FORSYTH COUNTY, GEORGIA

BID # 19-59-3340
HWY 400 WATERLINE RELOCATION

CONSISTING OF:

BIDDING REQUIREMENTS
SPECIFICATIONS
DRAWINGS

CLOSING DATE: 2:00 P.M., MAY 23, 2019

Bids will be accepted at:
Forsyth County Procurement Department
514 West Maple Street, Suite 104
Cumming, GA 30040

Engineer:

Constantine Engineering

GEORGIA REGISTERED No. PE041239 PROFESSIONAL ENGINEER JEFFREY L. DUPLANTIS

INVITATION TO BID: BID NO. 19-59-3340

The Forsyth County Board of Commissioners will accept sealed bids until 2:00 p.m. (EST), Thursday, May 23, 2019 for the following:

Furnishing all labor, equipment and materials necessary for installation of the SR 400 Waterline. This project will be for the purposes of installing a new water transmission main in Forsyth County starting at Martin Road, following GA 400 south and ending approximately 1500 LF south of SR 369 Browns Bridge Road. Work will include but not limited to installation of approximately 3312 LF of 42" DIP water main, 3632 LF of 36" DIP water main, 62 LF of 24" DIP water main, 72 LF of 12" DIP water main, valves and connections to th owners potable water system. Project will also include a 105 LF 60" Jack and Bore and two separate 54" Jack and Bores that total 185 LF and associated work described in the contract documents.

PRE-BID MEETING: 9:00 a.m., Thursday, May 2, 2019 for all interested bidders, it is not mandatory but all parties are strongly encouraged to attend. Location: Forsyth County Administration Building, 110 E Main Street, Commissioners Meeting Room (2nd floor), Cumming GA 30040.

All work is to be completed within 360 calendar days of issuance of Notice to Proceed.

The Bidder is required to examine the sites of the proposed work, the Bid Specifications, Supplemental Specifications, Special Provisions, and Contract forms prior to submitting a Bid.

The envelopes containing the Bids must be sealed, addressed to Board of Commissioners of Forsyth County, GA, delivered to the Forsyth County Procurement Department, 514 West Maple Street, Suite 104, Cumming, GA 30040, and designated as Bid No. 19-59-3340 in the lower left-hand corner. ***No bids will be accepted after 2:00 p.m. (EST), May 23, 2019.***

Copies of the bidding documents are available on the Forsyth County website, www.forsythco.com, go to 'How do I' and then click on "Doing Business with the County". Instructions on how to obtain the bid documents are located at the top of the "Bids & Results" page. There is a non-refundable fee of forty-five dollars ($45.00) for each set of plans (plans will be provided on disc) and specifications (cash or check made out to "Forsyth County" only).

Each Bidder must deposit with his Bid, a Bid Bond, or a Certified or Cashier's Check to the order of the Forsyth County Board of Commissioners in an amount not less than five percent (5%) of the amount bid and a Consent of Surety form from a surety company licensed to conduct business in the State of Georgia, engaging to furnish, upon award of the Contract, a Performance Bond and a Payment Bond. The Performance Bond and Payment Bond shall be in a sum of not less than one hundred percent (100%) of the total price bid for the completed work and the appropriate insurance certificate showing Forsyth County, GA as an additional insured. No Bidder may withdraw his Bid within 90 days after the actual date of the opening, thereof.

Forsyth County, Georgia hereby gives public notice that: "It is our policy to assure compliance with Title VI of the Civil Rights Act of 1965, the Civil Rights Act of 1987, and related statutes and regulations in all programs and activities."

Award of bid will be made at a later date. The Board of Commissioners reserves the right to reject any or all bids. Bidders and the general public are invited to attend the bid opening at 2:05 p.m. (EST), Thursday, May 23, 2019 at Forsyth County Procurement Department, 514 West Maple Street, Suite 104, Cumming, Georgia.

Donna Kukarola, CPPO, CPPB
Director
April 5, 2019

To Media: Website, Legal Organ, GA Procurement, GA Municipal

BID 19-59-3340
INSTRUCTIONS TO BIDDERS

DATE ISSUED: April 5, 2019

For: **Furnishing all labor, equipment and materials necessary for installation of the SR 400 Waterline. This project will be for the purposes of installing a new water transmission main in Forsyth County starting at Martin Road, following GA 400 south and ending approximately 1500 LF south of SR 369 Browns Bridge Road. Work will include but not limited to installation of approximately 3312 LF of 42" DIP water main, 3632 LF of 36" DIP water main, 62 LF of 24" DIP water main, 72 LF of 12" DIP water main, valves and connections to the owners potable water system. Project will also include a 105 LF 60" Jack and Bore and two separate 54" Jack and Bores that total 185 LF and associated work described in the contract documents.**

Pre-Bid Meeting: 10:30 a.m., May 2, 2019. All interested parties are strongly encouraged to attend. Forsyth County Administration Building, 110 E. Main Street, Commissioners Meeting room (2nd floor), Cumming, GA 30040.

Work to be completed within 360 calendar days.

DEADLINE FOR RECEIVING SEALED BIDS:	**2:00 p.m., Thursday May 23, 2019**
LAST DAY FOR QUESTIONS:	**Noon, May 14, 2019**
SEALED BID RECEIVING OFFICE:	**Procurement Dept. 514 West Maple Street, Suite 14 Cumming, GA 30040**
SEALED BIDS WILL BE OPENED AT:	**2:05 p.m., Thursday May 23, 2019 Procurement Dept. 514 West Maple Street, Suite 14 Cumming, GA 30040**

Sealed Bids in **duplicate** copy (1 original, 1 copy), subject to all provisions of the Invitation to Sealed Bid, will be received and opened at the time, date and place shown above. Award of Sealed Bid will be made at a later date pending evaluations of all Sealed Bids submitted.

Place name of Firm, opening date, Bid Number 19-59-3340, and the words "SEALED BID" on the lower left side of the sealed envelope.

Sealed Bids submitted after 2:00 p.m. on the date of the deadline will not be accepted under any circumstances. Delivery of Sealed Bid to proper location by date/time of deadline is Bidding Firm's responsibility.

Sealed Bid packages must be complete, in detail with all required information, bonds or other documents and if not so completed will be rejected

Sealed Bid tabulations will be furnished upon written request, or may be viewed on Forsyth County's web site www.forsythco.com.

Addenda and Interpretations: No interpretation of the meaning of the plans and specifications or other Sealed Bid documents will be made to any Bidder orally. Every request for such interpretations must be in writing and addressed to: Donna Kukarola, CPPO, CPPB, Director, Forsyth County Procurement Department, 514 West Maple Street, Suite 14, Cumming, Georgia 30040, email: dhkukarola@forsythco.com and to be given consideration must be received at least seven business (7) days prior to the date fixed for the opening of Sealed Bids. Any and all such interpretations and any supplemental instructions will be in the form of written Addenda to the Specifications which, if issued, will be posted on the Forsyth County Web Page, www.forsythco.com, on the right-hand side click on "Bids & Results" then click on the appropriate Bid Number. Failure of any Bidders to receive any such addendum or interpretation shall not relieve such Bidders from any obligation under his Sealed Bid as submitted; it is the responsibility of the Bidders to ensure receipt of any addenda. All addenda so issued shall become part of the Contract Documents.

Permits and Fees – It is the Contractor's responsibility to secure and pay for the building permit and other permits and fees, licenses, and inspections necessary for proper execution of the Work which are customarily secured after execution of the Contract.

SEALED BID 19-59-3340
Required Information from Sealed Bidders

Date of Sealed Bid: May 23, 2019

The undersigned agrees, if this Sealed Bid is accepted within __90__ calendar days after date of opening, to furnish all equipment, materials, or services in strict accordance with the provisions of this Invitation to Bid, at the price and terms and according to specifications or other provisions in this bid package. All work is to be completed as specified within 360 calendar days of issuance of Notice to Proceed.

If the successful Bidder does not hold a Forsyth County business license they will be required to register their business license with the Forsyth County Planning and Zoning Department. Proof of license will be required.

SEALED BIDDER'S INFORMATION

_____	_____
Company Name	Name of Person Authorized to Submit this Bid
Street Address:	
_____	_____
	Title
_____	
Mailing Address:	Contact person for this bid:
_____	_____
	Name
_____	_____
	Telephone
_____	_____
Tax I.D. #	Email

I hereby acknowledge receipt of the following checked Addendum of the Sealed Bid, Plans, Specifications, and/or other documents pertaining to the Project.

Addendum No(s): 1____ 2____ 3____ 4____ 5____ I understand that failure to confirm the receipt of addendum is cause for rejection of Sealed BIDS. It is the responsibility of the Bidder to ensure receipt of all addenda.

Authorized Signature: _____ Date: _____

1. DEFINED TERMS:

1.1 The terms used in Instructions to Bidders and defined in General Conditions (Section G) shall have meanings assigned to them in the General Conditions.

1.2 The term "Successful Bidder" means the Bidder to whom the Owner awards or expects to award the contract.

2. COPIES OF BID DOCUMENTS:

2.1 Bid Document Package may be available in advance to contractors and other interested parties at the cost and location stipulated in the ADVERTISEMENT FOR BID.

2.2 Complete sets of Bid Documents shall be used in preparing Bids. The Owner assumes no responsibility for errors or misinterpretations resulting from using incomplete sets of Bid Documents.

2.3 The Owner, in making Bid Documents available on the above terms, does so only to obtain Bids on Work and does not confer license or grant for any other use.

2.4 Any part of the Bid Documents may be modified by Addenda.

Where forms are provided, THEY MUST BE USED WITHOUT SUBSTITUTION! Use of forms other than those provided by the County shall constitute a non-responsive Bid and shall be rejected.

NOTE: Bidder must submit one (1) original and one copy of Bid Documents to include: Bid Form; Instructions to Bidders; Bidder's Affidavit; SAVE Affidavit; Non-Collusion Affidavit; Special Conditions (if inserted), and Bid Bond (if required).

3. QUALIFICATIONS OF BIDDERS:

3.1 Owner may make any investigations deemed necessary to determine Bidder's ability to perform the Work, and Bidder shall furnish all information and data requested by Owner. Bidder's inclusion as a pre-qualified Bidder will not prohibit the Owner from reserving right to reject any bid from any Bidder that Owner considers not properly qualified to carry out Contract obligations or able to satisfactorily complete the Work on schedule.

3.2 If Bidder does not have offices in the State of Georgia, such Bidder shall designate a proper agent in the State of Georgia on whom service can be made in the event of litigation.

4. EXAMINATION OF BID DOCUMENTS AND SITE:

4.1 Before submitting Bid, each Bidder shall: (a) examine the Bid Document Package thoroughly; (b) visit the site to become familiar with local conditions affecting cost or Work progress or performance; (c) become familiar with federal, state, and local laws, ordinances, rules, and regulations affecting cost or Work progress or performance; (d) study and carefully correlate Bidder's observations with the Bid Document Package; and, (e) notify Owner concerning conflicts, errors, or discrepancies in Bid Document Package.

4.2 On request, Owner may provide each Bidder access to the site to conduct investigations and tests that Bidder deems necessary in order to submit Bid subject to easement acquisitions and existing conditions.

4.3 Land where Work is to be performed, rights-of-way for access to site, and other lands designated for use by Contractor in performing Work are identified in General Conditions and Plans. The

Contractor's operations must be confined inside such property, rights-of-way or easement lines as provided by the County.

The Contractor shall not enter any easements except upon written direction from the Owner.

4.4 Bid submission will constitute **incontrovertible** representation that Bidder understands and has complied with requirements contained in this Article 4, and that Bidder has read and understood the Bid Document Package and hereby stipulates that the documents are sufficient in scope and detail to indicate and convey understanding for terms and conditions in order to perform Work.

5. ADDENDA AND INTERPRETATIONS:

5.1 Questions concerning meaning or intent of Bid Document Package shall be submitted to Owner in Writing. Replies will be issued by Addenda and posted on County website, and mailed or delivered to parties recorded by the Owner as having received Bid Document Package. Questions received less than seven (7) days prior to date for opening Bids will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect. NOTE: It is the responsibility of the Bidder to ensure receipt of any/all Addenda issued.

5.2 Addenda may be issued to modify Bid Document Package as deemed necessary by the Owner.

6. BID SECURITY (NOT REQUIRED FOR PUBLIC WORKS UNDER $100,000.00):

6.1 Each Bid shall be accompanied by Bid Security made payable to Owner in the amount equal to five percent (5%) of the Bidder's maximum Bid Price. Bid Security shall be cashier's check or Bid Bond issued by Surety meeting requirements contained in paragraph 24 below. **Bid bond must be on County provided form found in the bid package.** Failure to use County forms shall constitute a non-responsive bid and shall be rejected.

6.2 Bid Security for Successful Bidder will be retained until Bidder has executed Agreement and furnished required payment and performance bonds. If Successful Bidder fails to furnish the qualifications submittals or fails to execute and deliver Agreement and furnish required Payment and Performance Bonds within ten (10) calendar days after Notice of Award, Owner may annul Notice of Award and Bidder's Bid Security will be forfeited.

Bid Security, for any Bidder that Owner believes to have reasonable chance to receive award, may be retained by Owner until the ninety-first (91st) day after Bid opening. If Notice of Award is issued within ninety (90) calendar days after Bid opening, Bid Security for Bidder receiving Notice of Award may be retained by Owner up to ninety (90) calendar days after Notice of Award.

6.3 Bid Bond shall be issued by company having a registered agent in State of Georgia and shall comply with the additional requirements of paragraph 24 below.

7. EXAMINATION OF BID PLANS AND SPECIFICATIONS:

Bidders are advised to carefully examine the Bid Plans and Specifications for the proposed Work. The Bid Plans indicate the surface and underground structures likely to affect the prosecution of the Work insofar as they have been determined, but the information indicated is not guaranteed as being correct and complete. Bidders are expected to examine the Bid Plans and the location of the Work, verify all information with authorities concerned, and judge for themselves all the circumstances affecting the cost of the Work and the time required for its completion, and shall assume all patent and latent risks in connection therewith.

8. SOIL CONDITIONS:

The Owner does not make any representations as to the soil conditions to be encountered or as to foundation materials. The Contractor must assume all risk as to the nature and behavior of the soil which may be encountered or of soil or water which underlies the Work or is adjacent thereto, including any difficulties that may be due to quicksand or other unfavorable conditions that may be encountered in the Work, whether apparent upon surface inspection or disclosed only in the process of carrying forward the Work.

9. BID BOND FORFEITURE (if required):

The Successful Bidder, upon his failure or refusal to execute and deliver the Contract and Bonds required within ten (10) calendar days after receipt of Notice of Award, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with Bid.

Provisions for liquidated damages are set forth in the Advertisement for Bid, Bid Documents, and Specifications (including General Conditions).

10. SUBSTITUTE OR "OR EQUAL" ITEMS:

10.1 The Contract, if awarded, will be based on material and equipment described in Plans or specified in Specifications without consideration for possible substitute or "or equal" items. Where indicated in Plans or specified in Specifications, substitute or "or equal" material or equipment may be furnished or used by Contractor, **if acceptable to the Owner**. Application for substitute or "or equal" items will be considered by the Owner until seven (7) calendar days prior to date for opening Bids. Procedure for submitting application and consideration by Owner is set forth in General Conditions and may be supplemented in Paragraphs 11.2 and 11.3 following.

10.2 Materials or equipment specified or described in Bid Document Package by proprietary name or by naming a particular supplier are intended to establish type, function, and quality required. Unless name is followed by words indicating no substitution is permitted, materials or equipment from other suppliers may be accepted by the Owner if sufficient information is submitted by Bidder to allow Owner to determine material or equipment proposed is equivalent or equal to named material or equipment. Bidders shall make written application to Owner for proposed substitute material or equipment, and shall certify that the proposed substitute material or equipment will perform adequate functions and achieve results called for by general design, be similar and equal substance to item specified, and be suited to same use as specified material or equipment. Application shall state that Owner's acceptance of proposed substitute will not prejudice Contractor's achieving Substantial Completion on time, will or will not require changes to Contract Documents to adapt design to proposed substitute, and will or will not require payment for license fee or royalty. Bidder shall indicate acceptance of responsibility for all costs of redesign which may be required through approval of Bidder's application.

Variations for proposed substitute from item specified will be identified in application and available maintenance, repair, and replacement service will be indicated.

10.3 Bidders may propose substitute construction means, methods, sequences, techniques, or procedures for specific construction means, methods, techniques, sequences, or procedures indicated in or required by Bid Document Package. Bidders shall submit sufficient information to allow Owner to determine substitute proposed is equivalent to means, method, sequence, technique, or procedure indicated or required by Bid Document Package. Procedure for review by Owner will be similar to method provided in paragraph 10.2 above.

10.4 Owner will be allowed reasonable time to evaluate each proposed substitute. No application for substitute will be considered later than seven (7) calendar days prior to opening date. Owner will be sole judge concerning proposed substitute acceptability.

11. SUBCONTRACTORS, SUPPLIERS AND OTHERS:

11.1 Each Bid shall identify names and addresses for subcontractors, suppliers, and other persons and organizations furnishing material and equipment, or Bid will be considered non-responsive. The Bidder is cautioned that any person, firm or other party to whom it is proposed to award a subcontract under this Contract must meet the same conditions of experience, competent personnel and workman's compensation insurance as the Bidder.

If requested by Owner, the Successful Bidder and any other Bidder shall, within seven (7) calendar days after request, submit to Owner experience statement with pertinent information for similar projects and other qualifications for each subcontractor, supplier, person, and organization. If Owner, after due investigation has reasonable objection to any proposed subcontractor, supplier, person, or organization, Owner may, before giving Notice of Award, request Successful Bidder to submit acceptable substitute without increase in Contract Price or Contract Time. If Successful Bidder declines to make substitution, Owner may elect not to award contract to Bidder. Bidder's declining to make substitution will not constitute grounds for sacrificing Bid Security.

11.2 Procedures for approving Subcontractors after executing Agreement are described in the General Conditions. No subcontractors may be employed without the specific written authorization of the Owner.

11.3 No Contractor will be required to employ subcontractor, supplier, person, or organization against whom Contractor has reasonable objection.

12. NOTICE OF SPECIAL CONDITIONS:

Attention is particularly called to those parts of the Specifications (including General Conditions) which deal with the following:

a. Insurance Requirements.

13. BID FORM/SCHEDULE:

13.1 Bid Form is included in the Bid Document package purchased by the Bidders.

13.2 Bid Forms shall be completed and submitted in duplicate.

13.3 Bids by corporations shall be executed in corporate name by president or vice-president (or other corporate officer accompanied by evidence indicating officer has authority to sign) and corporate seal shall be affixed and attested by secretary or assistant secretary. Corporate address and state of incorporation shall be shown below signature. If Bid is executed by someone other than president or vice-president, attach to Bid certified corporate resolution by board of directors authorizing person to execute Bid for Corporation.

13.4 Bids by partnerships shall be executed in partnership name and signed by partner, whose title shall appear under signature and official partnership address shall be shown below signature.

13.5 If requested, person signing Bid for corporation or partnership shall produce evidence satisfactory to Owner indicating person's authority to bind corporation or partnership.

13.6 Names shall be typed or printed below signature.

13.7 Bid shall contain acknowledgment Bidder has received Addenda (Addenda numbers shall be filled in on Bid Form).

13.8 Address and telephone number for communications regarding Bid shall be shown.

13.9 Bidder must furnish, in his Bid (if not furnished with Pre-Qualification Package), summary information relative to the facilities, ability, and financial resources available for the fulfillment of the Contract.

14. QUANTITIES OF WORK:

The quantities of Work as given for Unit Price Items in the Bid Form are approximate and are assumed solely for comparison of the proposals. They are not guaranteed to be accurate statements or estimates of quantities of Work that are to be performed under the Contract, and any departure, therefrom will not be accepted as valid grounds for any claim for damages, for extension of time or for loss of profits; nor will any additional payments other than that bid or stipulated under the Unit Prices, be made regardless of the actual quantities required or ordered to complete the Work.

15. SUBMISSION OF BIDS:

15.1 Bids shall be submitted before time and at place indicated in Advertisement for Bid and shall be submitted in opaque sealed envelope with notation "BID NUMBER, NAME OF BIDDER" on face, lower left-hand corner. If Bid is sent through mail or other delivery system, sealed envelope shall be enclosed in separate envelope with notations as above on face.

15.2 Each Bid shall contain following documents in completed form (County forms must be used without substitution):

1. Bid Form/Schedule
2. Bidder's Acknowledgement
3. Qualifications Statement C-451
4. Non-Collusion Affidavit
5. Bid Security (Surety Bond on County provided Form or Certified Cashier's Check) Power of Attorney (Surety Bonds only)
6. Corporate authority to execute Bid (required for any corporate officer other than president or vice-president)
7. List of proposed subcontractors
8. Contractor Affidavit

15.3 More than one Bid received for same work from individual, firm, partnership, corporation, or association under same or different names will not be considered. Reasonable grounds for believing any Bidder is interested in more than one Bid for same work will cause Owner to reject all Bids from Bidder. If Owner believes collusion exists among Bidders, Bids from participants in collusion will not be considered.

15.4 Conditions, limitations, or provisions attached by the Bidder to the Bid Forms may cause its rejection. Bids containing Items not included in the form of Bid will be considered irregular.

16. MODIFICATION AND WITHDRAWAL OF BIDS:

16.1 Withdrawal Prior to Time for Receiving Bids -- Bids may be modified or withdrawn by appropriate document duly executed (in manner Bid must be executed) and delivered to place where Bids are to be submitted at any time prior to deadline for submitting Bids. Bid Withdrawal will not prejudice Bidder's rights to submit new Bid prior to Bid Date and Time.

16.2 Withdrawal After Time for Receiving Bids -- After period for receiving Bids has expired, no Bid may be withdrawn, modified, or explained except as provided for in paragraph 18 below.

17. OPENING OF BIDS:

Bids will be opened publicly at the time and place set forth in the ADVERTISEMENT FOR BID and read aloud. Abstract listing amounts for Base Bids and major alternates will be made available after Bid opening.

17.1 After Bid opening Bidder has up to twenty-four (24) hours to notify the Forsyth County Department of Procurement that Bidder made an obvious error in Bid calculation. Bid Bond withdrawal for this reason shall be requested in writing within this same twenty-four (24) hour period. Said written request shall be accompanied by sufficient documentation to demonstrate the origin and composition of the "obvious error". Bid Bond may not be withdrawn for any other reason.

18. BIDS TO REMAIN OPEN:

Bids shall remain open for acceptance by Owner for ninety (90) calendar days after Bid opening. Owner may, at its sole discretion, release any Bid and return Bid Security prior to that date.

19. AWARD OF CONTRACT:

19.1 To extent permitted by applicable state and federal laws and regulations, Owner reserves right to reject any and all Bids, to waive any and all informalities, and to disregard nonconforming, non-responsive, or conditional Bids. Bids may be considered irregular and subject to rejection if they show serious omission, unauthorized form alterations, use of unauthorized forms, unauthorized alternate bids, incomplete or unbalanced unit prices, or other irregularities. Discrepancies between words and figures will be resolved in favor of correct sum. Any mistake which is obviously a clerical one, such as an error in price extension, or in placement of decimal points, reversal of prices, FOB destination, FOB point of origin, etc., may be corrected by the purchasing authority after verification is made by the bidder. However, under no circumstances can unit prices be changed.

19.2 Contract will be awarded by Owner pursuant to applicable law. Nothing contained herein shall place duty upon Owner to reject bids or award contract based upon anything other than Owner's sole discretion as described herein.

19.3 Owner may consider qualifications and experience for subcontractors, suppliers, persons, and organizations proposed for Work.

19.4 Owner may conduct investigations deemed necessary to assist in evaluating Bids and to establish responsibility, qualifications, and financial ability for Bidders, proposed Subcontractors, persons, and organizations to do Work. Owner reserves the right to reject Bid from any Bidder not passing evaluation to Owner's satisfaction.

19.5 One contract for Work will be awarded, if award is made, based upon Base Bid to lowest responsible, responsive Bidder. Alternate Bids will not be considered as basis for award unless specifically stated on the Bid Form. Successful Bidder will be required to perform Work as Prime Contractor. Work performed by Contractor shall be 50% minimum. No Contract assignment or subcontracting will be allowed without written permission from Owner.

19.6 The Successful Bidder will be required to furnish a Performance and Payment Bond, each in a sum not less than one hundred percent (100%) of the amount of the contract. The Bonds shall be that of an approved surety meeting the requirements as noted in paragraphs 6 and 22 herein.

19.7 If at any time after the execution and approval of the Contract and of the Surety Bonds as required in the Bid Advertisement, the Owner shall deem any of the Sureties upon such Bonds to

be unsatisfactory, or such Bonds to be inadequate security for the Owner, the Contractor shall, within ten (10) calendar days after notice from the Owner to do so, furnish new or additional Contract Bonds, in form and sum, and signed by such Sureties who all shall be satisfactory to the Owner. Nor further payment will be deemed due nor will any further payment be made to the Contractor unless such new or additional Bonds are furnished and approved. The premium on such Bonds shall be paid by the Contractor.

Failure of the Contractor to submit approved Performance and Payment Bonds within the required ten (10) calendar days shall, at the discretion of the Owner, constitute a forfeiture of the Bid Bond.

20. SUBMITTALS BY SUCCESSFUL BIDDER:

20.1 Owner intends to award contract to Bidder competent to perform and complete Work in satisfactory manner. Owner will require Successful Bidder to submit, within seven (7) calendar days after receiving written request from Owner and prior to contract award, Preliminary Progress Schedule and Schedule of Values, as set forth below.

20.2 Preliminary Progress Schedule shall be submitted in triplicate and include time-scaled schedule and narrative in accordance with appropriate formats established in Owner's written request for schedules. Activities in schedule shall show order Successful Bidder proposes to perform Work within constraints and sequencing conditions set forth in Specifications (including General Conditions) and shall indicate starting and completion dates for key milestones and Work pertaining to each Specifications division within each major structure or geographical area on site. Activities shall identify significant submittals and approvals, major equipment deliveries, equipment testing, Owner's responsibilities, affected utilities, and other similarly involved third parties.

20.3 Schedule of Values shall include Bid itemization by major structures or Work areas.

20.4 Successful Bidder and surety, if any, agree any delays within Bidder's control in delivering submittals shall constitute request by Bidder for time extension and Bid shall remain open for Owner's acceptance. If Owner agrees to time extension, Bidder shall comply with Submittal Requirement within five (5) additional calendar days. At Owner's option, failure by Successful Bidder to deliver submittals within extended period will void Bid evaluation and will constitute proof Successful Bidder has abandoned Bid, Bid Security may be declared forfeited to Owner as liquidated damages, and Work may be awarded to another Bidder.

21. TAXES:

Contractor shall pay applicable sales, consumer, use, and other similar taxes required by law. Contractor is responsible for reviewing pertinent state statutes involving sales tax and complying with requirements.

The Contract prices for articles, materials, or equipment named herein are subject to increase by the amount of any additional tax or taxes affecting the articles, materials or equipment involved in the Contract imposed by or under the authority of the Federal or State Government and passed or taking effect after the receipt of Bids, and shall continue in effect during such time as such tax or taxes are lawfully collectible; provided, however, that in the event of such increase in cost, the claim shall be presented within thirty days and supported by evidence of such additional tax, satisfactory to the County Attorney.

22. QUALIFICATIONS OF SURETY COMPANIES:

In order to be acceptable to Owner, the surety company issuing Bid Guaranty Bonds or 100% Performance/Payment bonds as required in Bid Advertisement, shall meet and comply with following minimum standards:

22.1 **BONDING COMPANY MUST BE LICENSED TO DO BUSINESS IN GEORGIA BY THE GEORGIA SECRETARY OF STATE, AUTHORIZED TO DO BUSINESS IN GEORGIA BY THE GEORGIA INSURANCE DEPARTMENT, LISTED IN THE DEPARTMENT OF THE TREASURY'S PUBLICATION OF COMPANIES HOLDING CERTIFICATES OF AUTHORITY AS ACCEPTABLE SURETY ON FEDERAL BONDS AND AS ACCEPTABLE REINSURING COMPANIES AND HAVE AN A.M. BEST RATING OF A-CLASS VI OR HIGHER.**

22.2 All bonds must be submitted on forms provided by Forsyth County and agencies providing bonds and insurance must provide proof that they meet the criteria outlined in the bid and contract documents.

22.3 Surety shall be admitted to do business in State of Georgia and shall be registered to provide such surety by the State of Georgia Insurance Commissioner.

22.4 Surety shall have been in business and have record indicating successful continuous operations for at least five (5) years.

22.5 Attorneys-in-fact who sign bid bonds or performance/payment Bonds shall file with bond certified power of attorney to sign bond.

22.6 Surety company agents shall list name, address, and telephone number on bonds.

22.7 Performance and Payment Bonds shall extend twelve (12) months beyond date of final payment and shall contain waiver for alteration to Contract terms, time extensions, or forbearance on Owner's part.

23. EXECUTION OF WRITTEN CONTRACT:

Successful Bidder will be required to sign written contract identified in bid package as Agreement. Unsigned Agreement will be submitted to Successful Bidder either prior to or along with the Notice of Award. The Contractor shall sign and deliver the fully executed Agreements to Owner with all required bonds within ten (10) calendar days following receipt of Agreement forms, (unless otherwise stipulated by the Owner).

24. ADDITIONAL WORK NOT INCLUDED IN THE CONTRACT:

Any additional work not included in this contract or intended to be included in this contract that is performed by the Contractor will be paid for as an "extra" providing the work has been authorized and cost agreed upon in writing by the Owner. All Change Orders, Time Extensions, must go through the Forsyth County Procurement Department.

Such extra work shall be subject to payment by fixing the prices and the method of payment and of doing the work, or compensation shall be provided for on the basis of reasonable cost of necessary labor and material and an allowance of 15 percent (15%) for overhead and profit as may be stipulated by the Owner in the written authorization for the Work. The cost may include all items of labor or materials; the use of power tools, and equipment actually used, power, and all items of cost such as public liability and workmen's compensation insurance, pro-rata charges for foremen; also social security, old age and unemployment insurance; however, no percentage for overhead and profit shall be allowed on items of social security, old age and unemployment insurance. Among the items considered as overhead are included insurance other than mentioned above, bond or bonds, superintendence, timekeeper, clerks, watchmen, use of small tools, incidental job burdens, and general office expenses. Charges for power tools and equipment shall not exceed the charges listed in the

latest edition of the "Contractors Equipment Ownership Expenses" as published by the Associated General Contractors of America, Inc.

The Contractor shall give the Owner access to all accounts, bills, payrolls, and vouchers relating to such extra work, and he agrees that he shall have no claim for compensation for such extra work in case of items not covered by unit prices unless a statement in writing of the actual cost of the same, fully itemized as to labor, materials, and other allowable costs is presented to the Owner before the fifteenth (15th) day of the month following that during which each specific order was complied with.

25. SCHEDULE OF BEGINNING AND COMPLETION OF WORK:

The Contractor shall begin each project within seven (7) calendar days after from issuance of Notice to Proceed to begin work on each particular project. The Contractor will be required to provide the necessary personnel and equipment to complete installation of the Work at an acceptable rate in accordance with the approved submittals.

If the Contractor's rate of progress consistently fails to meet the specifications, or, if the Contractor repeatedly fails to comply with the Owner's requests relating to the performance or timely completion of the Work or fails to maintain the Work in a safe manner, after notification from the Owner, the Owner shall have the right to assign all or any portion of the Work to an outside contractor. Any and all costs over and above the Contract unit costs which are incurred by the Owner in assigning work to an outside contractor as a result of the Contractor's failure to complete the Work at the rates and in the manner herein specified shall be deducted from any monies due the Contractor.

The Contractor shall furnish the Owner the names, residence and business addresses and telephone numbers of three (3) responsible persons who shall be authorized to receive emergency notices and to act on behalf of the Contractor.

(REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK)

26. BIDDER'S ACKNOWLEDGEMENT:

The undersigned bidder acknowledges all requirements outlined in the above "Instructions to Bidders Package" and all documents referred to therein. This signed form must accompany the completed bid form submitted at the time of bid.

SIGNATURE: _____ DATE: _____
(President, Vice President or Corporate Officer)

PRINTED NAME: _____ TITLE: _____

ATTESTED BY: _____ DATE: _____
(Secretary of Corporation)

PRINTED NAME: _____ TITLE: _____

SEAL
(Corporate Seal required if Bidder is a Corporation)

COMPANY NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

TELEPHONE NUMBER: _____

SPECIAL CONDITIONS BID 19-59-3340

The undersigned has read and agrees with the "Special Conditions" outlined above in the accordance with our contract agreement.

1. Forsyth County, in accordance with Title VI of the Civil Rights Act of 1964 and 78 Stat. 252, 42 USC 2000d – 42 and Title 49, Code of Federal Regulations, Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, minority enterprise will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated on grounds of race, color, sex or national origin in consideration of award.
2. Compliance with Regulations – Contractor shall comply with the Regulations relative to nondiscrimination in federally-assisted programs of the DOT, Title 49, Code of Federal Regulations, part 21, as they may be amended from time to time (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
3. Nondiscrimination – Contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, sex, or national origin in the selection and retention of subcontractors, including procurement of materials and leases of equipment. Contractor shall not participate either directly or indirectly in discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.
4. Solicitation for subcontracts, Including Procurement of Materials and Equipment – In all solicitations either by competitive bidding or negotiations made by the Contractor for work to be performed under a subcontract, including procurement of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the Contractor of the Contractor's obligations under this contract and the Regulations relative to nondiscrimination on the ground of race, color, sex, or national origin.
5. Information and Reports - Contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto, and shall permit access to its books records, accounts, other sources of information and its facilities as may be determined by the County or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations, orders, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the County, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
6. Sanctions for Noncompliance – in the event of the Contractor's noncompliance with the nondiscrimination provisions of this contract, the County shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:
   a) Withholding of payments to the Contractor under the contract until the Contractor complies; and/or
   b) Cancellation, termination, or suspension of the contract, in whole or in part

The undersigned has read and agrees with the "Special Conditions" as outlined above in accordance with the Invitation to Bid Number 19-59-3340.

_____ Date: _____

Authorized Signature

_____

Printed Name and Title

BID SCHEDULE 19-59-3340

FOR: Furnishing all labor, equipment and materials necessary for installation of the SR 400 Waterline. This project will be for the purposes of installing a new water transmission main in Forsyth County starting at Martin Road, following GA 400 south and ending approximately 1500 LF south of SR 369 Browns Bridge Road. Work will include but not limited to installation of approximately 3312 LF of 42" DIP water main, 3632 LF of 36" DIP water main, 62 LF of 24" DIP water main, 72 LF of 12" DIP water main, valves and connections to th owners potable water system. Project will also include a 105 LF 60" Jack and Bore and two separate 54" Jack and Bores that total 185 LF and associated work described in the contract documents.

GENERAL INFORMATION: All work to conform to Forsyth County Water and Sewer Specifications. Contractor to have valid Georgia Utility Contractors License and show proof of insurance. C-451 Qualifications MUST be submitted with Bid and will be part of the review process in determining responsive and responsible bidder. **Georgia Utility Contractors License:**_____

Item	Description	Quantity	Unit	Unit Price	Cost
1	42" Restrained Joint Class 200 Ductile Iron Water Main	1578	LF	$	$
2	42" Restrained Joint Class 200 Ductile Iron Water Main with Polywrap	1055	LF	$	$
3	42" Restrained Joint Class 350 Ductile Iron Water Main	100	LF	$	$
4	42" Restrained Joint Class 350 Ductile Iron Water Main with Polywrap	540	LF	$	$
5	36" Restrained Joint Class 200 Ductile Iron Water Main	3503	LF	$	$
6	36" Restrained Joint Class 200 Ductile Iron Water Main with Polywrap	18	LF	$	$
7	36" Restrained Joint Class 350 Ductile Iron Water Main	85	LF	$	$
8	24" Restrained Joint Class 200 Ductile Iron Water Main	57	LF	$	$
9	12" Restrained Joint Class 350 Ductile Iron Water Main	11	LF	$	$
10	12" Restrained Joint Class 350 Ductile Iron Water Main with Polywrap	62	LF	$	$
11	10" Restrained Joint Class 350 Ductile Iron Water Main with Polywrap	23	LF	$	$
12	36" Tie-in Connection	1	EA	$	$
13	24" Tie-in Connection (Sta 0+00)	1	EA	$	$
14	24" Tie-in Connection (17+98)	1	EA	$	$
15	12" Tie-in Connection	1	EA	$	$
16	10" Tie-in Connection	1	EA	$	$
17	60" Steel Casing by Open Cut Under Stream Crossing	84	LF	$	$
18	60" Steel Casing by Jack and Bore	105	LF	$	$

19	54" Steel Casing by Jack and Bore County Way	129	LF	$	$
20	54" Steel Casing by Jack & Bore Martin Road	56	LF	$	$
21	54" Steel Casing by Jack and Bore US 19/SR 400 @ Martin Road	203	LF	$	$
22	42" Restrained End Gate Valve (Installation)	2	EA	$	$
23	36" Restrained End Gate Valve (Installation)	3	EA	$	$
24	24" Restrained Joint Mechanical Joint Gate Valve	2	EA	$	$
25	12" Restrained Joint Mechanical Joint Gate Valves	3	EA	$	$
26	6" Air Release Valve	7	EA	$	$
27	Fittings (Restrained Mechanical Joint)	28	TONS	$	$
28	Fittings (Restrained Mechanical Joint or Restrained End)	28	TONS	$	$
29	2" Short Side Service Connection	1	EA	$	$
30	Asphalt - Cut and Replace	800	LF	$	$
31	Concrete Curb & Gutter Replacement	115	LF	$	$
32	Concrete Swale	1	LS	$	$
33	Gravel Replacement	20	LF	$	$
34	Remove Existing Fire Hydrant	2	EA	$	$
35	Existing Main Abandonment with Grout	900	LF	$	$
36	Existing Main Abandonment without Grout	1	LS	$	$
37	Existing Main Removal	6400	LF	$	$
38	Rip Rap	40	CY	$	$
39	Clearing and Grubbing	1	LS	$	$
40	Traffic Control	1	LS	$	$
41	Mobilization (3% Maximum)	1	LS	$	$

TOTAL BID: **$**_____

_____

Total Bid in Written Format

Authorized Signature:_____ **Name and Title:**_____

Company Name:_____ **Date:**_____

LIST OF SUBCONTRACTORS

I do_____, do not_____, propose to subcontract some of the work on this project. I propose to subcontract work to the following subcontractors:

NAME AND ADDRESS	TYPE OF WORK

Note: All subcontractors will be required to complete a subcontractor e-verify affidavit prior to starting work.

COMPANY NAME: _____

NON-COLLUSION AFFIDAVIT
(This Affidavit is Part of the Bid Documents)

BID DATE:

PROJECT DESCRIPTION:

STATE OF _____ }

COUNTY OF _____ }

_____, being first duly sworn, deposes and says that (s)he is _____ (the sole owner, a partner, the president, secretary, etc.) of _____ the party making the foregoing Proposal or Bid; that such Bid is genuine and not collusive or a sham; that said Bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any Bidder or person, to put in a sham Bid, or that such other person refrain from bidding, and has not in any manner, directly or indirectly sought by agreement or collusion, or communication or conference, with any person, to fix the Bid Price of affiant or any other Bidder, or to fix any overhead, profit or cost element of said Bid Price, or that of any other Bidder, or to secure any advantage against Forsyth County, or any person interested in the proposed Contract; and that all statements in said Proposal or Bid are true; and further, that such Bidder has not, directly or indirectly submitted this Bid, or the contents thereof, or divulged information or data relative thereto, to any association or to any member or agent thereof.

Affiant: _____ Date: _____

Signed and sworn to (or affirmed) before me on _____, 20____
By _____,
Printed name(s) of individual(s) making statement

Who proved to me on the basis of satisfactory evidence to be the person who appeared before me.

_____Personally Known
Or
_____Produced Identification
Type and # of ID (last 4 digits) _____
ID Expiration Date _____

_____
Notary Public

(SEAL)

My Commission Expires: _____

CONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this affidavit, the undersigned Contractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual, firm or corporation which is contracting with (Forsyth County Board Of Commissioners) has registered with and is participating in a federal work authorization program* [any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603], in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

The undersigned further agrees that, should it employ or contract with any subcontractor(s) in connection with the physical performance of services pursuant to this contract with (Forsyth County Board of Commissioners), contractor will secure from such subcontractor(s) similar verification of compliance with O.C.G.A. 13-10-91 on the Subcontractor Affidavit provided in Rule 300-10-01-.08 or a substantially similar form. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the (Forsyth County Board of Commissioners) at the time the subcontractor(s) is retained to perform such service.

By initialing in the appropriate space below, the contractor indicates the applicable deadline as established in O.C.G.A. 13-10-91:

_____ On or after July 1, 2007, to public employers, contractors, or subcontractors of 500 or more employees:

_____ On or after July 1, 2008, to public employers, contractors, or subcontractors of 100 or more employees:

_____ On or after July 1, 2012 to all other public employers, their contractors, or subcontractors

_____ _____

EEV / Basic Pilot Program* User Identification Number Contractor Name

_____ _____

BY: Authorized Officer or Agent Date
(Contractor Name)

_____

Title of Authorized Officer or Agent of Contractor

_____

Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME ON THIS THE

_____ DAY OF _____, 201___.

_____

Notary Public
My Commission Expires:

_____

* As of the effective date of O.C.G.A. 13-10-91, the applicable federal work authorization program is the "EEV / Basic Pilot Program" operated by the U.S. Citizenship and Immigration Services Bureau of the U.S. Department of homeland Security, in conjunction with the Social Security Administration (SSA).

(End of Form)

SUBCONTRACTOR AFFIDAVIT

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services under a contract with (_____) on behalf of (Forsyth County Board Of Commissioners) has registered with and is participating in a federal work authorization program* [any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603], in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

_____ _____

EEV / Basic Pilot Program* User Identification Number Subcontractor Name

_____ _____

BY: Authorized Officer or Agent Date
(Subcontractor Name)

_____

Title of Authorized Officer or Agent of Subcontractor

_____

Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME ON THIS THE

_____ DAY OF _____, 201____

_____

Notary Public
My Commission Expires:

_____

* As of the effective date of O.C.G.A. 13-10-91, the applicable federal work authorization program is the "EEV / Basic Pilot Program" operated by the U.S. Citizenship and Immigration Services Bureau of the U.S. Department of homeland Security, in conjunction with the Social Security Administration (SSA).

