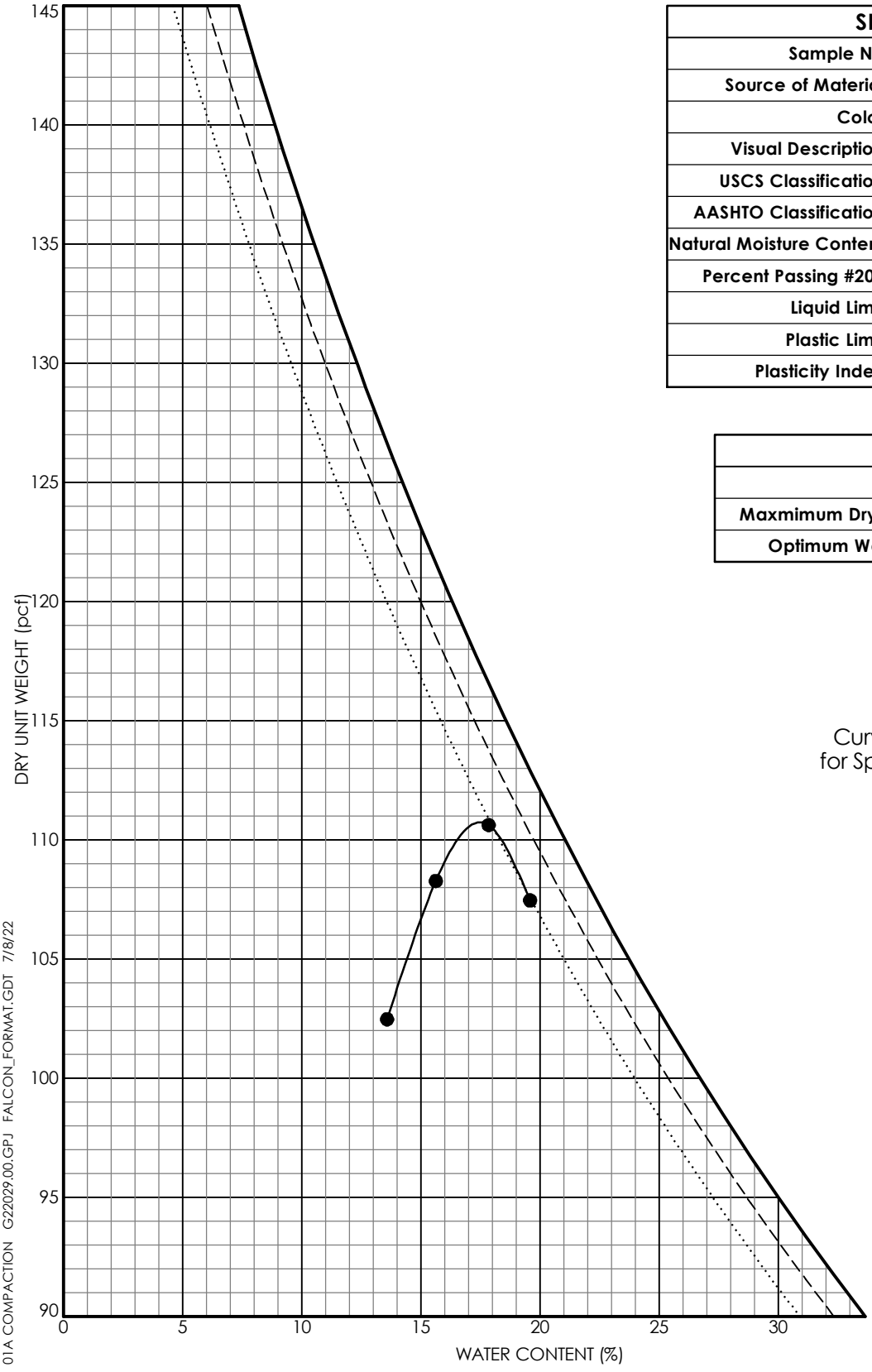
LABORATORY COMPACTION TEST RESULTS

Project No.: G22029.00
Project Name: Buck Jones Rd Waterline Replacements
Project Location: Raleigh, North Carolina



SPECIMEN DATA	
Sample No:	BS-02
Source of Material:	B-13
Color:	Reddish Brown
Visual Description:	
USCS Classification:	SANDY LEAN CLAY(CL)
AASHTO Classification:	A-7-6
Natural Moisture Content:	19.2 %
Percent Passing #200:	61.7 %
Liquid Limit:	45
Plastic Limit:	25
Plasticity Index:	20

TEST RESULTS	
Test Method:	ASTM D698 Method A
Maxmimum Dry Unit Weight:	110.7 pcf
Optimum Water Content:	17.5 %

Curves of 100% Saturation
for Specific Gravity Equal to:

2.8
2.7
2.6

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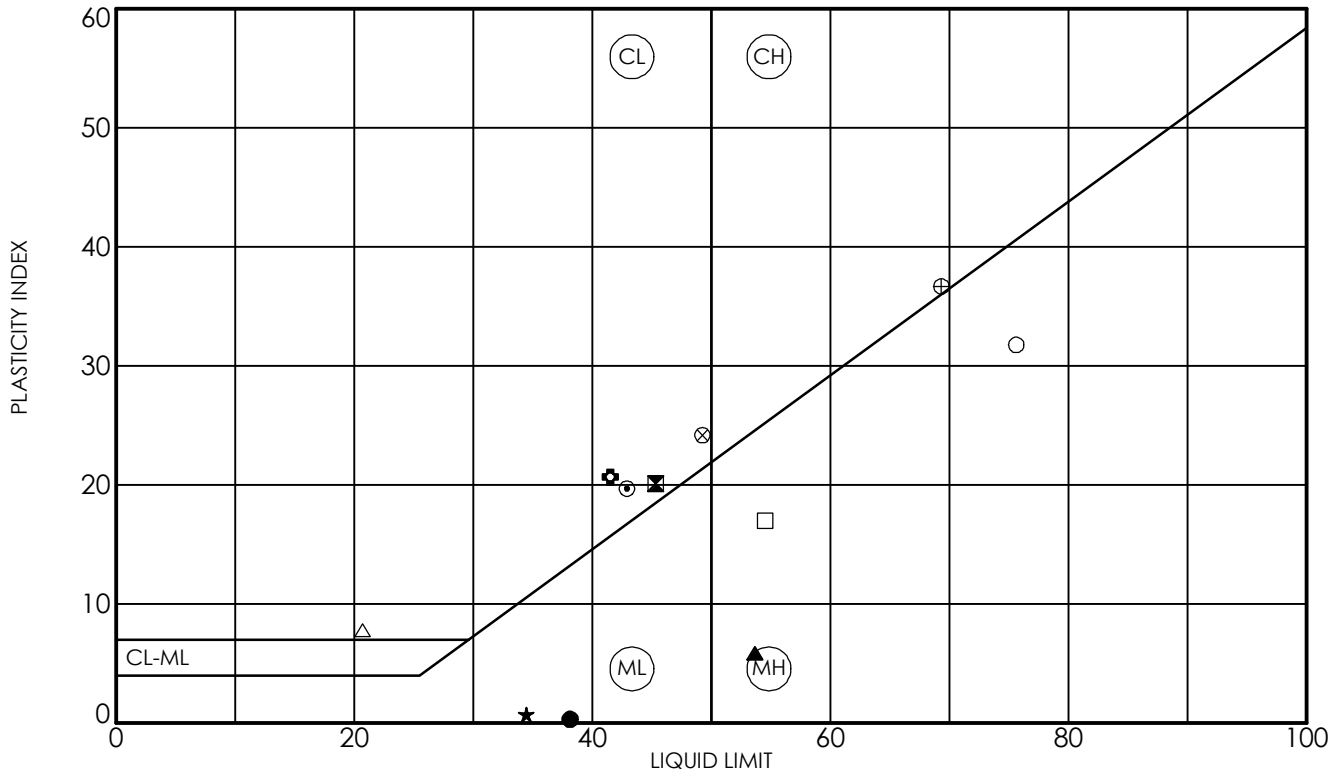
ATTERBERG LIMITS RESULTS