(End of Form)

Forsyth County, Georgia
Sub-subcontractor Affidavit under O.C.G.A. § 13-10-91 (b)(4)

By executing this affidavit, the undersigned sub-subcontractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services under a contract for (name of subcontractor or sub-subcontractor with whom such sub-subcontractor has privity of contract) and (name of contractor) on behalf of Forsyth County Government has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned sub-subcontractor will continue to use the federal work authorization program throughout the contract period and the undersigned sub-subcontractor will contract for the physical performance of services in satisfaction of such contract only with sub-subcontractors who present an affidavit to the sub-subcontractor with the information required by O.C.G.A. § 13-10-91(b). The undersigned sub-subcontractor shall submit, at the time of such contract, this affidavit to (name of subcontractor or sub-subcontractor with whom such sub-subcontractor has privity of contract). Additionally, the undersigned sub-subcontractor will forward notice of the receipt of any affidavit from a sub-subcontractor to (name of subcontractor or sub-subcontractor with whom such sub-subcontractor has privity of contract). Sub-subcontractor hereby attests that its federal work authorization user identification number and date of authorization are as follows:

_____
Federal Work Authorization User Identification Number

_____
Date of Authorization

_____
Name of Sub-subcontractor

_____
Name of Project

_____
Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed on _____, 201___ in _____(city), _____(state).

_____
Signature of Authorized Officer or Agent

_____
Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME
ON THIS THE _____ DAY OF _____-,201___.

_____
NOTARY PUBLIC
My Commission Expires _____

FORSYTH COUNTY
STANDARD TERMS AND CONDITIONS

1. CHANGES: No change will be made to this invitation except by written modification by the County Procurement Office. Requests for interpretation or changes must be in writing and received at least (7) seven calendar days prior to the time set for opening of the bids.

2. FOB POINT: Bid price to include shipping, packing, crating and unloading at address in Bid Schedule. Title to remain with vendor until fully accepted by county. Goods damaged or not meeting specifications will be rejected and removed at vendor's expense. Concealed damaged goods to remain property of vendor until replaced or removed at County's direction.

3. RISK OF LOSS: Vendor agrees to bear all risk of loss, injury and destruction of goods and materials ordered herein which occur prior to delivery to include concealed damage; and such loss, injury or destruction shall not release vendor from any obligation.

4. DELIVERY TIME: Specify on Bid Schedule the delivery time you are able to meet for items listed in Bid Schedule. Failure to meet stated delivery times may be grounds for cancellation of order.

5. BID ACCEPTANCE TIME: Bids requiring acceptance by the county in less than (60) sixty calendar days could be rejected, unless so stated on "Bidder's Response Page" and accepted by the county.

6. WITHDRAWAL OF BIDS: Bids may be withdrawn by written request only, if the request is received prior to the time and date set for the opening of bids. Negligence on the part of the bidder in preparing his bid confers no right of withdrawal or modification of his bid after bid has been opened. No bid may be withdrawn for a period of (60) Sixty days after time has been called on the date of opening.

7. SUBSTITUTIONS: When references are made in these documents to trade names or to the brand names of manufacturers, such references are made solely to designate and identify the quality of materials or equipment to be furnished and are not intended to restrict competitive bidding. If comparable materials or equipment of trade names or of manufactures' names which are different from those mentioned in the bid specifications are offered, the burden of proving equality of a proposed substitution rest on the submitting party and must be provided with the bid.

8. AWARD: For all contracts established through a Bid/Proposal the award will be made to the lowest responsible bidder meeting all specifications and whose bid is responsive to the Bid/Proposal. This is the bidder who submits the lowest price, whose bid meets the specifications, who agrees to contract terms and conditions with Forsyth County, and who is clearly capable of performing the resulting contract. Therefore, the lowest responsible bidder will not always be the bidder who has submitted the lowest monetary bid.

   8.1: The vendor in accepting this contract, attests that he is in compliance with the nondiscrimination clause contained in Section 202 of Executive Order 11246, as amended, relative to equal employment opportunity for all persons without regard to race, color, religion, sex, or national origin, and the implementing rules and regulations prescribed by the Secretary of Labor, which is incorporated herein by reference.

9. EXCEPTIONS TO SPECIFICATIONS: Any award resulting from this invitation shall bind the bidder to all terms, conditions and specifications set forth in this invitation. Bidders whose bids do not conform should so note on separate page if necessary and/or on Bid Schedule. While the county reserves the right to make an award to a nonconforming bidder when in the best interest of the county, such awards will not be readily made, and bidders are urged to conform to the greatest extent possible. No exceptions will be considered to have been taken by a bidder unless it is properly set out as provided above. No exception

will be deemed to have been taken by the county unless incorporated in an award resulting from this invitation and so stated.

10. BID RESULTS: No bid results will be issued by telephone. Interested parties may request in writing, a bid tabulation by sending a self-addressed, stamped envelope with their request to: Forsyth County Procurement Department, 514 West Maple Street, Suite 14, Cumming GA 30040.

11. PAYMENT: Upon inspection and acceptance of all items, amount due shall be paid within thirty (30) days of receipt of correct invoice, unless a shorter time is stated in the bid and accepted by the County (see #13 below). Submit invoice(s) with original signature of receiving County personnel to Forsyth County Commissioners, Attn. Accounts Payable, 110 E. Main St, Suite 210, Cumming, Georgia 30040

    11.1: Itemize all invoices in full. Show payment terms. Be sure our Purchase Order number is on your invoice. Mail the original and one copy of your invoice to the address above.

    11.2: Vendor must furnish delivery receipt with invoice identifying that this order has been delivered in accordance with specifications, quantities, and price as set forth on the purchase order. A Forsyth County employee's signature must appear on the delivery receipt or invoice.

    11.3: Items on this order are exempt from Federal Excise Tax and Georgia Sales and Use Tax. A certificate will be furnished if requested. Forsyth County is exempt from taxes but the successful bidder shall pay all taxes required of him by law and Forsyth County cannot exempt others from tax.

    11.4: Payment terms and provisions herein or otherwise found within the contract documents supersede all provisions of the Georgia Prompt Pay Act (House Bill 837; 13 O.C.G.A. Chapter 11 et seq.)

12. COMMODITY STATUS: It is understood and agreed that materials delivered shall be new, of latest design, and in first quality condition, that all bags, containers, etc., shall be new and suitable for storage, unless otherwise stated by Forsyth County.

13. INQUIRIES REGARDING PAYMENT: All inquiries regarding payment of invoices are to be directed to: Accounts Payable, 110 E. Main St, Suite 210, Cumming, Georgia 30040.

    13.1 DISCOUNTS: Prompt payment discounts offered for period of less than fifteen (15) days will not be considered in determining the low bidder. However, such discounts, when offered, will be taken provided payment is made within the time specified. Time, in connection with discounts for prompt payment, will be computed from the date of final acceptance of all goods for which payment is claimed, or the date the correct invoice is received by the county, whichever is later.

14. ANTI-DISCRIMINATION CLAUSE: "Forsyth County does not discriminate against any person because of race, color, religion, national origin, or disabilities in employment or service provided."

15. TERMINATION: Pursuant to O.C.G.A. 36-60-13, if applicable, any contract resulting from this Invitation to Bid, if not sooner terminated pursuant to the provisions of termination contained herein, is terminable by the Board of Commissioners of Forsyth County, Georgia on December 31 of each calendar year during the term of said contract, except that said contract shall be renewed automatically on such date, and without any lapse, unless positive action is taken to terminate said contract by the board in a public meeting and such action entered in the Official Minutes of the Forsyth County Commission.

16. APPROPRIATION OF FUNDS: Initial contract and any continuation contract(s) will terminate immediately and absolutely at any such time as there are no appropriated and otherwise un-obligated funds available to satisfy the County's obligations under said contract(s).

17. REGULATORY AGENCIES: Successful bidder will be responsible for all required permits or license required by any regulatory agency of the city, county, state or federal governments. Further, successful bidder will be responsible for meeting all requirements of any regulation(s) or guideline(s) of any of the

said governments or any independent agency recognized by said governments as publisher of any such regulation(s) or guideline(s).

18. INDEPENDENT CONTRACTORS: The bidder represents to Forsyth County that he is fully experienced and properly qualified to perform the functions provided for herein and that he is properly equipped, organized and financed to perform such functions. The bidder shall finance his own operations hereunder, shall operate as an independent contractor and not as the agent of Forsyth County and nothing contained in this Invitation to Bid or a contract resulting from same shall be construed to constitute the bidder or any of his employees, servants or agents or subcontractors as a partner, employee, servant or agent of the county nor shall either party have any authority to bind the other in any respect, it being intended that each shall remain an independent contractor.

19. ASSIGNMENT OF CONTRACTUAL RIGHTS: It is agreed that successful bidder will not assign, transfer, convey or otherwise dispose of a contract that results from this invitation or his right, title, or interest in or to the same, or any part thereof, without written consent of the county.

20. QUESTIONS: All questions concerning this invitation should be directed to the purchasing agent whose name appears on the cover page unless otherwise directed.

21. REJECTION OF BIDS/PROPOSALS: The Forsyth County Board of Commissioner's reserves the right to reject any and all bids/proposals submitted in response to any solicitation, to reject any portion thereof, or to waive any minor irregularity or administrative requirement.

22. PAYMENT ON CONTRACTS: Payment for work completed will be made on monthly invoices at the contract price for units in place and accepted by the County. Except that a 5% retainer will be withheld from each payment. Upon completion of all work acceptance by the County, any retainer due the contract will be paid within thirty (30) days of final acceptance or receipt of correct invoice, whichever is later.

23. SITE INSPECTION: Bidders should inspect the site to ascertain the nature and location of the work and the general conditions, which could affect the work or the cost thereof. The County will assume no responsibility for representations or understandings concerning conditions made by any of its Officers or Employees unless included in the Invitation to Bid/Proposal.

24. AFFIDAVIT: The bidder will be required to execute an Affidavit of Non-Collusion and submit it with Bid Documents.

25. EXECUTION OF CONTRACT: Subsequent to the award the successful bidder will be presented with a contract and other applicable forms. The successful bidder shall execute and return the contract and forms within ten (10) days of presentation together with the Payment Bond, Performance Bond, and Certificate of Insurance. If said documents are mailed to the successful bidder, the date of presentation shall be deemed the postmark date. The bid of the successful bidder and the Invitation to Bid shall be incorporated into the contract, except to the extent that this Invitation to Bid conflicts with the contract, in case the provisions of the contract differ from the Invitation, the contract shall have precedence. A copy of the contract is attached to these Bid Documents for review.

26. COMPLETION TIME: Project is to be completed within the time frame established in the Invitation to Bid and accepted by the County. Work shall be completed as bid, in the manner with the specifications bid. In the event that the contract is not completed within the time provided, bidder shall pay to the County, not as a penalty, but as liquidated damages, a set sum per day as stated in the contract, for each and every day beyond said completion day.

27. CERTIFICATATE OF INSURANCE: Successful bidder will be required to furnish a certificate of liability insurance in an amount of not less than $1,000,000.00 per occurrence to protect the County. Certificate is to be submitted at the time the Contract is executed.

28. BONDS: Bonds are required for construction (public works) contracts. They are required only occasionally for non-construction contracts. The requirement will be stated clearly in the solicitation document in all cases, and the bid bond must accompany the bid/proposal. Any bid or proposal submitted without the required bid bond will not be considered for award. **BONDS ARE NOT REQUIRED FOR PUBLIC WORKS PROJECTS UNDER $100,000.00.**

- BID BOND: The bid must be accompanied by a bid guarantee of not less than five (5) percent of the amount of the bid. The guarantee may be in the form of a Cashier's Check, Certified Check made payable to the Forsyth County Board of Commissioners, or a Bid Bond issued by a surety company. The guarantee shall insure the execution of the contract document and the furnishing of a Payment and Performance Bond. Bid Bonds will be returned to all bidders upon award of the contract.

- PERFORMANCE BOND: The successful bidder will be required to furnish a guarantee of the performance in the amount of the contract: if the contract is more than: $5,000 for ROAD PROJECTS, and $40,000 for all other projects, prior to commencing work. This guarantee of performance may be in the form of a Cashier's Check, Certified Check made payable to Forsyth County Board of Commissioners, Performance Bond, or an irrevocable Letter of Credit issued by a Bank or Savings and Loan Association as defined in O.C.G.A., Section 7-1-4. Irrevocable letters of credit will not be accepted on contracts of more than $300,000.00. Performance Bonds will be returned to the contractor within thirty (30) days after the work is completed and accepted by the County.

- PAYMENT BOND: The success bidder will be required to furnish a guarantee of payment for the protection of all subcontractors, and all persons supplying labor, material, machinery and equipment provided for in the contract in the amount of the contract awarded prior to commencing work. This bond is required for ROAD PROJECTS only if the contract is more than $20,000.00; all other projects require a Payment Bond no matter the contract amount. This guarantee may be in the form of a Payment Bond, Cashier's Check, Certified Check made payable to the Forsyth County Board of Commissioners, or by an irrevocable Letter of Credit issued by a Bank or a Savings and Loan Association as defined in O.C.G.A., Section 7-1-4. Irrevocable Letters of Credit will not be accepted on contracts of more than $300,000.00.

29. INSPECTION OF RECORDS: The records of the Procurement Office are open and accessible to the public in accordance with the provisions of the Georgia Open Records Act. Requests for inspection of records, must be in writing, must be reasonable, must contain sufficient information to facilitate retrieval, and must not interfere with the orderly operation of the Procurement Office.

Bidders/offerors are cautioned that any documentation submitted with or in support of a bid or proposal will become subject to public inspection under the Georgia Open Records Act. Labeling such information "Confidential," "Proprietary," or in any other manner will not protect this material from public inspection upon request. There will be a charge assessed to any vendor requesting copies of records.

Forsyth County does not discriminate against any person because of race, color, religion, national origin, sex, age, or handicapped individuals in employment, services provided, or contracts awarded.

10/20/98

GENERAL CONDITIONS

NOTE: The headings of the Sections herein are intended for the convenience of reference only and shall not be considered as having any bearing on their interpretation.

DEFINITIONS: (Sec. G.01) Whenever in the Contract Documents the following terms, or pronouns in place of them are used, their intent and meaning shall be interpreted as follows:

COUNTY, the County of Forsyth, Georgia, party of the first part of the Contract; also referred to as the OWNER.

CHAIRMAN, the Chairman of the Board of Commissioners of Forsyth County, Georgia.

BOARD, the Board of Commissioners of Forsyth County, Georgia.

DIRECTOR, the Director of the Forsyth County Department of Engineering.

PROJECT ENGINEERS, unless otherwise notified by Owner, the Department of Engineering, Engineering Division is the Project Engineer.

ENGINEER OR INSPECTOR, the Engineer duly authorized by The Board of Commissioners to observe the construction of the work contemplated herein, or his duly authorized assistants or representatives.

CONTRACT DOCUMENTS, the documents covering the performance of the Project, hereinafter defined, and payments therefore including the Advertisement, Information for Bidders, Proposals, Non-Collusion Affidavit, Executed Contract, Contract Bonds, General Conditions, Specifications, Detail Drawings, Plans, Addenda, Change-Orders, and Supplementary Agreement which may be entered into, all of which documents are to be treated as one instrument whether or not set forth at length in the Form of Contract.

PROJECT OR WORK, the entire work to be performed under the Contract.

PLANS, DRAWINGS, OR CONTRACT DRAWINGS, drawings or reproductions thereof furnished by the Consulting Engineers, pertaining to the Project and such detailed drawings as may be issued by the Owner as the work proceeds.

SPECIFICATIONS, the Specifications -General Requirements, Specifications-Items, Appendix Drawings, Addenda and all written agreements, made or to be made, pertaining to the method or manner of performing the Work or to the quantities or qualities of materials to be furnished for the work.

BID FORM, the prepared form furnished by the County properly filled in, executed, and submitted as a Bid for the performance of the Work.

BIDDER, an individual firm, partnership, or corporation, acting directly or through a duly authorized representative, legally submitting a Proposal.

CONTRACTOR, party of the second part to the Contract, or his or their legal representatives, successors, or assigns, acting directly or through agents or employees, and primarily liable for the acceptable performance of the work and for payment of all debts pertaining to the work.

SUB-CONTRACTOR, a person, firm or corporation, other than the Contractor supplying labor and materials, or labor for the Contractor, for work at the Site of the Project.

SURETY, the corporate body which is bound with and for the Contractor and which engages to be responsible for his acceptable performance of the work and for his payment of all debts pertaining to the work.

BONDS, the Performance Bond for the faithful performance of the Contract and the Payment Bond for the protection of persons furnishing materials or labor, in connection with the performance of the work, properly executed by the Contractor as Principal, and the Surety Company as Surety.

AS DESIGNATED OR AS INDICATED, has reference to the information or directions indicated on the Contract Drawings or in the Specifications covering the construction of the improvements included in the Project.

APPROVED, the written approval by the Owner, unless otherwise specified. Use of the terms DIRECTED, REQUIRED, PERMITTED, or words of like import, shall be considered as similarly defined.

PROVIDE, requiring both furnishing and installing of a thing, products, system, or the like.

Whenever, in describing or referring to any person, party, matter, or thing, any word imparting the singular number of masculine gender is used, the same shall be understood to include and to apply to several persons or parties as well as to one person or party and to females as well as males and to bodies corporate as well as individuals, and to several matters and things as well as one matter or thing.

EXTENT OF CONTRACT: (Sec. G.02) The Work covered by the Contract shall be taken to be as set forth in the Contract Documents as herein defined. All work and material mentioned in the Specifications and not indicated on the Drawings, and all work and materials indicated on the Drawings and not mentioned in the Specifications, and all work and materials necessary for the completion of the Work according to the true intent and meaning of the Contract Documents shall be furnished, performed, and done as if the same were both mentioned in the Specifications and indicated on the Drawings.

Should anything be omitted from the Contract Documents which is necessary for a clear understanding of the Work, or should any error appear either in any of the various instruments furnished or in the work done by other contractors affecting the Work, the Contractor shall promptly notify the Owner of such omission or error; and in the event of the Contractor's failure to do so, he shall make good any damage to or defect in his Work caused thereby. He will not be allowed to take advantage of any error or omission in the Contract Documents, as full instructions will be furnished by the Owner should such error or omission be discovered, and the Contractor shall carry out such instruction as if originally specified.

In any other case of disagreement between the documents which constitute the Contract Documents, the Owner will decide which shall prevail and the Contractor shall proceed in accord with the Owner's decision at no change in the Contract Price.

Each and every provision of law and of any clause required by law to be inserted in the Contract shall be deemed to be included herein, and the Contract shall be read and enforced as though such were inserted herein; and if through mistake, inadvertence, or otherwise any such provision is not inserted or is not correctly inserted, then, upon the application of either party hereto, the Contract shall forthwith be physically amended to make such insertion.

Where provisions of the Contract Documents refer to the specifications of the American Society for Testing and Materials, or of the American Water Works Association, or of the American National Standards Institute (ANSI-formerly USASI and ASA), or of the Federal Specification Board, or of any other specified standard, such specifications are made a part thereof to the extent which is indicated.

OBLIGATIONS OF CONTRACTOR: (Sec. G.03) The Contractor shall, at his own cost and expense, and in strict conformity with the Contract Documents, furnish all the materials, labor, and superintendent and all

scaffolding, tools, derricks, tackle, implements, machinery, and appliances of every kind necessary or proper for the purpose, and in a good substantial and workmanlike manner and within the time herein specified, shall perform and complete the Work of this Contract.

He shall complete the Work to the satisfaction and approval of the Owner, and shall accept in consideration thereof as full compensation therefore, the sum set opposite the respective classes of work and material named in the Contract Documents and Bid Documents herein contained or hereto annexed, the said sums being the amounts at which the Contract was therefore awarded to the Contractor.

ABSENCE OF CONTRACTOR: (Sec. G.04) In the absence of the Contractor, there shall at all times be a duly authorized representative of the Contractor on the work, who shall receive and execute all orders given by the Owner, and such orders so given to and received by the said representative shall be deemed to have been given to and received by the Contractor. Whenever the Contractor or his representative is not present at any place on the Work where it may be necessary to give orders or directions, such will be given by the Owner or his assistants to, and shall be received and promptly obeyed by, the Superintendents or the Foremen who may have immediate charge of the men employed on the particular work in relation to which the order may be given. If subcontract work is approved, the Contractor shall, at all times, have a duly authorized representative on the work, while the subcontractor is working or shall designate, in writing to the Owner, a representative of the subcontractor who shall be empowered to act on behalf of the Contractor. The Contractor shall furnish in writing to the Owner the names, residences and business addresses and telephone numbers of two (2) responsible persons who shall be authorized to receive emergency notices and to act on behalf of the Contractor.

NOTICES TO CONTRACTORS: (Sec. G.05) The residence or place of business given by the Contractor in the Bid or Proposal upon which this Contract is founded, is hereby designated as the place where all notices, letters, and other communication shall be served, mailed to, or delivered. Any notice, letter, or other communication addressed to the Contractor and delivered at any post office or box regularly maintained by the United States Postal Service shall be deemed sufficient service thereof, upon the Contractor, and the date of service shall be deemed to be twenty four (24) hours after the date of mailing. The above named place may be changed at any time by an instrument in writing, executed by the Contractor, which shall be hand delivered to the Owner who shall acknowledge receipt thereof. Nothing herein contained shall be deemed to preclude or render inoperative the service of any notice, letter, or other communication upon the Contractor personally, or otherwise as provided by law.

INSPECTION: (Sec. G.06) The Owner will inspect the materials furnished and the Work done under this Contract, and he is also hereby authorized and empowered to reject and refuse all work and materials, and the methods of application of any part thereof, under in fulfillment of the Contract, that does not comply in kind, quality, quantity, time, or place with the Contract Documents. The inspection, approval, or acceptance of any part of the Work, or the materials used therein, or any payment on account thereof shall not prevent the rejection of said work or materials at any time thereafter during the existence of the Contract and prior to the payment of the guarantee retainer should said work or materials be found to be defective or not in accord with the requirements of the Contract.

OWNER'S DECISION: (Sec. G.07) The Owner shall, in all cases, determine the amount, quality, acceptability, and fitness of the several kinds of work, materials, and equipment which are to be paid for under this Contract. He shall also determine all questions in relation to said work and the performance thereof, and decide every question which may arise relative to the fulfillment of this Contract on the part of the Contractor.

COMPETENT STAFF TO BE EMPLOYED: (Sec. G.08) The Contractor shall employ only competent and skillful staff to do the work. Whenever the Owner shall notify the Contractor in writing that any person on the Work is, in his opinion, disobedient, incompetent, unfaithful, disorderly, disrespectful, or otherwise unsatisfactory, the Contractor, on receiving such Notice shall forthwith dismiss such person and shall not again be employed on any part of the Work without the written consent of the Owner.

LAWS AND ORDINANCES: (Sec. G.09) The Contractor shall keep himself fully informed of, and shall carefully observe and comply with all Federal, State, County and Local laws, ordinances, and regulations which in any manner affect the conduct of the Work, and all such orders or decrees as exist at present and those which may be enacted later, of bodies having any jurisdiction or authority over the Work. If any discrepancy, omission, or inconsistency is discovered in any of the Contract Documents for this Work in relation to any such law, ordinance, regulation, order, or decree, he shall forthwith report the same to the Owner in writing, and the Contractor agrees that said Contract Documents shall be deemed modified to the extent necessary to correct such discrepancy, omission, or inconsistency and to conform to every such law, ordinance, regulation, order or decree. The Contractor shall indemnify and save harmless the Owner and all its officers, representatives, agents, and servants against any claim or liability arising from or based upon the violation of any such law, ordinance, regulation, order, or decree, whether by himself, his employees, or his agents.

INDEMNIFICATION: (Sec. G.10) The Contractor shall indemnify and hold harmless the Owner, the Engineer, their officers, representatives, agents and employees from and against all claims, damages, losses, and expenses, including attorneys' fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss, or expense is caused in whole or in part by any negligent act or omission of the Contractor, any sub-contractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

In any and all claims against the Owner, the Engineer, or any of their officers, representatives, agents or employees by any employee of the Contractor, any sub-contractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation of the Contractor under this Section shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or any sub-contractor under Workmen's Compensation Acts, disability benefit acts, or other employee benefit acts.

PUBLIC LIABILITY, PROPERTY DAMAGE, AND AUTOMOBILE INSURANCE: (Sec. G.11) The Contractor shall take out and maintain during the life of this Contract the various types and amounts of insurance as required to protect the Contractor, the Owner, officials and representatives of the Owner, the Consulting Engineers, the Engineer, and any subcontractor performing work covered by this Contract from claims for damages for personal injury, including accidental death as well as from claims for property damages which may arise from operations under this Contract, whether such operations be by himself or by any subcontractor or by anyone directly employed by either of them.

Without restricting the obligations and liabilities assumed under the Contract Documents, the Contractor shall at his own cost and expense, purchase and maintain in force until final acceptance of his Work, the below listed forms of insurance coverage.

Certificates in triplicate from the insurance carrier stating the limits of liability and expiration date shall be filed with the Owner before operations are begun. Such certificates shall not merely name the types of policy provided, but shall specifically refer to this Contract and shall contain a separate express statement of compliance with each of the requirements as set forth in this Section. However, the original policies for Owner's Protective Liability Insurance (Item C) shall at this time be delivered to the Owner for its possession.

Certificate Holder Should Read:

Forsyth County Board of Commissioners
Forsyth County Commissioners Office
Cumming, Georgia 30040

All policies as hereinafter required shall be so written that the Owner will be notified of cancellation, expiration or restrictive amendment at least 30 days prior to the effective date of such cancellation, expiration or amendment.

Item A - Workers Compensation and Employer's Liability Insurance: Coverage to apply for all employees for Statutory Limits in compliance with the applicable state and federal laws. The policy must include Employer's Liability with a minimum limit of $100,000 each accident/$500,000 disease-policy limit/$100,000 disease-each employee.

Item B - Comprehensive General Liability Insurance: Shall have minimum limits of $1,000,000 per Occurrence Combined Single Limit for Bodily Injury Liability and Property Damage Liability. This shall include Premises/Operations, Independent Contractors, Products/Completed Operations, Broad Form Property Damage, XCU Coverage, Blanket Contractual Liability Coverage, Personal Injury Coverage, and Fire Legal Liability.

Item C - Owner's Protective Liability Insurance: (Separate Policy Required) In the name of the owner, including the interest of the Consulting Engineers and the Engineer as additional insured with a minimum limit of $1,000,000.

Item D - Comprehensive Automobile Liability Insurance: Shall have minimum limits of $1,000,000 Per Occurrence Combined Single Limit for Bodily Injury Liability and Property Damage Liability. This shall include, Owned vehicles, Hired and Non-Owned Vehicles.

NOTE: In B & C Underlying must equal $1,000,000. Underlying plus Excess must equal $1,000,000.

Item E - Umbrella Liability Insurance: Shall have $1,000,000 limit of liability with the same coverage as Items A, B, C and D above.

Item F - Builders Risk and Installation Floater: Builder's risk insurance shall be written in completed value form, and shall protect the Contractor, the Owners, and the Engineer against risk of damage to buildings, structures, and materials and equipment, excluding excavation, paving, and related work, not otherwise covered under Installation Floater Insurance, from the perils of fire and lightning, the perils included in the standard extended coverage endorsement, and the perils of vandalism and malicious mischief. The amount of such insurance shall be not less than the insurance value of the work at completion less the value of the materials and equipment insured under Installation Floater Insurance.

Equipment such as pumps, heat exchangers, compressors, tanks, motors, switchgear, transformers, panel boards, control equipment, and other similar equipment shall be insured under Installation Floater Insurance when the aggregate value of this equipment exceeds $10,000.

Builder's Risk Insurance shall provide for losses to be payable to the Contractor and the Owner as their interests may appear.

Installation Floater: Shall protect the Contractor, the Owner, and the Engineer from all insurable risks to physical loss or damage to materials and equipment not otherwise covered under Builder's Risk Insurance, while in warehouses or storage areas, during installation, during testing, and after the Work is completed.

It shall be of the "all risks" type, with coverages designed for the circumstances which may occur in the particular work included in this Contract. The coverage shall be for an amount not less than the value of the Work at completion, less the value of materials and equipment insured under Builder's Risk Insurance.

Installation Floater Insurance shall provide for losses to be payable to the Contractor and the Owner as their interest may appear. If the aggregate value of the equipment furnished under the Contract is less than $10,000, such equipment may be covered under Builder's Risk Insurance and if so covered, this Installation Floater Insurance may be omitted.

Certificates of insurance covering Installation Floater Insurance shall quote the insuring agreement and all exclusions as they appear in the policy; or in lieu of; certified copies of the complete policy may be submitted.

Item G - Insurance Required by Others: Such Protective and Contractual Bodily Injury Liability Insurance and such Protective and Contractual Property Damage Liability Insurance as shall be required by any public bodies or utility companies whose property, facilities, or rights-of-way may be affected by the work to be done under this Contract.

If any part of the Work is sublet, insurance of the same types and limits as required by above Items A, B, D, and F, shall be provided by or on behalf of the subcontractor(s) to cover that part of the Work they have contracted to perform.

SPECIAL INSURANCE REQUIREMENTS: (Sec. G-11A) The Forsyth County Board of Commissioners is to be included as an Additional Insured on all Liability Policies. Current and valid insurance policies meeting the requirements herein identified shall be maintained during the duration of the named project. Renewal certificates shall be sent to the County 30 days prior to any expiration date. There shall also be a 30-day notification to the County in the event of a cancellation or modification of any stipulated insurance coverage. All Insurance Policies must be written on an Occurrence Basis.

It shall be the responsibility of the contractor to ensure that all subcontractors comply with the same specified insurance requirements.

Certificates of insurance, policies, bonds, and any other requirements must be forwarded to the Owner.

Insurance Companies must be licensed to do business in Georgia by the Georgia Secretary of State, Authorized by the Georgia Insurance Department, and has an AM Best rating of A-6 or greater.

WORKER'S COMPENSATION INSURANCE: (Sec. G.12) This Contract shall be null and void and of no effect unless the Contractor shall, before entering upon the performance thereof, secure Workmen's Compensation Insurance for the benefit of and keep insured, during the life of said Contract, all employees engaged thereon and to fully protect the Owner as required by existing law, or as such may be amended. In case the Contractor shall sub-contract any portion of the Work, he shall require that all employees of the sub-contractor are properly covered by such Workmen's Compensation Insurance.

SOCIAL SECURITY: (Sec. G.13) The Contractor shall be and remain an independent Contractor with respect to all services to be performed hereunder and agrees to and does hereby accept full and exclusive liability for the payment of any and all contributions or taxes for social security, unemployment insurance, or old age retirement benefits, pensions, or annuities now or hereafter imposed under any State or Federal law which are measured by the wages, salaries, or other remuneration paid to persons employed by the Contractor on work performed under the terms of this Contract, and further agrees to obey all lawful rules and regulations and to meet all lawful requirements which are now or hereafter may be issued or promulgated under said respective laws by any duly authorized State or Federal officials; and said Contractor also agrees to indemnify and save harmless the Owner from any such contributions or taxes or liability therefore.

ASSIGNMENT OF CONTRACT: (Sec. G.14) The Contractor or his thoroughly qualified and designated representative shall give his personal attention constantly to the faithful prosecution of the Work. He shall

not assign, transfer, convey, or otherwise dispose of this Contract or of his legal right, title, or interest in or to the same or to any part thereof, without the previous approval of the Chairman.

The Contractor shall not assign by power of attorney or otherwise any of the moneys to become due and payable under this Contract, unless by and with the written consent of the Chairman, and such consent or approval, if given, will in no way relieve the Contractor from any and all of the obligations of said Contract.

Assignment of this Contract or any part thereof, or any funds to be received hereunder by the Contractor shall contain a clause to the effect that it is agreed that the funds to be paid the assignee under the assignment are subject to a prior lien for services rendered or materials supplied for the performance of the Work called for in said Contract in favor of all persons, firms, or corporations rendering such service or supplying such materials.

PATENTS: (Sec. G15) The Contractor shall pay all license fees and royalties and assume all costs incident to the use of any invention, design, process or device which is the subject of patent rights or copyrights held by others. He shall indemnify and hold harmless the Owner and the Engineer and anyone directly or indirectly employed by any of them from and against all claims, damages, losses, and expenses (including attorneys fees) arising out of any infringement of such rights during or after completion of the Work, and shall defend all such claims in connection with any alleged infringement of such rights. In the event of any claim or action at law on account of such patents or fees, it is agreed that the Owner may retain out of the moneys which are or which may become due the Contractor under this Contract, a sum of money sufficient to protect himself against loss, and to retain the same until said claims are paid or are satisfactorily adjusted.

CLAIMS FOR LABOR, MATERIALS, AND DAMAGES: (Sec. G16) The Contractor shall, from time to time, as required by the Owner furnish the Owner with satisfactory evidence that all persons who have done work or furnished materials under this Contract, or have suffered damages on account of the Contractor's operations have been fully paid or secured, and in case such evidence be not furnished as aforesaid, such amount as the Owner may consider necessary to meet the lawful claims of the persons aforesaid will be retained from the moneys otherwise due said Contractor, until the liabilities aforesaid have been fully satisfied. It is understood and agreed, however, that the Owner hereby assumes no obligation toward such claimants nor in any way undertakes to pay such claims out of funds due or that may become due to the Contractor, or out of its own funds.

ACCIDENTS AND CLAIMS TO BE GUARDED AGAINST: (Sec. G.17) The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. He shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees on the Work and other persons who may be affected hereby, all the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, not designated for removal, relocation or replacement in the course of construction.

The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for its safety and protection. He shall notify owners of adjacent utilities when prosecution of the Work may affect them. All damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any sub- contractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by the Contractor. The Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and accepted.

The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be Contractor's superintendent unless otherwise designated in writing by Contractor to Owner.

MATERIALS AND WORK: (Sec. G.18) All materials furnished under the Contract shall be as specified and required, or in the absence of particular specifications shall be the best of their respective kinds, of new stock, unused, and not deteriorated, and all the work contemplated and described shall be done in a good substantial, and workmanlike manner.

Wherever the Contract Drawings or Specifications describe materials, devices, or equipment as those which shall be similar or equal to certain materials, devices, or equipment designated by trade or manufacturer's name, the Contractor will be required to demonstrate to the satisfaction of the Owner that the materials, devices, or equipment he proposes to furnish are in fact similar or equal to those designated. The Contractor may also be required to demonstrate that replacement parts will be readily obtainable.

Wherever in the Specifications or on the Plans the term "ASTM Specifications" is used, it shall be considered to mean the latest pertinent specifications (standard or tentative) of the American Society for Testing and Materials, and subsequent amendments thereto, which are published as of the date of this Contract. The same requirements shall govern for other referenced standard specifications.

DEFECTIVE WORK OR MATERIALS: (Sec. G.19) If at any time before the final acceptance of the Work, or any time thereafter as hereinafter set forth, materials or workmanship should be discovered which do not comply with the requirements of the Contract Documents, they shall be immediately removed by the Contractor when notified to do so by a written notice from the Owner and shall be replaced at the Contractor's expense. Work condemned by the Owner as unsuitable or improperly done shall be removed and repaired, or otherwise remedied, as the Owner may direct, without cost to the Owner.

Material condemned by the Owner shall be removed from the Site of the Work within two (2) days if and after Notice to that effect is given.

Should defective work be suspected and the Engineer so require, the Contractor shall uncover, take down, or make openings in the finished work for the purpose of examining at such points as said Owner designates. Should the work thus exposed or examined prove satisfactory, the uncovering, taking down, or making openings in and the replacing of the covering or the making good of the parts removed shall be paid for in accordance with the Contract Prices for the Items involved, but should the work exposed or examined prove unsatisfactory, the uncovering, taking down, replacing, and making good shall be at the expense of the Contractor.

If the Contractor shall neglect or refuse to remove or replace the suspected defective work within seven (7) days from the date of the written notice from the Owner to do so, said notice being served either personally or by leaving it at his place of business or with his agent in charge of the Work, then the Owner may remove or cause the same to be removed and satisfactorily replaced by the contract or otherwise, as it may deem expedient, and charge the expense thereof to the Contractor. The expense so charged will be deducted and paid by the Owner out of such moneys as are or may become due under this agreement, or if such moneys are not sufficient to meet said expense, the additional moneys shall be furnished by the Contractor, and if he refuses or neglects to provide the necessary moneys they shall be provided by his Surety.

EXTRA WORK: (Sec. G.20) Any extra work, within the scope of and necessary for the proper completion of the Contract, shall be performed by the Contractor upon receipt of a written change order prepared by the Owner and approved by the Owner, through the Forsyth County Procurement Department.

Extra work not originally contemplated, and considered beyond the general scope of the Contract, shall be performed by the Contractor upon authorization from the Owner through a written subsidiary agreement.

Every change order and subsidiary agreement shall become and is hereby made a part of this Contract.

All extra work shall be subject to payment according to the terms set forth in the Change Order or subsidiary agreement.

If deductions are ordered, the credits shall be the net costs, and no claim for damages for anticipated profits shall accrue to the Contractor.

OTHER CONTRACTS: (Sec. G.21) It is understood and agreed that the Contractor shall execute his Work in such manner and in such order as will not interfere with work in progress and will permit the Owner to perform other work or to enter into other contracts for work and materials to be constructed or placed in, on, or about the Work herein described, with the least interference possible and with complete cooperation whenever it is desirable to prosecute said work, either simultaneously with the Work under this Contract or otherwise.

It is agreed that the Contractor shall not be entitled to any damages or extra compensation from the Owner on account of any work performed by the Owner or other contractors that in any way affects the Work under this Contract, provided that such work of the Owner and other contractors shall, in the opinion of the Owner, be performed in a proper and expeditious or a necessary manner. The Owner shall decide all questions between the Contractor hereunder, and the other contractors, and the order of carrying on the Work shall always be subject to his direction and approval.

If, in the judgment of the Owner, the joint occupation of the Site of Work by the Owner and one or more contractors, or by two or more contractors working on different contracts at the same time actually impedes progress on the Work herein described, then, upon recommendation of the Owner, the Chairman may extend the time for the completion of the Work and in an amount which accords with the compensates for the delays so caused.

In case the Contractor, by his own acts or the acts of any person or persons in his employ, shall unnecessarily delay, in the opinion of the Owner, the work of the Owner or other contractors, by not properly cooperating with them, or by not according them sufficient opportunity or facility to perform work as may be specified, the Contractor shall, in that case, pay all costs and expense incurred by such parties due to any such delays, and hereby authorizes the Owner to deduct the amount of such cost and expenses from any moneys due or to become due the Contractor under this Contract. Nothing contained in this paragraph shall, however, relieve said Contractor from any liability or damage resulting to the Owner on account of such delay or delays.

SUSPENSION OF WORK: (Sec. G.22) The Director shall have the right to suspend the whole or any part of the Work to be done hereunder, when in the opinion of the Owner the Contractor is not doing the work in accord with the provisions of the Contract Documents.

ABANDONMENT OF WORK: (Sec. G.23) Should the Contractor abandon or in any manner fail to complete the said Work, the Owner is hereby authorized and empowered to pay any laborers for work done who may have been employed by said Contractor upon the Work, and to pay any claims against the Contractor for materials furnished, out of any funds that would otherwise be due said Contractor under this Contract, and in every such case the Owner is hereby authorized and empowered to ascertain the amount or amounts so due or owing to such labor or laborers, or for materials, from said Contractor, in such a manner and upon such proof as the Owner may deem sufficient. The amount or amounts so found by the Owner to be due and payable to such labor or laborers, or for materials furnished shall be final and conclusive against the Contractor and may thereafter be paid by the Owner to said labor or laborer, or to liquidate claims for materials furnished; and any estimate may be withheld from said Contractor until all such claims for labor or materials on his Contract have been satisfied.

FORFEITURE OF CONTRACT: (Sec. G.24) The Owner by and through the Chairman at any time during the continuance of the Contract for the Work herein provided for, and prior to the date of the acceptance of the Work as hereinafter provided, shall have the right and power to declare the whole or any part of the same forfeited for the violation on any of the conditions, terms, requirements, or limitations herein contained, or

if the Contractor is not progressing with the Work as fast as is necessary to insure its completion within the time specified by this Contract, or if the Contractor is showing bad faith in carrying out the Contract, or if the Work be not fully completed within the time fixed in this Contract for its completion, or within the time to which such completion may be extended as hereinafter provided or further, if the Contractor shall fail or refuse to remedy or repair defective work or materials when so ordered as herein provided. If the Owner shall declare the Contract forfeited, in the whole or in part, such declaration of the forfeiture shall in no way relieve or affect the liability of the Contractor and his Sureties for breach of any of the covenants and conditions of the Contract.

COMPLETION OF CONTRACT BY THE OWNER: (Sec. G.25) If the Work to be done hereunder shall be abandoned by the Contractor, or if this Contract shall be assigned or the work sublet by him, otherwise than as herein specified, or if at any time and for any reasons herein before specified the Owner declares the Contract forfeited, said Owner may notify the Contractor to discontinue all Work or any part thereof, hereunder, or may notify the Contractor to remedy or correct the conditions or breaches enumerated by a written notice served upon the Contractor. In the event the Work is discontinued as herein provided, or in case that the said conditions or breaches are not remedied and corrected to the satisfaction of the Owner within seven (7) days from service of the said written notice, the Owner will thereupon have power to contract for the completion of the work, or such parts thereof, in the manner prescribed by law, or to employ such and so many persons as they may deem advisable, by contract or otherwise, the work at and complete the work herein described, or such parts thereof, and to use such materials, machinery, tools, and appliances as they may find upon the site of the work, and to procure other materials, machinery, tools, and appliances for the completion of the same, and to charge the expense so incurred to the Contractor. The expense so charged will be deducted and paid by the Owner out of such monies as may be due or may at any time thereafter become due to the Contractor under and by virtue of this Contract or any part thereof. In case such expense exceeds the amount due and payable under this Contract, if completed by the Contractor, the amount of such excess shall be repaid to the Owner, and in case such expense shall be less than that sum which would have been payable under this Contract, if the same had been completed by the Contractor, then the Contractor shall be entitled to receive the difference. When any particular part of the work is being carried on by the Owner, by contract or otherwise, under the provisions of this clause of the Contract, the Contractor shall continue the remainder of the work in conformity with the terms of this Contract, and in such manner as to nowise hinder or interfere with the persons or workmen employed, as above provided by the Owner, by Contract or otherwise, to do any part of the work, or to complete the same under the provisions of this article of the Contract.

COMPLETION OF THE WORK DEFINED: (Sec. G.26) The time for the completion for the specified work is defined at that stage when the installations and appurtenant equipment included under the Contract have been completed and tested and are, together, ready for continuous permanent use and occupancy for the purpose intended. After this date, there may still remain some cleaning up of the Contractor's plant or other minor work, which does not prevent the permanent use of the work.

BEGINNING WORK AND TIME FOR COMPLETION: (Sec. G.27) Work on individual sections or additionally assigned projects to be constructed under this Contract shall be commenced within seven (7) days from the date of a written notice from the Director to commence work on said sections. The Contractor is required to notify the Director in writing 48 hours prior thereto, of the date he shall actually begin work.

The work shall be carried on with such force and in such manner and order and at such points that by the date stipulated in the Proposal and Contract, or as may be modified or extended as hereinafter provided, the whole work and its part shall be completed in accord with the terms of the Contract.

Emergency maintenance and repair work shall be undertaken by the Contractor immediately upon notification by the Director, or his authorized representative, of the existence of an emergency. The Contractor shall have all required material, personnel and equipment at the site of the emergency within four (4) hours after notification. The Contractor shall furnish the Director the names, residence and business addresses and telephone numbers of three responsible persons who shall be authorized to receive emergency notices and to act on behalf of the Contractor.

LIQUIDATED DAMAGES: (Sec. G.28) The time of completion of the whole, as well as each of the parts of the work is of the essence of the Contract and the parties hereto expressly recognize the fact that the failure upon the part of the Contractor to complete the work within the time specified will occasion to the Owner damages which are not susceptible to the law, and therefore agree that in the event the Contractor neglects, refuses or fails to complete the Work, or any portion thereof, within the time herein specified after adding all extensions of time granted by the Owner in writing, then the Owner shall have and is hereby expressly given the right to deduct and retain out of such moneys which may be due or may become due and payable to the Contractor for the Work, the sum set forth in the Contract for each and every calendar day that the Work is delayed in its completion beyond said time, and in the event that there shall not be due or become due to the Contractor an amount sufficient to pay the damages so computed the Owner shall have the right to sue for and recover the balance from the Contractor in any court of competent jurisdiction.

It is further expressly understood and agreed by and between the parties that the specified sum per day for such delay, failure, or non-completion shall be deemed, taken and treated as liquidated damages and representing a fair sum as compensation to the Owner for the damages which it will suffer by reason of such default, and are not in any wise to be considered a penalty.

In addition, the Owner will deduct from payments due the Contractor the wages paid by the Owner to any inspector or inspectors necessarily employed by the Owner on the Work, and any sums paid by the Owner for any observation of construction services performed by the Owner, for the number of days in excess of the number of calendar days allowed for the completion of the Work.

DELAYS AND EXTENSIONS OF THE TIME FOR COMPLETION: (Sec. G.29) The Owner shall have the right to defer the beginning or to suspend the whole or any part of the Work herein contracted to be done whenever, in the opinion of the Owner, it may be necessary or expedient for the Owner so to do. If the Contractor be delayed in the completion of the Work by any act or neglect of the Owner or of any officer or employee of theirs, or of any other contractor employed by the Owner or by changes ordered in the Work, or by strikes lockouts, fire, unusual delay by common carriers, unavoidable casualties, or any cause beyond the Contractor's control, or by delay authorized by the Owner pending arbitration, or by any cause which the Owner shall decide to justify the delay, then for such delays and suspensions the Contractor shall be allowed one (1) day additional to the time herein stated for each and every day of such delay caused in the completion of the Work, the same to be ascertained by the Owner.

No such extension shall be made for any one or more of such delays unless within ten (10) days after the beginning of such delay a written request for additional time shall be filed with the Owner. In case of a continuing cause of delay, only one (1) request is necessary.

No claims for damages or any claim other than for an extension of time as herein provided shall be made or asserted against the Owner by reason of any of the delays herein before mentioned.

PRICES: (Sec. G.30) The Owner will pay and the Contractor shall receive the Prices bid and stipulated in the Bid Form herein contained or hereto annexed, as full compensation for furnishing all materials and performing all labor and superintendent which may be required in the prosecution and completion of the Work, and also for all loss and damages arising out of the nature of the Work, and from the action of elements or from any foreseen obstruction or difficulty encountered in the prosecution of the Work, and for all expenses incurred by or in consequence of the suspension of discontinuance of the Work; provided however that the Prices bid and stipulated in the Proposal may, in the event of the subsequent imposition of or change in State or Federal taxes, be increased as particularized herein.

APPROVAL AND ACCEPTANCE OF WORK: (Sec. G.31) Following the completion of the Contract as such completion is defined herein and as soon thereafter as is practicable, the Owner will inspect the entire Work in all its parts and details or cause the same to be inspected. If said Work and all Contract performances are found to be satisfactory and in accord with the provisions and terms of the Contract Documents, the Chairman, with the concurrence of the Board, upon recommendation of the Owner will certify the Work as completed and will accept it on behalf of the Owner but conditional upon the subsequent remedying of

defects which may become manifest within a period of one (1) year following completion and as herein required. The certification of completion and the said acceptance of the Work will be a prerequisite to final payment hereunder.

Twelve (12) months after the date of the certificate of acceptance as herein before set forth and as soon thereafter as practicable, the Owner will make a review and re-inspection of the work and performances of this Contract or cause the same to be made. If the said work and performances shall be found satisfactory and the Work not to have deteriorated through defects of workmanship or material, then the Chairman, upon recommendation of the Owner, will release the Surety on the Contract Bond or Bonds. If, however, the review and re-inspection as herein provided or any prior inspection discloses defects due to the non-fulfillment of this Contract, or noncompliance with its requirements, the Owner will so notify the Contractor in writing; and thereupon the Contractor shall, at his own expense repair and replace and shall make good all defects of workmanship, material, and guarantee same, and shall rectify any non-compliance, and such repairs and fulfillment shall be a prerequisite to the release of the Surety on the Contract Bond or Bonds. If, however, the Contractor shall, after due Notice, refuse or neglect to make good the defects as notified and to the satisfaction of the Owner, then the Owner may and is hereby empowered to proceed in the manner prescribed in the event of abandonment or forfeiture of the Work by the Contractor and completion by the Owner and the payment of claims for materials and labor and other expense as provided in such procedures be prerequisite to the termination of the guaranty, and to the release of the Surety on the Bond or Bonds.

ESTIMATES AND PAYMENTS - PARTIAL, FINAL, AND GUARANTY RETAINER: (Sec. G.32) Before the 25th of each month, the Contractor shall make an approximate estimate based on the value of the work completed under the provisions of the contract documents plus the value of materials and equipment suitable stored, insured, and protected at the construction site, and at the Owner's discretion, such materials and equipment suitably stored, insured, and protected off-site at a location approved by the contract documents, less retainage. The making of any such estimates or payments thereon shall not be taken or construed as an approval or acceptance by the Engineer or Owner of any work so estimated. Three copies of suppliers' invoices shall be attached to each copy of the payment request supplied to the Engineer to substantiate all claims for payment for materials and equipment on the site but not incorporated into the work. Each invoice shall be identified with the Item Number under which claim for payment is made. Upon the Engineer's approval the pay estimated shall be submitted to the Owner. Upon such estimate being made and approved by the Owner, the Owner will pay to the Contractor the amount stated in the estimate,

Following the completion of the work and the acceptance thereof, the Contractor will make a final request of the work done and the value thereof. Upon such estimate being made and certified by the Owner's representative, the Owner will pay to the Contractor the full value of the work done under this Contract less any amounts previously paid.

CONTRACTOR'S CLAIM FOR DAMAGES: (Sec. G.33) If the Contractor shall claim compensation for any damages sustained by reason of the acts of the Owner or its officers, representatives or agents, he shall within seven (7) days after the sustaining of such damages, make a written statement to the Owner of the nature of the damage sustained. On or before the fifteenth day of the month subsequent to that in which any such damage shall have been sustained, the Contractor shall file with the Owner an itemized statement of the details and the amount of such damage, and unless such statement is made as thus required, his claim for compensation shall be forfeited and invalidated, and he shall not be entitled to payment on account of any such damage.

NO WAIVER OF CONTRACT: (Sec. G.34) Neither an extension of the time for any reason beyond the date fixed herein for the completion of the Contract, nor the delivery and acceptance of the whole or any part of the Work by the Owner, nor any possession taken by the Owner or its employees or agents shall be deemed to be a waiver by the Owner of the right to abrogate this Contract for abandonment or delay or non-performance in the manner therein provided, nor shall it operate to void or annul any of the terms of this Contract.

NO ESTOPPEL: (Sec. G.35) Neither the Owner, nor any department or officer thereof shall be precluded or estopped, by any return or certificate made or given by the Chairman, the Director, the Owner or other officer, agent, or appointee of the Owner under any prevision of this Contract, from at any time (before the completion and acceptance of the Work, and payment therefore, or before the payment of the guaranty retainer, pursuant to any such return or certificate) indicating the true and correct amount and character of the work done and materials furnished by the Contractor or any other person under this Contract, or from indicating at any time that any such return or certificate is untrue and incorrect or improperly made in any particular, or that the work and materials or any part thereof, do not in fact conform to the Contract Documents, and the Owner shall not be precluded or estopped, notwithstanding any such return of certificate and payment in accordance therewith, from demanding and recovering from the Contractor such damages as it may sustain by reason of his failure to comply with the Contract Documents.

SUBLETTING: (Sec. G.36) The Contractor agrees to sublet only those portions of the Work that he declared in the proposal would be subcontracted, and only with the subcontractors named for this work and meeting the equipment/experience requirements of the Owner. In making his application for subletting any portion of the Work, the Contractor shall state in writing to the Chairman with copy to the Owner, the portion of the Work which each subcontractor is to do or the material he is to furnish, his place of business, and such other information which may be required in order to ascertain whether such subcontractor is responsible, reliable, and able to perform the work or to furnish the materials as called for in the Specifications. The provisions of paragraph 3, page A1, and Section G.04, page G4 are included herein. In any event, no work will be awarded if the total work proposed for subletting by the Contractor exceeds ten percent (10%) of the amount of the Contract exclusive of the specialty work of blasting, boring, boring and jackcasing, tunneling and large tapping. Subletting, if permitted, shall not relieve the Contractor of his obligations under the Contract.

The Contractor shall be fully responsible to the Owner for the acts and omissions of his sub-contractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of the persons directly employed by him.

The Contractor shall cause appropriate provisions to be inserted in all sub-contracts relative to the Work to bind sub-contractors to the Contractor by the terms of the General Conditions and other Contract Documents insofar as applicable to the work of the sub-contractors and to give the Contractor the same power as regards terminating any sub-contract that the Owner may exercise over the Contractor, under any provisions of the Contract Documents.

Nothing contained in this Contract shall create any contractual relations between any sub-contractor and the Owner.

Within five (5) days after the Contractor receives payment for the work performed under this Contract, he shall pay each sub- contractor the amount allowed the Contractor for and on account of the work performed by the sub-contractor to the extent of the sub- contractor's interest therein.

PROHIBITED INTERESTS: (Sec. G.37) No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept, or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction, or material supply contract or any sub-contract in connection with the construction of the Project shall become directly or indirectly interested personally in this Contract or in any part hereof. No officer, employee, architect, attorney, engineer, or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any executive supervisory or other similar functions in connection with the construction of the Project, shall solicit or accept any substantial favor or any compensation of whatever nature from the Contractor, sub-contractor, or material supplier under this Contract.

No member of or Delegate to Congress or Resident Commissioner shall be admitted to share any or part of this Contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

SPECIAL NOTICE: (Sec. G.38) The Contractor shall keep himself fully informed of the conditions relating to construction and labor under which the Work will be, or is being performed, and he shall employ, so far as possible, such methods and means in the carrying out of his work as will not cause any interruption or interference with any other contractor or the Owner, or infringe upon the rights, safety and convenience of the Public.

Work performed in State or County roads shall conform to the rules and regulations of the controlling agency.

SAFETY AND HEALTH REGULATIONS: (Sec. G.39) The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL-91-596) and Safety Standard Act (PL-91-54).

EXPERIENCE REQUIREMENTS: (Sec. G.40) Certain Items of these Specifications require that materials, equipment, or systems to be included in the Work conform to specific length of service requirements or that they be the product of a supplier or manufacturer having specific experience qualifications. Consideration will be given to materials, equipment, or systems, and to suppliers or manufacturers which do not meet the length of service or experience requirements provided that the supplier or manufacturer, promptly after award of the Contract, furnish the Owner warranty bond, acceptable to the Owner's Counsel or cash deposit in amount not less than the full cost of the materials, equipment, or systems to the Contractor and for a warranty period of not less than that stated for the required experience guaranteeing replacement if the materials, equipment, or systems provided fails to perform the required service. Inclusion of a manufacturer's name in the Specifications does not exempt him from meeting either the stated experience requirements or furnishing the bond as stated above.

MEANS AND METHODS: (Sec. G.41) Unless otherwise expressly provided in the Contract Drawings, Specifications, or Addenda, the means and methods of construction shall be such as the Contractor may choose; subject, however to the Owner's right to reject means and methods proposed by the Contractor which will not produce finished work in accord with the terms of the Contract, or to the Owner's duties as observer of the construction to recommend means or methods more stringent than those proposed by the Contractor in the interest of alleviating hazards to the Work, to persons, or to property.

The Owner's approval of the Contractor's means or methods of construction or his failure to exercise his right to reject such means and methods, shall not relieve the Contractor of his obligation to accomplish the result intended by the contract; nor shall the exercise of or failure to exercise such right to reject create a cause of action for damages.

The Contractor shall be solely responsible for means, methods or both actually used. To diminish his liability the Contractor shall have the right to deny access to the Work or parts of it to third parties at all times during construction except to third parties to inspect, certify, or observe it when required by law, or to those who require reasonable access to a particular part or parts of the Work by reason of specific contractual relationship to the Work.

END OF GENERAL CONDITIONS

AGREEMENT BETWEEN
OWNER AND CONTRACTOR
SAMPLE
Project No. 19-59-3340

P.O. #

This Agreement is made by and between Forsyth County, a political subdivision of the State of Georgia, (hereinafter referred to as the "Owner") and _____ (hereinafter referred to as the "Contractor") under seal for all work called for in that certain Forsyth County Project Number 19-59-3340. All work to be in accordance with Forsyth County Specifications and Standards, as well as State of Georgia Department of Transportation Specifications.

ARTICLE 1
THE CONTRACT AND THE CONTRACT DOCUMENTS

1.1 The Contract

The Contract between the Owner and the Contractor, of which this Agreement is a part, consists of the Contract Documents. It shall be effective on the date this Agreement is executed by the last party to execute it.

1.2 The Contract Documents

1.2.1 The Contract Documents consist of this Agreement, the Specifications (including those set forth in the Owner's invitation to bid on the project), Contractor's Bid Schedule, the Drawings, all Change Orders and Field Orders issued hereafter, and any other amendments hereto executed by the parties' hereafter. Documents not enumerated in this paragraph are not Contract Documents and do not form part of this Contract.

1.3 Entire Agreement

1.3.1 This Contract, together with the Contractor's payment bond for the Project, constitutes the entire and exclusive agreement between the Owner and the Contractor with reference to the Project.

1.4 No Privity with Others

1.4.1 Nothing contained in this Contract shall create, or be interpreted to create, privity or any other contractual agreement between the Owner and any person or entity other than the Contractor.

1.5 Intent and Interpretation

1.5.1 The intent of this Contract is to require complete, correct and timely execution of the Work. Any work that may be required, implied or inferred by the Contract Documents, or any one or more of them, as necessary to produce the intended result shall be provided by the Contractor for the Contract Price.

1.5.2 This Contract is intended to be an integral whole and shall be interpreted as internally consistent. What is required by any one Contract Document shall be considered as required by the Contract.

1.6 Ownership of Contract Documents

1.6.1 The Contract Documents, and each of them, shall remain the property of the Owner. The Contractor shall have the right to keep one record set of the Contract Documents upon completion of the Project; provided, however, that in no event shall Contractor use, or permit to be used, any or all of such Contract Documents on other projects without the Owner's prior written authorization.

ARTICLE II
THE WORK

2.1 The Contractor shall perform all of the Work required, implied or reasonably inferable from, this Contract, all in accordance with plans, specifications and drawings of the Project and in accordance with the bid and specifications as outlined in Bid Number 19-59-3340.

2.2 The term "Work" shall mean whatever is done by or required of the Contractor to perform and complete its duties under this Contract, including the following: construction of the whole or a designated portion of the Project; furnishing of any required bonds and insurance; provision of required certifications and documentation of associated testing results; provision or furnishing of labor, supervision, services, materials, supplies, equipment, fixtures, appliances, facilities, tools, transportation, storage, power, permits and licenses required of the Contractor, fuel, heat, light, cooling and all other utilities as required by this Contract. The work to be performed by the Contractor is generally described as follows:

1. To provide all equipment, materials, and labor for the SR 400 Waterline project; as detailed in Bid Specifications, Plans, Documents or Bid Number 19-59-3340. (attachments “A” and “B”)

ARTICLE III
CONTRACT TIME

3.1 Time and Liquidated Damages

3.1.1 The Contractor shall complete the work within 360 calendar day of issuance of Notice to Proceed.

3.1.2 The Contractor shall pay the Owner the sum of $500.00 per day for each and every calendar day of delay not excused by Section 8.2.5.1 in achieving completion beyond the time set forth herein for completion of the work. Any sums due and payable hereunder by the Contractor shall be payable, not as a penalty, but as liquidated damages representing an estimate of delay damages likely to be sustained by the Owner, estimated at or before the time of executing this Contract. When the Owner reasonably believes that completion will be inexcusably delayed, the Owner shall be entitled, but not required, to withhold from any amounts otherwise due the Contractor an amount then believed by the Owner to be adequate to recover liquidated damages applicable to such delays. If and when the Contractor overcomes the delay in achieving completion, or any part there, for which the Owner has withheld payment, the Owner shall promptly release to the Contractor those funds withheld, but no longer applicable, as liquidated damages.

3.2 Substantial Completion

3.2.1. "Substantial Completion" shall mean that state in the progression of the Work when the Work is sufficiently complete in accordance with this Contract that the Owner can enjoy beneficial use or occupancy of the work and can utilize the work for its intended purpose.

3.3 Time is of the Essence

3.3.1 All limitations of time set forth in the Contract Documents are of the essence of this Contract.

ARTICLE IV
CONTRACT PRICE

4.1 The Contract Price

The Owner shall pay, and the Contractor shall accept, as full and complete payment for all of the work required herein, the sum of . Said sum consists of furnishing all materials, labor and equipment necessary to complete the transmission mains as detailed in bid documents. The sum set for in this Paragraph 4.1.1 shall constitute the Contract Price which shall not be modified except by Change Order as provided in this Contract. Actual quantities used for the subject work will be verified and paid using unit pricing as detailed in the Bid Documents; unless stipulated as “lump sum”.

ARTICLE V
PAYMENT OF THE CONTRACT PRICE

5.1 Payment Procedure

5.2.1 Based upon the Contractor's applications and certificates for payment issued to the Owner, Owner shall make progress payments to the Contractor on account of the Contract Price.

5.2.2 On or before the tenth day of each month after commencement of the work, the Contractor shall submit an Application for Payment for the period ending the last day of the prior month to the Owner in such form and manner, and with such supporting data and content, as the Owner may require. Therein, the Contractor may request payment for ninety five percent (95%) of that portion of the Contract Price properly allocable to Contract requirements properly provided, i.e., labor, materials and equipment properly incorporated in the work plus ninety five percent (95%) of that portion of the Contract Price properly allocable to materials or equipment incorporated in the work, less the total amount of previous payments received from the Owner. Such Application for Payment shall be signed by the Contractor and shall constitute the Contractor's representation that the work has been properly performed in full accordance with this Contract. When Owner determines amounts requested to be properly owing to the Contractor, the Owner shall make partial payments on account of the Contract Price to the Contractor on or before the 25th day of each month in which application for payment is made.

5.2.3 The Contractor warrants that upon submittal of an Application for Payment, all work for which payments have been received from the Owner shall be free and clear of liens, claims, security interest or other encumbrances in favor of the Contractor or any other person or entity whatsoever. The Contractor shall promptly pay each Subcontractor out of the amount paid to the Contractor on account of such Subcontractor's work, the amount to which such Subcontractor is entitled. In the event the Owner becomes informed that the Contractor has not paid a Subcontractor as herein provided, the Owner shall have the right, but not the duty, to issue future checks in payment to the Contractor of amounts otherwise due hereunder naming the Contractor and such Subcontractor as joint payees.

5.2.4 No progress payment, nor any use or occupancy of the Project by the Owner, shall be interpreted to constitute an acceptance of any work not in strict accordance with this Contract.

5.3 Withheld Payment

5.3.1 The Owner may decline to make payment, may withhold funds, and, if necessary, may demand the return of some or all of the amounts previously paid to the Contractor, to protect the Owner from loss because of:

(a) Defective work not remedied by the Contractor;
(b) Claims of third parties against the Owner;
(c) Failure by the Contractor to pay Subcontractors or others in a prompt and proper fashion;
(d) Evidence that the balance of the work cannot be completed in accordance with the Contract for the unpaid balance of the Contract Price;
(e) Evidence that the work will not be completed in the time required for substantial or final completion;
(f) Persistent failure to carry out the work in accordance with the Contract;
(g) Damage to the Owner or a third party to whom the Owner is, or may be, liable.

5.4 Completion and Final Payment

5.4.1 When all of the work is finally complete and the Contractor is ready for a final inspection, it shall notify the Owner thereof in writing. Thereupon, the Owner will make final inspection of the work and, if the work is complete in full accordance with this Contract and this Contract has been fully performed, the Owner will promptly issue a final Certificate for Payment certifying to the Owner that the Project is complete and the Contractor is entitled to the remainder of the unpaid Contract Price, less any amount withheld pursuant to this Contract.

5.4.2 The Contractor shall not be entitled to final payment unless and until it submits to the Procurement Department its affidavit that all payrolls, invoices for materials and equipment, and other liabilities connected with the work for which the Owner, or the Owner's property might be responsible, have been fully paid or otherwise satisfied; releases and waivers of lien from all Subcontractors of the Contractor and of any and all other parties required by the Engineer or the Owner; consent of Surety to final payment. If any third party fails or refuses to provide a release of claim or waiver of lien as required by the Owner, the Contractor shall furnish a bond satisfactory to the Owner to discharge any such lien or indemnify the Owner from liability.

5.4.3 The Owner shall make final payment of all sums due the Contractor within ten (10) days of the Engineer's execution of a final Certificate for Payment.

5.4.4 Acceptance of final payment shall constitute a waiver of all claims against the Owner by the Contractor except for those claims previously made in writing against the Owner by the Contractor, pending at the time of final payment, and identified in writing by the contractor as unsettled at the time of its request for final payment.

5.4.5 Payment shall be made at the unit rates as set out in the Bid Schedule submitted by the Contractor for the Work for the quantities actually installed into the Work except as follows:

(a) There are no exceptions.

ARTICLE VI
THE OWNER

6.1 Information, Services and Things Required From Owner

6.1.1 The Owner shall furnish to the Contractor, at the time of executing this Contract, any and all written and tangible material in its possession that are necessary to facilitate the completion of this project in a timely manner, if any.

6.1.2 Excluding permits and fees normally the responsibility of the Contractor, the Owner shall obtain all approvals, easements, and the like required for construction.

6.1.3 The Owner shall furnish the Contractor, free of charge, three copies of the Contract Documents for execution of the Work.

6.2 Right to Stop Work

6.2.1 If the Contractor persistently fails or refuses to perform the work in accordance with this Contract, the Owner may order the Contractor to stop the work, or any described portion thereof, until the cause for stoppage has been corrected, no longer exists, or the Owner orders that work be resumed. In such event, the Contractor shall immediately obey such order. The stop work order referenced herein must be in writing and must specify in detail the alleged failure of the Contractor in accordance with the contract documents.

6.3 Owner's Right to Perform Work

6.3.1 If the Contractor's work is stopped by the Owner under Paragraph 6.2, and the Contractor fails within seven (7) days of such stoppage to provide adequate assurance to the Owner that the cause of such stoppage will be eliminated or corrected, then the Owner may, without prejudice to any other rights or remedies the Owner may have against the Contractor, proceed to carry out the subject work. In such a situation, an appropriate Change Order shall be issued deducting from the Contract Price the cost of correcting the subject deficiencies, plus compensation for the Engineer's additional services and expenses necessitated thereby, if any. If the unpaid portion of the Contract Price is insufficient to cover the amount due the Owner, the Contractor shall pay the difference to the Owner.

ARTICLE VII
THE CONTRACTOR

7.1 The Contractor shall perform the work strictly in accordance with this Contract.

7.2 The Contractor shall supervise and direct the work using the Contractor's best skill, effort and attention. The Contractor shall be responsible to the Owner for any and all acts or omissions of the Contractor, its employees and others engaged in the work on behalf of the Contractor.

7.3 Warranty

7.3.1 The Contractor warrants to the Owner that all labor furnished to progress the work under this Contract will be competent to perform the tasks undertaken, that the product of such labor will yield only first-class results, that materials and equipment furnished will be of good quality and new unless otherwise permitted by this Contract, and that the work will be of good quality, free from faults and defects and in strict conformance with this Contract. All work not conforming to these requirements may be considered defective.

7.4 The Contractor shall obtain and pay for all permits, fees and licenses necessary and ordinary for the work. The Contractor shall comply with all lawful requirements applicable to the work and shall give and maintain any and all notices required by applicable law pertaining to the work.

7.5 Supervision

7.5.1 The Contractor shall employ and maintain at the Project site only competent supervisory personnel. Absent written instruction from the Contractor to the contrary, the superintendent shall be deemed the Contractor's authorized representative at the site and shall be authorized to receive and accept any and all communications from the Owner.

7.6 Cleaning the Site and the Project

7.6.1 The Contractor shall keep the site reasonably clean during performance of the work. Upon final completion of the work, the Contractor shall clean the site and the Project and remove all waste, together with all of the Contractor's property therefrom.

7.7 Access to Work

7.7.1 The Owner and the Engineer shall have access to the work at all times from commencement of the work through final completion. The Contractor shall take whatever steps necessary to provide access when requested.

7.8 Indemnity

7.8.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner from and against liability, claims, damages, losses and expenses, including attorneys' fees, arising out of or resulting from performance of the work, provided that such liability, claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable.

7.8.2 In claims against any person or entity indemnified under this Paragraph 7.8 by an employee of the Contractor, a Subcontractor, any one directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Paragraph 7.8 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE VIII
CONTRACT ADMINISTRATION

8.1 Administration

8.1.1 The Forsyth County Department of Water & Sewer shall be the Owner's representative from the effective date of this Contract until final payment has been made for work site operations. Any and all change orders must be submitted through the Forsyth County Department of Procurement.

8.1.2. The Owner and the Contractor shall communicate with each other in the first instance through the Forsyth County Department of Water & Sewer.

8.1.3 The Owner's Representative shall be the initial interpreter of the requirements of the drawings and specifications and the judge of the performance thereunder by the Contractor.

8.1.4 The Owner's Representative shall have authority to reject work that is defective or does not conform to the requirements of this Contract.

8.1.5 The Owner's Representative will review the Contractor's Applications for Payment and will certify those amounts then due the Contractor as provided in this Contract. All invoices are to be submitted to the attention of the Procurement Department.

8.1.6 The Owner's Representative, shall, upon request from the Contractor, conduct inspections to determine the date of final completion, will receive records, written warranties and related

documents required by this contract and will issue a final Certificate for Payment upon compliance with the requirements of this Contract.

8.2 Claims by the Contractor

8.2.1 All Contractor claims shall be initiated by written notice and claim to the Owner attention the Procurement Department. Such written notice and claim must be furnished within seven (7) days after occurrence of the event, or the first appearance of the condition, giving rise to the claim.

8.2.2 Pending final resolution of any claim of the Contractor, the Contractor shall diligently proceed with performance of this Contract and the Owner shall continue to make payments to the Contractor in accordance with this Contract. The resolution of any claim under this paragraph 8.3 shall be reflected by a Change Order executed by the Owner and the Contractor.

8.2.3 *Claims for Concealed and Unknown Condition* **-** Should concealed and unknown conditions encountered in the performance of the Work (a) below the surface of the ground or (b) in an existing structure be at variance with the conditions indicated by this Contract, or should unknown conditions of an unusual nature differing materially from those ordinarily encountered in the area and generally recognized as inherent in Work of the character provided for in this Contract, be encountered, the Contract Price shall be equitably adjusted by Change Order upon the written notice and claim by either party made within seven days after the first observance of the condition. As a condition precedent to the Owner having any liability to the Contractor for concealed or unknown conditions, the Contractor must give the Owner written notice of, and an opportunity to observe, the condition prior to disturbing it. The failure by the Contractor to make the written notice and claim as provided in this Subparagraph shall constitute a waiver by the Contractor of any claim arising out of or relating to such concealed or unknown condition.

8.2.4 *Claims for Additional Costs* **-** If the Contractor wishes to make a claim for an increase in the Contract Price, as a condition precedent to any liability of the Owner therefore, the Contractor shall give the Owner written notice of such claim within seven days after the occurrence of the event, or the first appearance of the condition, giving rise to such claim. Such notice shall be given by the Contractor before proceeding to execute any additional or changed Work. The failure by the Contractor to give such notice and to give such notice prior to executing the Work shall constitute a waiver of any claim for additional compensation.

8.2.4.1 In connection with any claim by the Contractor against the Owner for compensation in excess of the Contract Price, any liability of the Owner for the Contractor's costs shall be strictly limited to direct costs incurred by the Contractor and shall in no event include indirect costs or consequential damages of the Contractor. The Owner shall not be liable to the Contractor for claims of third parties, including Subcontractors, unless and until liability of the Contractor has been established therefor in a court of competent jurisdiction.

8.2.5 *Claims for Additional Time*

8.2.5.1 If the Contractor is delayed in progressing any task which at the time of delay is then critical or which during the delay becomes critical, as the sole result of any act or neglect to act by the Owner or someone acting in the Owner's behalf, or by changes ordered in the work, unusual delay in transportation, unusually adverse weather conditions not reasonably anticipated, fire or any causes beyond the Contractor's control, then the date for achieving completion of the work shall be extended upon the written notice and claim of the Contractor to the Owner's Procurement Department for such reasonable time as the Owner's representative may determine. Any notice and claim for an extension of time by the Contractor shall be made not more than fifteen (15) days after the occurrence of the event or the first appearance of the

condition giving rise to the claim and shall set forth in detail the Contractor's basis for requiring additional time in which to complete the Project.

8.2.6 *Claims for Weather Delays*

8.2.6.1 Claims for weather delays shall not be considered unless work is not feasible for more than one-half of a day due to weather conditions. Claims for weather delays shall not be considered for Sundays unless the Contractor consistently works on Sundays prior to the claim. Claims for weather must be submitted within four weeks of the requested delay time.

ARTICLE IX
CHANGES IN THE WORK

9.1 Changes Permitted

9.1.1 Changes in the work within the general scope of this Contract, consisting of additions, deletions, revisions, or any combination thereof, may be ordered without invalidating this Contract, by Change Order. Change Orders are to be issued through the Forsyth County Department of Procurement, with the County Administrator signature required as authorization.

9.1.2 Changes in the work shall be performed under applicable provisions of this Contract and the Contractor shall proceed promptly with such changes.

9.2 Change Order Defined

9.2.1 Change Order shall mean a written order to the Contractor executed by the Owner, issued after execution of this Contract, authorizing and directing a change in the work or an adjustment in the Contract Price or the Contract Time. The Contract Price and the Contract Time may be changed only by Change Order.

9.3 Changes in the Contract Price

9.3.1 Any change in the Contract Price resulting from a Change Order shall be determined as follows: (a) by mutual agreement between the Owner and the Contractor as evidenced by (1) the change in the Contract Price being set forth in the change Order, (2) such change in the contract Price, together with any conditions or requirements related thereto, being initialed by both parties and (3) the Contractor's execution of the Change Order, or (b) if no mutual agreement occurs between the Owner and the Contractor, then as provided in Subparagraph 9.3.2 below.

9.3.2 If no mutual agreement occurs between the Owner and the contractor as contemplated in Subparagraph 9.3.1 above, the change in the Contract Price, if any, shall then be determined by the Owner on the basis of the reasonable expenditures or savings of those performing, deleting or revising the work attributable to the change, including, in the case of an increase or decrease in the Contract Price, a reasonable allowance for direct job site overhead and profit. In such case, the Contractor shall present, in such form and with such content as the Owner requires, an itemized accounting of such expenditures or savings, plus appropriate supporting data for inclusion in a Change Order.

9.3.3 If unit prices are provided in the Contract, and if the quantities contemplated are so changed in a proposed Change Order that application of such unit prices to the quantities of Work proposed will cause substantial inequity to the Owner or to the Contractor, the applicable unit prices shall be equitably adjusted.

ARTICLE X
CONTRACT TERMINATION

10.1 Termination by the Contractor

10.1.1 If the work is stopped for a period of ninety (90) days by an order of any court or other public authority, or as a result of an act of the Government, through no fault of the Contractor or any person or entity working directly or indirectly for the Contractor, the Contractor may, upon ten (10) days' written notice to the Owner, terminate performance under this contract and recover from the Owner payment for the actual reasonable expenditures of the Contractor for all work executed.

10.1.2 If the Owner shall persistently or repeatedly fail to perform any material obligation to the Contractor for a period of thirty (30) days after receiving written notice from the Contractor of its intent to terminate hereunder, the Contractor may terminate performance under this Contract by written notice to the Owner. In such event, the Contractor shall be entitled to recover from the Owner as though the Owner had terminated the Contractor's performance under this Contract for convenience pursuant to Subparagraph 10.2.1.

10.2 Termination by the Owner

10.2.1 *For Convenience*

10.2.1.1 The Owner may for any reason whatsoever terminates performance under this Contract by the contractor for convenience. The Owner shall give written notice of such termination to the Contractor specifying when termination becomes effective.

10.2.1.2 The Contractor shall incur no further obligations in connection with the work and the Contractor shall stop work when such termination becomes effective. The Contractor shall also terminate outstanding orders and subcontracts. The Contractor shall settle the liabilities and claims arising out of the termination of subcontracts and orders. The Owner may direct the Contractor to assign the Contractor's right; title and interest under terminated orders or subcontracts to the Owner or its designee.

10.2.1.3 The Contractor shall transfer title and deliver to the Owner such completed or partially completed work and materials, equipment, parts, fixtures, information and Contract rights as the Contractor has.

10.2.1.4 (a) The Contractor shall submit a termination claim to the Owner specifying the amounts due because of the termination for convenience together with costs, pricing or other data required by the Owner. If the Contractor fails to file a termination claim within one (1) year from the effective date of termination, the Owner shall pay the Contractor, an amount derived in accordance with subparagraph (c) below.

(b) The Owner and the Contractor may agree to the compensation, if any, due to the Contractor hereunder.

(c) Absent agreement to the amount due to the contractor, the Owner shall pay the Contractor the following amounts:

(i) Contract prices for labor, materials, equipment and other services accepted under this Contract;

(ii) Reasonable costs incurred in preparing to perform and in performing the terminated portion of the work, and in terminating the Contractor's performance, plus a fair and reasonable allowance for overhead and profit thereon (such profit shall not include anticipated profit or consequential damages); provided however, that if it appears that the Contractor would have not profited or would have sustained a loss if the entire Contract would have

been completed, no profit shall be allowed or included and the amount 0of compensation shall be reduced to reflect the anticipated rate of loss, if any;

(iii) Reasonable costs of settling and paying claims arising out of the termination of subcontracts or orders pursuant to Subparagraph 10.2.1.2 of this Paragraph. These costs shall not include amounts paid in accordance with other provisions hereof.

The total sum to be paid the Contractor under this Subparagraph 10.2.1 shall not exceed the total Contract Price, as properly adjusted, reduced by the amount of payments otherwise made, and shall in no event include duplication of payment.

10.2.2 ***For Cause***

10.2.2.1 If the Contractor persistently or repeatedly refuses or fails to prosecute the work in a timely manner, supply enough properly skilled workers, supervisory personnel or proper equipment or materials, or if it fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a material provision of this Contract, then the Owner may by written notice to the Contractor, without prejudice to any other right or remedy, terminate the employment of the contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the work by whatever methods it may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished.

10.2.2.2 If the unpaid balance of the Contract Price exceeds the cost of finishing the work, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. This obligation for payment shall survive the termination of the Contract.

10.2.2.3 In the event the employment of the Contractor is terminated by the Owner for cause pursuant to subparagraph 10.2.2 and it is subsequently determined by a Court of competent jurisdiction that such termination was without cause, such termination shall thereupon be deemed a Termination for Convenience under Subparagraph 10.2.1 and the provisions of Subparagraph 10.2.1 shall apply.

ARTICLE XI
INSURANCE

11.1 Contractor's Insurance Requirements

11.1.1 The Contractor shall maintain in full force and effect at all times during the Contract period Comprehensive General Liability Insurance in an amount equal to One Million ($1,000,000.00) Dollars.

11.1.2 The Contractor shall provide to the Owner Certificates of Insurance naming the Owner as additional insured party under the policy or policies of Comprehensive General Liability Insurance required by Paragraph 11.1.1.

11.1.3 The insurance policy or policies as aforesaid shall provide that thirty (30) days written notice be given to the Owner prior to cancellation thereof.

11.1.4 The Contractor shall maintain in full force and effect at all times during the Contract period Workers' Compensation Insurance as provided by Georgia law.

ARTICLE XII
NONDISCRIMINATION

12.1 In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 U.S.C. § 12132, and all other provisions of Federal law, Contractor agrees that, during performance of the Agreement, Contractor, for itself, its assignees and successors in interest, will not discriminate against any employee or applicant for employment, any subcontractor, or any supplier because of race, color, creed, national origin, gender, age or disability. In addition, Contractor agrees to comply with all applicable implementing regulations and shall include the provisions of this Section in every subcontract for services contemplated under the Agreement.

ARTICLE XIII
E-VERIFY

13.1 It is the policy of Client that unauthorized aliens shall not be employed to perform work on Client contracts involving the physical performance of services. Therefore, Client shall not enter into a contract for the physical performance of services within the State of Georgia unless:

(1) Contractor shall provide evidence on Client-provided forms, attached hereto as Exhibits "B" and "C" (affidavits regarding compliance with the E-Verify program to be sworn under oath under criminal penalty of false swearing pursuant to O.C.G.A. § 16-10-71), that it and Contractor' subcontractors have conducted a verification, under the federal Employment Eligibility Verification ("EEV" or "E-Verify") program, of the social security numbers, or other identifying information now or hereafter accepted by the E-Verify program, of all employees who will perform work on the County contract to ensure that no unauthorized aliens will be employed, **or**

(2) Contractor provides evidence that it is not required to provide an affidavit because it is licensed pursuant to Title 26 or Title 43 or by the State Bar of Georgia and is in good standing as of the date when the contract for services is to be rendered.

Contractor hereby verifies that it has, prior to executing this Agreement, executed a notarized affidavit, the form of which is provided in Exhibit "B", and submitted such affidavit to Client or provided Client with evidence that it is not required to provide such an affidavit because it is licensed and in good standing as noted in subsection (2) above. Further, Contractor hereby agrees to comply with the requirements of the federal Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603, O.C.G.A. § 13-10-91 and Rule 300-10-1-.02.

In the event Contractor employs or contracts with any subcontractor(s) in connection with the covered contract, Contractor agrees to secure from such subcontractor(s) attestation of the subcontractor's compliance with O.C.G.A. § 13-10-91 and Rule 300-10-1-.02 by the subcontractor's execution of the subcontractor affidavit, the form of which is attached hereto as Exhibit "C", which subcontractor affidavit shall become part of the contractor/subcontractor agreement, or evidence that the subcontractor is not required to provide such an affidavit because it is licensed and in good standing as noted in subsection (2) above. If a subcontractor affidavit is obtained, Contractor agrees to provide a completed copy to Client within five (5) business days of receipt from any subcontractor.

Where Contractor is required to provide an affidavit pursuant to O.C.G.A. § 13-10-91, the County Manager or his/her designee shall be authorized to conduct an inspection of Contractor' and Contractor' subcontractors' verification process at any time to determine that the verification was correct and complete. Contractor and Contractor' subcontractors shall retain all documents and records of their respective verification process for a period of three (3) years

following completion of the contract. Further, where Contractor is required to provide an affidavit pursuant to O.C.G.A. § 13-10-91, the County Manager or his/her designee shall further be authorized to conduct periodic inspections to ensure that no Client contractor or their subcontractors employ unauthorized aliens on County contracts. By entering into a contract with Client, Contractor and Contractor's subcontractors agree to cooperate with any such investigation by making their records and personnel available upon reasonable notice for inspection and questioning. Where a Contractor or Contractor's subcontractors are found to have employed an unauthorized alien, the County Manager or his/her designee may report same to the Department of Homeland Security. Contractor' failure to cooperate with the investigation may be sanctioned by termination of the contract, and Contractor shall be liable for all damages and delays occasioned by Client thereby.

Contractor agrees that the employee-number category designated below is applicable to Contractor. [Information only required if a contractor affidavit is required pursuant to O.C.G.A. § 13-10-91.]

____ 500 or more employees.

____ 100 or more employees.

____ Fewer than 100 employees.

Contractor hereby agrees that, in the event Contractor employs or contracts with any subcontractor(s) in connection with this Agreement and where the subcontractor is required to provide an affidavit pursuant to O.C.G.A. § 13-10-91, Contractor will secure from the subcontractor(s) such subcontractor(s') indication of the above employee-number category that is applicable to the subcontractor.

The above requirements shall be in addition to the requirements of State and federal law, and shall be construed to be in conformity with those laws.

ARTICLE XIV
MISCELLANEOUS

14.1 Governing Law

14.1.1 The Contract shall be governed by the laws of the State of Georgia.

14.2 Successors and Assigns

The Owner and Contractor bind themselves, their successors, assigns and legal representatives to the other party hereto and to successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in this Contract. The Contractor shall not assign this Contract without written consent of the Owner.

14.3 Surety Bonds

14.3.1 The Contractor shall furnish separate performance and payment bonds to the Owner. Each bond shall set forth a penal sum in an amount not less than the contract price. Each bond furnished by the Contractor shall incorporate by reference the terms of this Contract as fully as though they were set forth verbatim in such bonds. In the event the Contract Price is adjusted by Change Order executed by the Contractor, the penal sum of both the performance bond and the payment bond shall be deemed increased by like amount. Thee performance and payment bonds furnished by the Contractor shall be in form suitable to the Owner and shall be executed by a surety, or sureties, reasonably suitable to the Owner.

IN WITNESS WHEREOF, the Undersigned have set their hands and seals on the day and date appearing below the signatures of their authorized representatives.

FORSYTH COUNTY, A Political Subdivision
Of the State of Georgia

By: _____

_____
a Georgia Corporation

By: _____

BID BOND

FORSYTH COUNTY

BID NUMBER: 19-59-3340

KNOW ALL MEN BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a_____(Corporation, Partnership or individual)

hereinafter called Principal, and

_____
(Name of Surety)

_____
(Address of Surety)

a Corporation of the State of_____, and a surety authorized by law to do business in the State of Georgia, hereinafter called Surety, are held and firmly bound unto

Forsyth County Board of Commissioners

hereinafter referred to as Obligee, in the penal sum of:
_____ Dollars ($_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to submit, or has submitted, to Forsyth County, Georgia, a proposal for furnishing materials, labor, and equipment for construction of the SR 400 Waterline project.

WHEREAS, the Principal desires to file this Bond in accordance with law in lieu of a certified Bidder's check otherwise required to accompany this Proposal.

BID BOND

Bid Number: 19-59-3340
BID DATE:

NOW, THEREFORE, the conditions of this obligation are such that if the proposal be accepted, the Principal shall within ten days after receipt of notification of the acceptance, execute a Contract in accordance with the Proposal and upon the terms, conditions, and prices set forth in the form and manner required by Forsyth County, Georgia, and execute a sufficient and satisfactory Performance Bond and Payment Bond payable to Forsyth County, Georgia, each in the amount of 100% of the total Contract Price, in form and with security satisfactory to said Forsyth County, Georgia, and otherwise, to be and remain in full force and virtue in law, and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to Forsyth County, Georgia, upon demand, the amount hereof in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

PROVIDED, FURTHER, that Principal and Surety agree and represent that this bond is executed pursuant to and in accordance with the applicable provisions of the Official Code of Georgia Annotated, as Amended, including, but not limited to, O.C.G.A. 13-10-1, et seq. and 36-86-101, et seq., and is intended to be and shall be constructed as a bond in compliance with the requirements thereof.