Project No.: G22029.00
Project Name: Buck Jones Rd Waterline Replacements
Project Location: Raleigh, North Carolina



Sample Identification			LL	PL	PI	Fines	USCS Classification | AASHTO Classification
● BS-01	B-03	1.0 - 6.0	38	38	NP	71.6	SILT with SAND (ML) | A-4
⊠ BS-02	B-13	1.0 - 5.0	45	25	20	61.7	SANDY LEAN CLAY (CL) | A-7-6
▲ SS-02	B-02	1.5 - 2.0	54	48	6	70.1	ELASTIC SILT with SAND (MH) | A-5
★ SS-04	B-05	3.5 - 5.0	34	34	NP	67.3	SANDY SILT (ML) | A-4
⊙ SS-05	B-06	1.0 - 2.5	43	23	20	51.9	SANDY LEAN CLAY with GRAVEL (CL) | A-7-6
✿ SS-07	B-08	1.0 - 2.5	42	21	21	49.0	CLAYEY SAND with GRAVEL (SC) | A-7-6
○ SS-09	B-10	1.0 - 2.5	76	44	32	76.6	ELASTIC SILT with SAND (MH) | A-7-5
△ SS-13	B-15	1.0 - 2.5	21	13	8	61.9	SANDY LEAN CLAY (CL) | A-4
⊗ SS-15	B-17	1.0 - 2.5	49	25	24	52.8	SANDY LEAN CLAY (CL) | A-7-6
⊕ SS-17	B-19	1.0 - 2.5	69	33	36	80.8	FAT CLAY with SAND (CH) | A-7-5
□ SS-20	B-22	3.5 - 5.0	55	38	17	70.6	ELASTIC SILT with SAND (MH) | A-7-5

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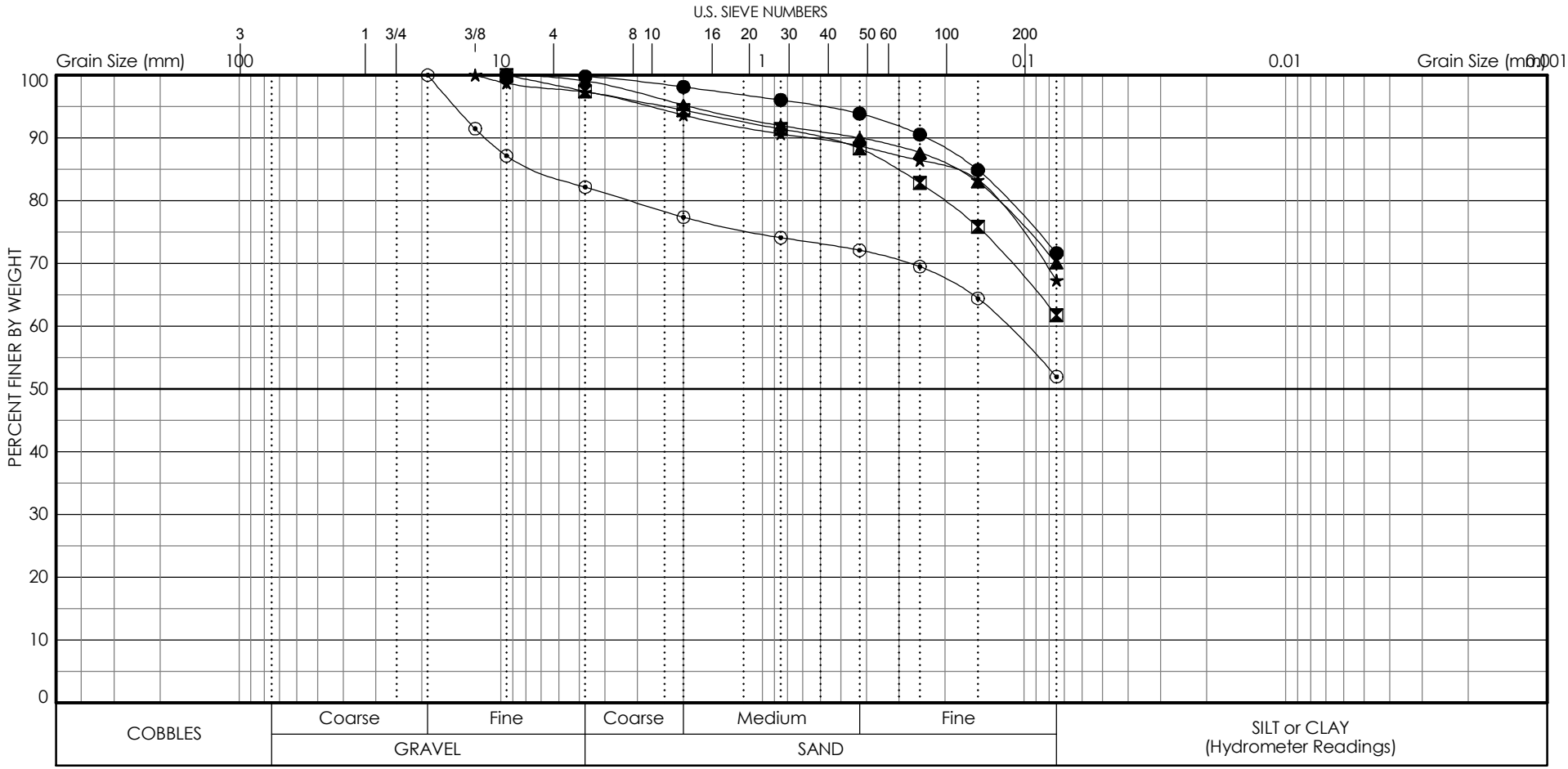
GRAIN SIZE DISTRIBUTION

Project No.: G22029.00
Project Name: Buck Jones Rd Waterline Replacements
Project Location: Raleigh, North Carolina



Sample ID	Source	Depth (ft)	D_{100}	D_{60}	D_{30}	D_{10}	C_c	C_u	%Gravel	%Sand	%Silt/%Clay	LL	PI	USCS Classification | AASHTO Classification
● BS-01	B-03	1.0 - 6.0	9.5						0	28	71.6	38	NP	SILT with SAND (ML) | A-4
⊠ BS-02	B-13	1.0 - 5.0	9.5						3	36	61.7	45	20	SANDY LEAN CLAY (CL) | A-7-6
▲ SS-02	B-02	1.5 - 2.0	9.5						1	29	70.1	54	6	ELASTIC SILT with SAND (MH) | A-5
★ SS-04	B-05	3.5 - 5.0	12.5						3	30	67.3	34	NP	SANDY SILT (ML) | A-4
⊙ SS-05	B-06	1.0 - 2.5	19	0.117					18	30	51.9	43	20	SANDY LEAN CLAY with GRAVEL (CL) | A-7-6