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(Signatures Next Page)

BID BOND

Bid Number: 19-59-3340
BID DATE: May 23, 2019

Signed, sealed, and dated this _____day of _____A.D. 20_____.

ATTEST:

_____ _____
(Principal Secretary) (Principal)

By: _____

(SEAL)

_____ _____
(Witness as to Principal) (Address)

_____ _____
(Address) (Surety)

ATTEST: By: _____
(Attorney-in-Fact and Resident Agent)

_____
(Attorney-in-Fact)

(SEAL)

_____ _____
(Witness as to Surety) (Address)

_____
(Address)

_____

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

CONSENT OF SURETY

(This Consent of Surety is Part of the Bid Documents)

BID DATE: May 23, 2019 BID NUMBER: 19-59-3340

PROJECT DESCRIPTION: Forsyth County, Georgia, SR 400 waterline project.

KNOWN ALL MEN BY THESE PRESENTS, that we_____, as principal

and _____
(Name of Company),
a Corporation created and Surety existing under the laws of the State of _____ and having its principal office at

_____
(Complete Address of Surety Company)

are held firmly bound unto Forsyth County, Georgia hereby jointly and severally bind ourselves, our heirs, successors, administrators, executors, legal representatives, and assigns by these presents.

THE CONDITIONS OF THIS OBLIGATION are such that whereas, the above named principal submits the herewith Bid for construction of the SR 400 Waterline project within Forsyth County, GA.

Forsyth County, Georgia to the Board of Commissioners of Forsyth County, Georgia in conformance with the Advertisement for Bids and Information for Bidders; we, the above Surety will meet all stipulations and will execute the Surety Bonds as hereinafter, to the above named principal in the event he should be awarded a Contract and in the amount of one hundred percent (100%) of the total Bid Price for performing the work and guaranteeing its performance in conformity with the Plans and Specifications and in amount one hundred percent (100%) of the total Bid Price for the payment of all persons performing labor or furnishing materials therewith, to Forsyth County, Georgia.

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CONSENT OF SURETY

(Continued)

(This Consent of Surety is Part of the Bid Documents)

WITNESS OUR SIGNATURES this _____ day of _____, 2019.

Attest:_____ By:_____
(Principal Secretary) (Principal- printed name, title)

By:_____
SEAL (Signature)

Surety:

Attest: _____ _____
(Name of Surety)

By:_____
(Attorney in Fact and Resident Agent)
Signature

Seal

_____
Witness as to Surety

Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

PERFORMANCE BOND

PROJECT NAME: Forsyth County Georgia, SR 400 Waterline Project
BID NUMBER: 19-59-3340

KNOW ALL MEN BY THESE PRESENTS, That

_____
(Name of Contractor)

_____
(Address of Contractor)

a _____
(Corporation, Partnership or Individual)

hereinafter called Principal, and

_____
(Name of Surety)

_____
(Address of Surety)

a Corporation of the State of _____, and a surety authorized by law to do business in the State of Georgia, hereinafter called Surety, are held and firmly bound unto

Forsyth County Board of Commissioners

110 E. Main Street, Cumming, Georgia 30040

hereinafter referred to as Obligee, are held and firmly bound unto said Obligee and all persons doing work or furnishing skill, tools, machinery, supplies, or material under or for the purpose of the Contract hereinafter referred to, in the penal sum of _____ in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

This condition of this obligation is such, as whereas the Principal entered into a certain contract, hereto attached with the Obligee, dated_____, 2019.

PERFORMANCE BOND

NOW, THEREFORE THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal shall well, truly, fully and faithfully perform said contract according to its terms, covenants, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Obligee, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreement of any and all duly authorized modifications of said contract that may hereafter be made, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED FURTHER, that said Surety to this Bond, for value received, hereby stipulates and agrees that no change, extension of time, alterations or additions to the terms of the Contract or to the Work to be performed thereunder shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alterations, or additions to the terms of the Contract or to the work to be performed thereunder.

PROVIDED, FURTHER, that Principal and Surety agree and represent that this bond is executed pursuant to and in accordance with the applicable provisions of the Official Code of Georgia Annotated, as Amended, including, but not limited to, O.C.G.A. 13-10-1, et seq. and 36-86-101, et.seq., and is intended to be and shall be construed as a bond in compliance with the requirements thereof.

(Signatures Next Page)

(This space intentionally left blank)

PERFORMANCE BOND

Signed, sealed, and dated this _____day of _____A.D., 2019.

ATTEST:

_____ _____
(Principal Secretary) (Principal)

By: _____

(SEAL)

_____ _____
(Witness as to Principal) (Address)

_____ _____
(Address) (Surety)

ATTEST: By: _____
(Attorney-in-Fact and Resident Agent)

_____
(Attorney-in-Fact)

(SEAL)

_____ _____
(Witness as to Surety) (Address)

_____
(Address)

_____

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

PAYMENT BOND

BID NUMBER: 19-59-3340

KNOW ALL MEN BY THESE PRESENTS, That

_____
(Name of Contractor)

_____
(Address of Contractor)

a_____
(Corporation, Partnership or Individual)

hereinafter called Principal, and

_____
(Name of Surety)

_____
(Address of Surety)

a Corporation of the State of _____, and a surety authorized by law to do business in the State of Georgia, hereinafter called Surety, are held and firmly bound unto

Forsyth County Board of Commissioners

110 E Main Street, Cumming, Georgia 30040

hereinafter called Obligee, for the use and protection of all subcontractors and all persons supplying labor, services, skill, tools, machinery, materials and/or equipment in the prosecution of the work provided for in the contract hereinafter referred to in the full and just sum of $_____ in lawful money of the United States, for the payment of which sum, well and truly to be made, the Principal and Surety bind themselves, their, and each of their heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

The condition of this obligation is such, as whereas the Principal entered into a certain contract, hereto attached, with the Obligee, dated _____, 2019 for Forsyth County.

NOW, THEREFORE THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal shall well, truly, and faithfully perform said contract according to its terms, covenants and conditions, and shall promptly pay all persons furnishing labor, materials services, skill, tools, machinery and/or equipment for use in the performance of said Contract, then this obligation shall be void; otherwise it shall remain in full force and effect.

All persons who have furnished labor, materials, services, skill, tools, machinery and/or equipment for use in the performance of said Contract shall have a direct right of action on this Bond provided payment has not been made in full within ninety (90) days after the last day on which labor was performed, materials, services, skill, tools, machinery, and equipment furnished or the subcontract completed.

PROVIDED FURTHER, that said Surety to this Bond, for value received, hereby stipulates and agrees that no change, extension of time, alterations, or additions to the terms of the Contract or to the Work to be performed thereunder shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alterations, or additions to the terms of the Contract or to the work to be performed thereunder.

PROVIDED, HOWEVER, that no suit or action shall be commenced hereunder by any person furnishing labor, materials, services, skill, tools, machinery, and/or equipment having a direct contractual relationship with a subcontractor, but no contractual relationship express or implied with the Principal:

Unless such person shall have given notice to the Principal within ninety (90) days after such person did, or performed the last of the work or labor, or furnished the last of the materials, services, skill, tools, machinery and/or equipment for which claim is made stating with substantial accuracy the amount claimed and the name of the party to whom the materials, services, skill, tools, machinery and/or equipment were furnished, or for whom the work or labor was done or performed. Such a notice shall be served by mailing the same by registered mail, postage prepaid, in an envelope addressed to the Principal, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the State in which legal process may be served in the State in which the aforesaid project is located, save that such service need not be made by a public officer, and a copy of such notice shall be delivered to the Obligee, to the person and at the address provided for in the Contract, within five (5) days of the mailing of the notice to the Principal.

PROVIDED, FURTHER, that any suit under this bond must be instituted before the expiration of one (1) year after the acceptance of the public works covered by the Contract by the proper authorities.

PROVIDED, FURTHER, that Principal and Surety agree and represent that this bond is executed pursuant to and in accordance with the applicable provisions of the Official Code of Georgia Annotated, as Amended, including, but not limited to, O.C.G.A. 13-10-1, et seq. and 36-86-101, et seq., and is intended to be and shall be construed as a bond in compliance with the requirements thereof.

PAYMENT BOND

Signed, sealed, and dated this _____day of _____A.D., 2019.

ATTEST:

_____ _____
(Principal Secretary) (Principal)

By: _____

(SEAL)

_____ _____
(Witness as to Principal) (Address)

_____ _____
(Address) (Surety)

ATTEST: By: _____
(Attorney-in-Fact and Resident Agent)

_____
(Attorney-in-Fact)

(SEAL)

_____ _____
(Witness as to Surety) (Address)

_____
(Address)

_____

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

CONTENTS **Pages**

SPECIFICATIONS

APPENDIX

SECTION C-451

QUALIFICATIONS STATEMENT
TO BE RETURNED WITH BID
(if not submitted it may be reason for rejection of bid)
Qualifications Statement is part of the review process.

THE INFORMATION SUPPLIED IN THIS DOCUMENT IS CONFIDENTIAL TO THE EXTENT PERMITTED BY LAWS AND REGULATIONS

1. SUBMITTED BY:

Official Name of Firm: _____

Address: _____

_____

_____

2. SUBMITTED TO: _____

3. SUBMITTED FOR: _____

Owner: _____

Project Name: _____

_____

_____

_____

TYPE OF WORK: _____

_____

_____

4. CONTRACTOR'S CONTACT INFORMATION

Contact Person: _____

Title: _____

Phone: _____

Email: _____

5. AFFILIATED COMPANIES:

Name: _____

Address: _____

_____

_____

6. TYPE OF ORGANIZATION:

☐ SOLE PROPRIETORSHIP

Name of Owner: _____

Doing Business As: _____

Date of Organization: _____

☐ PARTNERSHIP

Date of Organization: _____

Type of Partnership: _____

Name of General Partner(s): _____

_____

_____

☐ CORPORATION

State of Organization: _____

Date of Organization: _____

Executive Officers:

- President: _____

- Vice President(s): _____

- Treasurer: _____

- Secretary: _____

☐ LIMITED LIABILITY COMPANY

State of Organization: _____

Date of Organization: _____

Members: _____

_____

_____

☐ JOINT VENTURE

Sate of Organization: _____

Date of Organization: _____

Form of Organization: _____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

7. LICENSING

Jurisdiction: _____

Type of License: _____

License Number: _____

Jurisdiction: _____

Type of License: _____

License Number: _____

8. CERTIFICATIONS CERTIFIED BY:

Disadvantage Business Enterprise: _____

Minority Business Enterprise: _____

Woman Owned Enterprise: _____

Small Business Enterprise: _____

Other (_____): _____

9. BONDING INFORMATION

Bonding Company: _____

Address: _____

_____

Bonding Agent: _____

Address: _____

_____

Contact Name: _____

Phone: _____

Aggregate Bonding Capacity: _____

Available Bonding Capacity as of date of this submittal: _____

10. FINANCIAL INFORMATION

Financial Institution: _____

Address: _____

_____

Account Manager: _____

Phone: _____

11. CONSTRUCTION EXPERIENCE:

Current Experience:

List on **Schedule A** all uncompleted projects currently under contract with pressure pipe sizes above 24-inch (If Joint Venture list each participant's projects separately).

Previous Experience:

List on **Schedule B** all projects completed within the last 7 Years with pressure pipe sizes above 24-inch (If Joint Venture list each participant's projects separately).

Contractor must have the requisite experience from Schedule A and Schedule B a combined total of 5,000 linear feet of 36-inch or larger Pressure Pipe installation experience. Demonstrate installation experience with a single (1) project totaling 3,000 linear feet of 36-inch or larger Pressure Pipe and one (1) 36-inch or larger water tie-in. All experience must be within the past 7 years. Demonstrate through project references the ability to complete projects on time in accordance with the project's construction schedule and contract documents.

Project Manager shall have a total of 3,000 linear feet of 36-inch or larger Pressure Pipe installation experience. All experience must be within the past 7 years.

Superintendent shall have a total of 3,000 linear feet of 36-inch or larger ductile iron Pressure Pipe. All experience must be within the past 7 years.

Has firm listed in Section 1 ever failed to complete a construction contract awarded to it?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

Has any Corporate Officer, Partner, Joint Venture participant or Proprietor ever failed to complete a construction contract awarded to them in their name or when acting as a principal of another entity?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

Are there any judgments, claims, disputes or litigation pending or outstanding involving the firm listed in Section 1 or any of its officers (or any of its partners if a partnership or any of the individual entities if a joint venture)?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

12. SAFETY PROGRAM:

Name of Contractor's Safety Officer:_____

Workers' compensation Experience Modification Rate (EMR) for the last 5 years:

YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____

Total Recordable Frequency Rate (TRFR) for the last 5 years:

YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____

13. EQUIPMENT:

MAJOR EQUIPMENT:

List on **Schedule C** all pieces of major equipment available for use on Owner's Project.

I HEREBY CERTIFY THAT THE INFORMATION SUBMITTED HEREWITH, INCLUDING ANY ATTACHMENTS, IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

NAME OF ORGANIZATION: _____

BY: _____

TITLE: _____

DATED: _____

NOTARY ATTEST:

SUBSCRIBED AND SWORN TO BEFORE ME

THIS _____ DAY OF _____, 20___

NOTARY PUBLIC - STATE OF _____

MY COMMISSION EXPIRES:_____

REQUIRED ATTACHMENTS

1. Schedule A (Current Experience).
2. Schedule B (Previous Experience).
3. Schedule C (Major Equipment).
4. Resumes of key individuals proposed for the project.
5. Additional items as pertinent.

SCHEDULE A

CURRENT EXPERIENCE

Project Name, Project Manager, and Superintendent	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name, Project Manager, and Superintendent	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name, Project Manager, and Superintendent	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE C - LIST OF MAJOR EQUIPMENT AVAILABLE

ITEM	PURCHASE DATE	CONDITION	ACQUIRED VALUE

SECTION 01001
GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 GENERAL

A. A brief description of the Work is stated in the Advertisement for Bids. To determine the full scope of the project or any particular part of the project, coordinate the applicable information in the several parts of these Contract Documents.

PART 2 SEQUENCE OF OPERATIONS

2.01 SCHEDULING

A. Prior to starting the Work, confer with the Engineer and Owner's representative to develop an approved Work schedule. Do not make connections between existing Work and new Work until necessary inspection and tests have been completed on the new Work and it is found to conform in all respects to the requirements of the Contract Documents.

B. Work on existing facilities shall be performed on a schedule and in a manner that will permit the existing water system to operate continuously, unless agreed to by the Owner as described herein.

2.02 SHUTDOWN OR ALTERATION OF EXISTING OPERATIONS OR UTILITIES

A. Continuous operation of the existing water system is of critical importance.

B. Connections to existing services or utilities, or other Work that requires the temporary shutdown of any existing operations or utilities shall be planned in detail with appropriate scheduling of the Work and coordinated with the Owner or Engineer. The approved schedule for shutdown or restart shall be indicated on the Contractor's Progress Schedule, and advance notice shall be given in order that the Owner or Engineer may witness the shutdown, tie-in, and startup.

C. All materials and equipment (including emergency equipment) necessary to expedite tie-ins shall be on hand prior to the shutdown of existing services or utilities.

2.03 OPERATION OF EXISTING SYSTEM PROHIBITED

A. At no time undertake to close off any lines or open valves or take any other action which would affect the operation of the existing system, except as specifically required by the Drawings and Specifications and after approval is granted by the Owner. Request approval to change the system operation three (3) working days in advance of the time that interruption of the existing system is required.

2.04 SEQUENCE OF OPERATIONS

A. The Work shall proceed in the following sequence:

1. The Work sequence shall be scheduled by the Contractor.

PART 3 SITE CONDITIONS

3.01 SITE INVESTIGATION AND REPRESENTATION

A. The Contractor acknowledges satisfaction as to the nature and location of the Work, the general and local conditions, particularly those bearing upon availability of transportation, access to the site, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, river stages, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during the prosecution of the Work, and all other matters which can in any way affect the Work or the cost thereof under this Contract.

B. The Contractor further acknowledges satisfaction as to character, quality, and quantity of surface and subsurface materials to be encountered from his inspection of the site and from reviewing any available records of exploratory Work furnished by the Owner or included in these Documents. Failure by the Contractor to become acquainted with the physical conditions of the site and all the available information will not relieve the Contractor from responsibility for properly estimating the difficulty or cost of successfully performing the Work.

C. The Contractor warrants that as a result of examination and investigation of all the aforesaid data, the Contractor can perform the Work in a good and workmanlike manner and to the satisfaction of the Owner. The Owner assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefor is assumed by the Owner.

3.02 INFORMATION ON SITE CONDITIONS

A. General: Any information obtained by the Engineer regarding site conditions, groundwater elevations, existing construction of site facilities as applicable, and similar data will be available for inspection at the office of the Engineer upon request. Such information is offered as supplementary information only. Neither the Engineer nor the Owner assumes any responsibility for the completeness or interpretation of such supplementary information.

3.03 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE

A. Utilities and structures adjacent to or expected to be encountered in the Work are the Contractor's sole responsibility to locate. A utility notification service is

available and it is encouraged that it be used to notify those utilities that participate in the service.

B. Where the Contractor's operations could cause damage or inconvenience to railway, telegraph, telephone, television, power, oil, gas, water, sewer, or irrigation systems, the operations shall be suspended until all arrangements necessary for the protection of these utilities and services have been made by the Contractor.

C. Notify all utility offices which are affected by the construction operation at least forty-eight (48) hours in advance. Under no circumstances expose any utility without first obtaining permission from the appropriate agency. Once permission has been granted, locate, expose, and provide temporary support for all existing underground utilities.

D. The Contractor shall be solely and directly responsible to the Owner and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage which may result from the construction operations under this Contract.

E. Neither the Owner nor its officers or agents shall be responsible to the Contractor for damages as a result of the Contractor's failure to protect utilities encountered in the Work.

F. If the Contractor while performing the Contract discovers utility facilities not identified by the public agency in the Contract Drawings or Specifications, he shall immediately notify the public agency and utility in writing.

G. The public utility, where they are the Owner, shall have the sole discretion to perform repairs or relocation Work or permit the Contractor to do such repairs or relocation Work at a reasonable price.

H. The Contractor shall replace, at his own expense, all existing utilities or structures removed or damaged during construction, unless otherwise provided for in these Contract Documents or ordered by the Engineer.

3.04 INTERFERING STRUCTURES

A. Take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground. An attempt has been made to show major structures on the Drawings. The completeness and accuracy of information shown cannot be guaranteed, and it is presented simply as a guide to avoid known possible difficulties.

B. Protect underground and aboveground existing structures from damage, whether or not they lie within the limits of the easements obtained by the Owner. Where such existing fences, gates, barns, sheds, buildings, or any other structure must be removed in order to properly carry out the construction, or are damaged during construction, restore to their original condition to the satisfaction of the property owner involved at the Contractor's own expense. Notify the Engineer of

any damaged underground structure and make repairs or replacements before backfilling.

C. Without additional compensation, the Contractor may remove and replace in a condition as good as or better than original, such small miscellaneous structures as fences, mailboxes, and signposts that interfere with the Contractor's operation.

3.05 FIELD RELOCATION

A. During the progress of construction, it is expected that minor relocations of the Work will be necessary. Such relocations shall be made only by direction of the Engineer. If existing structures are encountered which prevent the construction, and which are not properly shown on the Drawings, notify the Engineer before continuing with the construction in order that the Engineer may make such field revisions as necessary to avoid conflict with the existing structures. If the Contractor fails to so notify the Engineer when an existing structure is encountered, and proceeds with the construction despite this interference, he shall do so at his own risk.

PART 4 SALVAGE OF MATERIALS

4.01 SALVAGE OF EQUIPMENT AND MATERIALS REMOVED

A. If existing equipment or materials are removed and replaced, they shall be salvaged by the Contractor. Upon removal and replacement, the Contractor shall return equipment or materials to Forsyth County Department of Water and Sewer at 4050 County Way, Cumming, Georgia.

PART 5 SAFETY AND CONVENIENCE

5.01 CONSTRUCTION SAFETY PROGRAM

A. The Contractor shall develop and maintain for the duration of this Contract, a safety program that will effectively incorporate and implement all required safety provisions. The Contractor shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program.

B. The duty of the Engineer to conduct construction review of the Contractor's performance is not intended to include a review or approval of the adequacy of the Contractor's safety supervisor, the safety program, or any safety measures taken in, on, or near the construction site.

5.02 SAFETY EQUIPMENT

A. The Contractor, as part of his safety program, shall maintain at his office or other well-known place at the job site, safety equipment applicable to the Work as prescribed by the governing safety authorities, all articles necessary for giving first-aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of any person who may be injured on the job site.

B. The Contractor shall do all Work necessary to protect the general public from hazards, including, but not limited to, pedestrian sidewalk or walkway, and trenches or excavations in roadway. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the Work.

C. The performance of all Work and all completed construction, particularly with respect to ladders, platforms, structure openings, scaffolding, shoring, lagging, machinery guards and the like, shall be in accordance with the applicable governing safety authorities.

D. During construction, the Contractor shall construct and at all times maintain satisfactory and substantial temporary chain link fencing, solid fencing, railing, barricades or steel plates, as applicable, at all openings, obstruction, or other hazards in streets, sidewalks, floors, roofs, and walkways. All such barriers shall have adequate warning light as necessary, or required, for safety.

5.03 ACCIDENT REPORTS

A. If death or serious injuries or serious damage are caused, the accident shall be reported immediately by telephone or messenger to the Engineer. In addition, the Contractor must promptly report in writing to the Engineer all accidents whatsoever arising out of or in connection with, the performance of the Work whether on, or adjacent to, the site, giving full details and statements of witnesses.

B. If claim is made by anyone against the Contractor or any subcontractor on account of any accidents, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

5.04 SAFE ACCESS BY FEDERAL, STATE, AND LOCAL GOVERNMENT OFFICIALS

A. Authorized representatives of the Georgia Environmental Protection Division, and other government officials shall at all time have safe access to the Work, and the Contractor shall provide proper facilities for such access and inspection.

5.05 PROTECTION OF PROPERTY

A. Protect stored materials, cultivated trees and crops, and other items located adjacent to the proposed Work. Notify property owners affected by the construction at least forty-eight (48) hours in advance of the time construction begins. During construction operations, construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be cut off from access to his residence or place of business for a period exceeding eight (8) hours, unless the Contractor has made special arrangements with the affected persons.

5.06 FIRE PREVENTION AND PROTECTION

A. The Contractor shall perform all Work in a fire-safe manner. He shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable Federal, State, and local fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operation (NFPA No. 241) shall be followed.

5.07 TRAFFIC MAINTENANCE AND SAFETY

A. Comply with all rules and regulations of the State, County, and City authorities regarding closing or restricting the use of public streets or highways. No public or private road shall be closed, except by express permission of the Owner. Conduct the Work so as to assure the least possible obstruction to traffic and normal commercial pursuits. Protect all obstructions within traveled roadways by installing approved signs, barricades, and lights where necessary for the safety of the public. The convenience of the general public and residents adjacent to the project and the protection of persons and property are of prime importance and shall be provided for in an adequate and satisfactory manner.

B. When flagmen and guards are required by regulation or when deemed necessary for safety, they shall be furnished with approved orange wearing apparel and other regulation traffic-control devices.

5.08 ACCESS AND NOTIFICATION FOR POLICE, FIRE, AND POSTAL SERVICE

A. Notify the fire department and police department before closing any street or portion thereof. No closing shall be made without the Owner's approval. Notify said departments when the streets are again passable for emergency vehicles. Conduct operations with the least interference to fire equipment access and at no time prevent such access.

B. The Contractor shall leave a night emergency telephone number or numbers with the police departments, so that contact may be made easily at all times in case of barricade or flare trouble or other emergencies.

C. Maintain postal service facilities in accordance with the requirements of the U.S. Postal Service, and at the completion of the Work in each area, replace them in their original location and in a condition satisfactory to the U.S. Postal Service.

PART 6 USE OF EXPLOSIVES

A. The Contractor shall use all precaution, control, and safety features necessary to insure the safety of life or property in the area of operation.

B. Blasting operations shall be performed under the most skilled supervision. Where necessary, Contractor shall use suitable mats or other approved methods to smother blast.

C. No loaded holes shall be left unattended.

D. Extreme care shall be taken to minimize the amount and degree of ground vibration, noise, overpressure, and flying debris.

E. All explosives shall be stored in a safe manner, in compliance with local, state and federal laws and ordinances.

PART 7 PRESERVATION, RESTORATION, AND CLEANUP

7.01 EROSION CONTROL

A. The Contractor shall protect floodplains and wetlands by complying with the requirements in Title 33 of the Code of Federal Regulations Part 330, Appendix A. The Contractor shall provide silt fences, straw bales or wattles, and inlet protection as required or by the recommendations of the Owner or Engineer.

7.02 SITE RESTORATION AND CLEANUP

A. At all times during the Work, keep the premises clean and orderly, and upon completion of the Work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.

B. All existing drainage ditches and culverts shall be reopened and graded and natural drainage restored. Restore culverts broken or damaged to their original condition and location.

7.03 FINISHING OF SITE, BORROW, AND STORAGE AREAS

A. Upon completion of the project, all areas used by the Contractor shall be properly cleared of all temporary structures, rubbish, and waste materials and properly graded to drain and blend in with the abutting property. Areas used for the deposit of waste materials shall be finished to properly drain and blend with the surrounding terrain.

7.04 RESEEDING AND FERTILIZING

A. If damaged originally seeded areas inside and outside of the construction area shall be fertilized and reseeded with first-quality seed or planted with new sod as approved by the property owner. All ground preparation, reseeding, and sodding shall be done in accordance with the best accepted practices for lawn planting. The Contractor shall be responsible for obtaining a satisfactory grass turf acceptable to the property owner.

7.05 STREET CLEANUP DURING CONSTRUCTION

A. Thoroughly clean all foreign material caused by the construction operations from all streets and roads at the conclusion of each day's operation.

PART 8 SUBMITTALS DURING CONSTRUCTION

8.01 GENERAL

A. Requirements in this Section are in addition to any specific requirements for submittals specified in other Sections of these Contract Documents.

B. Submittals to the Owner shall be addressed to:

Forsyth County Water & Sewer
110 East Main Street, Suite 150
Cumming, Georgia 30040
Attn: Kyle Fikes, Project Manager

C. Submittals to the Engineer shall be addressed to:

Constantine Engineering
368 West Pike Street
Lawrenceville, GA 30046
Attn: Jeff Duplantis, P. E.

D. Submitted data shall be fully sufficient in detail for determination of compliance with the Contract Documents.

E. Review, acceptance, or approval of substitutions, schedules, shop Drawings, lists of materials, and procedures submitted or requested by the Contractor shall not add to the Contract amount, and all additional costs which may result therefrom shall be solely the obligation of the Contractor.

F. The Owner is not precluded, by virtue of review, acceptance, or approval, from obtaining a credit for construction savings resulting from allowed concessions in the Work or materials therefore.

G. It shall not be the responsibility of the Owner to provide engineering or other services to protect the Contractor from additional costs accruing from such approvals.

H. No equipment or material for which listings, Drawings, or descriptive material is required shall be installed until the Engineer has on hand copies of such approved lists and the appropriately stamped final shop Drawings.

I. The review of Drawings by the Engineer will be limited to general design requirements only and shall in no way relieve the Contractor from responsibility for errors or omissions contained therein.

J. Submittals will be acted upon by the Engineer as promptly as possible and returned to the Contractor no later than the time allowed for review in SHOP DRAWING SUBMITTAL PROCEDURE. Delays caused by the need for resubmittals shall not constitute reason for an extension of Contract time.

8.02 SHOP DRAWING SUBMITTAL PROCEDURE

A. The Contractor shall submit PDF copies, to the Engineer for his review, of shop Drawings, electrical diagrams, and catalog cuts for fabricated items and manufactured items (including mechanical and electrical equipment) furnished under this Contract. Shop Drawings shall be submitted in sufficient time to allow the Engineer not less than twenty (20) regular working days for examining the shop Drawings.

B. These shop Drawings shall be accurate, distinct, and complete, and shall contain all required information, including satisfactory identification of items, units, and assemblies in relation to the Contract Drawings and Specifications.

C. Shop Drawings shall be submitted only by the Contractor, who shall indicate by a signed stamp on the shop Drawings, or other approved means, that he (the Contractor) has checked and approved the shop Drawings, and that the Work shown is in accordance with Contract requirements and has been checked for dimensions and relationship with Work of all other trades involved. The practice of submitting incomplete or unchecked shop Drawings for the Engineer to correct or finish will not be acceptable, and shop Drawings which, in the opinion of the Engineer, clearly indicate that they have not been checked by the Contractor will be considered as not complying with the intent of the Contract Documents and will be returned to the Contractor for resubmission in the proper form.

D. When the shop Drawings have been reviewed by the Engineer, a PDF will be returned to the Contractor appropriately stamped. If major changes or corrections are necessary, the shop Drawing may be rejected and a PDF will be returned to the Contractor with such changes or corrections indicated, and the Contractor shall correct and resubmit the shop Drawings in the same manner

and quantity as specified for the original submittal, unless otherwise directed by the Engineer. If changes are made by the Contractor (in addition to those requested by the Engineer) on the resubmitted shop Drawings, such changes shall be clearly explained in a transmittal letter accompanying the resubmitted shop Drawings.

E. The review of such shop Drawings and catalog cuts by the Engineer shall not relieve the Contractor from responsibility for correctness of dimension, fabrication details, and space requirements, or for deviations from the Contract Drawings or Specifications, unless the Contractor has called attention to such deviations in writing by the letter accompanying the shop Drawings and the Engineer approves the change or deviation in writing at the time of submission; nor shall review by the Engineer relieve the Contractor from the responsibility for errors in the shop Drawings.

F. The Contractor agrees that shop Drawing submittals processed by the Engineer do not become Contract Documents and are not Change Orders; that the purpose of the shop Drawing review is to establish a reporting procedure and is intended for the Contractor's convenience in organizing his Work and to permit the Engineer to monitor the Contractor's progress and understanding of the design.

8.03 SHOP DRAWING REQUIREMENTS

A. Shop Drawings referred to herein shall include shop Drawings and other submittals for both shop and field-fabricated items. The Contractor shall submit, as applicable, the following for all prefabricated or manufactured structural, mechanical, electrical, plumbing, process systems, and equipment:

1. Shop Drawings or equipment Drawings, including dimensions, size and location of connections to other Work, and weight of equipment.

2. Catalog information and cuts.

3. Installation or placing Drawings for equipment, drives, and bases.

4. Supporting calculations for equipment and associated supports specified to be designed by equipment manufacturers or suppliers.

5. Wiring and control diagrams of systems and equipment.

6. Complete manufacturer's specifications, including materials description and paint system.

7. List of special motor features being provided (i.e., space heaters, altitude corrections, thermal protectors, etc.).

8. Complete motor rating for all motors fifteen (15) hp and larger, including motor no-load, starting, and full-load current at rated voltage; full-load speed and full-load current at one hundred-ten (110%) percent voltage; motor efficiency and power factor at ½, ¾, and full load at rated voltage.

9. Performance data and pump curves.

10. Suggested spare parts list with current price information.

11. List of special tools required for checking, testing, parts replacement, and maintenance (Special tools are those which have been specially designed or adapted for use on parts of the equipment, and which are not customarily and routinely carried by maintenance mechanics).

12. List of special tools furnished with the equipment.

13. List of materials and supplies required for the equipment prior to and during startup.

14. List of materials and supplies furnished with the equipment.

15. Samples of finish colors for selection.

16. Special handling instructions.

17. Requirements for storage and protection prior to installation.

18. Requirements for routine maintenance required prior to plant startup.

19. List of all requested exceptions to the Contract Documents.

B. The submittals shall include satisfactory identification of items, units, and assemblies in relation to the Specification Section number, and the system or equipment identification or tag number shown on the Drawings or as provided in the applicable Specification Section.

C. Should the Contractor propose any item on his shop Drawings, or incorporate an item into the Work, and that item should subsequently prove to be defective or otherwise unsatisfactory, (regardless of the Engineer's preliminary review), the Contractor shall, at his own expense, replace the item with another item that will perform satisfactorily.

8.04 AS-BUILT RECORD DRAWINGS

A. The Contractor will prepare Record Drawings for the Project in accordance with Forsyth County Department of Water and Sewer’s policies, procedures, and design requirements, which includes, but is not limited to, documentation of the changes made in materials, equipment, locations, and dimensions of the Work. Each month, or as otherwise agreed, the Contractor shall submit to the Engineer a current listing and description of each change incorporated into the Work since the preceding submittal.

B. As-built drawings of the installed water distribution system and/or sanitary sewer system shall be performed by a Georgia Registered Land Surveyor and/or Georgia Licensed Professional Engineer.

C. As-Built Drawings shall be completed upon completing the water distribution system and/or sanitary sewer system to the FCDWS system.

D. As-Built Drawings shall show all street names, right-of-way widths, related easements, lot number, service addresses, vertical depth with respect to pavement, size and material of all water distribution system and/or sanitary sewer system components and location of the centerline, valves, and taps. As-built profiles shall be submitted.

E. As-Built Drawings should also contain a table showing linear footage of pipe by size (water & sewer), number of valves and fire hydrants, and number of sanitary sewer manholes. Elevation, northing and easting shall be included for all fittings, valves and profile elevations a minimum of every 100 linear feet.

F. As-Built Drawings shall be prepared using a survey that ties the water distribution system and/or sanitary sewer systems horizontally and vertically to the following state plane coordinate system or as amended by the FCDWS.

Horizontal Control: North American Datum 83 (NAD83) (HARN) 1994
Vertical Control: North American Vertical Datum of 1988 (NAVD88).
Grid Zone: Georgia West 1002 (US Survey feet)

G. *The following certification shall be included on the As-Built Drawings and signed by the Design Engineer:*

"I certify that the water distribution system and/or sanitary sewer system depicted by this As-Built Drawing was constructed in accordance with the plans approved by the FCDWS. The information submitted on this As-Built Drawing is to the best of my knowledge and belief, true, accurate and complete."

H. The water distribution system and/or sanitary sewer system shall not be considered complete until the As-Built Drawings have been reviewed and approved by the FCDWS Engineer. The approved As-Built Drawings shall also be submitted to the FCDWS Engineer in a digital format (AUTOCAD Version 14 or newer version).

END SECTION 01001

TYPICAL MAINTENANCE SUMMARY FORM

1. EQUIPMENT ITEM

2. MANUFACTURER

3. NAMEPLATE DATE (hp, voltage, speed, etc.)

4. MANUFACTURER'S LOCAL REPRESENTATIVE

Name_____ Telephone Number_____

Address_____

5. SPARE PARTS. Include your recommendations regarding what spare parts, if any should be kept on the job.

6. MAINTENANCE REQUIREMENTS

Maintenance Operation[1]	**Frequency[2]**	**Lubricant (If Applicable) [3]**	**Comments**

1. List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable.

2. List required frequency of each maintenance operation.

3. List lubricant manufacturers, types, and identification numbers.

SECTION 02480
SEEDING AND MULCHING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Furnish and install seed and mulch and do related work necessary to complete work shown or specified.

B. The Contractor shall repair or replace lawn areas, trees, and ornamental plants damaged or destroyed during construction of the work included in this Contract, unless otherwise shown on the drawings.

1.02 QUALITY ASSURANCE

A. Codes, specifications, and standards referred to by number or title shall form a part of this specification to the extent required by the reference thereto. Latest revisions as of the date of bid opening shall apply, unless otherwise shown or specified.

B. Package standard products with manufacturer's certified analysis. For other materials, provide analysis by a recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

1.03 SUBMITTALS

A. Submittals shall be made in accordance with Section **GENERAL REQUIREMENTS** and the requirements of this section.

B. Submit seed vendor's certified statement for each grass seed mixture required, stating botanical and common name, percentage by weight, and percentages of purity, germination, and weed seed for each grass seed species.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall be responsible for the delivery, storage, and handling of products.

B. Promptly remove damaged products from the job site. Replace damaged products with undamaged products.

C. Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

1.05 JOB CONDITIONS

A. Do not sow seed during adverse weather conditions. Do not broadcast seed during high wind. Do not sow seed when the moisture content of the soil is too low or two high for seed germination.

B. Proceed with and complete seeding and mulch work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required.

PART 2 PRODUCTS

2.01 SEEDING AND MULCHING

A. Topsoil: Topsoil shall be a natural, friable soil, representative of product soils in the vicinity. It shall be well-drained, free from admixture of subsoil and foreign matter, objects larger than two (2) inches in diameter, toxic substances, and any other deleterious material that may be harmful to plant growth and be a hindrance to grading, planting, and maintenance operations. Soil excavated on site may be used provided it meets the requirements of topsoil.

B. Seed shall meet the requirements of these Specifications. The type of quick growing seed used shall be appropriate to provide an early ground cover during the particular season when planting is done. The rate of spread shall be as specified in Section 3.01D.

C. Mulch shall meet the material requirements of the Georgia Department of Transportation Standard Specifications for Highway's and Bridges, latest revision.

D. For areas requiring sod it shall be Tifton Bermuda free of weeds and other undesirable grasses. 118 minimum ½ yard cuts.

E. Fertilizer: Commercial plant food containing eight (8%) percent nitrogen, eight (8%) percent available phosphate, and eight (8%) percent potassium, uniform in composition, dry, free-blowing, and delivered in containers bearing manufacturer's guaranteed analysis.

2.02 EQUIPMENT

A. The seed spreader shall be an approved mechanical hand spreader or other approved type of spreader.

B. The mulching equipment shall be of a type capable of cutting the specified materials uniformly into the soil and to the required depth. Harrows will not be allowed.

C. Cultipacker, traffic roller, or other suitable equipment will be required for rolling the grassed areas.

PART 3 EXECUTION

3.01 GRADING, SEEDING AND MULCHING

A. Pre-Finish Grading: Complete rough grading to grades indicated on the Drawings or to accomplish adequate drainage patterns required by the site layout. Rough grading shall allow for the addition of materials needed to accomplish finish grading. Fill areas required during subgrade preparation shall be compacted to eighty-five (85%) percent of the relative maximum density. Topsoil shall be spread over the prepared rough grade using a rubber-tired tractor with grader blade or equivalent.

B. Fertilizing: Apply commercial fertilizer at the rate of nine hundred twenty (920) pounds per one-acre or at a rate determined from soil tests, distributing uniformly with a rotary mechanical spreader. Apply soil additives such as lime if the soil pH requires adjustment.

C. Finish Grading: After placing topsoil and applied materials, rake the topsoil to a uniform grade so that all areas drain, as indicated on the grading plan or as required to complete drainage patterns. Lightly compact with a cultipacker before planting grass. Remove all trash from the area prior to planting grass.

D. Seeding

1. Seeding and mulching operations will not be permitted when wind velocities exceed fifteen (15) miles per hour. Seed shall be sown only when the soil is moist and in proper condition to induce growth. No seeding shall be done when the ground is unduly wet or otherwise not in a tillable condition.

2. Whenever a suitable amount of area has been graded, it shall be made ready and grassed as specified in this Section. Grassing shall be incorporated into the project at the earliest practical time in the life of the Contract.

E. The several operations involved in the work shall proceed in the following sequence: preparation of the ground; seeding; spreading of mulch; cutting-in mulch; and rolling or preparation of the ground; installation of erosion control matting, placing soil; hydroseeding; placing excelsior mat.

F. The ground over which the seed is to be sown shall be prepared by diskharrowing and thoroughly pulverizing the soil to a suitable depth. The prepared soil shall be loose and reasonably smooth. It shall be reasonably free of large clods, roots, and other material, which will interfere with the work or subsequent mowing and maintenance operations. Apply lime at two (2) tons per acre, and 8,8,8 commercial fertilizer at nine hundred twenty (920 lbs.) pounds per acre.

G. While the soil is still loose and moist, the seed shall be scattered uniformly over the grassing area. The rate of spread for the seed mixture shall be per schedule.

August through February	**Winter**
Kentucky 31	30 lbs/acre
Reseeding Crimson Clover	15 lbs/acre
Bermuda Grass (Unhulled)	30 lbs/acre
Perennial Ryegrass	30 lbs/acre

March through July	**Spring**
Kentucky 31	30 lbs/acre
Kobe Lespedeza (Var. Tenn)	30 lbs/acre
Bermuda Grass (Cynodon Ductylon)	20 lbs/acre (Hulled)

H. Approximately two (2) inches, loose thickness of mulch material shall be applied uniformly over the seeded area, and the mulch material cut into the soil with equipment specified, to produce a loose mulched thickness of three (3) to four (4) inches. Care shall be exercised that the materials are not cut too deeply into the soil.

I. Immediately after completion of the seeding, the entire mulched area shall be rolled thoroughly with the equipment specified. At least two (2) trips of the entire area will be required.

J. Maintenance:

1. Water to keep surface soil moist. Repair washed out areas by filling with topsoil, liming, fertilizing, and seeding. Replace mulch on banks when washed or blown away. Mow grass to two (2) inches after grass reaches at least three (3) inches in height, and mow frequently enough to keep grass from exceeding 3 ½ inches.

2. If a satisfactory stand of grass has not been established in eight (8) weeks, the Contractor shall renovate and reseed the grass or unsatisfactory portions thereof immediately. A satisfactory stand of grass is defined as having no bare spots larger than three (3) square feet and not more than ten (10%) percent of total area with bare spots larger than one (1) square foot.

3. The seeded areas shall be watered to provide optimum growth conditions for the establishment of the grass. In no case, however, shall the period of maintaining such moisture be less than two weeks after the planting. Manual watering shall continue at least every four (4) days until the end of the growing season.

K. The Contractor shall maintain the planted areas in a satisfactory condition until final acceptance of the project. Such maintenance shall include filing, leveling, and repairing of any washed or eroded areas. Replant any areas in which the establishment of the grass stand does not develop satisfactorily.

L. Clean-up the job site following seeding and mulching. Remove rubbish, excess materials, temporary structures, and equipment. Leave the work in a neat and presentable condition.

M. Install Tifton Bermuda Sod in all swales, ditches, all slopes 3:1 or greater, within 10’ of each building structure and within 3’ of all walkways and driveways.

PART 4 PAYMENT

4.01 GENERAL

A. Payment for all work in this Section will be included as part of the bid item to which it pertains.

END OF SECTION 02480

SECTION 15002
WATER DISTRIBUTION

PART 1 GENERAL

1.01 GENERAL

A. This work consists of furnishing materials, labor, tools, equipment, and other items necessary for installing, removing, abandoning, relocating, and adjusting water distribution systems according to the Plans and Specifications.

B. See Section GENERAL REQUIREMENTS, which contain information and requirements that apply to the Work specified herein and are mandatory for this project.

C. All water lines shall have two (2) forms of restraint including mechanical restraint and thrust blocks on all fittings per details shown on the plans for pipe sizes 20-inch and below, pipe sizes 24" and larger shall be restrained per the Drawings.

PART 2 MATERIAL REQUIREMENTS

DUCTILE IRON PIPE AND FITTINGS

2.01 PIPE CLASSIFICATION

A. Ductile iron pipe shall conform to AWWA C 151 (ANSI A21.51) and shall be a minimum of pressure Class 350 for 20" diameter pipe and smaller unless otherwise specified or shown on the plans. Pipes with fill heights greater than 12-feet shall be a minimum pressure Class 350 unless otherwise specified or shown on the plans. Pipe sizes 24" diameter and above shall be pressure Class 200 unless otherwise specified or shown on the plans. All pipes shall be furnished in nominal lengths of 18 to 20 feet. Pipe and fittings shall be cement lined in accordance with AWWA C104. Fittings shall be mechanical joint compact ductile iron and conform to AWWA C153 with rated working pressure of 350 psi or AWWA C 110 with rated working pressure of 250 psi or restrained joint (Flex Ring by American, TR Flex or HP Lok by U.S. Pipe, or equal). Final pipe class shall be determined based on specific structural calculations as they relate to conditions encountered during design. Pipe shall be furnished with an outside layer of Zinc to a mass of 200 g/m^2 and an interior seal coat. Coating shall conform to ISO 81791. Fittings shall be furnished with a bituminous outside coating and an interior seal coat. Where pipe and fittings have been manufactured with a high speed cement lining, an interior seal coat shall not be required. Fittings may be furnished with a 6-mil minimum nominal thickness fusion bonded epoxy coating conforming to ANSI/AWWA C550 and C116/A21.16 in lieu of exterior bituminous coating. Both pipe and fittings shall be furnished by the same manufacturer.

1. All water line pipe and fittings to be NSF 61 certified.
2. All water line pipe and fitting to have cement lining in accordance with AWWA C104.

B. Joints shall be push-on-type for pipe and standard mechanical joints or restrained joints for fittings with the exception of hydrant fittings. Fittings for bends and hydrants shall be mechanical joint with retainer glands or restrained joints. Hydrant tees used in lieu of retainer glands and harness rods on fire hydrants shall be equal to ACIPCO A10180 or US Pipe U-592. Anchor couplings used in lieu of retainer glands and harness rods on fire hydrant leads shall be American A-10895 or approved equal. Joints shall conform to AWWA C111. Provide and install the appropriate gaskets, nuts, and bolts for mechanical joints. Nuts shall be steel with American Standard Regular hexagonal dimensions, all as specified in ANSI B 17.2.

All bolts and all nuts shall be threaded in accordance with ANSI B 1.1, Coarse Threaded Series, Class 2A and 2B fit. Mechanical joint glands shall be ductile iron.

1. Restrained joint retainers for mechanical joints shall be MEGALUG restrained gland by EBBA Iron or equal.

C. Where restrained joints are indicated, provide ACIPCO “Flex Ring” or “Lok Ring”, U.S. Pipe “TR Flex” or “HP Lok” or equal. Restrained joints 16 inches in diameter and smaller may be ACIPCO “Fast-Grip”, U.S. Pipe “Field Lok” or equal.

D. When flanged joints are indicated, provide gaskets for flanged joints made of 1/8-inch thick cloth reinforced rubber. Gaskets should be full-face type. Provide bolts for flanged connections. Bolts shall be steel with American Regular unfinished square or hexagonal heads. Nuts shall be steel with American Standard Regular hexagonal dimensions, all as specified in ANSI B 17.2. All bolts and all nuts shall be threaded in accordance with ANSI B 1.1, Coarse Threaded Series, Class 2A and 2B fit.

E. All ductile iron pipe shall be manufactured in the United States.

F. 42” and 36” gate valves supplied by the Owner require pipe end to match American restrained joint Flex Ring bell.

2.02 POLYETHYLENE WRAP

A. Where shown on the plans, ductile iron pipe and fittings shall be wrapped entirely in prefabricated, 8-mil polyethylene sleeves, which shall be slipped over the pipe during installation, overlapped where necessary, and secured with polyethylene tape to completely prevent the entrance of foreign matter. Such encasement

shall be carried out in accordance with ANSI/AWWA Specification C 105/A 21.5-82, "American National Standard for Polyethylene Encasement for Ductile Iron Piping and Water and Other Liquids". The color of polyethylene sleeve shall be green for force mains and blue for water lines.

2.03 UNLOADING AND LAYING

A. Unload ductile iron pipe, fittings and accessories with hoists or by skidding. Under no circumstances are pipe to be dropped. Do not skid or roll pipe handled on skid ways against pipe already on the ground. Do not damage casting and linings; but, in the event should damage occur, make repairs or replacement to satisfaction of the Engineer/Inspector.

B. Use proper, suitable tools and appliances for the safe and convenient handling and laying of the pipe and fittings. Take care to prevent the pipe coating from being damaged, particularly on the inside of the pipe and fittings.

C. Pipe may not be "strung" along the job within highway right-of- ways without the approval of the Engineer/Inspector.

D. Carefully examine all pipe and fittings for defects just before laying and lay no pipe or fitting which is known to be defective. In the event that defective pipe is discovered after having been laid, remove and replace with a sound pipe or fitting in a satisfactory manner at Contractor's expense.

E. Thoroughly clean all pipe and fittings before being laid. Plug open ends of pipe with an approved plug during construction.

STEEL PIPE AND FITTINGS

2.04 CASING PIPE

A. The steel casing pipe shall be manufactured from steel conforming to ASTM A 139, Grade B and be new and unused. Minimum size and thickness shall be as follows:

UNDER ROADS AND HIGHWAYS

Pipe Diameter (inches)	Casing Diameter (inches)	Wall Thickness (inches)
6	12	0.375
8	16	0.375
10	16	0.375
12	18	0.375
14	22	0.500
16	24	0.500
18	30	0.500
20	30	0.500
24	36	0.500
30	42	0.500
36	54	0.781
42	60	0.844

B. The materials for casing under State Highways shall be in accordance with the Georgia Department of Transportation Standard Specifications for the Construction of Roads and Bridges, latest edition. It shall be the Contractor's responsibility to determine the exact requirements of the Georgia Department of Transportation. If there is a conflict between these Specifications and the Georgia Department of Transportation Specifications the latter shall take precedent.

2.05 STAINLESS STEEL CASING SPACERS

A. Spacers shall be bolt on style with a two piece shell made from T-304 stainless steel of a minimum 14 gauge thickness. The shell shall be lined with a ribbed PVC sheet of a .090-inch thickness that overlaps the edges. Runners, made from UHMW polymer, shall be attached to risers at appropriate positions to properly locate the carrier within the casing ant to ease installation. Risers shall be made from T-304 stainless steel of a minimum 14-gauge thickness and shall be attached to the shell by MIG welding. All welds shall be fully passivated. All fasteners shall be made from T-304 stainless steel.

2.06 COATINGS AND LININGS

A. Steel pipe used as casing shall not require a coating or lining unless otherwise indicated.

COPPER PIPE AND FITTINGS

2.07 PIPE CLASSIFICATION

A. Buried service three-quarter (¾) inches in diameter to one (1) inch in diameter shall be seamless, annealed copper tube conforming to the requirements of ASTM B-88, Type “K”.

B. Buried service greater than one (1) inch in diameter shall be soft temper copper tube conforming to the requirements of ASTM B-88, Type “K”

C. All pipe, solder or flux shall be lead free with not more than 8.0% lead in pipes and fittings and not more than 0.2% lead in solders and flux.

2.08 FITTINGS

A. Fittings for annealed copper tube, Type “K”, shall be brass compression type.

B. Meter couplings and tail pieces shall be cast brass threaded type.

C. All pipe, solder or flux shall be lead free with not more than 8.0% lead in pipes and fittings and not more than 0.2% lead in solders and flux.

Acceptable Manufacturers

Copper components shall be domestically manufactured.

1. As Approved.

HDPE PIPE

2.09 CASING FOR COPPER PIPE

A. HDPE pipe shall be used as a casing for copper water service lines that are to be installed under pavement.

B. HDPE pipe used as a casing shall be a minimum of SDR-17.

C. HDPE casing pipe shall have a minimum diameter of two (2) inches.

VALVES

2.10 GATE VALVE (30-INCH OR LESS)

A. Provide 250 psi pressure rated, ductile iron, resilient wedge valves in conformance with the latest revisions of AWWA Standard C515.

B. Provide valves in conformance with the Safe Water Drinking Act, ANSI/NSF 61 Drinking Water System Components – Health Effects.

C. Provide vertically mounted valves with Spur gear unless otherwise specified.

D. Provide valves with non-rising stems that open counter clockwise. (Open Left)

E. Gate valves shall employ the use of restrained mechanical joint or flange ends for air release valves.

F. All gaskets shall be pressure-energized O-ring type seals.

G. Provide locking type valve extensions on any gate valve where operating nut is 5 feet below finished grade with the extension 2 feet below finished grade.

H. All internal and external surfaces of the valve shall be coated prior to assembly, with epoxy coating, complying with ANSI/AWWA C550.

I. The wedge shall be symmetrical and seal equally well with flow in either direction. For gate valves 4" to 48" the wedge nut shall be independent of the wedge. The wedge shall be ductile iron fully encapsulated with EPDM rubber per ASTM D429 and provided with male type guides and polymer guide covers.

J. Bolting material shall be 304 stainless steel. Bolts may have either regular square or hexagonal shaped heads with dimensions conforming to ANSI B18.2.1. Metric size socket head cap screws are not allowed.

K. The 2-inch square operating nut shall be constructed of ductile iron and shall have four flats at stem connection to assure even input torque to the stem.

L. The valve shall have thrust washers located with (1) above and (1) below the thrust collar to assist operation of the valve.

Acceptable Manufacturers

1. Meuller
2. American Flow Control
3. U.S. Pipe

4. M&H Valve Company
5. Approved equal

2.11 GATE VALVE (36-INCH OR LARGER)

A. Shall be supplied by FCDWS.

B. Comply with material specification in 2.10 above except the following:

1. Valve ends shall be push-on restraint.

2. Acceptable Manufacturer: American Flow Control

2.12 AIR/VACUUM RELEASE VALVE

A. Combination air/vacuum release valves with backwash kits shall be sized according to the manufacturer's recommendations, which shall be submitted as part of the shop drawing submittal. Minimum size for 36-inch and 42-inch pipes shall be 6-inches.

B. Valves designated for use with water or sewage shall be used on the respective system. Water valves shall be NSF 61 certified.

C. Valve shall be housed in a "dog house" style manhole.

D. Operation of the valve shall be as follows:

1. Prior to the ingress of liquid into the valve chamber, as when the pipeline is being filled, valves shall vent through the large orifice when sewage/effluent approach velocities are relative to a transient pressure rise, on valve closure, of <2 x valve rated pressure.
2. At higher sewage/effluent velocities, which have a potential to induce transient pressure rises greater than two times valve rated pressure on valve closure the valve shall automatically discharge air/gas through the anti-shock orifice and reduce sewage/effluent approach velocity, so that on closure a maximum transient pressure rise of less than two times valve rated pressure is realized.
3. Valves shall not exhibit leaks or weeping of liquid past the large orifice seal at operating pressures of 7.3 psi to twice rated working pressure.
4. Valves shall respond to the presence of air/gas by discharging it through the small orifice at any pressures within a specified design range, 7.3 psi to 150 psi and shall remain leak tight in the absence of air.
5. Valves shall react immediately to pipeline drainage or liquid column separation by the full opening of the large orifice so as to allow unobstructed air intake at the lowest possible negative internal pipeline pressure.

E. 316 stainless steel barrel, flanges, tie rods, nozzle and fasteners. ABS Polylac top cover. HDPE floats

F. Flange bolts on air/vacuum release valves and gate valve shall be 316 stainless steel.

G. Gate valves per Section 2.10 above with flanged ends.

H. 316 stainless steel threaded by flange nipple.

I. Use detail No. 20.0 and 21.0 when applicable.

Acceptable Manufacturers

1. Vent-O-Mat series RBX by RF Valves
2. Approved equal

2.13 CORPORATION VALVE

A. Corporation valves shall be of the ball valve type and manufactured of bronze in conformance with ASTM B61, ASTM B62 and NSF 61.

B. Corporation valves shall withstand a working pressure of 300 psi, Mueller 300 Ball Corporation Valve (Mueller B-2500Y) or approved equal.

C. Corporation valves shall be tapered for installation in a double strap saddle and shall have compression fittings.

D. Corporation valves shall be ¾ inch or one (1) inch in size as required by the service.

D. All pipe, solder or flux shall be lead free with not more than 8.0% lead in pipes and fittings and not more than 0.2% lead in solders and flux.

Acceptable Manufacturers

1. Mueller Brass
2. Approved equal

2.14 CURB STOP

A. Curb stops shall be of the ball valve type and manufactured of bronze in conformance with ASTM B61, ASTM B62 and NSF 61.

B. Curb stops shall withstand a working pressure of 300 psi, Mueller 300 Ball Angle Meter Valve (Mueller B-24258) or approved equal.

C. The internal ball shall be manufactured of low carbon steel coated with brass.

D. Internal O-rings and seats shall be of Buna-N.

E. Curb stops shall be compression fitting with meter swivel nut.

F. Curb stops shall be fitted with wing locks suitable to accept a keyed padlock.

G. Curb stops shall be ¾ inch, one (1) inch or two (2) inches in size as required by the service. For ¾" – 1", a 90 – degree angle curb stop is required, with a meter swivel nut.

H. All pipe, solder or flux shall be lead free with not more than 8.0% lead in pipes and fittings and not more than 0.2% lead in solders and flux.

Acceptable Manufacturers

Curb stops shall be domestically manufactured and comply with all Lead Free regulations.

1. Mueller Brass
2. Approved equal

2.15 WATER METER BOXES AND METERS

A. Relocate existing meter boxes and meters including backflow preventer and box.

2.16 VALVE BOX

A. Valve boxes shall be of the two-piece type and manufactured of cast iron.

B. Valve boxes shall have an internal diameter of 5.25 inches.

C. Valve boxes shall be fitted with a cast iron cover with the word "WATER" or "SEWER" integrally cast in the cover depending on the service.

Acceptable Manufacturers

1. Bingham-Taylor (Fig. # 4905 or #4908)
2. Approved equal

TAPPING SLEEVES

2.17 TAPPING SADDLE

A. Tapping saddles shall be epoxy coated ductile iron with stainless steel straps and synthetic rubber sealing gasket and rated for 250 psi. Ductile iron shall conform to ANSI/AWWA standards. Stainless Steel shall be type 304 (18-8).

B. Double strap saddles with 2" gate valve shall be used when tapping for 1-1/2-inch or 2 inch service lines.

C. Tapping saddles shall seal with pipe by an O-ring gasket virgin nitrile (Buna-N, NBR).

D. Saddle outlet to pipe shall be flanged or tapped with pipe threads.

Acceptable Manufacturers

For pipe diameters 4 inches through 12 inches:

1. Smith Blair – 313
2. JCM Industries – 408

For pipe diameters 14 inches and larger:

1. As Approved.

WATER METERS

2.18 RESIDENTIAL AND LIGHT COMMERCIAL

A. Relocate existing meters. The following specification is required only if a meter is determined to be defective.

B. Water meters shall be positive displacement type with oscillating piston or nutating disk having a magnetic drive conforming to AWWA C-700 and a sealed register conforming to AWWA C-707.

C. Meters shall be capable of operating up to a working pressure of 150 psi and have an operating flow range shown on the following table.

SIZE (in)	OPERATING FLOW RANGE (gpm)	LOW FLOW REGISTRATION
5/8	1 to 20	95% at 1/8 gpm
¾	2 to 30	95% at 1/4 gpm
1	3 to 50	95% at 3/8 gpm
1-1/2	5 to 100	95% at 3/4 gpm
2	8 to 160	95% at 1 gpm

D. Meter outer case shall be constructed of Water Works bronze (minimum 75% copper content) and shall be split case. External fasteners shall be corrosion resistant.

E. The size of the meter and a flow direction arrow shall be cast in raised figures on the outer casing. The manufacturer's serial number shall be permanently affixed to the outer case and shall be visible from the topside.

F. Meter shall have a separate measuring chamber that shall be easily removable from the outer case. The measuring chamber shall be held in-place without the use of fasteners. The measuring chamber shall be constructed of Water Works bronze (minimum 85% copper content) or a suitable synthetic polymer.

G. The sealed register shall be of the straight reading type and have a full test dial on the face. The register shall be fitted with an external or internal locking device so that the register can only be removed with specialized tools.

H. The register shall measure flow in gallons and shall be read by visual inspection and remote data relay. Remote data relay shall be accomplished using a Touchpad and/or a Meter Transceiver Unit that is sturdy and tamperproof and shall be located external to the meter. The Touchpad shall be compatible with the Touch Probe, Touch Gun or Smart Gun as manufactured by Solid State Interrogator or Visual Reader.

I. Meters shall have a corrosion resistant strainer that is easily removed without the meter itself being disconnected from the service line.

J. Meter connections to 5/8 inch and one (1) inch service lines shall be with a meter spud. Meter connections to 1-1/2 inch and two (2) inch service lines shall be with a two (2) bolt flange.

K. 5/8"–1 " meter boxes shall be cast iron and have a cast iron cover that is made to house a "radio read" device. 1½"-2" meter shall be housed in Carson Industries, LLC Super Jumbo, specification grade 1324, meter boxes with plastic lids manufactured for use with radio read equipment. All meter covers shall be supplied with plugs installed in. Meter box covers shall be provided with plugs

installed to keep out debris until the meter is set and the radio read antenna is installed.

Acceptable Manufacturers

1. Schlumberger Neptune T-10
2. Approved equal

MANHOLES FOR AIR RELEASE VALVES

2.19 MANHOLES

A. Pre-cast manhole barrel shall be of the dimensions indicated on the Drawings or required and shall meet the latest requirements of ASTM C-478. Barrels shall be 72-inch, machine made, tongue and groove indicated. Joints shall be joined by an approved preformed plastic gasket meeting the requirements of federal specifications SS-S-00210, "Sealing Compound, Preformed Plastic For Pipe Joints," Type 1, rope form (Kent Seal or approved equal).

B. Add grout inside joints.

C. All riser joints shall be sealed on the outside with a 6” to 9” EPDM rubber seal wrap (Infi-Shield Gator Wrap, Seal Wrap, or approved equal).

D. Grade ring and cover shall be cast into flat slab top.

E. Riser sections to be sealed with single offset gasket per ASTM C-443.

F. Manhole barrels shall be constructed of pre-cast reinforced concrete with 7-inch wall thickness unless otherwise indicated on the Drawings.

G. A cast iron frame and cover shall be furnished for each manhole as follows:

1. Type B - For areas subject to flooding. Provide East Jordan Iron Works V2358 watertight, U.S. Foundry & Mfg. Corp. Model 152-BV-BWT or approved equal. Areas subject to flooding include those manholes whose cover resides below the 100-year flood plain shown on the drawings.
2. Type C - For areas requiring venting. Provide, where shown on drawings, Neenah Foundry Co., Catalog R, 9th Edition, No. R-1659 or approved equal.
3. Type D – For elevated manholes, particularly on sanitary sewer trunk and outfall lines, the manholes should be installed with a ring and cover casting that allows the cover to rotate on a shaft recessed into the cast iron ring. The cover shall be of a water-tight and bolt down configuration equal to U.S. Foundry & Mfg. Corp. Model USF 275 Ring & RO Cover or East Jordan Iron

Works “Revolution” ring and cover. Both cover and frame shall be Class 35 B and meet the latest requirements of ASTM A48
NOTE: The following shall be cast into all manhole covers:
“Air Release Valve”

4. Type B, Type C and Type D frames and covers shall be cast into the pre-cast manhole cones or slab tops at the place of manufacture of the manholes.

MANHOLES—CONCRETE DESIGN

2.20 CONCRETE DESIGN

A. Work Included:

1. There shall be two classes of concrete, Class A for formed, reinforced, cast-in-place structures, or Class B for non-reinforced concrete thrust blocks, concrete cradles, concrete encasement, concrete fill and similar uses. All concrete shall be a minimum of 3000 PSI.

B. Cement

1. All cement shall be dry, free from lumps and shall conform to the current Standard Specifications for Portland Cement ASTM Designation C150, Type II for General Construction.

C. Fine Aggregate

1. The fine aggregate or sand used in the concrete masonry shall be clean, siliceous sand.
2. Fine aggregate shall be well graded and shall conform to the following requirements:

Passing	Percentage by Weight
3/8 inch sieve	100
No. 4 sieve	at least 90
No. 16 sieve	not less than 45 nor more than 70
No. 50 sieve	not less than 15 nor more than 30
No. 100 sieve	not less than 3 nor more than 8

D. Coarse Aggregate

1. Coarse aggregate shall be composed of hard, strong, durable, broken stone or crushed gravel, subject to the Engineer's approval. Course aggregate shall be well graded and shall conform to the following requirements:

Passing	Percentage by Weight
1-1/2 inch sieve	not less than 95
3/4 inch sieve	not less than 35 nor more than 70
3/8 inch sieve	not less than 10 nor more than 30
1/4 inch sieve	not more than 5

1. In thin sections, such as roof and floor slabs, or where otherwise directed by the Engineer, the maximum size of coarse aggregate to be used in making concrete shall be three-quarter inch.

E. Water

1. The water used in mixing concrete shall be potable and shall be accurately measured for each batch. The quantity to be added shall vary as hereinafter provided with the dryness of the materials and with the condition of the weather.

2. The amounts of water used in concrete, inclusive of that contained by the aggregate shall not exceed five and three-quarter gallons per sack of cement.

F. Reinforcement

1. Steel reinforcement shall be designed, detailed, fabricated and placed in conformance with all applicable requirements of ACI 315, ACI 318, and the CRSI Manual of Standard Practice.

2. No concrete shall be placed until all steel reinforcement to be covered has been inspected in place and approved by the Engineer.

G. Proportions

1. Provide concrete which, on test in standard cylinders, shall show a compressive strength of not less than 3000 PSI in twenty-eight days for Class A and Class B concrete.

2. Slump shall range from three to five inches.
3. In no case shall there be less than six bags of cement per cubic yard for Class A or Class B concrete.

3. The Contractor shall make slump tests as required to determine the workability of the concrete and the proper proportions of aggregates to be used.

4. The Contractor shall provide a standard cone of metal for making slump tests and a supply of suitable non-absorbent cardboard containers for making standard six-inch by twelve-inch cylinders for testing the compressive strength of the concrete.

6. No admixtures will be permitted unless specifically approved by the County Engineer.

H. Forms

1. The Contractor shall furnish all labor and materials for all forms required for the construction of the work.

2. Either metal or wood forms may be used.

3. All forms shall be true to the required shape, clean, of sufficient strength, and well braced so that they will maintain their proper position during the placing and vibrating of the concrete.

I. Mixing

1. Concrete shall be obtained by mixing at the site or plant-mixed concrete may be used, subject to the conditions contained hereinafter.

2. The mixing of concrete, except when hand mixing is authorized by the Engineer, shall be done in an approved type of rotary batch mixer which will insure a uniform distribution. No mixer shall be used which requires less than a bag of cement per batch of concrete mixed therein. The entire contents of the drum shall be discharged before recharging. In no case shall concrete be discharged which has not been mixed for a period of at least two (2) minutes at a peripheral drum speed of not less than two hundred (200) feet per minute after all materials, including water, are in the mixer.

3. When necessary to mix small batches of concrete by hand, the ingredients shall be mixed until they are homogeneous in appearance and color.

4. Concrete shall be mixed in such quantities and at such times that any batch can be placed in the work within thirty (30) minutes after the time of mixing. No concrete shall be placed in the work after its initial set has occurred, and no retempered concrete shall be allowed to be used under any conditions.

5. Plant-mixed concrete shall conform to the following conditions.
   a. The truck used in transporting concrete shall have its drum rotating continuously at agitating speed from the time it is charged until it is discharged. Plant-mixed concrete shall be on the job site and placed

within a period of thirty (30) minutes after being loaded, and in any case, prior to the period of initial set.

b. The placing of concrete shall be a continuous operation throughout any pour.

J. Placing

1. Before placing concrete, forms shall be thoroughly cleaned and wetted and the space inside the forms shall be thoroughly cleaned of all chips, shavings or other debris. Concrete shall be deposited so as to maintain a nearly level surface and avoid flowing along the forms. It shall be continuously and sufficiently vibrated to expel air.

2. All formed concrete and all slab on grade concrete shall be vibrated. Minimum 6 mil polyethylene sheeting shall be utilized under any concrete slab poured on earth or gravel.

K. Bonding and Joints

1. Joints, either vertical or horizontal, shall be made only where and as permitted by the Engineer.

L. Surface Finish

1. All surfaces which are exposed prior to the filling of the structures with water or sewage and all exposed surfaces immediately following the removal of the forms, by first moistening and then vigorously rubbing with carborundum brick and water so as to produce a smooth surface. Where necessary, rubbing shall be done with grout composed of one part cement and two parts fine sand. Unless otherwise specified, all surfaces not built against forms shall be screened to an even finish.

2. Particular care shall be taken in order to secure smooth, dense and hard surfaces of flow conduits.

3. Floor and similar surfaces shall be pitched to drain as directed. No plastering of any concrete surfaces shall be done unless expressly permitted.

M. Curing

1. All exposed surfaces of finished shall be kept constantly wet in an approved manner for a minimum period of ten days.

N. Pipes, Metal Work, and Openings

1. The Contractor shall build into the concrete the steel reinforcement, pipes, sleeves, anchor bolts, steps, castings and other inserts. Great care shall be

taken to tamp under and around them so that there will not be a passage for water.

O. Placing in Water Prohibited

1. Unless permission is granted in writing by the County Engineer, concrete shall not be laid in water nor shall water be allowed to rise on or flow over freshly placed concrete until the concrete has set for at least twenty-four hours.

P. Freezing and Inclement Weather

1. Concrete shall not be mixed at any time during freezing, inclement weather, or at night, without explicit permission, and then only at the Contractor's risk. If permitted to build concrete structures in freezing weather, the Contractor shall provide and use proper facilities for covering and keeping warm the newly laid concrete.

Q. Defective Work

1. Any concrete masonry found to be defective from any cause whatever, at any time before the Final Acceptance of the work, shall be removed and either replaced or repaired at the expense of the contractor.

GROUT

2.21 MORTAR AND GROUT MATERIALS

A. The brick shall be laid in mortar consisting of one (1) part by volume of Portland Cement and two parts of volume of clean, coarse, screened sand, thoroughly mixed dry, with sufficient water afterwards added slowly to give proper consistency. Twenty (20) pounds of lime per sack of cement may be added.

B. Portland Cement shall meet ASTM C150, Type I, natural color, domestic manufacturer. Use only one brand of cement throughout project.

C. Masonry Cement shall meet ASTM C91-89, non-staining, 22% maximum air content by volume.

D. Hydrated Lime shall meet ASTM C207-79 (1988), Type S.

E. Aggregates for mortar shall meet ASTM C144-87 and ASTM C404-87, size 2 natural and shall be clean, hard and washed sand.

F. Aggregates for cement grout shall meet ASTM C404-87, fine aggregate, size 1.

G. Water reducing and plasticizing admixtures are acceptable.

H. Admixtures containing calcium chloride shall not be used unless approved by FCDSW Engineer.

I. Water shall be clean, potable and free from deleterious amounts of alkalis, acids and organic matter.

J. Non-shrink Grout: Submit products for approval by FCDWS Engineer.

2.22 MORTAR AND GROUT PROPORTIONS

Proportion materials by volume in accordance with ASTM C270-88a or as follows:

A. Mortar: One (1) part Masonry cement to ½ part Portland cement to aggregate proportioned at not less than 2-1/4 nor more than three (3) times the volume of Cementous material used.

B. Grout: One (1) part Portland cement and ¼ to ½ parts hydrated lime to aggregate, proportioned at not less than three (3) times the combined volume cement and lime used.

2.23 CONCRETE ASPHALT

A. Comply with details on the plans.

ENVIRONMENTAL COATINGS

2.24 MATERIALS REQUIRING COATINGS

A. Materials for buried surface shall be coated as indicated in their respective section.

B. The following materials shall have exterior coatings manufacturer applied or field applied:

1. Piping and appurtenances
2. Supports
3. Pumps
4. Valves
5. Equipment and appurtenances

2.25 COATING SCHEDULE

A. Non-Submerged Ferrous Metal

Minimum Surface Preparation: SSPC – SP6
Generic System Type: Aliphatic Polyurethane

Coat No.	Induron		Tnemec	
	DFT	Product	DFT	Product
1	3.0	P-14	2.0	#69
2	3.0	Armorgaurd	2.0	#69
3	2.0	5500	2.0	#74

B. Submerged Ferrous Metal
Minimum Surface Preparation: SSPC – SP10
Generic System Type: Polyamide Epoxy

Coat No.	Induron		Tnemec	
	DFT	Product	DFT	Product
1	5.0	PE-54	5.0	#20 P-Pox
2	5.0	PE-54	5.0	#20 P-Pox

C. Non-Submerged Non-Ferrous and Galvanized Metal
Minimum Surface Preparation: SSPC – SP6 (non-ferrous); SP1 (galvanized)
Generic System Type: Aliphatic Polyurethane

Coat No.	Induron		Tnemec	
	DFT	Product	DFT	Product
1	0.5	VW Prime	5.0	#69
2	2.0	5500	2.0	#74

D. Submerged Non-Ferrous and Galvanized Metal
Minimum Surface Preparation: SSPC – SP10 (non-ferrous); galvanized per coating manufacturer.
Generic System Type: Polyamide Epoxy

Coat No.	Induron		Tnemec	
	DFT	Product	DFT	Product
1	0.5	VW Prime	5.0	#69-1211
2	5.0	PE-54	5.0	#69

Acceptable Manufacturers

1. Induron.
2. Tnemec.
3. As Approved.

PIPING IDENTIFICATION SYSTEMS

2.26 DETECTABLE WARNING TAPE AND TRACER WIRE FOR BURIED PIPE

A. Tracing Wire Standards - All tracing wire shall be Copperhead Industries Trace Wire or equivalent #12 AWG Copper clad steel unless otherwise approved by Owner.

1. Open Trench –High Strength with a minimum 450Lbs break load, with minimum 30 mil HDPE insulation Thickness.
2. Directional Drilling / Boring – Extra High strength with minimum 1,150 Lbs. break load. With a minimum 30 mil HDPE insulation thickness.
3. Pipe Bursting / Slip Lining – Trace wire shall be 7x7 stranded Copper Clad Steel, Extreme Strength with a 4,700 Lbs. break load, with a 50 mil HDPE insulation thickness.

B. Trace Wire

1. Open trench – Copperhead #12 High Strength Part # 1230-hs or an approved equal.
2. Directional Drilling / Boring – Copperhead Extra-High Strength Part # 1245*EHS or an approved equal.
3. Pipe Bursting / Slip Lining – Copperhead Solo Shot Extreme Strength 7 x7 Stranded Part # PBX-50 or an approved equal.

C. Connectors

1. Copperhead 3-way locking connector part # LSC1230 or an approved equal.
2. Dryconn 3-way Direct bury lug: Copperhead Part # 3Wb-01 or an approved equal.

D. Termination / Access

1. Non-roadway access boxes applications: Trace wire access boxes Grade level Copperhead adjustable lite duty Part # LD14*TP or an approved equal.
2. Concrete / Driveway access box applications: trace wire access boxes Grade level Copperhead Part # CD14*TP14” or an approved equal.
3. Fire Hydrant trace wire access box applications: Aboveground two terminal with 1” conduit. Copperhead Part # T3-75-F (Cobra T3 Test Station, denoting “F” includes mounting flange) or an approved equal.

E. Grounding

1. Drive in Magnesium Anode: Copperhead Part # ANO-1005 (1.5 Lb.) or approved equal.

F. Prohibited Products and Methods

1. Uninsulated trace wire.
2. Trace wire insulation other than HDPE.
3. Trace wire not domestically manufactured.
4. Non-locking, friction fit, twist on or taped connectors.
5. Brass or copper ground rods.
6. Wire connections utilizing taping or spray-on waterproofing.
7. Looped wire or continuous wire installations that has multiple wires laid side by side or in close proximity to one another.
8. Trace wire wrapped around the pipe or service.
9. Brass fittings with trace wire connection lugs.
10. Wire terminations within the roadway. I.e. valve boxes. Clean-outs, manholes, etc.
11. Connecting trace wire to existing conductive utility.

G. Warning Tape

1. Polyethylene film warning tape manufactured for marking and identifying underground utilities.
2. Minimum 2” (50 mm) wide, 4 mils thick.
3. Color: BLUE
4. Continuously printed lettering “CAUTION BURIED WATER LINE BELOW”.

2.27 ELECTRONIC LOCATING DEVICES

A. Marker Balls for 24” and Larger Pipe

1. Marker balls for water shall be 3M iD ball marker 1423-XR / iD.
2. Marker balls for Sewer shall be 3M iD ball marker 1424-XR / iD.
3. Marker balls for Re-use water shall be 3M ball marker 1428-XR / iD
4. Marker balls shall conform to APWA uniform color coding for marking underground utilities, i.e., blue for water, green for sewer, and purple for reuse water.
5. Marker balls shall be locatable to a depth of 5 feet below finished grade but installed to a maximum 2’ below finished grade.
6. Marker balls shall be between 4” and 4.5” in diameter.

7. Marker balls shall have a passive antenna circuit and therefore not need an internal power source.
8. Ball markers shall be polyethylene, weather resistant enclosure or an approved equal.

2.28 CONCRETE VALVE MARKERS

A. Concrete valve markers shall comply with details on plans.

2.29 JOINT AIR TEST

A. Provide Lansas Double-Bladder Low and High Pressure Joint Tester or approved equal.

B. Joint tester shall include joint tester frame for appropriate diameter pipe with fittings to assemble and bladder, joint tester wheel kit with fittings, joint tester control panel, and a minimum 50-foot test hose assembly.

2.30 DRY PIG

A. Provide Girard Industries Yellow Series Polly-Pig or approved equal.

MISCELLANEOUS MATERIALS

Materials not covered in Part 2, Material Requirements, shall be in accordance with the approved plans.

PART 3 CONSTRUCTION REQUIREMENTS

GENERAL

3.01 CONTRACTOR LICENSE

A. A licensed Utility Contractor shall install any underground utility or component thereof.

B. Prior to commencing construction activities on a FCDWS approved project, the FCDWS Engineer/Inspector shall receive a copy of the Utility Contractor's License.

3.02 UTILITY NOTIFICATION

A. The Official Code of Georgia, Title 25, Chapter 9 requires that utilities be located in the proposed work area prior to commencing any clearing, grading or excavation activity.

B. The Utilities Protection Center can be reached at (770) 623-4344 or 1-800-282-7411.

C. The Utilities Protection Center shall be notified at least three (3) business days prior to commencing work.

3.03 WORK COMMENCEMENT

A. Clearing and grubbing activities shall not commence on any project until Forsyth County Engineering has issued a Land Disturbance Permit.

B. Work on a water distribution system and/or sanitary sewer system shall not begin until the FCDWS approves the development plans, and permit is issued by Forsyth County Engineering.

C. Contractor shall schedule & attend a pre-construction meeting with FCDWS Inspector prior to beginning work.

D. The FCDWS Engineer shall receive a 24-hour notice prior to commencing construction activities on a water distribution system and/or sanitary sewer system.

E. A set of plans stamped approved by the FCDWS shall be present on the job site during all phases of construction of the water distribution system and/or the sanitary sewer system.

F. The installation of water distribution piping should not begin until curb and gutter has been installed, and lot lines and numbers are painted on the curb.

3.04 MISCELLANEOUS STANDARDS

Construction standards not covered in Part 3, Construction Standards, shall be in accordance with the approved plans.

MATERIAL DISTRIBUTION

3.05 GENERAL

A. Work covered by this section shall include all labor, equipment and accessories required to distribute material.

B. All materials installed as part of an extension to the existing water distribution system and sanitary sewer system shall be new

3.06 DELIVERY

A. Equipment and facilities shall be furnished for unloading and distributing pipe, equipment and materials.

3.07 HANDLING

A. Pipe shall be handled by use of forklift or excavator using choker straps or cable. Forks, chains or other devices shall not be inserted into pipe.

B. Any pipe, equipment or material dropped or dumped during handling procedures shall be subject to rejection by the FCDWS without further justification.

3.08 STORAGE

A. Pipe should not be strung more than 500 feet beyond the point where pipe is being laid.

B. Drainage ditches shall not be obstructed by stored materials.

C. Necessary arrangements shall be made to store pipe, fittings, valves and accessories that cannot be distributed along the route.

D. Pipe shall be stored in a clean manner and kept free from contaminants. Including stormwater runoff and on-site chemicals.

E. Pipe that is either stored or strung out shall be kept clean, so no dirt or mud is allowed to get inside pipe.

F. At the end of each work day, for pipe that has been installed but not in service: Open end of pipe will be required to have temporary plug installed. Plug may be composed of foam rubber or cloth material. Where possible, recently installed pipe should be swept clean of debris.

3.09 MAINTENANCE AND PROTECTION

A. The contractor shall be responsible for maintenance and protection of all pipe, equipment and material.

B. All equipment shall be boxed, crated or otherwise completely enclosed and protected during transportation, handling and storage.

C. Equipment shall be stored above ground level and adequately supported on wood blocking or other approved support material.

D. All equipment shall be protected from exposure to elements and shall be kept dry at all times.

E. Pumps, motors, valves, control panels, instrumentation, electrical equipment and other equipment having anti-friction or sleeve bearings shall be stored in a weather-tight enclosure which is maintained at a minimum air temperature of 60°F.

F. Any pipe, equipment or material damaged by impact, vibration, abrasion, discoloration or other damage shall be repaired in accordance to manufacturer instructions or replaced at the discretion of the FCDWS.

SITE PREPARATION

3.10 CLEARING AND GRUBBING

A. Prior to commencing clearing activities, areas designated by the plans to be cleared shall be demarcated using survey ribbon, stakes or other suitable means.

B. In areas to be cleared, all trees, stumps, buried logs, brush, grass and other unsatisfactory materials shall be removed.

C. Trees to remain in or near work area shall be protected from clearing activities.

D. All damaged trees over three (3) inches in diameter shall be repaired by an experienced nursery expert.

E. Tap roots and other projections exceeding 1-inch in diameter shall be grubbed out to a depth of at least 18 inches.

F. All holes remaining after grubbing activities shall be filled with suitable material and properly compacted in layers to density required for in-place backfill.

G. All materials cleared and grubbed shall be disposed of off-site in accordance with applicable local, state and federal regulations.

H. Burning of any material or debris shall not be permitted on County property without written authorization from FCDWS.

I. Prior to and upon completion of clearing and grubbing activities, install erosion control and sedimentation measures as identified on the Erosion Control and Sedimentation Plan prepared by the Design Engineer.

J. Prior to commencing any other job site activity, installed erosion control and sedimentation measures shall be inspected and approved by Forsyth County Department of Engineering, or their designated representatives.

3.11 TOPSOIL STOCKPILING

A. Remove topsoil to full depth encountered in areas to be graded and stockpile soil and install erosion control devices as indicated on drawings.

B. Soil shall be placed such that the integrity of an excavation or proposed excavation is not jeopardized.

C. Soil shall not be stockpiled against tree trunks.

D. Stockpile shall be shaped to drain.

3.12 REMOVING PAVEMENT

A. Removal of pavement shall be performed so as not to endanger roadway activity. Work shall be coordinated and be in compliance with the appropriate road and highway agencies.

B. Pavement shall be marked squarely and neatly to size of excavation.

C. Pavement shall be scored and broke along the marked lines using a rotary saw and jackhammer.

D. Upon removal, pavement shall be loaded and disposed of off-site.

E. Adjacent pavement damaged during construction shall be removed as described above.

F. Driveways and sidewalks shall be removed to their full width from the edge of curb or road pavement to the nearest construction/control joint.

G. Curbs shall be removed for the entire length from control joint to control joint.

EXCAVATION

3.13 SOIL EXCAVATION

A. Excavation shall include those measures necessary to establish grades indicated on drawings for utilities, structures and appurtenances.

B. Excavated soil shall be placed in a location such that the integrity of the excavation is not jeopardized.

C. Excavation walls shall be sloped or stepped in accordance with recognized industry standards.

D. The Contractor shall assume the responsibility for design and construction of excavation shoring and bracing capable of supporting excavations and construction loads.

E. The excavation shall provide space for foundation work and inspection.

F. Excavations shall be covered in accordance with applicable regulations and/or barricaded and roped-off with identifying tape during work progress.

3.14 ROCK EXCAVATION

A. Excavation shall include those measures necessary to establish grades indicated on drawings for utilities, structures and appurtenances.

B. Rock shall be excavated to a minimum depth of six (6) inches below grades indicated on drawings.

C. The Contractor shall be responsible for determining methods required for removal of rock or hard materials.

D. Perform blasting only after receiving written approval from the applicable regulatory agencies.

E. A licensed explosive contractor shall perform blasting operations.

F. Blasting operations shall be conducted in accordance with all local, state and federal regulations.

G. Excavated rock shall not be used as backfill in the pipe trench.

3.15 PIPE TRENCH EXCAVATION

A. Pipe trenching shall comply with excavation and rock excavation specifications.

B. Trench should be excavated to natural undisturbed soil.

C. Where unsuitable material is encountered, over excavate through unsuitable material and backfill to required grade with No. 57 stone. The FCDWS Inspector shall determine depth of over excavation. No. 57 stone shall conform to the GDOT Standard Specifications for the Construction of Roads and Bridges, latest edition.

D. Where encountered, remove rock to a minimum of six (6) inches below required bottom of trench elevation and backfill to required grade with No. 57 stone.

E. Bottom of trenches shall be prepared so that the entire length of the pipe barrel is supported.

F. Maintain trenches dry at all times using pumps, well points or other dewatering means.

G. Limit trenching to not greater than 300 feet ahead of completely backfilled work.

H. In populated areas, cover or barricade open trenches until completely backfilled.

I. Open trenches shall be made safe at all times.

INSTALLATION

3.16 PIPE BEDDING

A. DIP shall be laid with type III, IV, or V bedding, depending on pipe diameter, class, and laying conditions (use detail No. 33.0 and 34.0.) Valves shall be laid atop a minimum of twelve (12) inches of No. 57 stone. No. 57 stone shall be extended up to one-half (1/2) the valve diameter. Stone shall extend twelve (12) inches in all directions of valve. Stone shall be shovel sliced.

B. Standard Laying Conditions

1. Type 1 - Flat bottom, undisturbed soil with loose backfill.
2. Type II - Flat bottom, undisturbed soil backfill is lightly consolidated to centerline of pipe.
3. Type III – Pipe is bedded in 4 inch loose, native soil excavated from the pipe trench, free of foreign materials and rocks. Backfill is lightly consolidated to the top of the pipe.
4. Type IV – Pipe bedded in sand, gravel or crushed stone in accordance with ASTM D 2321 and ASTM D 2487, latest revisions. Bedding shall be to a depth of one eighth (1/8) pipe diameter or (4) inch minimum. Backfill material shall be compacted to the top of the pipe approximately eighty (80) percent standard proctor, AASHTO T-99.
5. Type V – Pipe bedded to its centerline in compacted granular material as defined per the Unified Soil Classification System ASTM D 2487.

3.17 PIPE, FITTING, VALVE AND FIRE HYDRANT INSTALLATION

A. Prior to placement, the interior of pipes, fittings and valves shall be cleaned free of dirt and debris.

B. Pipe, fittings, valves and accessories shall not be laid or jointed in water.

C. Pipe, fittings, valves and accessories shall be lowered into their respective positions using an excavator with choker straps or cables. Pipe barrel shall be supported for its entire length.