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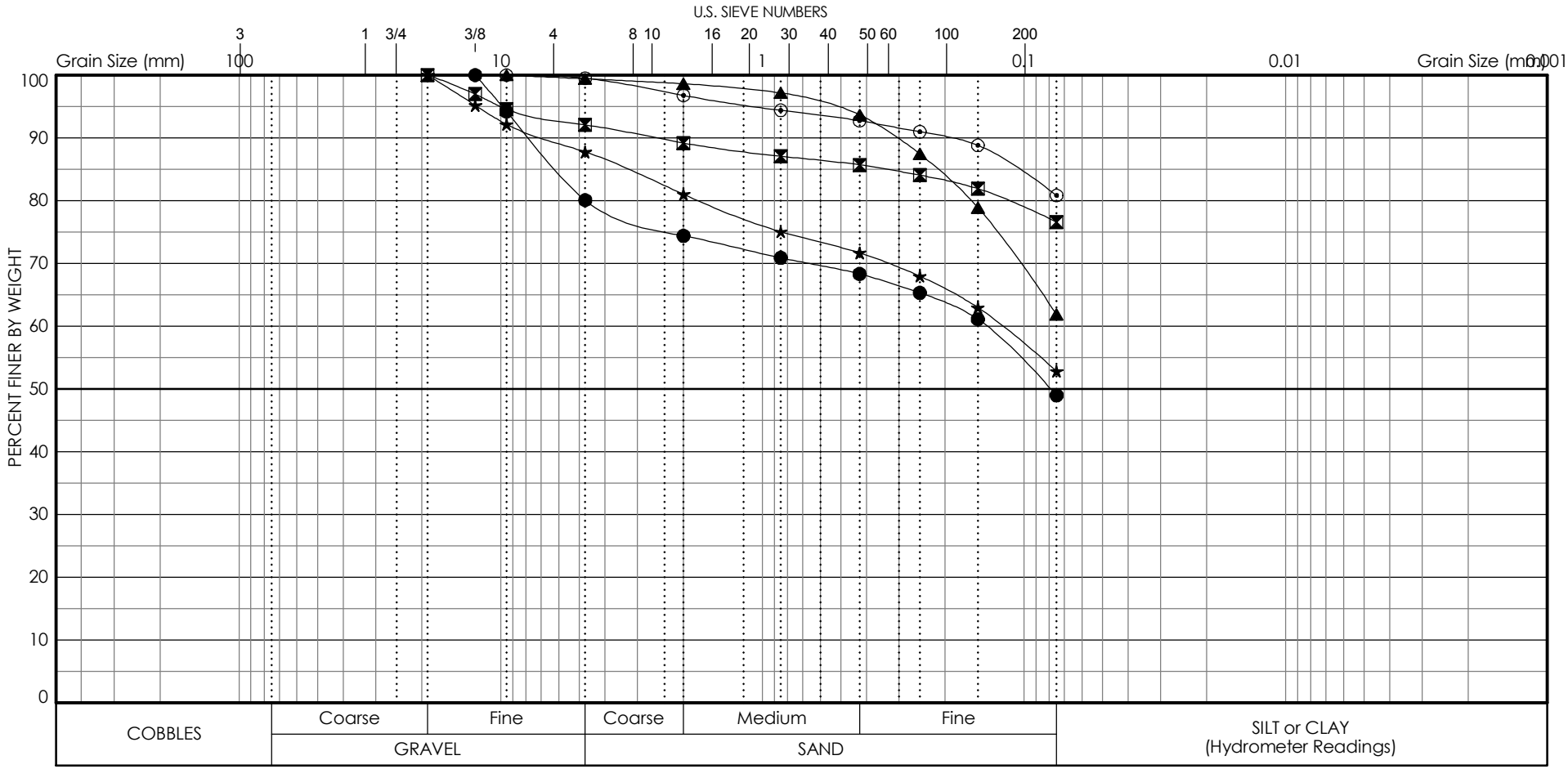
GRAIN SIZE DISTRIBUTION

Project No.: G22029.00
Project Name: Buck Jones Rd Waterline Replacements
Project Location: Raleigh, North Carolina



Sample ID	Source	Depth (ft)	D_{100}	D_{60}	D_{30}	D_{10}	C_c	C_u	%Gravel	%Sand	%Silt/%Clay	LL	PI	USCS Classification | AASHTO Classification
● SS-07	B-08	1.0 - 2.5	12.5	0.141					20	31	49.0	42	21	CLAYEY SAND with GRAVEL (SC) | A-7-6
⊠ SS-09	B-10	1.0 - 2.5	19						8	15	76.6	76	32	ELASTIC SILT with SAND (MH) | A-7-5
▲ SS-13	B-15	1.0 - 2.5	9.5						1	38	61.9	21	8	SANDY LEAN CLAY (CL) | A-4
★ SS-15	B-17	1.0 - 2.5	19	0.122					12	35	52.8	49	24	SANDY LEAN CLAY (CL) | A-7-6
⊙ SS-17	B-19	1.0 - 2.5	9.5						0	19	80.8	69	36	FAT CLAY with SAND (CH) | A-7-5