D. Gravity flow pipe shall be laid to the consistent grade change as indicated on drawings and aligned straight using pipe laser or transit.

E. Pressure flow pipe shall be aligned to follow route. Pipe alignment shall not be deflected greater than 75% of the manufacturer's recommended maximum deflection.

F. Install compression type gaskets in accordance with manufacturer's instructions to ensure proper joint sealing.

G. Pipe shall be jointed in accordance with manufacturer's instructions. The mating ends (bell and spigot) shall be thoroughly cleaned and soaped before jointing. The mating ends shall be aligned and shoved together using a steady force.

H. Connections of fittings, valves and fire hydrants shall be with bolts and nuts as supplied with the component. Upon tightening, a minimum of two (2) bolt threads shall be exposed to ensure proper thread engagement.

I. Retaining gland of mechanical joint shall be evenly spaced from the fitting or valve for its entire circumference upon installation.

J. After jointing pipe, repair any damage to pipe's protective coating in accordance with manufacturer's instructions or replace pipe.

K. Prior to jointing consecutive pipe, backfill previously jointed pipe with sufficient material to prevent movement.

L. Place a plug in the open end of uncompleted laid piping at the end of each day.

3.18 THRUST BLOCKING

A. Thrust blocking shall be installed at all bends, tees, valves, fire hydrants and points where shown on plans.

B. Thrust blocking shall consist of cast-in-place concrete, tie rods, combinations thereof or other method approved by the FCDWS Engineer.

C. Cast-in-place concrete blocking shall be formed to the required dimensions and installed against undisturbed earth. Blocking size may be increased based on soil bearing capacity. Forms may be earthen berm, or wood as directed by FCDWS Engineer/Inspector.

D. Concrete shall have a minimum 3,000 psi compressive strength at 28 days and shall be plant mix.

E. Bolts and nuts shall be protected from concrete coverage.

F. Use detail No. 16.0, 17.0, 18.0, and 19.0 when applicable.

3.19 MANHOLE INSTALLATION

A. Manholes shall be set atop a twelve (12) inch bed of No. 57 stone that extends a minimum of twelve (12) inch beyond all exterior sides.

B. The bedding of No. 57 stone may be replaced with a six (6) inch layer of steel reinforced cast-in-place concrete.

C. The bed shall be prepared so that the manhole is set level.

D. Manhole sections shall be handled with lifting straps or hooked cables using a minimum of two (2) of the manufactured manhole lifting holes.

E. Manhole sections shall be positioned such that influent and effluent piping enter the center of their respective opening. Manhole shall not rest on the top of the pipe.

F. Prior to jointing consecutive sections, tongue-and-grooved ends shall be cleaned free of dirt and debris.

G. Tongue-and-grooved ends shall be fitted with preformed gasket sealing compound.

H. Manhole joints and grade adjustment rings shall be sealed with an 8” EDPM rubber seal wrap for joints and a flexible EDPM rubber seal for grade adjustment rings to prevent leakage of water into the manhole.

I. Manhole sections shall be stacked level and plumb at all times.

J. Manhole lifting holes shall be sealed using non-shrink grout throughout the entire depth of hole.

K. Manholes shall be kept free of dirt and debris.

L. Use detail No. 21.0 when applicable.

3.20 METER BOX INSTALLATION

A. Meter boxes shall be installed as follows.

1. Meter box shall be set atop 6” of No. 57 stone. Backfill around box shall be compacted using a hand tamp.
2. Top of meter box shall be set flush with curb or finished grade. Meter box shall not be set in a depression.
3. Stone within meter box shall be to the bottom of the meter assembly and free of debris.

3.21 BORINGS AND CASINGS

A. The Contractor shall provide to the FCDWS for approval, a detailed plan for the methods proposed for the construction of the casing. These plans shall include the methods proposed for groundwater control and face protection.

B. In general, jack and bore operations shall conform to the requirements of the Georgia Department of Transportation as presented in their Standard Specifications for the Construction of Roads and Bridges, latest edition. If a conflict between these specifications and the Georgia Department of Transportation specifications exists, the Department of Transportation specifications shall govern.

C. Install the steel casing pipe by the dry boring method. Bore the hole and install the casing through the soil simultaneously by a cutting head on a continuous auger mounted inside the casing pipe. Fully weld lengths of casing pipe to the preceding section in accordance with AWS recommended procedures.

D. After construction of the casing is complete, and has been approved by FCDWS, install the pipeline in accordance with the detailed Drawings and/or the Specifications.

E. Check the alignment and grade of the casing and prepare a plan for approval to set the carrier pipe at proper alignment, grade, and elevation. The carrier pipe shall be supported by stainless steel casing spacers to limit radial movement to a maximum of 1-inch within the casing. Provide a minimum of two spacers for each section nominal length of pipe. One spacer shall be placed not more than two feet from each end of the casing. Subsequent spacers shall be placed at a maximum spacing of 10 feet within the casing.

F. Flowable fill all voids and seal the ends of the casing with 4-inch brick walls, plastered with Portland cement mortar and waterproofed with asphaltic roofing cement or Link-Seal Model PL or approved equal.

G. Provide all necessary bracing, bulkheads, and shields to ensure complete safety to all traffic at all times during the work. Perform the work in such a manner as to not permanently damage the roadbed or interfere with normal traffic over it.

H. Begin the bore operation in a pit, sheeted and shored as necessary, and proceed from one end. Observe all applicable requirements of Georgia Department of Transportation regulations. Conduct the operations in such a manner that all work will be performed below the level of the roadbed. Coordinate and schedule all of the work with the Georgia Department of Transportation if on a State highway.

I. Complete all boring work at one particular location before boring work is started at another location.

J. If, in the opinion of the FCDWS or Georgia Department of Transportation, the casing installation work is being conducted in an unsafe manner or in a manner detrimental to the over-passing roadway or to the safety of the traveling public, all operations of boring shall cease until the necessary corrections have been made. In the event that distress occurs to the roadway due to the boring, the Contractor shall be required to submit a plan to repair the roadway. The plan must be acceptable to Department of Transportation and/or Forsyth County. After approval, the road repairs shall be made by the Contractor.

K. Casing damage during installation shall be repaired. Should damaged casing prevent the installation of the pipe, then that boring and casing shall be abandoned.

L. Use detail No. 27.0 and 28.0 when applicable.

3.22 PIPE AND VALVE IDENTIFICATION

A. Service lines and valves shall be locatable via marked curbing or other FCDWS approved method. Adjacent street curb to service line and valves shall be marked via saw-cut as follows. Curb markings shall be a minimum of four (4) inches in height.

1. “W” for water service location.
2. “V” for water valve location.
3. “X” for sewer service location.

B. Concrete valve markers are required at each valve, set to a minimum 18” above grade, per Forsyth County Detail No. 13.0.

C. Trace Wire Systems

1. General
   a. Tracing wire shall be installed with all water potable or raw, gravity sewer, sewer force mains, sewer laterals, low pressure sewer systems, vacuum sewer systems and reuse waterlines. Tracing wire shall continue into all casing under all crossings.
   b. Trace wire shall be installed in a manner that allows proper access for connection of electronic locating equipment.
   c. Proper locating of wire without loss or deterioration of signal for distances over 1,000 linear feet, without distortion of signal caused by multiple wires installed close to water or sewer utility.
   d. Trace wires must be a continuous single wire, except where using approved connectors. No looping or coiling of locate wire is allowed.
   e. Any damage to trace wire during installation or otherwise must be repaired immediately by removing the damaged wire and installing a new section of wire with approved connectors. Taping and/or spray coating is prohibited.
   f. Trace wire must be installed on pipe on the bottom half of pipe and taped to pipe every 5 feet.
   g. Trace wire must be properly grounded as specified.
   h. Trace wire for all services must terminate in the meter box or approved trace wire access box.
   i. At all main line dead-ends, trace wire shall ground using an approved connection to a drive-in magnesium grounding anode rod, buried at the same level as the trace wire.
   j. Main line trace wire shall not be connected to existing conductive pipes. Treat as a dead-end. Ground using an approved waterproof connection to a grounding anode buried at the same depth as trace wire.
   k. All service lateral trace wires shall be a single wire, connected to the mainline trace wire using a mainline to lateral lug connector, installed without cutting / splicing the mainline trace wire.
   l. In occurrences where an existing trace wire is encountered on an existing utility that is being extended or connected to, the new trace wire and existing trace wire shall be connected using approved splice connectors and shall be properly grounded at the splice location as specified.
   m. Trace wire shall be installed through all casing, taking care not to damage wire.
   n. A trace wire box at ground level or an aboveground box must be installed at all air relief manholes, vaults or valve manholes or vaults. Trace wire shall be connected to main trace wire at main.

2. Trace Wire System for Potable Water Applications
   a. A mainline trace wire must be installed, with all service lateral trace wire connected to the main line trace wire to ensure full locating capabilities from a single connection point.

b. Lay mainline trace wire continuously, bypassing around the outside of valves and fittings on the North or East side.
c. Trace wire on all water services must terminate at the water meter box or an approved access box and must follow the service line as installed.
d. Aboveground trace wire access boxes will be installed on fire hydrants when applicable.
e. Trace wire to fire vaults or water meter vaults must terminate at an in-ground access box above the water line just before the wire enters into the vault. The trace wire must be connected to the mainline trace wire by the proper connectors.
f. All conductive and non-conductive service lines shall include trace wire.
g. All creek and road crossings shall have an in-ground access box or use a Tri-View marking post at each end with internal test station connected to the trace wire through the casing and connected to the main trace wire.
h. A trace wire box at ground level or an aboveground box must be installed at all air relief manholes, vaults or valve manholes or vaults. Trace wire shall be connected to main trace wire at main.

3. Connectors and Splices
   a. All trace wires must be interconnected at intersections, at tees, crosses, etc. The three wires at tees shall be connected by using a single three-way lockable connector. At crosses all four wires must use a 4-way connector. The use of two 3-way connectors with a jumper between is acceptable.
   b. All connectors shall be direct bury connectors and shall include 3-way lockable connectors and main line to lateral lug specifically manufactured for underground use in underground tracing wire applications.
   c. All connectors shall be dielectric silicon filled to seal out moisture and corrosion.
   d. All tracing wire shall be connected as to prevent any bare wire from contact with moisture at any connection.
   e. Non-locking friction fit, tape, twist electrical connectors without a direct bury waterproof cap or any spray / dip insulation is prohibited.

4. Termination / Access
   a. All trace wire termination points - Must utilize an approved trace wire access box. (Either aboveground or grade level access box.), specifically manufactured for trace wire access.
   b. All trace wire boxes aboveground or grade level - Shall be identified with “water”, “sewer” or “reuse” cast into cap or box lid. Boxes must be colored coded to utility.
   c. Trace wire access boxes - Must include a manually interruptible conductive / connective link between the terminal(s) for the trace wire connection and the terminal for grounding anode connection.
   d. Grounding anode - Shall be connected to the identified or bottom terminal on all access boxes.

e. Service laterals – Trace wire must terminate at an approved grade level / in ground box located at sewer lateral connection at the back of right of way or sanitary sewer easement.
f. Hydrants – trace wires must terminate at an approved aboveground trace wire access point. Trace wire box must be affixed to the hydrant flange. (Tape, zip ties or wire is not acceptable.)
g. Long runs in excess of 500 feet without service laterals or hydrants – Trace wire must be in an approved grade level / aboveground access box marked with appropriate color per APWA for utility in the proper utility corridor. Ground level access boxes must have 48" polyethylene marker post color coded per APWA standard for the utility installed.

5. Grounding
   a. Trace wire must be properly grounded at all dead ends and stubs.
   b. Grounding of trace wire is achieved by the use of a drive-in magnesium grounding anode rod with a minimum of 20 feet of #14 red HDPE copper clad steel wire connected to anode specifically manufactured for this purpose and buried at same level as utility.
   c. Grounding the trace wire at dead ends / stubs shall be done by installing ground anode at 180 degrees opposite of the trace wire at a maximum distance allowed.
   d. When grounding where the trace wire is continuous and neither the main line, trace wire or the grounding anode wire will be terminated at or above grade, install grounding anode directly beneath and in-line with the trace wire. Do not coil excess wire from grounding anode. When connecting to trace wire using this method, the grounding anode wire shall be trimmed to correct length before connecting trace wire with a mainline lateral lug connector.
   e. When connecting to trace wire access box, a minimum of 2 feet of excess / slack wire is required after meeting final elevation.

6. Testing of Trace Wire
   a. All new trace wire installations shall be located and witnessed by an Owner's Representative, prior to acceptance and approval of As-built or Final Plat.
   b. This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project.
   c. Continuity testing of actual line tracing shall not be accepted.

D. Electronic Locating Devices
1. Marker Ball Installation for 24" and Larger Pipes
   a. Marking Ball Installation Locations
      1) Every 200 feet of straight run for water, sewer, reuse, force mains lines.
      2) At all bends.
      3) At all tees.

4) At all service taps. Longside service lines, install marker balls at each side of the road crossings.
5) At the ends of casing.
6) All sewer lateral taps and clean- outs.
7) At any repair points that has un-locatable PVC.
8) Any change in direction of pipe.
9) Marking balls shall be installed at tees and bends at the connecting points and in the center of the tee and bends and 5 feet before and 5 feet after the bends or tees.
10) If the pipe is deflected during installation then the marking balls shall be installed 5 feet before and after the deflection and every 5 feet during the deflection

b. Marking balls shall be installed no deeper than 2 feet below the finished grade.
c. Marker balls must be installed in 6" schedule 40 PVC pipe.
d. Install 6" schedule 40 PVC pipe to the top of water, sewer, reuse or sewer force main pipe.
e. Washed 57 stone must be installed in 6" schedule 40 pipe to bring marker ball to within 2 feet of ground level. After installing the marker ball fill the 6" schedule 40 PVC pipe to the top of pipe and capped with PVC end cap.

2. Marker Ball Programing - Marker balls shall be programed with the following:
   a. Forsyth Co. Water and Sewer.
   b. Type of utility I.E. Potable Water, Raw water, re-use water, gravity sewer, force main sewer, low pressure sewer, vacuum sewer, lateral sewer, etc.
   c. Marker balls shall be programed with the material type, ductile iron pipe (DIP), Polyvinylchloride (PVC), High Density Polyethylene (HDPE), Copper, etc.
   d. Marker balls shall be programed with the size of the pipe.
   e. Prior to burying the iD marker, the identification number shall be recorded and provided on As-built or Final plats at the locations the marking balls are installed.
   f. All Marker balls must have Survey Grade GPS coordinates on As-built or Final Plats.
   g. Depth from marker balls to the main.
3. Marker Ball Testing
   a. Marker balls shall be tested to verify that all requirements for programing and installation have been completed.
   b. Testing shall be witnessed by an Owner Representative before acceptance.

E. Warning Tape

4. Install continuous underground warning tape during backfilling of trench for underground water distribution piping.
5. Install 12” (300 mm) below finished grade or 6” (150 mm) below subgrade under pavements and walkways.
6. Install directly over piping.

BACKFILL AND COMPACTION

3.23 BACKFILL

A. Excavations shall be backfilled using suitable material recommended in ASTM D2321 Table 2, Recommendations for Installation and Use of Soils and Aggregates for Foundation, Embedment, and Backfill with soil groups classified by the Unified Soil Classification System outlined in ASTM D2487.

B. The suitability of backfill materials shall be as defined in ASTM D2321 Table 1 Classes of Embedment and Backfill Materials.

C. Place no backfill until any poured concrete has developed design compressive strength.

D. Place backfill against below grade walls in uniform level lifts to prevent wedging action.

E. Backfill shall not be placed on surfaces that are saturated, frozen or containing frost or ice.

F. Place backfill in excavations as follows:

1. Backfill in loose lifts not exceeding 6 inches when compacting using manual tamping devices (jumping jack).
2. Backfill in loose lifts not exceeding 12 inches when compacting using vibrating/ramming devices (sheep-foot vibratory roller).

G. Any settlement shall be filled and compacted to conform to adjacent surfaces.

H. All material remaining after completion of backfilling operations and unsuitable excavated material must be properly disposed of in a manner acceptable to Forsyth County and in a manner that will not adversely impact the development.

3.24 COMPACTION

A. Backfill shall be compacted using manual tamping devices or vibrating/ramming devices.

B. Use manual tamping devices as follows:

1. When area is inaccessible to vibrating devices and within 5 feet of below grade walls (includes manholes).
2. From bottom of pipe trench to twelve (12) inches above the top of pipe.

C. Compaction requirements are as follows.

1. Backfill, beneath and within 10 feet of the building line of any structure, proposed structure or other area determined by the FCDWS, shall be compacted for the entire depth to a minimum of 98% of the maximum dry density as determined by a Standard Proctor Analysis at ±3% of optimum moisture content.
2. Backfill, beneath any road, walk, proposed improvement or area determined by the FCDWS shall be compacted for the entire depth to a minimum of 100% of the maximum dry density as determined by a Standard Proctor Analysis at ±3% of optimum moisture content.
3. Backfill in road right-of-way and not described above shall be compacted the entire depth to a minimum of 95% of the maximum dry density as determined by a Standard Proctor Analysis at ±3% of optimum moisture content.

3.25 COMPACTION TESTING

A. Soil samples from the proposed construction area shall be analyzed for maximum dry density in accordance with ASTM 698 – Method C.

B. The extent of testing required shall be dependent upon soil conditions, Contractor's methods of construction and regulatory requirements.

C. Minimum compaction testing shall be as follows.

1. Backfill in excavations shall be tested at 2-foot lift intervals per 1,000 square feet of fill or as deemed necessary by the FCDWS Engineer/Inspector.
2. Backfill in trench excavations shall be tested at 2-foot intervals per 400 linear feet of fill or as deemed necessary by the FCDWS Engineer/Inspector.

SITE COMPLETION

3.26 GRADING

A. Grade areas to lines and elevations indicated on drawings or to surrounding surface grades.

B. Graded areas shall be within 0.10 foot of required sub-grade elevation and shall not permit the ponding of water.

C. In areas to receive grassing, redistribute stockpiled topsoil over graded areas to a minimum depth of four (4) inches. Provide additional topsoil to achieve required depth.

D. Where finish grade meets or abuts curbs, walks or pavement, uphill grades shall be slightly higher than curb or pavement to permit drainage.

E. All material remaining after completion of backfilling operations and unsuitable excavated material must be properly disposed of in a manner acceptable to Forsyth County and in a manner that will not adversely impact the development.

F. Stabilize site in accordance with the approved soil erosion and sedimentation control plan.

3.27 REPLACING PAVEMENT

A. Existing pavement shall be replaced in accordance to the standards required by Forsyth County Engineering and/or the Georgia Department of Transportation.

B. Construction shall be performed so as not to endanger roadway activity. Work shall be coordinated and be in compliance with the appropriate road and highway agencies.

C. Pavement shall be reinstalled immediately after completing backfill operations and compaction requirements.

D. Driveways and sidewalks shall be replaced to their full width from the edge of curb or road pavement to the nearest construction/control joint.

E. Curbs shall be replaced for the entire length from control joint to control joint.

F. Removed pavement shall be disposed offsite.

G. Use Detail No. 35.0, 36.0 and 37.0 when applicable.

TESTING

3.28 GENERAL

A. The following tests shall be performed at the expense of the Developer/Utility Contractor.

B. Water distribution systems and/or sanitary sewer systems failing the required tests shall be repaired at the expense of the Developer/Utility Contractor.

C. The Contractor shall provide a detailed chlorination, dechlorination, and flushing plan for approval by the FCDWS Engineer.

3.29 HYDROSTATIC

A. Water distribution piping and force mains shall be subjected to a hydro static pressure and leakage test in accordance with AWWA Standard C600, latest edition.

B. Pipe shall be flushed free of dirt and debris.

C. A corporation stop or fire hydrant shall be installed at the high point of elevation in the pipe line system to release air, or a meter service can be used if in the right location.

D. Water and force main pipe shall be filled with potable water to a pressure of 200 psi as measured from the lowest elevation of testing and pipe pressure allowed to stabilize. Hydrostatic pressure testing will not be done unless the temperature is at least 36 degrees (F) and rising

E. Pressure test shall be considered acceptable when test pressure has not varied by more than +/- 5 psi for a minimum period of two (2) hours.

F. After satisfactory completion of the pressure test, all pressure piping shall be leak tested. During test period, pressure shall be maintained within 5 psi of test pressure.

G. Leakage test shall be considered acceptable when leakage is less than or equal to the allowable leakage as calculated in:

$$L = \frac{SD\sqrt{P}}{133{,}200}$$

L = allowable leakage, gal/hr
S = length of pipe, ft
D = diameter of pipe, in
P = test pressure, psi

DISINFECTION

3.30 GENERAL

A. All newly installed water distribution piping and piping affected during construction shall be disinfected in accordance with AWWA C651.

B. The FCDWS shall be involved in disinfecting the following piping:

1. Water mains.
2. Service connections up to and including water meters and back flow prevention devices.

C. The Contractor shall supply an appropriate chlorine solution and complete disinfection procedures.

D. Water for disinfection shall be provided by the FCDWS at no expense to the contractor.

E. Excessive use of water during disinfection procedures, as determined by the FCDWS, may be reason for charges to be levied against the contractor.

F. Collection and testing of water samples shall be performed by the FCDWS at the expense of the developer. The fee for the test will be collected when the final plat and as-builts are presented to FCDWS for approval.

G. No water piping system shall be placed in service until written approval is received from the FCDWS Engineer/Inspector.

H. The contractor shall be responsible for preventing soil erosion associated with disinfecting procedures.

3.31 INITIAL FLUSHING

A. Prior to disinfection, the contractor shall flush piping system with sufficient water to create a minimum velocity in the pipe of 2.5 ft/s.

B. All piping and components associated with service connections shall be thoroughly flushed with fresh potable water prior to installation.

3.32 CHLORINATION

A. The Contractor shall introduce a chlorine solution having a concentration of 50 to 100 milligrams per liter (mg/l) into the piping system.

B. Upon introducing chlorine solution, all valves associated with piping system shall be fully operated to ensure complete disinfection.

C. Piping system shall have a minimum 25 mg/l chlorine residual after a 24-hour retention period.

D. Disinfection of piping system shall be repeated until the minimum chlorine residual is obtained.

E. All piping and components associated with service connections shall be thoroughly flushed with a chlorine solution.

F. Laboratory analyses shall be performed and certified by the FCDWS.

3.33 FINAL FLUSHING

A. After chlorination is complete, the contractor shall flush the piping system until the chlorine residual in water of the piping system is at a maximum concentration of one (1) mg/l.

B. After chlorination is complete, all piping and components associated with service connections shall be thoroughly flushed with fresh potable water.

C. Due to the proximity of creeks, streams, ponds, or other bodies of water, the Contractor may be directed to dechlorinate any water flushed from the main to prevent damage to aquatic organisms, plants, fish, etc.

3.34 JOINT AIR TEST

A. During construction, each joint shall be air tested after installation.

B. Joints shall be pressure tested per FCDWS minimum standards using Lansas Low or High Pressure Double-Bladder Joint Tester or equal.

C. Joints shall be tested per Joint Tester Manufacturer's specifications to 200 psi.

3.35 PIGGING

A. Dry pig shall be pulled through the pipe during construction to reduce sediment build up.

CONCRETE

3.36 FORMWORK

A. Formwork shall comply with ACI 347R-94.

B. Contractor shall be responsible for design and construction of concrete formwork capable of supporting construction loads. Forms shall be as follows:

1. Pre-engineered steel.
2. Pre-engineered reinforced fiberglass.
3. Wood.
4. Earth.

C. Construct formwork to lines and elevations as shown on drawings.

D. Construct forms to be removed without hammering or prying against concrete.

E. Plug holes in existing forms to prevent leakage of cement.

F. Clean forms of dirt and debris prior to each use.

G. Form ties shall be as follows:

1. Break-back type with 5/8-inch removable sleeve or 1-inch cone type.

2. For retaining walls and walls below liquid level, provide ties with positive water stop projection at center of wall.

H. Prior to placement of reinforcing steel, apply form release agent to formwork. Release agent shall be evenly applied and compatible with type form being used.

I. Construct bulkheads with shear keys at separation of pours.

J. Shear key width shall be 1/3 of the wall or slab thickness.

K. Removal of formwork shall take place only after concrete has developed sufficient strength to support itself and resist damage during removal.

L. Forms used below grade shall be removed prior to backfill.

3.37 STEEL REINFORCEMENT

A. Shop fabricate reinforcement to shape and dimensions as indicated on drawings.

B. Use no bars or wire mesh with kinks or bends not shown on the drawings.

C. Secure reinforcement in forms in accordance with the drawings, ACI 315, ACI 318 and CRSI “Recommended Practice for Placing Reinforcing Bars”.

D. Steel reinforcement shall set atop concrete bricks and/or be spaced using steel highchairs. When highchairs are used as a form spacer, the highchair feet shall be plastic dipped.

E. Concrete coverage over reinforcing shall be as follows:

1. Concrete cast against earth……3 inches.
2. Formed concrete exposed to earth or weather…….2 inches.
3. Slabs and walls exposed to wet conditions……..2 inches.
4 Interior slabs and walls……...¾ inch.

F. Splice reinforcement a minimum of 48 times (x) bar diameter. Mechanical splices shall be prohibited.

G. Steel reinforcement, at the time cement is placed, shall be free of dirt, rust and debris. Reinforcement with flaking rust shall not be used.

H. Conduits and pipes shall have same concrete coverage as reinforcing steel.

I. Tie wire shall be used to secure reinforcing.

J. Joints in wire mesh shall be lapped one wire spacing plus 2 inches. Wire mesh shall have 1 inch of concrete cover at forms.

3.38 PLACEMENT

A. Place concrete in accordance with ACI 301-89, Chapter 8.

B. Place no concrete until all embedded items and reinforcement have been placed in accordance with the plans.

C. A FCDWS Inspector shall approve formwork layout and placement of steel reinforcement prior to placing concrete. Provide 24-hour notice prior to placing concrete.

D. Concrete shall not be placed on loose, saturated or frozen soil.

E.. Concrete shall not be placed in water unless approved by the FCDWS Engineer.

F. Concrete shall be placed only when ambient temperature is at 40º F and rising or Place concrete in accordance with ACI 306-R88.

G. During hot weather (>80°F), place concrete in accordance with ACI 305-R89.

H. Saw control joints as soon as concrete can be traveled by foot without leaving impressions. Saw joint depth shall be ¼ of the slab depth.

I. Consolidate all placed concrete with vibrator of suitable vibrations per minute.

J. Do not pull or push concrete with vibrator.

K. Do not drop concrete more than four (4) vertical feet.

3.39 FINISHING

A. Screed floor slabs or tops of walls by use of straight edge or screed board.

B. Concrete shall be finished as follows.

1. Interior slab to receive setting bed…….float finish.
2. Interior slab exposed……trowel finish.
3. Exterior slab exposed……..broom finish.
4. Exterior wall/column exposed……rubbed finish.
5. Unexposed concrete……...form finish.

3.40 CURING

A. Prevent freshly placed concrete from premature drying and protect from excessive hot or cold temperatures.

B. Maintain freshly placed concrete, without drying, at a relatively constant temperature.

C. Begin curing after placement and finishing of concrete as soon as free water has disappeared from concrete surface.

D. Curing methods shall be by the continuous application of water or by applying a liquid membrane forming curing-sealing compound to the fresh concrete surface.

1. Curing by the continuous application of water shall occur for a period of not less than 72 hours.

2. After application of liquid membrane forming curing-sealing compound, maintain continuity of coating and recoat areas damaged during curing period. Curing period shall be not less than 72 hours.

E. Do not apply liquid curing sealing compound to concrete that is to be finished with a coating material such as paint, flooring material, etc.

ENVIRONMENTAL COATINGS

3.41 GENERAL

A. Priming, painting and special coating of all surfaces shall include but are not limited to the following.

1. Piping and appurtenances.
2. Supports.
3. Pumps.
4. Valves.
5. Equipment and appurtenances.
6. Concrete and masonry.

7. Structural and miscellaneous metals.

B. Priming, painting and special coating of all surfaces shall be in accordance with the coating manufacturer's recommendations.

PART 4 MEASUREMENT AND PAYMENT

4.01 PIPE INSTALLATION

A. Payment for pipe installation shall be on a linear foot basis measured along the centerline of the pipe and shall be the actual laying length of the installed pipe including the laying length of valves and fittings.

B. The unit price bid for pipe shall be full compensation for materials furnished by the Contractor, labor, clearing and grubbing, excavation, bedding, backfilling, temporary plugs, joint air test, dry pig, joint restraints, thrust blocks, tracer tape, locator balls, markers, compaction, grassing, sedimentation and erosion control, cleaning up, sterilizing, testing, and all other work incidental to the installation of the pipe except as listed below.

4.02 GATE VALVES (30-INCH OR LESS)

A. Payment for gate valves shall be made per actual number of gate valves with valve boxes satisfactorily furnished and installed complete with covers, concrete collars, and valve markers.

B. The unit price bid shall be full compensation for furnishing all labor, materials and equipment to install the valve, valve box, valve box extensions, operating nut extensions, valve markers, test station box and cap, valve wrenches, restraining devices, covers, concrete collars, excavation, sheeting, shoring, bracing, dewatering, backfill, compaction, restoration, and all other items required for a complete, acceptable and operable installation. Price shall also include providing GPS coordinates.

C. Gate valves for air release valves shall be included in the price for air/vacuum release valves in Section 4.08.

4.03 GATE VALVES (36-INCH OR LARGER)

A. Payment for 36-inch or larger gate valves shall be the Unit Price shown on the Bid Schedule per B and C below.

B. 36-inch and 42-inch Class 250 gate valves with restrained joint ends will be supplied by the Owner.

C. 36-inch and 42-inch Class 250 gate valves with restrained joint ends installation shall include the costs for installation and all ancillary requirements including, but not limited to, overhead and profit.

D. Payment for gate valves shall be made per actual number of gate valves with valve boxes satisfactorily installed complete with covers, concrete collars, and valve markers.

E. The unit price bid shall be full compensation for furnishing all labor, materials and equipment to install the valve, valve box, valve box extensions, operating nut extensions, valve markers, test station box and cap, valve wrenches, restraining devices, covers, concrete collars, excavation, sheeting, shoring, bracing, dewatering, backfill, compaction, restoration, and all other items required for a complete, acceptable and operable installation. Price shall also include providing GPS coordinates.

4.04 WATER SERVICES

A. Measurement for water services shall be made per actual number of service connections relocated to provide a complete and functional unit.

B. Payment for the water service shall be made based on the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials and equipment necessary to install the water service connection including service saddle, corporation stop, water service piping, water service HDPE casing, curb stops, relocating meter boxes, relocating meters, relocating backflow preventers and backflow preventer boxes. Payment also includes excavation, boring, shoring and bracing, dewatering, backfill, compaction, grading, pressure testing, restoration, sod and all other items required for a complete, acceptable and operable installation.

4.05 EXISTING WATER MAIN ABANDONMENT

A. Payment for cap or remove existing water main shall be per the Bid Form. Payment shall include all labor and materials to abandon the line in-place with end caps and grout fill when pipe runs perpendicular to the roadway. Payment shall include complete removal and restoration when pipe runs parallel with the roadway.

B. The unit price bid for cap or remove water main shall be full compensation for materials furnished by the Contractor, labor, excavation, grout fill, removal of pipe, backfilling, temporary plugs, compaction, grassing, cleaning up, and all other work incidental to capping or removing existing water main. Price shall include removal of all abandoned gate valves including valve and valve box.

C. Payment for ductile iron caps, traffic control, and cut and replace asphalt will be included in Payment Item 4.08, 4.11, 4.12, and 4.13.

4.06 STEEL CASING

A. Payment for casing installation shall be on a linear foot basis measured along the centerline of the pipe and shall be the actual laying length of the installed casing.

B. The unit price bid for steel casing shall be full compensation for materials furnished by the Contractor, labor, clearing and grubbing, excavation, bedding, backfilling, flowable fill voids, end seal, spacers, temporary plugs, compaction, grassing, cleaning up, and all other work incidental to the installation of the water main.

4.07 REMOVE EXISTING HYDRANT

A. Payment for remove existing hydrant shall be made per the actual number removed.

B. The unit price bid for remove existing hydrant shall be full compensation for materials furnished by the Contractor, including labor, demolition, removal of hydrant, removal of valve, capping line, excavation, bedding, backfilling, temporary plugs, compaction, grassing, cleaning up, and all other work incidental to removal of hydrants. Salvage material as required will be returned to the Owner.

4.08 FITTINGS

A. Payment for fittings, including couplings, sleeves, and abandonment caps shall be on a unit price per ton as stated in the bid form and shall include the cost for restraint with weight of fittings being based upon the published weight of the C153 fitting body or restrained end fitting body.

B. Payment for mechanical joint or restrained joint shall be per the Bid Form. The unit price bid for fittings shall be full compensation for materials furnished by the Contractor, labor, clearing and grubbing, excavation, bedding, backfilling, temporary plugs, joint restraints, thrust blocks, tracer tape, locator balls, markers, compaction, grassing, sedimentation and erosion control, cleaning up, sterilizing, testing, and all other work incidental to the installation of the fittings.

4.09 AIR/VACUUM RELEASE VALVES

A. Payment for air/vacuum release valves shall be made per actual number of air/vacuum release valves with dog house manholes satisfactorily furnished and installed complete with frames and covers.

B. The unit price bid shall be full compensation for furnishing all labor, materials and equipment to install the air/vacuum release valve, gate valve, nipple, saddle, bedding, dog house manhole, frame, cover, excavation, sheeting, shoring, bracing, dewatering, backfill, compaction, restoration, and all other items required for a complete, acceptable and operable installation. Price shall also include providing GPS coordinates.

4.10 TIE-IN CONNECTIONS

A. Payment for the Tie-in Connection shall be made per actual number of tie-in connections satisfactorily completed.

B. The unit price bid shall be full compensation for furnishing all labor, materials and equipment to complete tie-in including, but not limited to, excavation, sheeting, shoring, bracing, dewatering, backfill, compaction, restoration, and all other items necessary to complete the work.

C. Payment for pipe, fittings and other material to be included with appropriate pay item.

4.11 ASPHALT – CUT AND REPLACE

A. Measurement for Asphalt – Cut and Replace, shall be made per linear foot (LF) of trench measured along the centerline of the pipeline.

B. Payment for Asphalt – Cut and Replace shall be made based on the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials and equipment necessary to complete installation of base and asphalt patch. Also included is backfill, compaction, paint markings, restoration, and all other items required for a complete and acceptable installation.

4.12 CONCRETE CURB & GUTTER REPLACEMENT

A. Measurement for Concrete Curb & Gutter Replacement shall be made per linear foot (LF) of curb replaced.

B. Payment for Concrete Curb & Gutter Replacement shall be made based on the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials and equipment necessary to complete installation of concrete curb and gutter. Also included is backfill, compaction, finishing of concrete, restoration, and all other items required for a complete and acceptable installation.

4.13 TRAFFIC CONTROL

A. The work shall be paid as a lump sum and consist of establishing traffic control and maintaining safe, convenient use of public roads and rights-of-way in accordance with GDOT regulations. Payment shall include obtaining applicable permits from GDOT.

4.14 MOBILIZATION

A. All work covered by this section will be paid for at the contract sum price for Mobilization. The lump sum bid price shall not exceed 3% of the total project bid.

END OF SECTION 15002

APPENDIX

Report of Soil Survey SR 369 Widening

ECS Southeast, LLP

Report of Soil Survey

SR 369 Widening

Forsyth County, Georgia

P.I. No.: 0013369

ECS Project Number 10:9315-A

October 25, 2017
Revision No. 1

October 25, 2017
Revision No. 1

Mr. Tom Fravel, P.E.
American Engineers, Inc.
1634 White Circle, Suite 101
Marietta, GA 30066

Reference: SR 369 Widening – Soil Survey Report
Forsyth County, Georgia
P.I. No.: 0013369

ECS Project No. 10:9315-A

Dear Mr. Fravel:

ECS Southeast, LLP (ECS) is pleased to submit this revised Soil Survey Report for the SR 369 Widening project in Forsyth County. The attached report has been revised to incorporate the comments we received back from GDOT in their review correspondence dated October 11, 2017.

Thank you for the opportunity to provide geotechnical engineering services on this project. Should you have questions regarding our findings or need additional consultation, please do not hesitate to contact our office.

Sincerely,

ECS SOUTHEAST, LLP represented by:

Jay Hornsby, P.G.
Geotechnical Department Manager

Robert H. Barnes, P.E., P.G.
Principal Engineer
GA Registration No. 29715

Enclosure: Soil Survey Report

SOIL SURVEY SUMMARY
For

Forsyth County
SR 369 Widening
PI No. 0013369
Revision No. 1

1. Location / Description

This project is for the widening, intersection improvements, and construction of new ramps along State Route 369 (SR 369)/ Matt Highway/ Browns Bridge Road in Forsyth County, GA. The widening project begins on SR 369 at Station 107+50 and continues east to Station 236+00.

The following Intersection and roadway improvements are also planned:

1. State Route 9/ Dahlonega Highway from Station 308+00 to the north to 327+10.39,
2. State Route 306/ Keith Bridge Road from Station 424+57,
3. Realignment of Settingdown Rd from Station 340+00 (beginning at SR 369, Station 133+50) to 347+14,
4. Four new ramps (Ramps A, B, C, and D) at the intersection of SR 369 (Browns Bridge Road) and SR 400, and
5. A new driveway alignment for the Browns Bridge Community Church at SR 369 Station 183+70.

2. Geology

This project will be geologically sited in the Aluminous Schist (pa1), Biotitic Gneiss/ Mica Schist/ Amphibolite (fg3), and Quartzite (q1) formations of the Georgia Piedmont Region.

3. Rock

Hard rock, noted as auger refusal and possibly requiring blasting for removal, was encountered near or above grade at the following locations:

Station to Station	Location
2000+00 ± to 2002+50 ±	Lt., Rt., & CL
3015+50 ± to 3018+50 ±	Lt., Rt., & CL

Additionally, rock in the form of partially weathered rock or rock layers, which may be removed by heavy equipment and/ or light blasting, was encountered on this project. We estimate that this material will be encountered at the following locations:

Station to Station	Location
2000+00 ± to 2002+50 ±	Lt., Rt., & CL
2005+50 ± to 2008+50 ±	Lt., Rt., & CL
3010+00 ± to 3015+50 ±	Lt., Rt., & CL

Please note shallow hand auger refusal was encountered in a number of borings due to the limited nature of the hand equipment. These refusals appeared to be in dense soils and/or rocky fills that mechanical equipment would typically be able to

excavate or penetrate through.

4. Removal

Within and adjacent to the wet (inundated) area at Ramps C and D, material unsuitable for embankment construction (such as soft saturated soils) which requires removal may be encountered at the following locations to the maximum depths indicated on this project:

RAMP C

Station to Station	Location	Maximum Depth
4005+00 ± to 4010+00 ±	Lt., Rt., & CL	18 inches

RAMP D

Station to Station	Location	Maximum Depth
5007+00 ± to 5014+00 ±	Lt., Rt., & CL	18 inches

The removed material may be used in thin layers to flatten the slopes or may be wasted outside the construction limits of the project. Replacement material should be with rock embankment, placed to a depth of 18 inches above the water elevation at the time of construction. Refer to the attached *Filter Fabric & Embankment Detail* (Figure 4) for inundated areas requiring the removal of soft soils.

This work should be done at the direction of the Engineer, and may be eliminated if the subgrade soils are dry and stable at the time of construction.

The soils near the proposed grade in the following areas were found to have in-place moisture contents far above the optimum moisture contents. This condition has the potential to cause severe pumping problems during subgrade and base construction. After excavation in these areas is complete, we recommend that 24 inches of subgrade soils beneath the pavement and shoulders be removed and either dried out and replaced, or replaced with drier soils:

SR 369

Station to Station	***Location***
152+00 ± to 154+00 ±	Rt.
158+00 ± to 160+00 ±	Rt.
163+00 ± to 165+00 ±	Lt.
169+00 ± to 171+00 ±	Rt.
193+50 ± to 195+50 ±	Lt.
202+50 ± to 204+50 ±	Lt.
212+50 ± to 214+50 ±	Lt.
217+50 ± to 219+50 ±	Lt.

SR 9/ Dahlonega Highway

Station to Station	***Location***
316+00 ± to 318+00 ±	Rt.
321+00 ± to 325+00 ±	Lt.

RAMP C

Station to Station	***Location***
4014+00 ± to 4016+00 ±	Lt., Rt., & CL

This work should be done at the direction of the Engineer, and may be eliminated if the subgrade soils are dry and stable at the time of construction. A *Removal Detail* (Figure 6) has been attached to this report for non-inundated areas requiring removal.

5. Waste None of the materials found on this project will require wasting.

6. Subgrade Materials No additional subgrade material will be required for this project.

7. Pavement Design Values We recommend the following values for use in the pavement design calculations for this project:

Soil Support Value = 3.0
Regional Factor = 2.0
Subgrade Reaction, k = 150 pci

Graded aggregate base is the only base material recommended for use on this project.

8. Ditch Lining Based on the tested soil sample from SR 369, Station 128+00, 25 feet left (from 2 to 7 feet), we recommend the following values for use in the ditch lining calculations for this project:

Plasticity Index, PI = 16
D75 (mm) = 0.3
Unified Soils Classification System (USCS) = ML/SM

9. Slopes Maximum 2:1 slopes will be safe for this project, except as noted below. Where cut slopes are steeper than 3:1, serrated slopes are required (see *Serrate Slopes* paragraph below).

Except where specifically excepted by the GDOT Geotechnical Bureau, slopes of maximum 3:1 will be required where embankment and cut slopes are greater than 35 feet high.

Embankment and cut slopes that are greater than 35 feet high will require 3:1 slopes and the construction of a berm in accordance with the attached detail (Figure 5) at the following locations:

SR 369/Browns Bridge Road

Station to Station	Location
169.25 ± to 170+50 ±	Lt.
170+50 ± to 173+50 ±	Lt. & Rt.
176+75 ± to 177+75 ±	Lt.

US 19/ SR 400

Station to Station	Location
1026+50 ± to 1032+00 ±	Rt.

Ramp A

Station to Station	Location
2002+50 ± to 2003+50 ±	Rt.
2007+00 ± to 2011+00 ±	Rt.

10. Groundwater

The project crosses a low wet (inundated) area and stream buffer which may be inundated at the time of construction. Ditching may be required prior to construction of the embankment in the following areas:

SR 369/Browns Bridge Road

Station to Station	Location
168+00 ± to 171+50 ±	Lt.
167+50 ± to 170+00 ±	Rt.

Ramp C

Station to Station	Location
4005+00 ± to 4010+00 ±	Lt., Rt., & CL

Ramp D

Station to Station	Location
5007+00 ± to 5014+00 ±	Lt., Rt., & CL

If these areas are inundated and it is not feasible to drain them during construction, a mat of rock embankment should be placed to a height of 18 inches above the water level prior to placing normal fills. Refer to the attached *Filter Fabric & Embankment Detail* (Figure 4).