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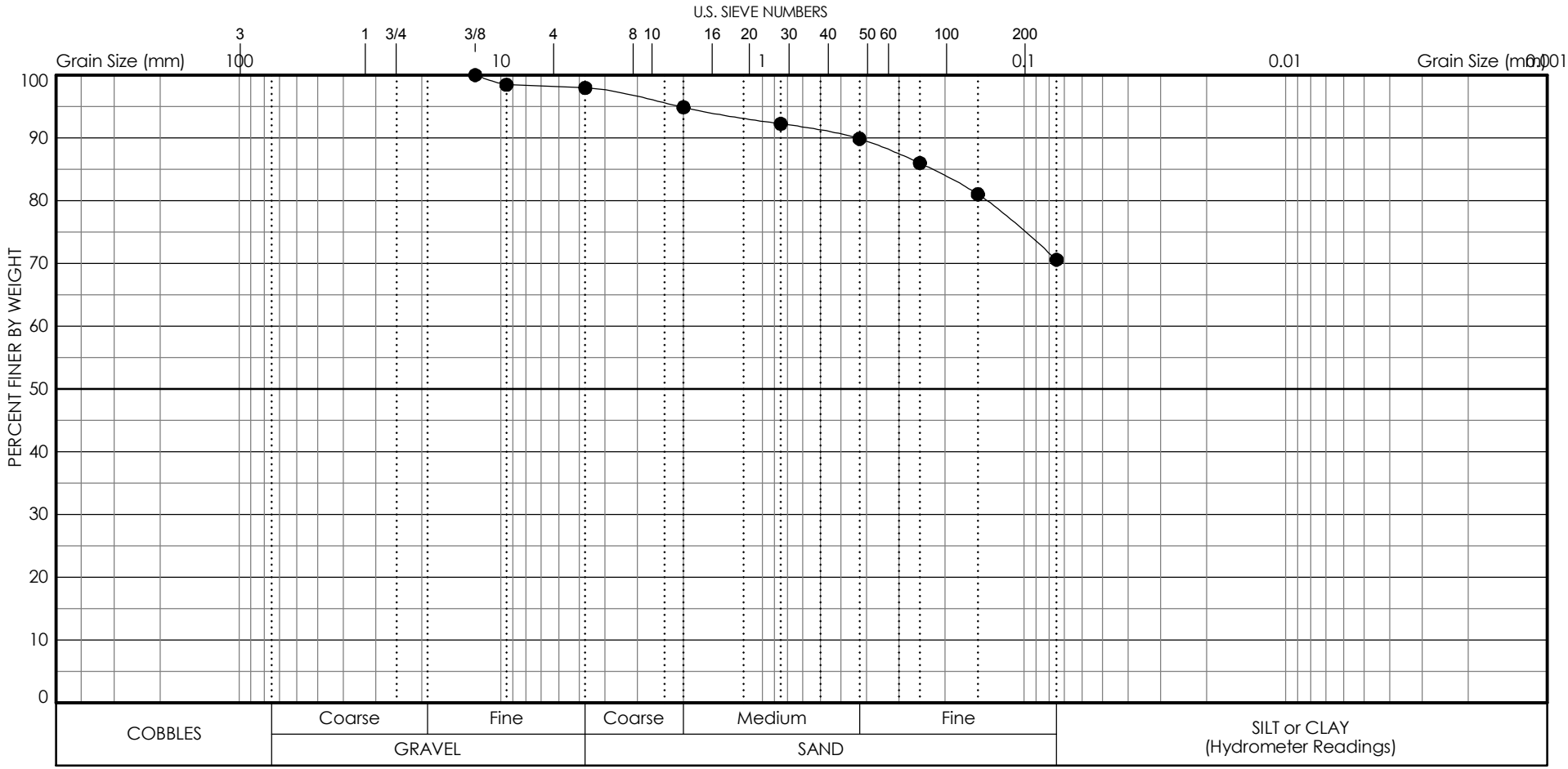
GRAIN SIZE DISTRIBUTION

Project No.: G22029.00

Project Name: Buck Jones Rd Waterline Replacements

Project Location: Raleigh, North Carolina



Sample ID	Source	Depth (ft)	D_{100}	D_{60}	D_{30}	D_{10}	C_c	C_u	%Gravel	%Sand	%Silt/%Clay	LL	PI	USCS Classification | AASHTO Classification
● SS-20	B-22	3.5 - 5.0	12.5						2	27	70.6	55	17	ELASTIC SILT with SAND (MH) | A-7-5

PART-3

VACUUM EXCAVATION TEST HOLE REPORT

PROJECT NUMBER:	CJSC00421	TEST HOLE NUMBER:	1
CLIENT NAME:	CJS Conveyance	SOIL TYPE:	Clay
PROJECT TITLE:	Buck Jones Test Holes	SURFACE MATERIAL:	Pavement
LOCATION:	Barclay Rd & Buck Jones Rd (Cary, NC)	PAVEMENT TYPE:	Asphalt
DATE:	6/1/2022	PAVEMENT THICKNESS:	0.3'

UTILITY #:	1	UTILITY #:		SITE PERSONNEL:	TM, NJ
TYPE:	Gas	TYPE:		METHOD USED:	Vacuum Excavation
SIZE:	2.5" OD ±	SIZE:		OTHER NOTES:	
MATERIAL:	Coated Steel	MATERIAL:			
DEPTH:	1.70'	DEPTH:			
DIRECTION:	N	DIRECTION:			
UTILITY #:		UTILITY #:		SURVEY PROVIDED BY:	
TYPE:		TYPE:		SURVEY COORDINATES:	
SIZE:		SIZE:		ELEVATION:	
MATERIAL:		MATERIAL:		NORTH:	
DEPTH:		DEPTH:		EAST:	
DIRECTION:		DIRECTION:			

Notes: All measurements obtained from top/center of associated utility unless otherwise noted.

Test Hole Location Map

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VACUUM EXCAVATION TEST HOLE REPORT

PROJECT NUMBER:	CJSC00421	TEST HOLE NUMBER:	2
CLIENT NAME:	CJS Conveyance	SOIL TYPE:	Clay
PROJECT TITLE:	Buck Jones Test Holes	SURFACE MATERIAL:	Pavement
LOCATION:	Lakeside & Norman (Cary, NC)	PAVEMENT TYPE:	Asphalt
DATE:	5/31/2022	PAVEMENT THICKNESS:	0.5'

UTILITY #:	1	UTILITY #:		SITE PERSONNEL:	TM, NJ
TYPE:	Water	TYPE:		METHOD USED:	Vacuum Excavation
SIZE:	9" OD ±	SIZE:		OTHER NOTES:	Could not determine material due to corrosion. Metallic in nature.
MATERIAL:	Unknown	MATERIAL:			
DEPTH:	3.18'	DEPTH:			
DIRECTION:	N	DIRECTION:			
UTILITY #:		UTILITY #:		SURVEY PROVIDED BY:	
TYPE:		TYPE:		SURVEY COORDINATES:	
SIZE:		SIZE:		ELEVATION:	
MATERIAL:		MATERIAL:		NORTH:	
DEPTH:		DEPTH:		EAST:	
DIRECTION:		DIRECTION:			

Notes: All measurements obtained from top/center of associated utility unless otherwise noted.

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VACUUM EXCAVATION TEST HOLE REPORT

PROJECT NUMBER:	CJSC00421	TEST HOLE NUMBER:	3
CLIENT NAME:	CJS Conveyance	SOIL TYPE:	Clay
PROJECT TITLE:	Buck Jones Test Holes	SURFACE MATERIAL:	Pavement
LOCATION:	Norman & Lakeside (Cary, NC)	PAVEMENT TYPE:	Asphalt
DATE:	5/31/2022	PAVEMENT THICKNESS:	0.4'

UTILITY #:	1	UTILITY #:		SITE PERSONNEL:	TM, NJ
TYPE:	Gas	TYPE:		METHOD USED:	Vacuum Excavation
SIZE:	5" OD ±	SIZE:		OTHER NOTES:	
MATERIAL:	Coated Steel	MATERIAL:			
DEPTH:	2.79'	DEPTH:			
DIRECTION:	N	DIRECTION:			
UTILITY #:		UTILITY #:		SURVEY PROVIDED BY:	
TYPE:		TYPE:		SURVEY COORDINATES:	
SIZE:		SIZE:		ELEVATION:	
MATERIAL:		MATERIAL:		NORTH:	
DEPTH:		DEPTH:		EAST:	
DIRECTION:		DIRECTION:			

Notes: All measurements obtained from top/center of associated utility unless otherwise noted.

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VACUUM EXCAVATION TEST HOLE REPORT

PROJECT NUMBER:	CJSC00421	TEST HOLE NUMBER:	5
CLIENT NAME:	CJS Conveyance	SOIL TYPE:	Clay
PROJECT TITLE:	Buck Jones Test Holes	SURFACE MATERIAL:	Pavement
LOCATION:	Buck Jones & Norman (Cary, NC)	PAVEMENT TYPE:	Asphalt
DATE:	6/2/2022	PAVEMENT THICKNESS:	1.4'

UTILITY #:	1	UTILITY #:		SITE PERSONNEL:	TM, NJ
TYPE:	Gas	TYPE:		METHOD USED:	Vacuum Excavation
SIZE:	4.5" OD ±	SIZE:		OTHER NOTES:	
MATERIAL:	Plastic	MATERIAL:			
DEPTH:	3.60'	DEPTH:			
DIRECTION:	E	DIRECTION:			
UTILITY #:		UTILITY #:		SURVEY PROVIDED BY:	
TYPE:		TYPE:		SURVEY COORDINATES:	
SIZE:		SIZE:		ELEVATION:	
MATERIAL:		MATERIAL:		NORTH:	
DEPTH:		DEPTH:		EAST:	
DIRECTION:		DIRECTION:			

Notes: All measurements obtained from top/center of associated utility unless otherwise noted.

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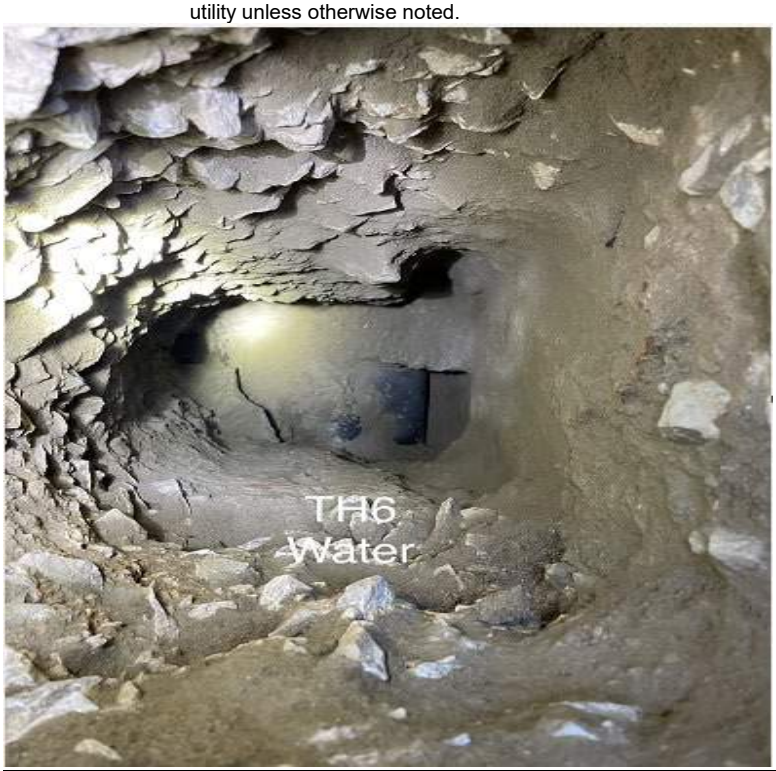
VACUUM EXCAVATION TEST HOLE REPORT

PROJECT NUMBER:	CJSC00421	TEST HOLE NUMBER:	6
CLIENT NAME:	CJS Conveyance	SOIL TYPE:	Clay
PROJECT TITLE:	Buck Jones Test Holes	SURFACE MATERIAL:	Pavement
LOCATION:	Buck Jones & Norman (Cary, NC)	PAVEMENT TYPE:	Asphalt
DATE:	6/2/2022	PAVEMENT THICKNESS:	1.0'

UTILITY #:	1	UTILITY #:		SITE PERSONNEL:	TM, NJ
TYPE:	Water	TYPE:		METHOD USED:	Vacuum Excavation
SIZE:	13" OD ±	SIZE:		OTHER NOTES:	
MATERIAL:	Cast Iron	MATERIAL:			
DEPTH:	4.05'	DEPTH:			
DIRECTION:	E	DIRECTION:			
UTILITY #:		UTILITY #:		SURVEY PROVIDED BY:	
TYPE:		TYPE:		SURVEY COORDINATES:	
SIZE:		SIZE:		ELEVATION:	
MATERIAL:		MATERIAL:		NORTH:	
DEPTH:		DEPTH:		EAST:	
DIRECTION:		DIRECTION:			

Notes: All measurements obtained from top/center of associated utility unless otherwise noted.



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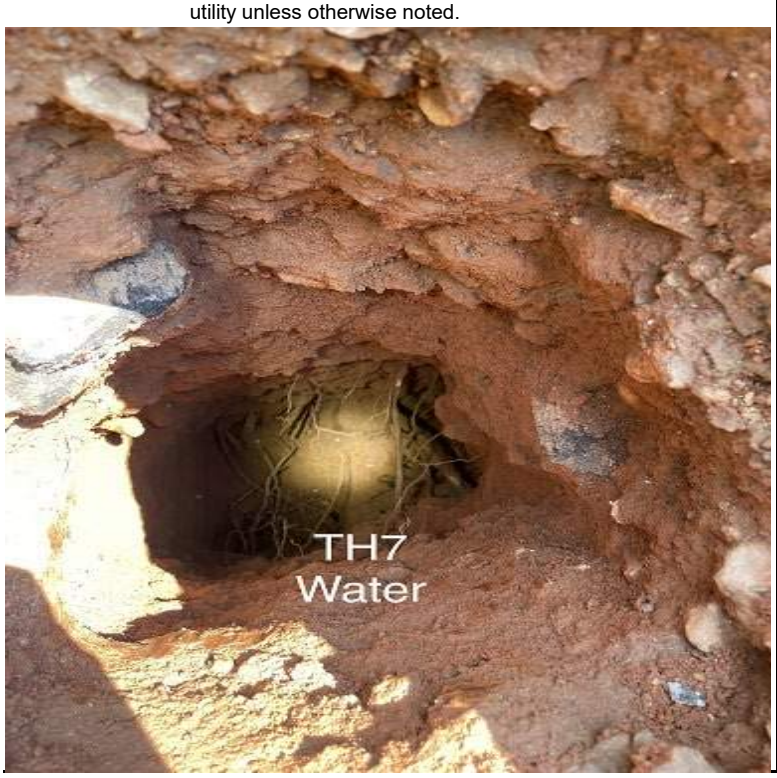
VACUUM EXCAVATION TEST HOLE REPORT

PROJECT NUMBER:	CJSC00421	TEST HOLE NUMBER:	7
CLIENT NAME:	CJS Conveyance	SOIL TYPE:	Clay
PROJECT TITLE:	Buck Jones Test Holes	SURFACE MATERIAL:	Pavement
LOCATION:	Norman & Jeffries (Cary, NC)	PAVEMENT TYPE:	Asphalt
DATE:	6/1/2022	PAVEMENT THICKNESS:	0.4'

UTILITY #:	1	UTILITY #:		SITE PERSONNEL:	TM, NJ
TYPE:	Water	TYPE:		METHOD USED:	Vacuum Excavation
SIZE:	3" OD ±	SIZE:		OTHER NOTES:	Could not determine material due to corrosion. Metallic in nature.
MATERIAL:	Unknown	MATERIAL:			
DEPTH:	3.78'	DEPTH:			
DIRECTION:	E	DIRECTION:			
UTILITY #:		UTILITY #:		SURVEY PROVIDED BY:	
TYPE:		TYPE:		SURVEY COORDINATES:	
SIZE:		SIZE:		ELEVATION:	
MATERIAL:		MATERIAL:		NORTH:	
DEPTH:		DEPTH:		EAST:	
DIRECTION:		DIRECTION:			

Notes: All measurements obtained from top/center of associated utility unless otherwise noted.