This work shall be done in accordance with Special Provision Section 208. (See *Removal* paragraph above). This work should be done at the direction of the Engineer, and may be eliminated if the subgrade soils are dry and stable at the time of construction.

11. Shrinkage We recommend an average shrinkage factor of 25% for use in the earthwork calculations for this project.

12. Rock Swell We recommend the use of an average swell factor of 30% for material shown as hard rock.

13. Culverts We recommend that a 12-inch blanket of Type II Foundation Backfill material be placed under the barrel of all culverts and 48-inch diameter and larger cross-drains on this project.

14. Corrosion Reference should be made to the attached "Pipe Culvert Material Alternates" chart for materials allowable by the Laboratory corrosion test.

15. Bench Detail Where new fills are to be placed on existing slopes steeper than 3:1, the existing slope should be benched in accordance with the attached detail. Benching should be provided at the following locations:

SR 369/Browns Bridge Road

Station to Station			Location
166+00 ±	to	168+00 ±	Rt.
168+00 ±	to	173+50 ±	Lt. & Rt.
198+50 ±	to	201+75 ±	Lt. & Rt.
222+00 ±	to	222+50 ±	Rt.
222+50 ±	to	229+00 ±	Lt. & Rt.
229+00 ±	to	229+50 ±	Lt.
229+50 ±	to	232+00 ±	Lt. & Rt.

US 19/ SR 400

Station to Station			Location
1018+00 ±	to	1019+00 ±	Rt.
1018+00 ±	to	1020+50 ±	Lt. & Rt.
1029+75 ±	to	1033+00 ±	Lt.

Ramp C

Station to Station			Location
4012+00 ±	to	4015+00 ±	Rt.
4018+00 ±	to	4020+34 ±	Lt.

Ramp D

Station to Station	Location
5000+00 ± to 5004+00 ±	Lt.

16. Pavement Design

We recommend the use of a minimum 12 inches of graded aggregate base in the pavement section for this project due to subgrade soils of low soil support values. However, this depth of base material may be slightly reduced on side streets with low-volume traffic.

17. Serrated Slopes

We recommend that cut slopes greater than 10 feet in height be serrated in accordance with the attached detail (Figure 3). Serrated slopes are required except where specifically excepted by the GDOT Geotechnical Bureau. Serrating will not be required in competent rock. Serrated slopes should be used at the following locations, unless competent rock is encountered:

SR 369/Browns Bridge Road

Station to Station	Location
177+00 ± to 180+00 ±	Rt.

US 19/ SR 400

Station to Station	Location
1023+75 ± to 1032+50 ±	Rt.

Ramp A

Station to Station	Location
2001+00 ± to 2014+00 ±	Rt.

Ramp B

Station to Station	Location
3000+00 ± to 3003+00 ±	Rt.

18. Special Problems

A. Both underground and overhead utilities are located within or close proximity of the planned work.

B. The following needs to be addressed prior to construction. The areas between Stations 4005+00 and 4010+00 and Stations 5007+00 and 5014+00 were inaccessible to heavy equipment due to inundation and conflicts with stream buffers. Hand augers were used to collect samples for USCS sampling in fill areas which were accessible near these Stations. However, there is significant fill planned for the

ramps in unexplored areas for soil support in the inundated area.

The Engineer should be consulted once the alignment is cleared and graded prior to road construction to confirm suitable conditions are present. An additional contingency for dewatering, removal and subgrade treatment in this area should be considered for costing (see *Removal* and *Groundwater* sections above).

C. Several residences are located within 75 feet of the construction limits of this project. Vibrations from construction may cause some concern with property owners. Construction vibration monitoring (i.e. preconstruction crack surveys, seismograph and other monitoring of construction vibrations, and post construction crack surveys) of the buildings located on Parcels 1, 4, 7, 11, 12, 14, 16, 18, 22, 24, 25, 26, 28, 43, 46, 47, 48, 51, 53, 57, 64, 65, 67, 69, 75, 77, 81, 91, 94 and 95 should be performed in accordance with Special Provision 154.

D. The existing structures located on Parcels 13 and 15 within the planned construction area and will need to be demolished. Debris from the demolition will need to be removed.

E. We recommend that all bridge approach slabs on this project be constructed in accordance with the notched detail on Georgia Standard 9017-R.

LIMITATIONS

This Soil Survey Report has been prepared in accordance with generally accepted geotechnical engineering practice and GDOT requirements for Soil Surveys. No warranty is expressed or implied. Furthermore, ECS assumes no liability for any third party's usage of this report and its attachments without express written consent.

The evaluations presented in this report are based on the available project information, as well as on the results of the exploration. Should a change in the project criteria be made such as the location of the new construction, ECS should be notified to evaluate the changes and make new recommendations if warranted.

ECS SOUTHEAST, LLP represented by:

Reported By: _____

Robert H. Barnes, P.E., P.G.
Geotechnical Principal Engineer
GA PE Registration No. 29715

Reviewed By: _____

Jay Hornsby, P.G.
Geotechnical Department Manager
GA Registration No. 1978

Attachments:

- Special Provision 154 – Construction Vibration Monitoring
- Special Provision 208 – Embankments
- Figure 1 – Site Location Diagram
- Figure 2 – Benching Detail
- Figure 3 – Serrated Slope Detail
- Figure 4 – Filter Fabric & Embankment Detail
- Figure 5 – Berm Detail for Cuts or Fills over 35 Feet
- Figure 6 – Removal Detail
- Soil Tables and Laboratory Results
- Pipe Culvert Material Alternatives
- Reference Notes for Boring Logs
- Boring Logs
  - SR 369/ Matt Highway/ Browns Bridge Road
  - SR 9/ Dahlonega Highway
  - Settingdown Road
  - Browns Bridge Community Church Driveway
  - Ramp A
  - Ramp B
  - Ramp C
  - Ramp D
  - Wall No. 3

Attachments

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION

PI No. 00133369, Forsyth County

Section 154 — Construction Vibration Monitoring

Add the following:

154.1 General Description

This Work consists of performing preconstruction crack surveys, seismograph and other monitoring of construction vibrations, and post construction crack surveys of the buildings located on the parcels identified in Table 1 below that are adjacent to the proposed project construction on SR 369/Matt Highway, SR 369/Browns Bridge Road, SR 9/Dahlonega Highway, US9/SR 400 and SR 306/Keith Bridge Road by procuring the services of a prequalified subcontractor specializing in this work.

TABLE 1 – ***Parcels with Buildings within 75 feet of Proposed Construction***

Parcel Number	Project Route Number/Road Name
1	SR 369/Matt Highway
4	SR 369/Matt Highway
7	SR 369/Matt Highway
11	SR 9/Dahlonega Highway
12	SR 369/Browns Bridge Road at SR 9/Dahlonega Highway
14	SR 369/Browns Bridge Road at SR 9/Dahlonega Highway
16	SR 369/Browns Bridge Road at SR 9/Dahlonega Highway
18	SR 369/Browns Bridge Road
22	SR 369/Browns Bridge Road
24	SR 369/Browns Bridge Road
25	SR 369/Browns Bridge Road
26	SR 369/Browns Bridge Road
28	SR 369/Browns Bridge Road
43	SR 369/Browns Bridge Road at US 19/SR 400
46	SR 369/Browns Bridge Road
47	SR 369/Browns Bridge Road
48	SR 369/Browns Bridge Road
51	SR 369/Browns Bridge Road
53	SR 369/Browns Bridge Road
57	SR 369/Browns Bridge Road
64	SR 369/Browns Bridge Road
65	SR 369/Browns Bridge Road
67	SR 306/Keith Bridge Road
69	SR 369/Browns Bridge Road
75	SR 9/Dahlonega Highway
77	SR 9/Dahlonega Highway
81	SR 9/Dahlonega Highway
91	SR 306/Keith Bridge Road
94	SR 306/Keith Bridge Road
95	SR 306/Keith Bridge Road

154.1.01 Definitions

General Provisions 101 through 150.

154.1.02 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

General Provisions 101 through 150.

154.1.03 Submittals

A. Prequalification of Subcontractor

Submit the following documentation for the Engineer's review and approval a minimum of thirty days prior to beginning construction activities on the project:

Evidence of the subcontractor's successful completion of at least five projects similar in concept and scope to the proposed crack survey and vibration monitoring. Include names, addresses and telephone numbers of the owners' representatives for verification.

Résumés of employees performing this work. Provide evidence showing each employee possesses experience and knowledge similar in concept and scope of this work for performing crack surveys and installing and reading seismographs. Provide evidence that the reports will be reviewed and signed by a Georgia Licensed Professional Engineer or Georgia Licensed Professional Geologist. The Department will be sole judge of determining if employees are qualified to perform the work on this project.

A detailed survey plan, monitoring plan, and sequence of work that describes all materials, methods and equipment to be used to complete the crack survey and vibration monitoring.

B. Construction Monitoring

Submit the following documentation during construction monitoring:

Preconstruction Crack Survey Report documenting existing conditions of buildings prior to construction activities in accordance with subsection 154.3.03.B.

Monthly Seismograph Data and Data Summary Report and Activity Log of all construction activities within 500 feet (152 meters) of the seismograph in accordance with subsection 154.3.03.A.1.

Reports of building conditions regarding cracks or any other damage potentially caused by construction activities as complaints are received in accordance with subsection 154.3.03.C.

C. Post Construction

Submit a Post Construction Crack Survey Report in accordance with subsection 154.3.03.D documenting post construction condition of cracks or damage identified in the pre-construction survey and cracks or any other damage potentially caused by construction activities.

154.2 Materials

General Provision 101 through 150.

154.3 Construction Requirements

154.3.01 Personnel

Ensure all employees performing this work have been approved by the Engineer in accordance with subsection 154.1.03.A.

154.3.02 Equipment

A. Seismograph

Use a seismograph(s) that is weather proof and capable of continuously recording particle velocity in three perpendicular components with a flat response of 2-250 HZ over a range of at least 0.01 to 5.0 inches per second (0.254 to 127 mm per second). Provide a seismograph(s) that employs an internal dynamic calibration during each recording sequence and that has been shake table tested within the previous 24 months verifying an accuracy of +/- 5% over the frequency range of 4 to 125 Hertz. Provide a recorder/ software system that is capable of digitally storing and reproducing vibration levels in tabular or histogram (bar graph) form at no greater than six minute intervals.

154.3.03 Construction

Obtain Engineer's written approval of the Prequalification documents submitted in accordance with Subsection 154.1.03.A prior to beginning this work.

Perform the preconstruction crack survey prior to starting construction activities on the project.

Install and begin seismograph monitoring prior to starting excavation, shoring and backfilling construction activities on the project.

Maintain seismograph and crack monitoring until excavation, shoring and backfilling, compaction of subgrade, base and pavement construction activities on the project are complete.

A. Seismograph Installation and Monitoring

Monitor vibrations at building(s) using seismograph(s) when construction activities including, but not limited to, excavation, shoring installation, backfilling, and compaction of subgrade, base and pavement are within 75 feet (23 meters) of the building(s), or otherwise have the potential to result in vibrations that may cause damage or complaints. Relocate seismograph(s) as needed. Protect the seismograph from weather and vandalism. Replace missing or damaged equipment at no cost to the Department. Document the following information at the time that the seismograph is installed:

Date and time of installation

Coordinates of installed instrument or Station and offset

Method of transducer attachment

Name and affiliation of the person installing the instrument

1. Monthly Seismograph Data and Data Summary Report and Activity Log:

   Compile a Monthly Seismograph Data and Data Summary Report containing the data from the seismograph and a summarization of the data showing time and magnitude of the maximum vibration that has occurred each day.

Maintain an activity log of all construction activities within 500 feet (152 meters) of the seismograph Include the following data in each log:

Location of construction activity

Type of construction activity

Types and number of construction equipment being used, including model, manufacture and weight.

Date and times construction equipment was used.

Submit Monthly Seismograph Data Summary Report and Activity Log to the Engineer on a monthly basis.

B. Preconstruction Crack Survey

Complete a preconstruction crack survey on the outside and inside of all buildings located on Parcels: 1, 4, 7, 11, 12, 14, 16, 18, 22, 24, 25, 26, 28, 43, 46, 47, 48, 51, 53, 57, 64, 65, 67, 69, 75, 77, 81, 91, 94 and 95. Document building conditions by taking photographs and detailed notes citing location, length and width of cracks. Compile documentation into a Preconstruction Crack Survey Report and submit to the Engineer.

C. Building Monitoring

Monitor buildings during construction for any new cracks and or elongation or widening of existing cracks. Provide a report of building conditions to the Engineer regarding cracks or any other damage potentially caused by construction activities as complaints are received.

D. Post Construction Crack Survey

Complete a post construction crack survey on the outside and inside of all buildings located on Parcels: 1, 4, 7, 11, 12, 14, 16, 18, 22, 24, 25, 26, 28, 43, 46, 47, 48, 51, 53, 57, 64, 65, 67, 69, 75, 77, 81, 91, 94 and 95. Document building conditions by taking photographs and detailed notes citing condition of cracks or damage identified in the pre-construction survey; also, location, length and width of cracks or any other damage potentially caused by construction activities.

154.4 Measurement

The Work under this Contract Item is not measured separately for payment.

154.5 Payment

This Contract Item completed and accepted will be paid for at the Lump Sum Price bid. Payment will be full compensation for furnishing and installing the seismograph(s), for monitoring and reporting vibration data recorded on the seismograph(s), for completing crack survey and documenting building conditions, and providing copies of all data to the Engineer in accordance with this specification. Seismographs and all other measuring equipment and devices will remain property of the Contractor.

Payment will be made under:

Item No. 154	Construction Vibration Monitoring	Per Lump Sum

Revised: February 8, 2012

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION
Forsyth County
P.I. NO. 0013369

SECTION 208 – EMBANKMENTS

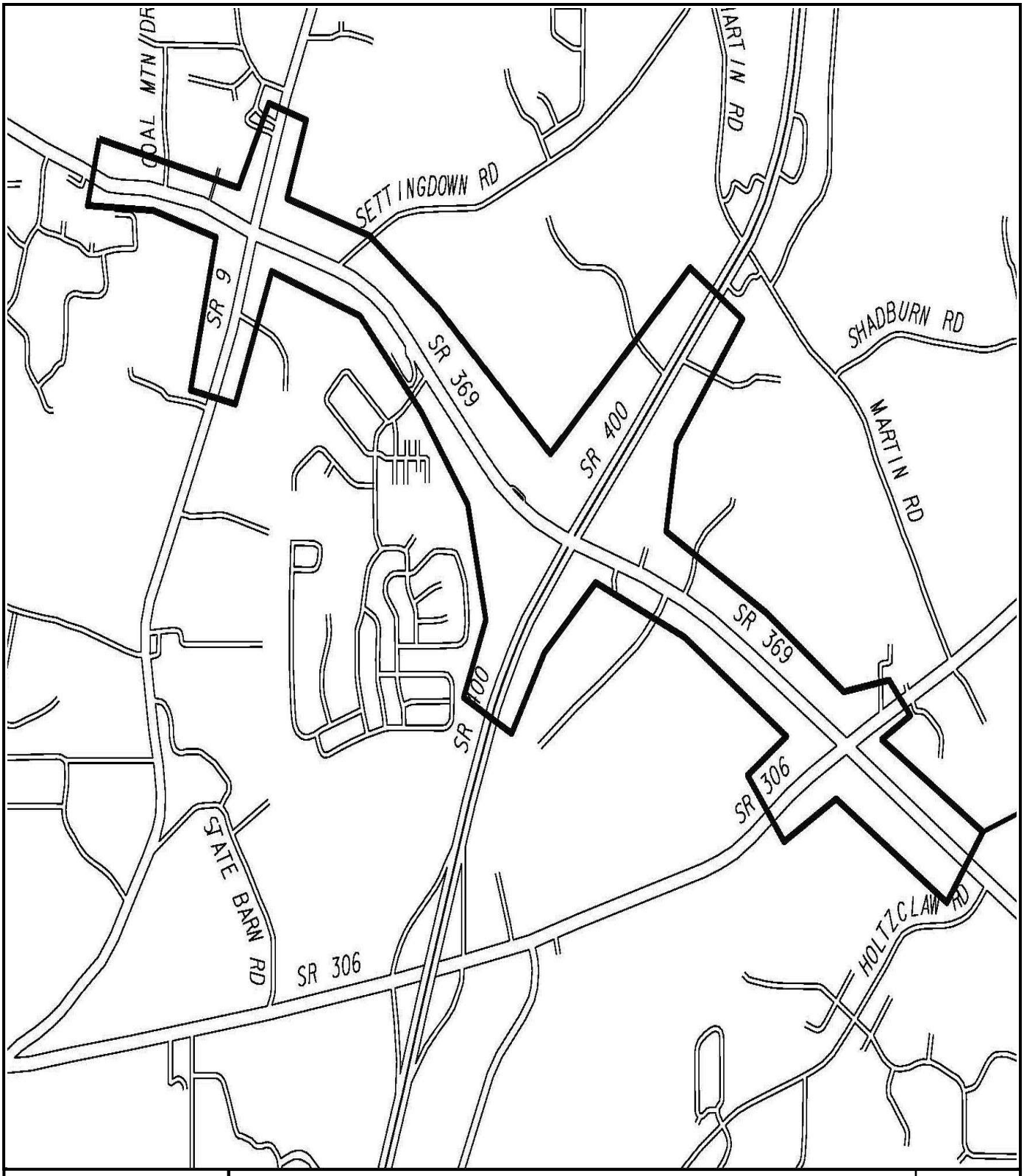
Modify Sub-Section 208.2.A.1 to read as follows:

INUNDATED EMBANKMENTS: Construct embankments in inundated areas with rock embankment placed to a level of 18 inches (457 mm) above the water surface at the time of construction.

Retain Sub-Section 208.5 - PAYMENT – as written and add the following:

Include costs for rock embankment construction and materials in the pay item provided in the contract for earthwork.

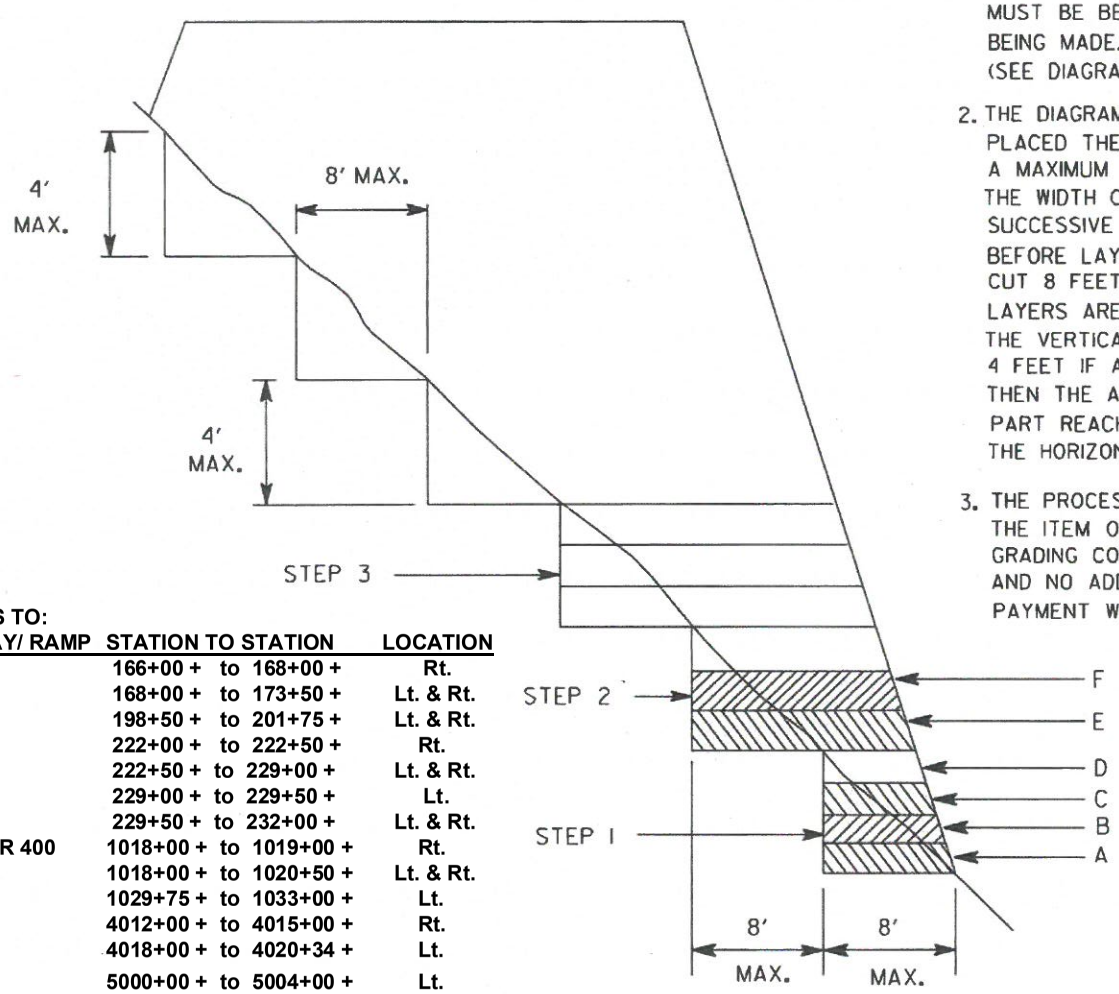
Office of Materials and Testing



	SITE LOCATION DIAGRAM	**Figure No.:**
	SOIL SURVEY	**Project No.: 10:9315-A**
	SR 369 Widening - Soil Survey Report **Forsyth Co., Georgia**	**PI No. 0013369** **Not To Scale**
	Reference: AEI Drawing No. 01-001	**Date: 9/2017**

1

REVISED 9/29/2008



1. WHERE THE EMBANKMENT IS TO BE PLACED ON A HILLSIDE OR ANOTHER EXISTING EMBANKMENT HAVING A SLOPE OF 3 TO 1 OR STEEPER, THE FOUNDATION MUST BE BENCHED WHILE THE EMBANKMENT IS BEING MADE. (SEE DIAGRAM AT LEFT.)

2. THE DIAGRAM SHOWS THAT BEFORE LAYER "A" IS PLACED THE FIRST STEP (1) IS CUT INTO THE SLOPE A MAXIMUM DISTANCE OF ABOUT 8 FEET (ABOUT ¾ THE WIDTH OF THE TYPICAL D-8 BULLDOZER BLADE). SUCCESSIVE LAYERS B, C, AND D ARE THEN PLACED BEFORE LAYER "E" IS PLACED, THE SECOND STEP IS CUT 8 FEET INTO THE SLOPE AND SUCCESSIVE LAYERS ARE AGAIN PLACED. IF IT IS ANTICIPATED THAT THE VERTICAL PART OF THE STEP WILL EXCEED 4 FEET IF A 8 FEET HORIZONTAL CUT IS MADE, THEN THE ACTUAL CUT STOPS WHEN THE VERTICAL PART REACHES A MAXIMUM OF 4 FEET ALLOWING THE HORIZONTAL DISTANCE TO VARY.

3. THE PROCESS OF BENCHING IS CONSIDERED INCIDENTAL TO THE ITEM OF UNCLASSIFIED EXCAVATION AND BORROW OR GRADING COMPLETE IN CONSTRUCTION OF THE EMBANKMENT AND NO ADDITIONAL MEASUREMENT OF QUANTITY OR PAYMENT WILL BE MADE FOR BENCHING.

APPLIES TO:

HIGHWAY/ RAMP	STATION TO STATION	LOCATION
SR 369	166+00 + to 168+00 +	Rt.
	168+00 + to 173+50 +	Lt. & Rt.
	198+50 + to 201+75 +	Lt. & Rt.
	222+00 + to 222+50 +	Rt.
	222+50 + to 229+00 +	Lt. & Rt.
	229+00 + to 229+50 +	Lt.
	229+50 + to 232+00 +	Lt. & Rt.
US 19/ SR 400	1018+00 + to 1019+00 +	Rt.
	1018+00 + to 1020+50 +	Lt. & Rt.
	1029+75 + to 1033+00 +	Lt.
RAMP C	4012+00 + to 4015+00 +	Rt.
	4018+00 + to 4020+34 +	Lt.
RAMP D	5000+00 + to 5004+00 +	Lt.

BENCHING DETAIL

NO SCALE

JOB NO.	10:9315-A
SCALE	NTS
DRAWN	AR
APPR. BY	RHB
DATE	09/2017

REVISIONS

FIGURE NAME: Benching Detail

GDOT REFERENCE: Forsyth County P.I. No.: 0013369

PROJECT: SR 369 WIDENING-SOIL SURVEY

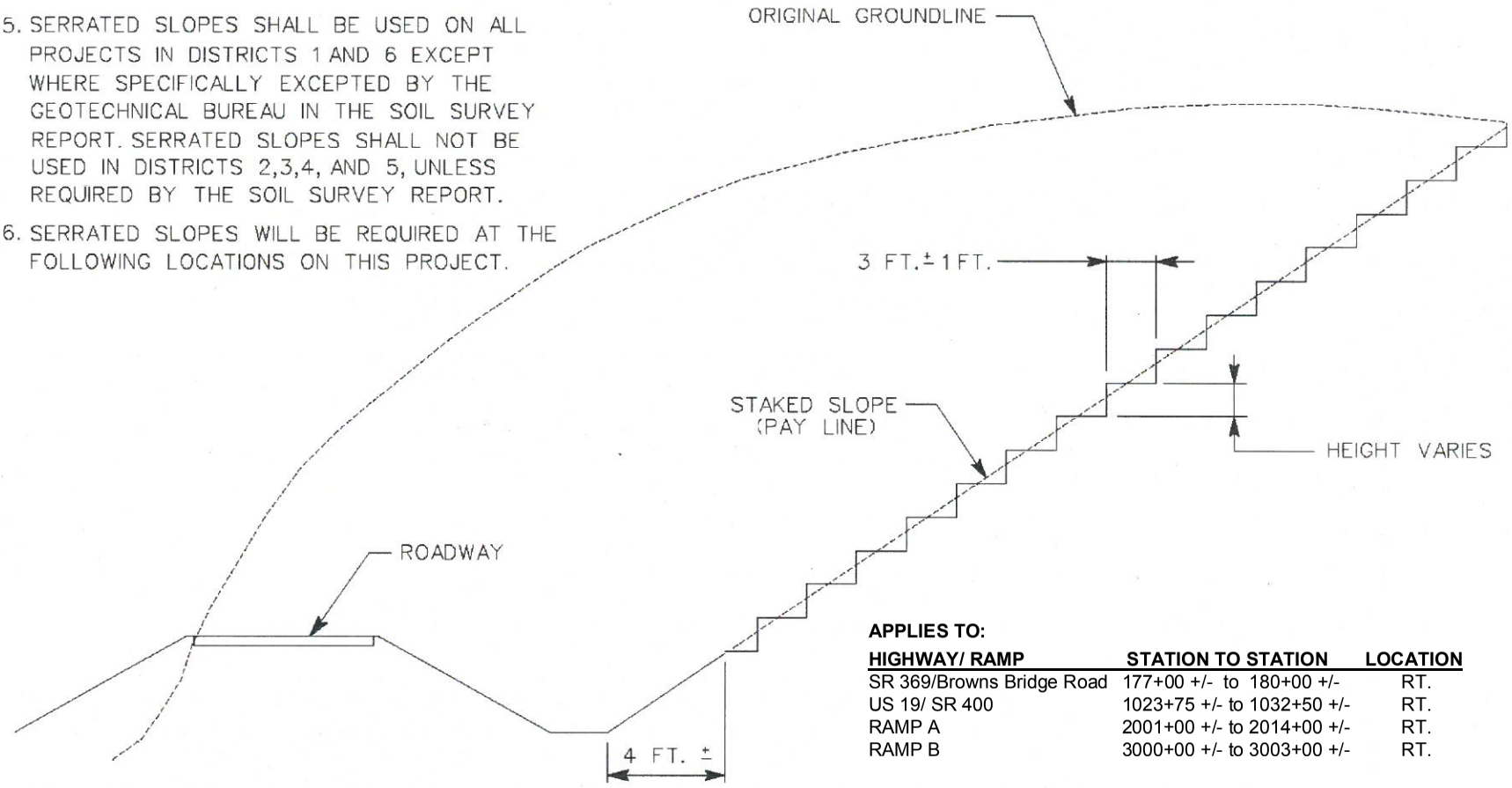
PREPARED FOR: American Engineers, Inc.

FIGURE NO.: 2

REVISED 7/23/2014

NOTES:

1. SLOPES STEEPER THAN 3:1 SHALL BE SERRATED, CUT SLOPES IN HARD AND COMPETENT ROCK WILL NOT REQUIRE SERRATING.
2. WIDTH OF STEP SHALL BE 3 FT.± 1 FT.
3. HEIGHT OF STEP IS A FUNCTION OF WIDTH AND STAKED SLOPE.
4. TREAD OF STEP SHALL BE APPROXIMATELY HORIZONTAL.
5. SERRATED SLOPES SHALL BE USED ON ALL PROJECTS IN DISTRICTS 1 AND 6 EXCEPT WHERE SPECIFICALLY EXCEPTED BY THE GEOTECHNICAL BUREAU IN THE SOIL SURVEY REPORT. SERRATED SLOPES SHALL NOT BE USED IN DISTRICTS 2,3,4, AND 5, UNLESS REQUIRED BY THE SOIL SURVEY REPORT.
6. SERRATED SLOPES WILL BE REQUIRED AT THE FOLLOWING LOCATIONS ON THIS PROJECT.



APPLIES TO:

HIGHWAY/ RAMP	STATION TO STATION	LOCATION
SR 369/Browns Bridge Road	177+00 +/- to 180+00 +/-	RT.
US 19/ SR 400	1023+75 +/- to 1032+50 +/-	RT.
RAMP A	2001+00 +/- to 2014+00 +/-	RT.
RAMP B	3000+00 +/- to 3003+00 +/-	RT.

SERRATED SLOPE DETAIL

NO SCALE

JOB NO.	SCALE	DRAWN	APPR. BY	DATE
10:9315-A	NTS	AR	RHB	09/2017

REVISIONS

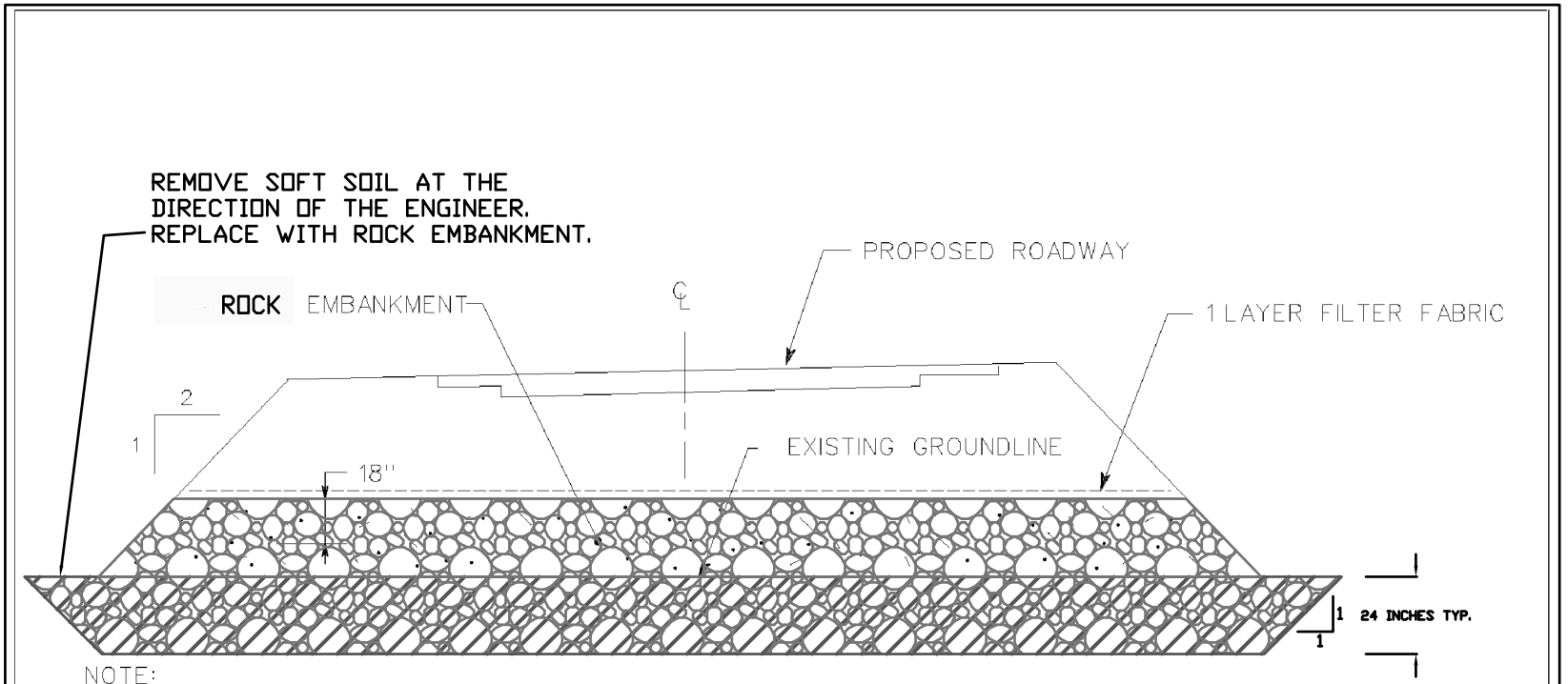
GDOT REFERENCE: Forsyth County P.I. No.: 0013369

FIGURE NAME: Serrated Slope Detail

PREPARED FOR: American Engineers, Inc.

PROJECT: SR 369 WIDENING-SOIL SURVEY

FIGURE NO.: 3



NOTE:

1. THIS AREA MAY BE INUNDATED AT THE TIME OF CONSTRUCTION. A MAT OF ROCK EMBANKMENT SHOULD BE PLACED TO 18" ABOVE WATER LEVEL.

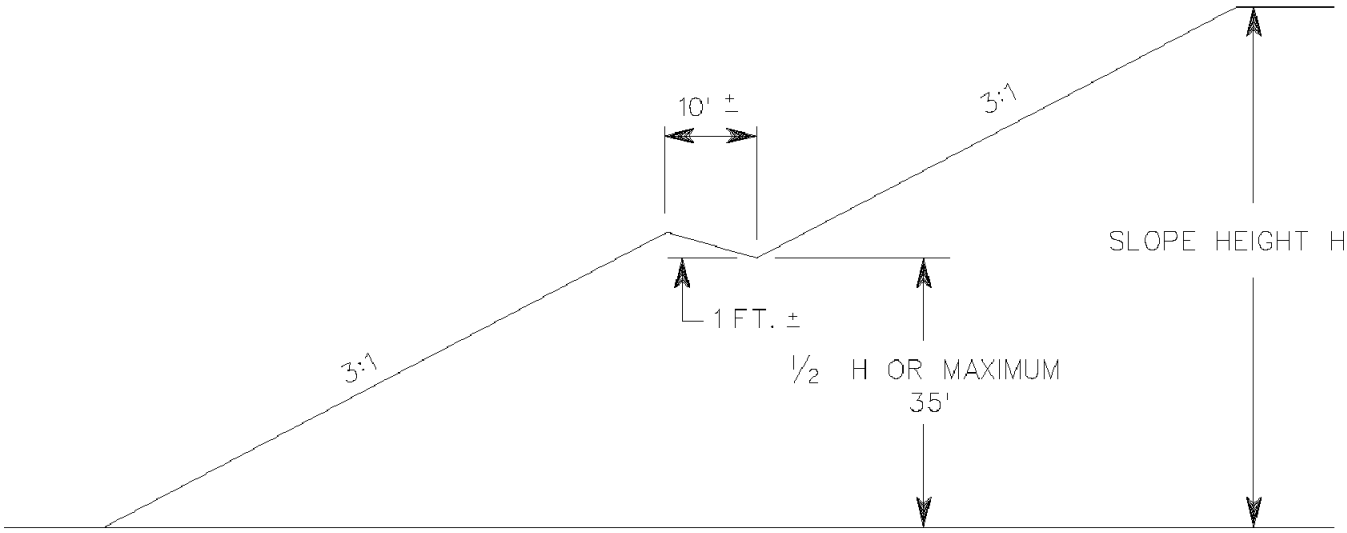
2. COVER WITH A LAYER OF WOVEN PLASTIC FILTER FABRIC PER STANDARD SPECIFICATION 881.

APPLIES TO STATION TO STATION		LOCATION
SR 369	168+00± to 171+50±	LT
SR 369	167+50± to 170+00±	RT
RAMP C	4005+00± to 4010+00±	LT, CL, & RT
RAMP D	5007+00± to 5014+00±	LT, CL, & RT

FILTER FABRIC & EMBANKMENT DETAIL

NO SCALE

JOB NO. 10:9315-A
SCALE NTS
DRAWN AR
APPR. BY RHB
DATE 09/2017
REVISIONS
FIGURE NAME: Filter Fabric & Embankment Detail
GDOT REFERENCE: Forsyth County P.I. No.: 0013369
PROJECT: SR 369 WIDENING-SOIL SURVEY
PREPARED FOR: American Engineers, Inc.
FIGURE NO.: 4



NOTES:

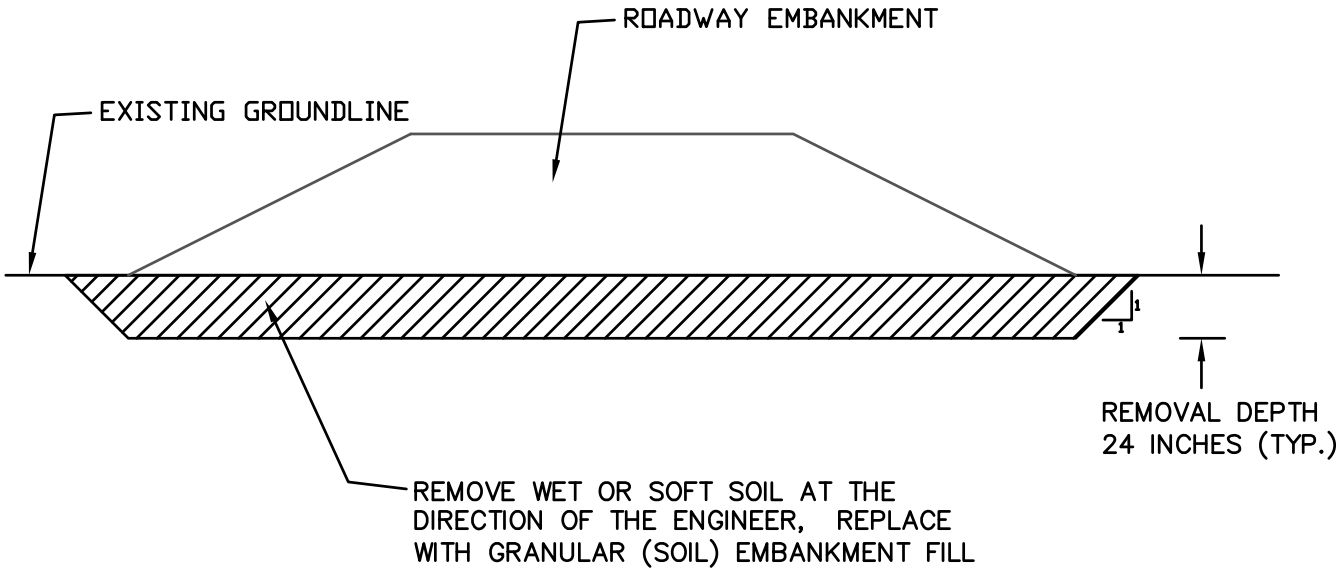
1. FOR SLOPE HEIGHTS LESS THAN 70 FT. BUT GREATER THAN 35 FT., A BERM SHOULD BE CONSTRUCTED AT APPROX. ½ THE SLOPE HEIGHT. FOR SLOPE HEIGHTS GREATER THAN 70 FT., CONSTRUCT A BERM EVERY 35 FT.
2. THE BERM SHOULD BE SLOPED TO DRAIN AND SHOULD BE CONNECTED TO CONCRETE FLUMES TO REMOVE WATER FROM SLOPE.
3. A DRAINAGE DITCH SHOULD BE CONSTRUCTED AT THE TOP OF CUT SLOPES WHERE WATER DRAINS TOWARDS SLOPE.
4. SLOPE HEIGHTS GREATER THAN 35 FEET OCCUR AT THE FOLLOWING LOCTIONS:

HIGHWAY/ RAMP	STATION TO STATION	LOCATION
SR 369	169+25± to 170+50±	LT
	170+50± to 173+50±	LT & RT
	176+75± to 177+75±	LT
US 19/ SR 400	1026+50± to 1032+00±	RT
RAMP A	2002+50+ to 2003+50+	RT
	2007+00+ to 2011+00+	RT

BERM DETAIL FOR CUTS OR FILLS OVER 35 FEET

NO SCALE

JOB NO.	10:9315-A	REVISIONS		FIGURE NAME: Berm Detail For Slopes Over 35 Ft	PROJECT: SR 369 WIDENING-SOIL SURVEY	FIGURE NO.: 5
SCALE	NTS					
DRAWN	AR					
APPR. BY	RHB			GDOT REFERENCE: Forsyth County P.I. No.: 0013369	PREPARED FOR: American Engineers, Inc.	
DATE	09/2017					



NOTES:

1. WORK SHOULD BE DONE UNDER THE DIRECTION OF THE ENGINEER, AND MAY BE ELIMINATED IF THE SUBGRADE SOILS ARE DRY AND STABLE AT THE TIME OF CONSTRUCTION.