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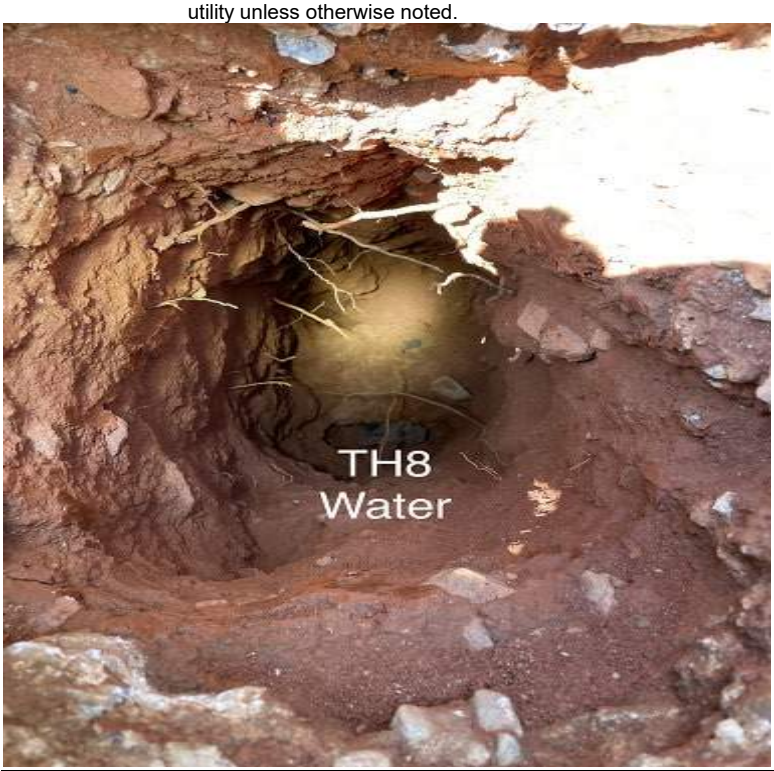
VACUUM EXCAVATION TEST HOLE REPORT

PROJECT NUMBER:	CJSC00421	TEST HOLE NUMBER:	8
CLIENT NAME:	CJS Conveyance	SOIL TYPE:	Clay
PROJECT TITLE:	Buck Jones Test Holes	SURFACE MATERIAL:	Pavement
LOCATION:	Norman & Lakeside (Cary, NC)	PAVEMENT TYPE:	Asphalt
DATE:	5/31/2022	PAVEMENT THICKNESS:	0.6'

UTILITY #:	1	UTILITY #:		SITE PERSONNEL:	TM, NJ
TYPE:	Water	TYPE:		METHOD USED:	Vacuum Excavation
SIZE:	7" OD ±	SIZE:		OTHER NOTES:	Could not determine material due to corrosion. Metallic in nature.
MATERIAL:	Unknown	MATERIAL:			
DEPTH:	3.34'	DEPTH:			
DIRECTION:	W	DIRECTION:			
UTILITY #:		UTILITY #:		SURVEY PROVIDED BY:	
TYPE:		TYPE:		SURVEY COORDINATES:	
SIZE:		SIZE:		ELEVATION:	
MATERIAL:		MATERIAL:		NORTH:	
DEPTH:		DEPTH:		EAST:	
DIRECTION:		DIRECTION:			

Notes: All measurements obtained from top/center of associated utility unless otherwise noted.



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VACUUM EXCAVATION TEST HOLE REPORT

PROJECT NUMBER:	CJSC00421	TEST HOLE NUMBER:	9
CLIENT NAME:	CJS Conveyance	SOIL TYPE:	Clay
PROJECT TITLE:	Buck Jones Test Holes	SURFACE MATERIAL:	Pavement
LOCATION:	Norman & Lakeside (Cary, NC)	PAVEMENT TYPE:	Asphalt
DATE:	5/31/2022	PAVEMENT THICKNESS:	0.3'

UTILITY #:	1	UTILITY #:		SITE PERSONNEL:	TM, NJ
TYPE:	Gas	TYPE:		METHOD USED:	Vacuum Excavation
SIZE:	2.5" OD ±	SIZE:		OTHER NOTES:	
MATERIAL:	Coated Steel	MATERIAL:			
DEPTH:	2.09'	DEPTH:			
DIRECTION:	W	DIRECTION:			
UTILITY #:		UTILITY #:		SURVEY PROVIDED BY:	
TYPE:		TYPE:		SURVEY COORDINATES:	
SIZE:		SIZE:		ELEVATION:	
MATERIAL:		MATERIAL:		NORTH:	
DEPTH:		DEPTH:		EAST:	
DIRECTION:		DIRECTION:			

Notes: All measurements obtained from top/center of associated utility unless otherwise noted.

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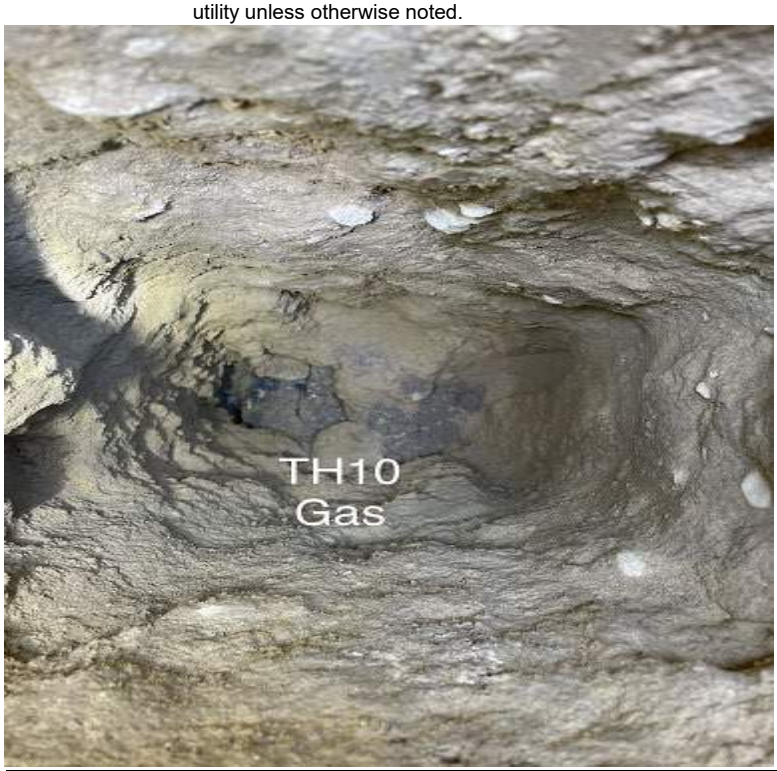
VACUUM EXCAVATION TEST HOLE REPORT

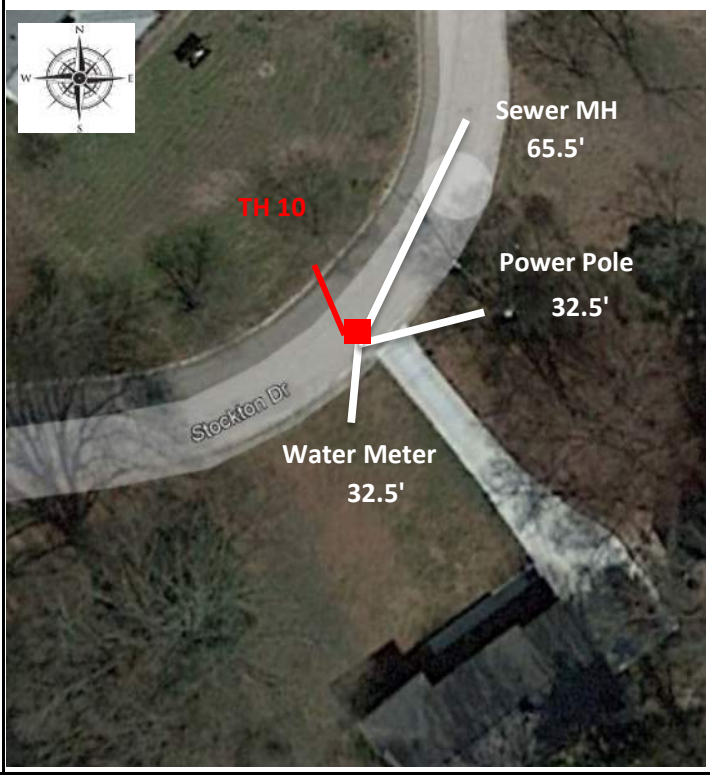
PROJECT NUMBER:	CJSC00421	TEST HOLE NUMBER:	10
CLIENT NAME:	CJS Conveyance	SOIL TYPE:	Clay
PROJECT TITLE:	Buck Jones Test Holes	SURFACE MATERIAL:	Pavement
LOCATION:	Stockton & Norman (Cary, NC)	PAVEMENT TYPE:	Asphalt
DATE:	6/1/2022	PAVEMENT THICKNESS:	0.4'

UTILITY #:	1	UTILITY #:		SITE PERSONNEL:	TM, NJ
TYPE:	Gas	TYPE:		METHOD USED:	Vacuum Excavation
SIZE:	3" OD ±	SIZE:		OTHER NOTES:	
MATERIAL:	Coated Steel	MATERIAL:			
DEPTH:	2.66'	DEPTH:			
DIRECTION:	N	DIRECTION:			
UTILITY #:		UTILITY #:		SURVEY PROVIDED BY:	
TYPE:		TYPE:		SURVEY COORDINATES:	
SIZE:		SIZE:		ELEVATION:	
MATERIAL:		MATERIAL:		NORTH:	
DEPTH:		DEPTH:		EAST:	
DIRECTION:		DIRECTION:			

Notes: All measurements obtained from top/center of associated utility unless otherwise noted.



Test Hole Location Map



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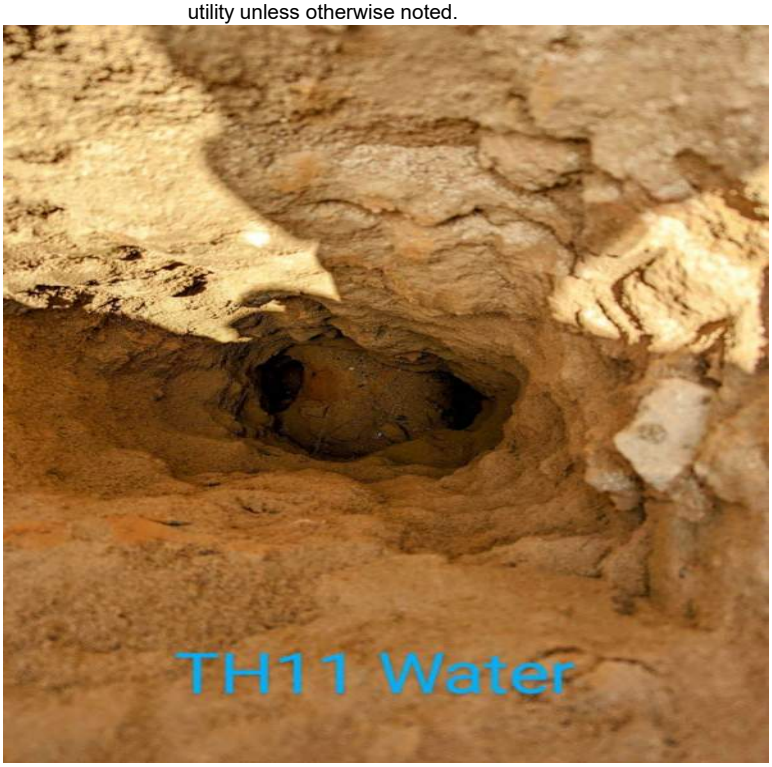
VACUUM EXCAVATION TEST HOLE REPORT

PROJECT NUMBER:	CJSC00421	TEST HOLE NUMBER:	11
CLIENT NAME:	CJS Conveyance	SOIL TYPE:	Clay
PROJECT TITLE:	Buck Jones Test Holes	SURFACE MATERIAL:	Pavement
LOCATION:	Stockton & Jeffries (Cary, NC)	PAVEMENT TYPE:	Asphalt
DATE:	5/26/2022	PAVEMENT THICKNESS:	0.6'

UTILITY #:	1	UTILITY #:		SITE PERSONNEL:	CJH, BC, RC
TYPE:	Water	TYPE:		METHOD USED:	Vacuum Excavation
SIZE:	9" OD ±	SIZE:		OTHER NOTES:	Could not determine material due to corrosion. Metallic in nature.
MATERIAL:	Unknown	MATERIAL:			
DEPTH:	3.55'	DEPTH:			
DIRECTION:	S	DIRECTION:			
UTILITY #:		UTILITY #:		SURVEY PROVIDED BY:	
TYPE:		TYPE:		SURVEY COORDINATES:	
SIZE:		SIZE:		ELEVATION:	
MATERIAL:		MATERIAL:		NORTH:	
DEPTH:		DEPTH:		EAST:	
DIRECTION:		DIRECTION:			

Notes: All measurements obtained from top/center of associated utility unless otherwise noted.



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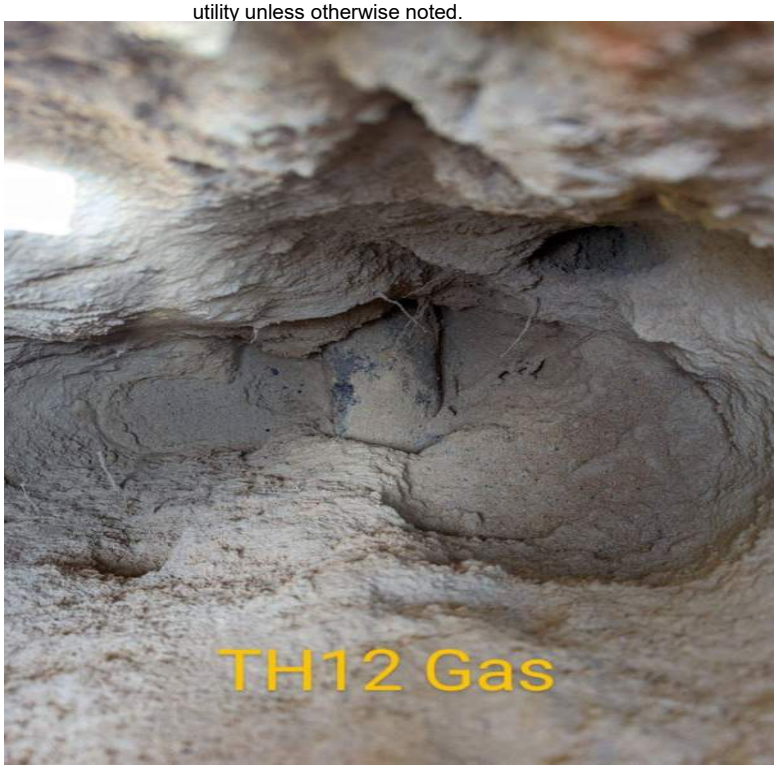
VACUUM EXCAVATION TEST HOLE REPORT

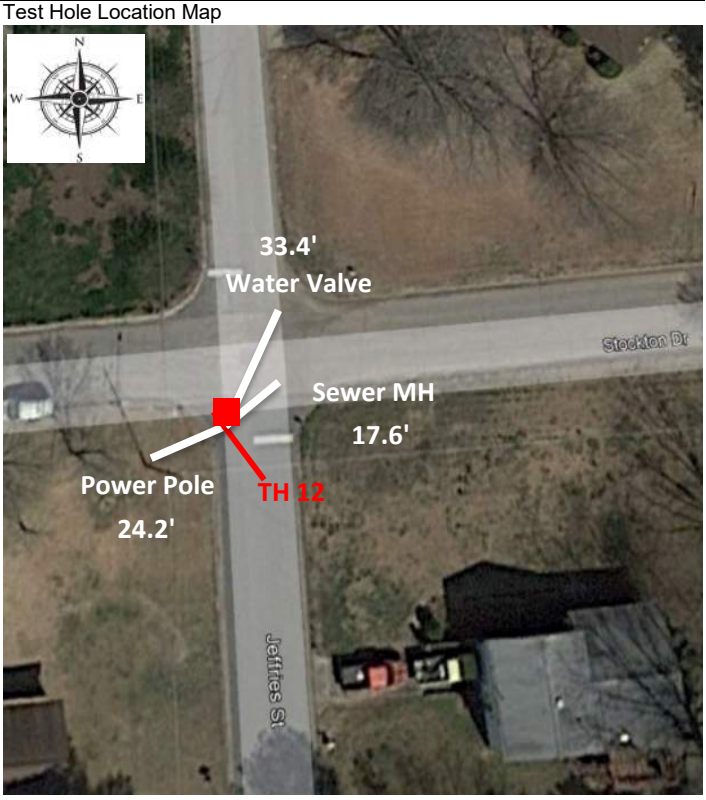
PROJECT NUMBER:	CJSC00421	TEST HOLE NUMBER:	12
CLIENT NAME:	CJS Conveyance	SOIL TYPE:	Clay
PROJECT TITLE:	Buck Jones Test Holes	SURFACE MATERIAL:	Pavement
LOCATION:	Stockton & Jeffries (Cary, NC)	PAVEMENT TYPE:	Asphalt
DATE:	5/26/2022	PAVEMENT THICKNESS:	0.45'

UTILITY #:	1	UTILITY #:		SITE PERSONNEL:	CJH, BC, RC
TYPE:	Gas	TYPE:		METHOD USED:	Vacuum Excavation
SIZE:	4.5" OD ±	SIZE:		OTHER NOTES:	
MATERIAL:	Steel	MATERIAL:			
DEPTH:	3.26'	DEPTH:			
DIRECTION:	S	DIRECTION:			
UTILITY #:		UTILITY #:		SURVEY PROVIDED BY:	
TYPE:		TYPE:		SURVEY COORDINATES:	
SIZE:		SIZE:		ELEVATION:	
MATERIAL:		MATERIAL:		NORTH:	
DEPTH:		DEPTH:		EAST:	
DIRECTION:		DIRECTION:			

Notes: All measurements obtained from top/center of associated utility unless otherwise noted.



Test Hole Location Map



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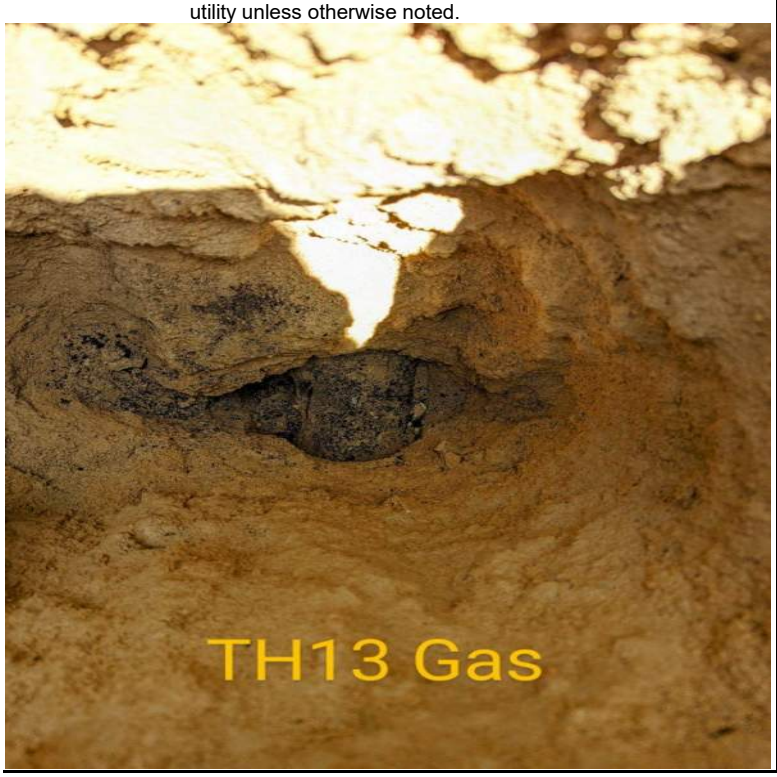
VACUUM EXCAVATION TEST HOLE REPORT

PROJECT NUMBER:	CJSC00421	TEST HOLE NUMBER:	13
CLIENT NAME:	CJS Conveyance	SOIL TYPE:	Clay
PROJECT TITLE:	Buck Jones Test Holes	SURFACE MATERIAL:	Pavement
LOCATION:	Stockton & Jeffries (Cary, NC)	PAVEMENT TYPE:	Asphalt
DATE:	5/26/2022	PAVEMENT THICKNESS:	0.4'

UTILITY #:	1	UTILITY #:		SITE PERSONNEL:	CJH, BC, RC
TYPE:	Gas	TYPE:		METHOD USED:	Vacuum Excavation
SIZE:	4.5" OD ±	SIZE:		OTHER NOTES:	
MATERIAL:	Steel	MATERIAL:			
DEPTH:	2.58'	DEPTH:			
DIRECTION:	E	DIRECTION:			
UTILITY #:		UTILITY #:		SURVEY PROVIDED BY:	
TYPE:		TYPE:		SURVEY COORDINATES:	
SIZE:		SIZE:		ELEVATION:	
MATERIAL:		MATERIAL:		NORTH:	
DEPTH:		DEPTH:		EAST:	
DIRECTION:		DIRECTION:			

Notes: All measurements obtained from top/center of associated utility unless otherwise noted.



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