2. DETAIL APPLIES TO:

HIGHWAY/ RAMP	STATION TO STATION	LOCATION
SR 369	**152+00 +/- to 154+00 +/-**	**Rt.**
	158+00 +/- to 160+00 +/-	**Rt.**
	163+00 +/- to 165+00 +/-	**Lt.**
	169+00 +/- to 171+00 +/-	**Rt.**
	193+50 +/- to 195+50 +/-	**Lt.**
	202+50 +/- to 204+50 +/-	**Lt.**
	212+50 +/- to 214+50 +/-	**Lt.**
	217+50 +/- to 219+50 +/-	**Lt.**
SR 9/ Dahlonega Highway	**316+00 +/- to 318+00 +/-**	**Rt.**
	321+00 +/- to 325+00 +/-	**Lt.**
RAMP C	**4014+00 +/- to 4016+00 +/-**	**Lt., CL. & Rt.**

REMOVAL DETAIL

NO SCALE

ECS	JOB NO.	10:9315-A	REVISIONS	FIGURE NAME: Removal Detail	PROJECT: SR 369 WIDENING-SOIL SURVEY	FIGURE NO.: 6
	SCALE	NTS				
	DRAWN	AR		GDOT REFERENCE: Forsyth County P.I. No.: 0013369	PREPARED FOR: American Engineers, Inc.	
	APPR. BY	RHB				
	DATE	10/2017				

TABLE 1
PHYSICAL PROPERTIES
S.R. 369 WIDENING - SOIL SURVEY
P.I. NO: 0013369

Boring No.	Station	Offset from Baseline (ft)	Sample Depth (ft)	No. 60 Sieve % Passing	No. 200 Sieve % Passing	D75 (mm)	Clay %	Volume Change	Maximum Dry Density	Optimum Moisture	Erosion Index	Class	Sub-Class
SR 369/ Matt Highway/ Browns Bridge Road													
HA-1	112+50	19' R	3-8	82.3	41.2	0.18	20.9	21.2	97.8	21.5	5.09	CLASS II	B4
HA-2	117+50	20' L	3-5	62.0	35.1	0.41	19.1	24.9	91.6	27.7	5.83	CLASS II	B4
HA-6	122+75	55' L	3-6	63.7	35.8	0.38	23.9	6.5	104.5	18.5	5.83	CLASS II	B4
HA-12	128+00	25' L	2-7	72.1	51.1	0.30	32.0	21.9	101.9	18.5	3.86	CLASS II	B4
HA-13	133+00	30' L	2-4	91.3	46.5	0.14	27.1	17.9	105.1	18.1	4.47	CLASS II	B3
HA-14	138+00	25' L	0.5-5	47.5	28.3	1.48	19.2	10.2	109.8	13.4	6.69	CLASS II	B3
HA-15	143+00	25' L	0.5-1.5	47.4	25.6	1.59	22.6	11.9	108.1	15.2	7.06	CLASS II	B3
HA-16	148+00	25' L	2-6	63.6	36.6	1.32	15.8	18.4	109.4	15.7	5.71	CLASS II	B3
HA-20	153+00	20' R	2-6	69.6	38.3	0.33	21.5	13.8	98.5	20.3	5.46	CLASS II	B4
HA-23	159+00	40' L	2-4	80.6	55.7	0.22	51.5	6.6	96.0	23.5	3.36	CLASS II	B4
HA-22	159+00	30' R	2-5	67.0	40.2	0.35	21.5	13.8	98.4	20.4	5.21	CLASS II	B4
HA-24	164+00	45' L	2-5	58.1	40.0	1.19	30.0	8.6	108.0	16.3	5.21	CLASS II	B3
HA-26	168+50	50' L	1-2	89.3	49.1	0.19	27.1	18.2	102.6	19.6	4.10	CLASS II	B4
HA-27	170+00	50' R	2-5	80.0	51.0	0.22	27.4	16.5	105.3	16.8	3.98	CLASS II	B3
SB-1	182+00	40' L	6-16	77.2	62.5	0.23	59.9	5.6	120.5	11.6	2.50	CLASS II	B4
HA-28	185+00	30' L	1-7	59.2	39.9	0.87	27.4	4.8	112.9	14.9	5.33	CLASS II	B2
HA-29	190+00	50' R	1-5	53.3	30.4	1.27	24.0	4.8	105.2	17.8	6.44	CLASS II	B3
HA-32	194+50	34' L	1-7	67.2	31.7	0.35	15.8	24.9	97.1	21.1	6.32	CLASS II	B4
HA-31	194+50	25' R	1-5	64.9	28.7	0.35	16.5	11.1	102.9	117.7	6.69	CLASS II	B4
HA-34	198+50	20' L	2-5	59.3	24.6	0.86	17.7	14.9	106.1	17.7	7.18	CLASS II	B3
HA-36	203+50	30' L	1-3	49.0	25.7	1.43	17.0	8.8	108.1	14.8	7.06	CLASS II	B3
HA-35	203+50	30' R	0.5-1	51.2	20.4	1.03	10.9	8.8	96.6	21.7	7.67	CLASS II	B4
HA-38	208+50	20' R	1-3	80.9	57.8	0.20	44.7	9.2	103.3	20.8	3.12	CLASS II	B4
HA-41	213+00	30' L	1-5	53.3	27.8	1.38	20.9	16.3	105.4	15.8	6.81	CLASS II	B3
HA-42	213+00	45' R	2-8	58.8	43.3	1.07	28.7	17.2	103.6	18.6	4.84	CLASS II	B4
HA-40	218+50	30' L	2-5	61.3	41.1	0.85	27.6	17.1	104.9	17.7	5.09	CLASS II	B4
HA-39	218+50	40' R	2-6	63.5	46.4	0.72	35.3	8.6	104.6	18.4	4.47	CLASS II	B4
HA-44	224+00	30' R	1-5	46.1	25.7	3.06	19.8	7.8	107.6	17.2	7.06	CLASS II	B3
HA-45	229+00	25' L	1-5	84.8	44.2	0.14	20.9	12.5	104.6	18.9	4.72	CLASS II	B4
HA-47	234+00	30' R	3-6	46.1	25.7	2.93	19.8	7.0	107.6	17.2	7.06	CLASS II	B3
SR 9/ DAHLONEGA HWY													
HA-5	313+00	25' R	1-5	55.5	32.8	0.79	19.6	6.4	115.6	13.5	6.19	CLASS II	B2
HA-4	317+00	35' R	2-4	91.3	50.1	0.13	27.8	18.4	105.4	18.0	3.98	CLASS II	B3
HA-8	321+80	30' L	1-5	56.1	38.0	0.84	28.4	5.0	107.5	16.5	5.46	CLASS II	B3
HA-10	324+00	20' R	1-5	56.2	32.8	0.94	20.6	9.0	113.6	13.2	6.19	CLASS II	B2
SETTINGDOWN ROAD													
HA-19	341+50	35' R	2-4	64.7	38.4	0.54	27.8	13.3	100.4	18.5	5.46	CLASS II	B4
HA-17	344+50	10' L	2-8	51.4	22.4	0.88	14.1	12.1	109.4	14.5	7.42	CLASS I	A3
BROWNS BRIDGE COMMUNITY CHURCH DRIVEWAY													
CD-HA-1	375+00	CL	1-3	68.0	47.7	0.38	29.8	20.4	103.2	16.8	4.32	CLASS II	B4
RAMP A													
RA-1	2001+00	CL	13-17	65.1	48.4	0.50	34.0	14.1	110.0	15.2	4.23	CLASS II	B3
RA-2	2003+75	CL	30-40	68.2	51.6	0.39	35.9	10.9	110.2	15.7	3.86	CLASS II	B3
RA-HA-1	2013+00	CL	1-5	53.0	37.1	2.26	19.6	16.7	107.6	17.2	5.58	CLASS II	B3
RAMP C													
RC-4	4012+00	CL	1-10	74.5	40.8	0.26	20.0	18.3	112	13.2	5.21	CLASS II	B3
RC-5	4015+00	CL	1-10	56.4	15.4	1.39	15.4	16.0	110.4	13.6	6.81	CLASS I	A3
RAMP D													
WB 3-2	5007+00	30' L	1-10	59.2	39.42	0.73254	25.69	13.2819	110	16.4	5.33	CLASS II	B3

TABLE 2
SOIL CLASSIFICATIONS
S.R. 369 WIDENING - SOIL SURVEY
P.I. NO: 0013369

Boring No.	Mainline Station	Offset from Baseline (ft)	Sampling Depth (ft)	Description	Class	Sub-Class
SR 369/ Matt Highway/ Browns Bridge Road						
HA-1	112+50	19' R	3-8	tannish brown and white CLAYEY SAND	CLASS II	B4
HA-2	117+50	20' L	3-5	tannish gray brown CLAYEY SAND	CLASS II	B4
HA-6	122+75	55' L	3-6	tannish brown CLAYEY SAND	CLASS II	B4
HA-12	128+00	25' L	2-7	tannish brown SANDY SILT/SILTY SAND	CLASS II	B4
HA-13	133+00	30' L	2-4	tannish brown CLAYEY SAND	CLASS II	B3
HA-14	138+00	25' L	0.5-5	dark brown, gray to reddish brown CLAYEY SAND	CLASS II	B3
HA-15	143+00	25' L	0.5-1.5	dark brown CLAYEY SAND	CLASS II	B3
HA-16	148+00	25' L	2-6	tannish brown SILTY SAND	CLASS II	B3
HA-20	153+00	20' R	2-6	reddish and tannish brown CLAYEY SAND	CLASS II	B4
HA-23	159+00	40' L	2-4	tannish brown SANDY CLAY	CLASS II	B4
HA-22	159+00	30' R	2-5	tannish brown CLAYEY SAND	CLASS II	B4
HA-24	164+00	45' L	2-5	tannish brown CLAYEY SAND	CLASS II	B3
HA-26	168+50	50' L	1-2	reddish and tannish brown CLAYEY SAND	CLASS II	B4
HA-27	170+00	50' R	2-5	reddish and tannish brown SANDY SILT/SILTY SAND	CLASS II	B3
SB-1	182+00	40' L	6-16	tan and white SANDY CLAY	CLASS II	B4
HA-28	185+00	30' L	1-7	tannish brown CLAYEY SAND	CLASS II	B2
HA-29	190+00	50' R	1-5	tan and gray CLAYEY SAND	CLASS II	B3
HA-32	194+50	34' L	1-7	tannish brown SILTY SAND	CLASS II	B4
HA-31	194+50	25' R	1-5	tan and gray CLAYEY SAND	CLASS II	B4
HA-34	198+50	20' L	2-5	tannish brown CLAYEY SAND	CLASS II	B3
HA-36	203+50	30' L	1-3	tan and dark gray CLAYEY SAND	CLASS II	B3
HA-35	203+50	30' R	0.5-1	brown and gray CLAYEY SAND	CLASS II	B4
HA-38	208+50	20' R	1-3	reddish brown, orangish brown SANDY CLAY	CLASS II	B4
HA-41	213+00	30' L	1-5	reddish brown to orangish tan CLAYEY SAND	CLASS II	B3
HA-42	213+00	45' R	2-8	reddish brown to orangish brown CLAYEY SAND	CLASS II	B4
HA-40	218+50	30' L	2-5	reddish brown to orangish brown CLAYEY SAND	CLASS II	B4
HA-39	218+50	40' R	2-6	reddish brown to tannish brown CLAYEY SAND	CLASS II	B4
HA-44	224+00	30' R	1-5	reddish and grayish brown CLAYEY SAND	CLASS II	B3
HA-45	229+00	25' L	1-5	tan and reddish brown CLAYEY SAND	CLASS II	B4
HA-47	234+00	30' R	3-6	dark brown and gray CLAYEY SAND	CLASS II	B3
SR 9/ DAHLONEGA HWY						
HA-5	313+00	25' R	1-5	dark brown to tannish brown CLAYEY SAND	CLASS II	B2
HA-4	317+00	35' R	2-4	dark brown, tannish brown SANDY CLAY/CLAYEY SAND	CLASS II	B3
HA-8	321+80	30' L	1-5	dark brown to tannish brown SANDY CLAY	CLASS II	B3
HA-10	324+00	20' R	1-5	dark brown to tannish brown SANDY CLAY	CLASS II	B2
SETTINGDOWN ROAD						
HA-19	341+50	35' R	2-4	tannish brown CLAYEY SAND	CLASS II	B4
HA-17	344+50	10' L	2-8	tan and white CLAYEY SAND	CLASS I	A3
BROWNS BRIDGE COMMUNITY CHURCH DRIVEWAY						
CD-HA-1	375+00	CL	1-3	tannish brown CLAYEY SAND	CLASS II	B4
RAMP A						
RA-1	2001+00	CL	13-17	tan CLAYEY SAND	CLASS II	B3
RA-2	2003+75	CL	30-40	reddish brown SANDY CLAY/CLAYEY SAND	CLASS II	B3
RA-HA-1	2013+00	CL	1-5	reddish brown to tannish brown CLAYEY SAND	CLASS II	B3
RAMP C						
RC-4	4012+00	CL	1-10	tannish brown SILTY SAND	CLASS II	B3
RC-5	4015+00	CL	1-10	reddish brown CLAYEY SAND	CLASS I	A3
RAMP D						
WB 3-2	5007+00	30' L	1-10	tannish brown and white CLAYEY SAND	CLASS II	B3

TABLE 3

SR 369 WIDENING - SOIL SURVEY
FORSYTH COUNTY
P.I. NO.: 0013369

Boring No.	Sample Depth (feet)	Sample Location	Maximum Dry Density	Optimum Moisture	Soaked CBR Value	Soil Support Value
SR 369/ Matt Highway/ Browns Bridge Road						
HA-13	2-4'	133+00, 30'L	105.1	18.1	15.1	5
HA-23	2-4'	159+00, 40' L	96	23.5	10.6	4.4
SB-1	20-22'	182+00, 40' L	120.5	11.6	17.8	5.3
HA-38	1-3'	208+50, 20' R	103.1	20.9	11.1	4.5
SR 9/ DAHLONEGA HIGHWAY						
HA-4	2-4'	317+00, 35' R	106.4	18	10.4	4.4
SETTINGDOWN ROAD						
HA-19	2-4'	341+50, 35' R	107.8	16.4	4.7	4.5

TABLE 4

SR 369 WIDENING - SOIL SURVEY
FORSYTH COUNTY
P.I. NO: 0013369

Boring No.	Station	Offset (feet)	Natural Moisture Content (%)	Optimum Moisture Content (%)*	Difference Between Optimum and Natural Moisture Content (%)
SR 369/ Matt Highway/ Browns Bridge Road					
HA-1	112+50	19' R	17.9	21.5	-3.6
HA-2	117+50	20' L	24.6	27.7	-3.1
HA-6	122+75	55' L	15.8	18.5	-2.7
HA-12	128+00	25' L	13.8	18.5	-4.7
HA-13	133+00	30' L	16.4	18.1	-1.7
HA-14	138+00	25' L	11.4	13.4	-2.0
HA-15	143+00	25' L	9.3	15.2	-5.9
HA-16	148+00	25' L	14.8	15.7	-0.9
HA-20	153+00	20' R	32.3	20.3	12.0
HA-23	159+00	40' L	20.4	32.3	-11.9
HA-22	159+00	30' R	30.8	23.5	7.3
HA-24	164+00	45' L	27.4	16.3	11.1
HA-26	168+50	50' L	21.3	19.6	1.7
HA-27	170+00	50' R	29.7	16.8	12.9
SB-1	182+00	40' L	8.4	11.6	-3.2
HA-28	185+00	30' L	12.6	14.9	-2.3
HA-29	190+00	50' R	14.8	17.8	-3.0
HA-32	194+50	34' L	28.1	21.1	7.0
HA-31	194+50	25' R	16.5	17.7	-1.2
HA-34	198+50	20' L	13.3	17.7	-4.4
HA-36	203+50	30' L	19.9	14.8	5.1
HA-35	203+50	30' R	15.8	21.7	-5.9
HA-38	208+50	20' R	23.3	20.8	2.5
HA-41	213+00	30' L	35.9	15.8	20.1
HA-42	213+00	45' R	8.7	18.6	-9.9
HA-40	218+50	30' L	29.3	17.7	11.6
HA-39	218+50	40' R	19.9	18.4	1.5
HA-44	224+00	30' R	21.7	17.2	4.5
HA-45	229+00	25' L	21.3	18.9	2.4
HA-47	234+00	30' R	19.5	17.2	2.3
SR 9/ DAHLONEGA HWY					
HA-5	313+00	25' R	8.7	13.5	-4.8
HA-4	317+00	35' R	23.1	18	5.1
HA-8	321+80	30' L	21.4	16.5	4.9
HA-10	324+00	20' R	17.7	13.2	4.5
SETTINGDOWN ROAD					
HA-19	341+50	35' R	20.7	18.5	2.2
HA-17	344+50	10' L	13	14.5	-1.5
BROWNS BRIDGE COMMUNITY CHURCH DRIVEWAY					
CD-HA-1	370=00	CL	16.5	16.8	-0.3
RAMP A					
RA-1	2001+00	CL	13.3	15.2	-1.9
RA-2	2003+75	CL	11.9	15.7	-3.8
RA-HA-1	2013+00	CL	17.7	17.2	0.5
RAMP C					
RC-4	4012+00	CL	13.9	13.2	0.7
RC-5	4015+00	CL	21.4	13.6	7.8
RAMP D					
WB 3-2	5007+00	30' L	20.4	16.4	4.0

ECS Southeast, LLP
Atlanta, Georgia
Table 5 - Additional Laboratory Testing Summary

Date: 9/6/2017

ECS Project Number: 10:9315-A

Project Name: SR 369 Widening - Soil Survey
PI Number: 0013369

Core/ Borehole	Station	Location	Depth (feet)	Moisture Content (%)	USCS	Liquid Limit	Plastic Limit	Plasticity Index	Percent Passing No. 200 Sieve	Other
HA-1	112+50, 19' R	SR 269	3-8	12.6	SC	27	19	8	41.2	
HA-12	128+00, 25' L	SR 369	2-7	13.8	ML/SM	47	31	16	51.1	
HA-27	170+00, 50' R	SR 369	2-5	29.7	ML/SM	39	28	11	51.0	
HA-45	229+00, 25' L	SR 369	1-5	17.2	SC	31	21	10	44.2	
RC-2	4005+00, CL	Ramp C	6.0-7.5							Resistivity: 170,000 ohms.cm, pH= 6.8
WB-3-2	5007+00, 30' L	Ramp D	3.5-5.0							Resistivity: 55,000 ohms.cm, pH= 6.7
RD-HA-2	5010+50, CL	Ramp D	1.5-3.0							Resistivity: 39,000 ohms.cm, pH= 6.5

Summary Key:

pH	6.5
Resistivity	39000

Project Number:
ECS Project No. 10:9315-A

County: Forsyth
Project: SR 369 Widening - Soil Survey

P.I. Number: 0013369

Pipe Culvert Material Alternates

TYPE OF INSTALLATION				PIPE TYPE									
				CONCRETE	STEEL			ALLUMINUM	THERMOPLASTIC				
				REINFORCED CONCRETE AASHTO M-170	CORRUGATED STEEL ALUMINUM COATED (TYPE 2) AASHTO M-36	CORRUGATED STEEL PLAIN ZINC COATED AASHTO M-36	POLYMER COATED STEEL AASHTO M-245	CORRUGATED ALUMINUM AASHTO M-196	CORRUGATED HDPE AASHTO M-252	CORRUGATED SMOOTHED LINED HDPE TYPE "S" AASHTO M-294	CORRUGATED SMOOTH LINED POLYPROPYLENE AASHTO M 330	PVC CORRUGATED SMOOTH INTERIOR ASTM F-949	PVC Profile Wall Drain Pipe AASHTO M-304
STORM DRAIN	NON-TRAVEL BEARING (OUTSIDE ROADBED)		INTERSTATE	X									
			NON INTERSTATE	X	X		X	X		X	X	X	X
	TRAVEL BEARING (INSIDE ROADBED)	GRADE ≤ 10%	ADT < 1,500	X	X		X	X		X	X	X	X
			1,500 < ADT < 5,000	X	X		X	X		X	X	X	X
			5,000 < ADT < 15,000	X						X	X	X	X
			ADT > 15,000 & INTERSTATES	X									
		GRADE > 10%					X			X	X	X	X
SIDE DRAIN				X	X	X	X	X		X	X	X	X
PERMANENT SLOPE DRAIN					X	X	X	X		X	X	X	X
PERFORATED UNDERDRAIN					X	X		X	X	X	X	X	X

NOTES:

1 Allowable materials are indicated by an "X".

2 Structural, installation, fill height and backfill requirements of storm drain pipe will be in accordance with Georgia Standard 1030-D or 1030-P and the Standard Specifications

3 The Contractor shall provide additional storm sewer capacity calculations if a pipe material other than concrete is selected.

4 Pipe used under mechanically stabilized earth (MSE) walls, within MSE wall backfill, or within five feet of an MSE wall face shall be Class V Concrete Pipe.

Rev. 1-12-16

REFERENCE NOTES FOR BORING LOGS

MATERIAL[1,2]	
	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	VOID
	BRICK
	AGGREGATE BASE COURSE
	FILL[3] MAN-PLACED SOILS
GW	**WELL-GRADED GRAVEL** gravel-sand mixtures, little or no fines
GP	**POORLY-GRADED GRAVEL** gravel-sand mixtures, little or no fines
GM	**SILTY GRAVEL** gravel-sand-silt mixtures
GC	**CLAYEY GRAVEL** gravel-sand-clay mixtures
SW	**WELL-GRADED SAND** gravelly sand, little or no fines
SP	**POORLY-GRADED SAND** gravelly sand, little or no fines
SM	**SILTY SAND** sand-silt mixtures
SC	**CLAYEY SAND** sand-clay mixtures
ML	**SILT** non-plastic to medium plasticity
MH	**ELASTIC SILT** high plasticity
CL	**LEAN CLAY** low to medium plasticity
CH	**FAT CLAY** high plasticity
OL	**ORGANIC SILT or CLAY** non-plastic to low plasticity
OH	**ORGANIC SILT or CLAY** high plasticity
PT	**PEAT** highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS			
SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION		
DESIGNATION		**PARTICLE SIZES**
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS		
UNCONFINED COMPRESSIVE STRENGTH, Q_P[4]	**SPT[5] (BPF)**	**CONSISTENCY[7] (COHESIVE)**
<0.25	<3	Very Soft
0.25 - <0.50	3 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

GRAVELS, SANDS & NON-COHESIVE SILTS	
SPT[5]	**DENSITY**
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

RELATIVE AMOUNT[7]	COARSE GRAINED (%)[8]	FINE GRAINED (%)[8]
Trace	≤5	≤5
Dual Symbol *(ex: SW-SM)*	10	10
With	15 - 20	15 - 25
Adjective *(ex: "Silty")*	≥25	≥30

WATER LEVELS[6]		
	WL	Water Level (WS)(WD)
		(WS) While Sampling
		(WD) While Drilling
	SHW	Seasonal High WT
	ACR	After Casing Removal
	SWT	Stabilized Water Table
	DCI	Dry Cave-In
	WCI	Wet Cave-In

[1] *Classifications and symbols per ASTM D 2488-09 (Visual-Manual Procedure) unless noted otherwise.*

[2] *To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.*

[3] *Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-**FILL**)].*

[4] *Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).*

[5] *Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf).*

[6] *The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.*

[7] *Minor deviation from ASTM D 2488-09 Note 16.*

[8] *Percentages are estimated to the nearest 5% per ASTM D 2488-09.*

SR 369/Matt Highway/Browns Bridge Road

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	9315-A	HA-1	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	American Engineers, Inc.

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 112+50, 19'R

P.I. #: P.I. NO. 0013369

SR 369/Matt Highway

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1206

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1205	
5						1200	
10						1195	
15						1190	
20						1185	
25						1180	
30							

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains roots and rock fragments, dark brown, moist

(SC) CLAYEY SAND, contains roots and rock fragments, tannish brown and white, moist, medium dense

END OF HAND AUGER @ 8'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-2	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 117+50, 20'L

P.I. #: P.I. NO. 0013369

SR 369/Matt Highway

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1212

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1210	
5						1205	
10						1200	
15						1195	
20						1190	
25						1185	
30							

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains roots, dark brown and gray, moist

(SC) CLAYEY SAND, tannish gray and brown, moist

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-3	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 117+50, 40'R

P.I. #: P.I. NO. 0013369

SR 369/Matt Highway

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION

SURFACE ELEVATION 1208

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1208	
5						1205	
10						1200	
15						1195	
20						1190	
25						1185	
30						1180	

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains roots and rock fragments, gray and dark brown, moist

HAND AUGER REFUSAL @ 2'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-6	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 122+75, 55'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2 (1 2 3 4 5+)

ROCK QUALITY DESIGNATION & RECOVERY: RQD% (20% 40% 60% 80% 100%) REC.%

PLASTIC LIMIT | WATER CONTENT % | LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10 20 30 40 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1219

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
					(SM FILL) SILTY SAND, contains roots and rock fragments, dark brown, moist			
					(SC) CLAYEY SAND, tannish brown, moist		1215	
5								
					END OF HAND AUGER @ 6'			
							1210	
10								
							1205	
15								
							1200	
20								
							1195	
25								
							1190	
30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-18	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 122+75, 70'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1223

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1223	
						1220	
5							
						1215	
10							
						1210	
15							
						1205	
20							
						1200	
25							
						1195	
30							

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains roots and rock fragments, dark brown, moist

(SM) SILTY SAND, tannish brown, moist

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	9315-A	HA-12	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	American Engineers, Inc.

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 128+00, 25'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2 (1 2 3 4 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20% 40% 60% 80% 100%) REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10 20 30 40 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1222

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1222	
						1220	
5							
						1215	
10						1210	
15						1205	
20						1200	
25						1195	
30							

Topsoil Depth [2"]

(SM FILL) SILTY SAND, contains rock fragments, dark and tannish brown, moist

(ML/SM) SANDY SILT/ SILTY SAND, tannish brown, moist

END OF HAND AUGER @ 7'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-13	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 133+00, 30L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1225

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1225	
5						1220	
10						1215	
15						1210	
20						1205	
25						1200	
30						1195	

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains rock fragments and roots, dark and tannish brown, moist

(SM) SILTY SAND, tannish brown to white, moist

END OF HAND AUGER @ 7'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-14	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 138+00, 25'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1212

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1210	
5						1205	
10						1200	
15						1195	
20						1190	
25						1185	
30							

Topsoil Depth [3"]

(SC) CLAYEY SAND, contains rock fragments and roots, dark brown and gray to reddish brown, moist

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-15	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 143+00, 25'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1198

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1198	
						1195	
5							
						1190	
10							
						1185	
15							
						1180	
20							
						1175	
25							
						1170	
30							

Topsoil Depth [3"]

(SC) CLAYEY SAND, contains rock fragments and roots, dark brown, moist

HAND AUGER REFUSAL @ 1.5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-16	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 148+00, 25'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1194

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0							
5						1190	
10						1185	
15						1180	
20						1175	
25						1170	
30						1165	

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains rock fragments and roots, dark brown, moist

(SM) SILTY SAND, tannish brown, moist

END OF HAND AUGER @ 6'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-21	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 153+00, 30'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1184

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1184	
5						1180	
10						1175	
15						1170	
20						1165	
25						1160	
30						1155	

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains roots and rock fragments, dark and reddish brown, moist

(SM) SILTY SAND, reddish and tannish brown, moist

END OF HAND AUGER @ 6'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-20	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 153+00, 40'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1185

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1185	
5						1180	
10						1175	
15						1170	
20						1165	
25						1160	
30						1155	

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains roots and rock fragments, dark and reddish brown, moist

(SC) CLAYEY SAND, reddish and tannish brown, moist

END OF HAND AUGER @ 6'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-23	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 154+00, 40'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2 (1 2 3 4 5+)

ROCK QUALITY DESIGNATION & RECOVERY: RQD% (20% 40% 60% 80% 100%) REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10 20 30 40 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1184

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1184	
						1180	
5							
						1175	
10							
						1170	
15							
						1165	
20							
						1160	
25							
						1155	
30							

Topsoil Depth [3"]

(SM) SILTY SAND, contains roots and rock fragments, dark to tannish brown, moist

(CL) SANDY CLAY, tannish brown, moist

END OF HAND AUGER @ 7'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-22	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 159+00, 30'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1174

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
					(SM) SILTY SAND, contains roots, dark to tannish brown, moist			
					(SC) CLAYEY SAND, tannish brown, moist		1170	
5					END OF HAND AUGER @ 5'			
							1165	
10								
							1160	
15								
							1155	
20								
							1150	
25								
							1145	
30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-24	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 164+00, 45'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2 (1 2 3 4 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20% 40% 60% 80% 100%) REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10 20 30 40 50+)

ENGLISH UNITS

BOTTOM OF CASING ▶ LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1167

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [2"]			
					(SM FILL) SILTY SAND, contains roots and rock fragments, dark brown, moist			
					(SC) CLAYEY SAND, tannish brown, moist		1165	
5					END OF HAND AUGER @ 5'		1160	
10							1155	
15							1150	
20							1145	
25							1140	
30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-25	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 164+00, 40'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1168

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1168	
						1165	
5							
						1160	
10							
						1155	
15							
						1150	
20							
						1145	
25							
						1140	
30							

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains roots and rock fragments, dark brown, moist

(SM) SILTY SAND, tannish brown, moist

END OF HAND AUGER @ 7'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/25/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/25/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-26	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 168+50, 50'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2 (1 2 3 4 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20% 40% 60% 80% 100%) REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10 20 30 40 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1166

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]		1165	
					(SM FILL) SILTY SAND, contains rock fragments and roots, reddish brown, moist			
					(SC) CLAYEY SAND, reddish and tannish brown, moist			
					HAND AUGER REFUSAL @ 2'			
5							1160	
10							1155	
15							1150	
20							1145	
25							1140	
30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	9315-A	HA-27	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	American Engineers, Inc.

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 170+00, 50'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1187

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1187	
						1185	
5							
						1180	
10							
						1175	
15							
						1170	
20							
						1165	
25							
						1160	
30							

Topsoil Depth [3"]

(SM) SILTY SAND, contains rock fragments and roots, gray and reddish brown, moist

(ML/SM) SANDY SILT/SILTY SAND, reddish and tannish brown, moist

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	SB-1	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 182+00,40'L

P.I. #: P.I. NO. 0013369

SR369

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

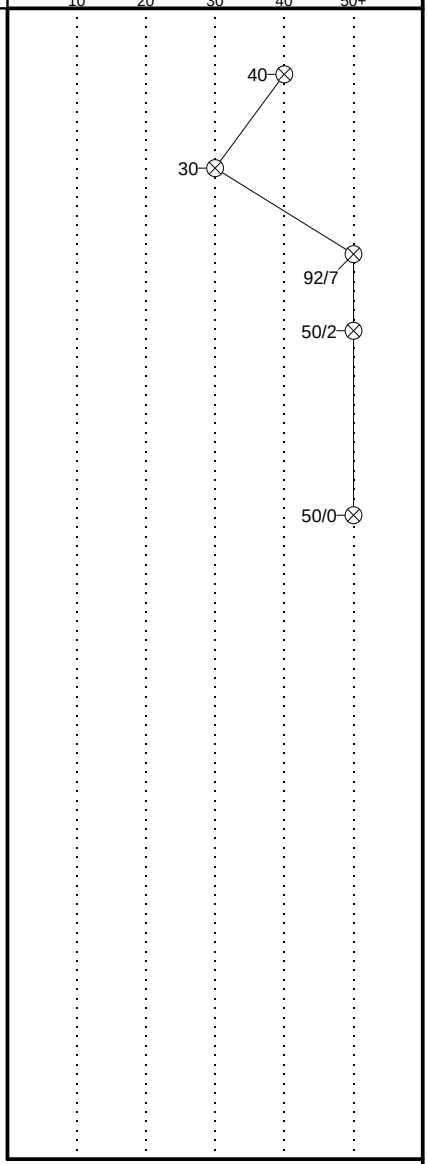
STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION

SURFACE ELEVATION 1246

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
	S-1	SS	18	18	(SM FILL) SILTY SAND, tannish brown and white, moist, dense		1245	7 14 26
	S-2	SS	18	18	(SM) SILTY SAND, white and tan, moist, dense			14 14 16
5	S-3	SS	13	13	PARTIALLY WEATHERED ROCK SAMPLED AS CLAYEY SAND, tan and white, moist, very dense		1240	16 42 50/1
	S-4	SS	2	2				50/2
10							1235	
	S-5	SS	0	0				50/0
15					AUGER REFUSAL @ 16'		1230	
20							1225	
25							1220	
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 06/12/17	
WL(BCR) WL(ACR)	BORING COMPLETED 06/12/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-28	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 185+00, 30'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1225

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1225	
5						1220	
10						1215	
15						1210	
20						1205	
25						1200	
30						1195	

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains roots and rock fragments, reddish brown, moist

(SC) CLAYEY SAND, tannish brown, moist

END OF HAND AUGER @ 7'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-30	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 190+00, 25'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1212

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1212	
						1210	
5							
						1205	
10							
						1200	
15							
						1195	
20							
						1190	
25							
						1185	
30							

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains roots and rock fragments, gray and reddish brown, moist

HAND AUGER REFUSAL @ 1.5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-29	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 190+00, 50'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2 (1 2 3 4 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20% 40% 60% 80% 100%) REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10 20 30 40 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1211

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]		1210	
					(SM FILL) SILTY SAND, contains roots and rock fragments, dark brown and reddish brown, moist			
					(SC) CLAYEY SAND, tannish and orangish brown, moist			
5					END OF HAND AUGER @ 5'		1205	
10							1200	
15							1195	
20							1190	
25							1185	
30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-32	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 194+50, 34'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2 (1 2 3 4 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20% 40% 60% 80% 100%) REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10 20 30 40 50+)

ENGLISH UNITS

BOTTOM OF CASING ▶ LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1202

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]		1202	
					(SM FILL) SILTY SAND, contains roots, reddish brown, moist			
					(SM) SILTY SAND, tannish brown, moist			
5							1200	
					END OF HAND AUGER @ 7'		1195	
10							1190	
15							1185	
20							1180	
25							1175	
30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-31	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 194+50, 25'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1197

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]		1197	
					(SM FILL) SILTY SAND, contains roots, dark brown, moist			
					(SC) CLAYEY SAND, tan and gray, moist to wet		1195	
5					END OF HAND AUGER @ 5'		1190	
10							1185	
15							1180	
20							1175	
25							1170	
30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-34	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 198+50, 20'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1193

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1193	
						1190	
5							
						1185	
10							
						1180	
15							
						1175	
20							
						1170	
25							
						1165	
30							

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains rock fragments and roots, dark gray and reddish brown, moist to wet

(SC) CLAYEY SAND, tannish brown, moist

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-33	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 198+50, 20'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1191

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1190	
5						1185	
10						1180	
15						1175	
20						1170	
25						1165	
30							

Topsoil Depth [2"]

(SM FILL) SILTY SAND, contains rock fragments and roots, dark gray and reddish brown, moist to wet

(SM) SILTY SAND, tannish brown, moist

END OF HAND AUGER @ 7'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-36	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 203+50, 30'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION

SURFACE ELEVATION 1205

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1205	
5						1200	
10						1195	
15						1190	
20						1185	
25						1180	
30						1175	

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains roots and rock fragments, reddish brown, moist

(SC) CLAYEY SAND, contains rock fragments, tan and dark gray, moist

HAND AUGER REFUSAL @ 3'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-35	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 203+50, 30'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1203

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1203	
5						1200	
10						1195	
15						1190	
20						1185	
25						1180	
30						1175	

Topsoil Depth [3"]

(SC FILL) CLAYEY SAND, contains rock fragments, brown and gray, moist

HAND AUGER REFUSAL @ 1'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-37	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 208+50, 30'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION

SURFACE ELEVATION 1214

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
					(SM FILL) SILTY SAND, contains roots and rock fragments, dark brown and gray, moist			
					(SC) CLAYEY SAND, dark brown and tannish brown, moist			
					HAND AUGER REFUSAL @ 3'			
5							1210	
10							1205	
15							1200	
20							1195	
25							1190	
30							1185	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-38	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 208+50, 20'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2 (1 2 3 4 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20% 40% 60% 80% 100%) REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10 20 30 40 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1216

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]		1215	
					(SM FILL) SILTY SAND, contains rock fragments, dark brown, moist			
					(SC) CLAYEY SAND, reddish brown, moist			
5					(SC) CLAYEY SAND, orangish brown, moist		1210	
					END OF HAND AUGER @ 6'			
10							1205	
15							1200	
20							1195	
25							1190	
30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-41	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 213+00, 30'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1226

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1225	
5						1220	
10						1215	
15						1210	
20						1205	
25						1200	
30							

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains roots, dark brown to reddish brown, moist

(SC) CLAYEY SAND, reddish brown to orangish tan, moist to wet

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-42	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 213+00, 45'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1231

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]		1230	
					(SM FILL) SILTY SAND, contains roots, reddish brown, moist			
5					(SC) CLAYEY SAND, reddish brown to orangish brown, moist		1225	
					END OF HAND AUGER @ 8'			
10							1220	
15							1215	
20							1210	
25							1205	
30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-40	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 218+50, 30'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1226

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]		1225	
					(SM FILL) SILTY SAND, contains roots and rock fragments, reddish brown, moist			
					(SC) CLAYEY SAND, reddish brown to orangish brown, moist			
5					END OF HAND AUGER @ 5'		1220	
10							1215	
15							1210	
20							1205	
25							1200	
30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-39	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 218+50, 40'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1227

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]		1227	
					(SM FILL) SILTY SAND, contains roots, reddish brown, moist			
					(SC) CLAYEY SAND, reddish brown to tannish brown, moist		1225	
5								
					END OF HAND AUGER @ 6'		1220	
10							1215	
15							1210	
20							1205	
25							1200	
30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-43	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 224+00, 30'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1225

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1225	
5						1220	
10						1215	
15						1210	
20						1205	
25						1200	
30						1195	

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains rock fragments, reddish and dark brown, moist

(SM) SILTY SAND, reddish and tannish brown, moist

HAND AUGER REFUSAL @ 3'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-44	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 224+00, 30'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION

SURFACE ELEVATION 1224

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1224	
						1220	
5							
						1215	
10							
						1210	
15							
						1205	
20							
						1200	
25							
						1195	
30							

Topsoil Depth [3"]

(SC FILL) CLAYEY SAND, contains rock fragments, reddish and grayish brown, moist

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-45	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 229+00, 25'L

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1232

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1230	
5						1225	
10						1220	
15						1215	
20						1210	
25						1205	
30							

Topsoil Depth [3"]

(SM FILL) SILTY SAND, tannish gray, moist

(SC) CLAYEY SAND, tan and reddish brown, moist

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-46	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 229+00, 25'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1234

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1234	
						1230	
5							
						1225	
10							
						1220	
15							
						1215	
20							
						1210	
25							
						1205	
30							

Topsoil Depth [3"]

(SM FILL) SILTY SAND, tannish gray, moist

(SM) SILTY SAND, tannish brown, moist

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-47	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 234+00, 30'R

P.I. #: P.I. NO. 0013369

SR 369/Browns Bridge

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1244

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1244	
5						1240	
10						1235	
15						1230	
20						1225	
25						1220	
30						1215	

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains rock fragments, reddish brown and gray, moist

(SC) CLAYEY SAND, dark brown and gray, moist

END OF HAND AUGER @ 6'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

SR 9/Dahlonega Highway

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-5	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 313+00, 25'R

P.I. #: P.I. NO. 0013369

SR9/Dahlonega Highway

CALIBRATED PENETROMETER TONS/FT^2 (1 2 3 4 5+)

ROCK QUALITY DESIGNATION & RECOVERY: RQD% (20% 40% 60% 80% 100%) REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10 20 30 40 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1220

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]		1220	
					(SC FILL) CLAYEY SAND, contains roots and rock fragments, dark brown, moist to wet			
2.5							1217.5	
					(SC) CLAYEY SAND, tannish brown, moist to wet			
5					END OF HAND AUGER @ 5'		1215	
7.5							1212.5	
10							1210	
12.5							1207.5	
15							1205	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-4	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 317+00, 35'R

P.I. #: P.I. NO. 0013369

SR9/Dahlonega Highway

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1222

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
					(CL/SC FILL) SANDY CLAY/CLAYEY SAND, contains roots and rock fragments, dark brown and tannish brown, moist			
							1220	
2.5								
					(SM) SILTY SAND, tannish brown, moist			
							1217.5	
5								
							1215	
7.5					END OF HAND AUGER @ 7'			
							1212.5	
10								
							1210	
12.5								
							1207.5	
15								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-8	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 321+80, 30'L

P.I. #: P.I. NO. 0013369

SR9/Dahlonega Highway

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1216

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
					(SC FILL) CLAYEY SAND, contains roots and rock fragments, dark brown, moist		1215	
2.5							1212.5	
					(SC) CLAYEY SAND, tannish brown, moist			
5					END OF HAND AUGER @ 5'		1210	
7.5							1207.5	
10							1205	
12.5							1202.5	
15								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-7	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 321+50, 30'R

P.I. #: P.I. NO. 0013369

SR9/Dahlonega Highway

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1215

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1215	
2.5						1212.5	
5						1210	
7.5						1207.5	
10						1205	
12.5						1202.5	
15						1200	

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains roots and rock fragments, dark brown, moist

(SM) SILTY SAND, tannish brown and gray, moist

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-9	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 324+00, 20'L

P.I. #: P.I. NO. 0013369

SR9/Dahlonega Highway

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

ENGLISH UNITS

BOTTOM OF CASING ▶ LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1210

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]		1210	
					(SM FILL) SILTY SAND, contains roots and rock fragments, gray and dark brown, moist			
2.5					(SC) CLAYEY SAND, dark gray, wet		1207.5	
					(SM) SILTY SAND, tannish brown, moist			
5					END OF HAND AUGER @ 5'		1205	
7.5							1202.5	
10							1200	
12.5							1197.5	
15							1195	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-10	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 324+00, 20'R

P.I. #: P.I. NO. 0013369

SR9/Dahlonega Highway

CALIBRATED PENETROMETER TONS/FT^2 (1 2 3 4 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20% 40% 60% 80% 100%) REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10 20 30 40 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1213

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]		1212.5	
					(SC FILL) CLAYEY SAND, contains roots and rock fragments, dark brown, moist			
2.5							1210	
					(SC) CLAYEY SAND, tannish brown, moist to very moist			
5					END OF HAND AUGER @ 5'		1207.5	
7.5							1205	
10							1202.5	
12.5							1200	
15								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

Settingdown Road

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-11	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 341+50, 25'L

P.I. #: P.I. NO. 0013369

Settingdown Rd.

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1227

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
					(SM FILL) SILTY SAND, contains roots and rock fragments, tannish to dark brown, moist			
							1225	
2.5					(SM) SILTY SAND, tannish brown, moist,			
							1222.5	
5								
							1220	
7.5					END OF HAND AUGER @ 7'			
							1217.5	
10								
							1215	
12.5								
							1212.5	
15								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-19	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 341+50, 35'R

P.I. #: P.I. NO. 0013369

Settingdown Rd.

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1228

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]		1227.5	
					(SM FILL) SILTY SAND, contains roots and rock fragments, dark brown, moist			
2.5					(SC) CLAYEY SAND, tannish brown, moist		1225	
5							1222.5	
7.5					END OF HAND AUGER @ 7'		1220	
10							1217.5	
12.5							1215	
15								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-A	HA-17	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 344+50, 10'L

P.I. #: P.I. NO. 0013369

Settingdown Rd.

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1229

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
					(SM FILL) SILTY SAND, contains roots and rock fragments, dark brown and tannish dark and reddish brown, moist		1227.5	
2.5					(SC) CLAYEY SAND, tan and white, moist		1225	
5								
					END OF HAND AUGER @ 6'		1222.5	
7.5							1220	
10							1217.5	
12.5							1215	
15								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 05/16/17	
WL(BCR) WL(ACR)	BORING COMPLETED 05/16/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

Browns Bridge Community Church Driveway

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	CD-HA-1	1 OF 1
PROJECT NAME	ARCHITECT-ENGINEER		
SR 369 Widening - Soil Survey			

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

P.I. #: 0013369

STATION: 375+00, CL
Browns Bridge Community Church Driveway

CALIBRATED PENETROMETER TONS/FT^2
1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY
RQD% — — REC.%
20% 40% 60% 80% 100%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT
10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION

SURFACE ELEVATION 1219

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
					(SC FILL) CLAYEY SAND, contains rock fragments, reddish brown, moist			
2.5					(SC) CLAYEY SAND, tannish brown, moist		1217.5	
					HAND AUGER REFUSAL @ 3'		1215	
5							1212.5	
7.5							1210	
10							1207.5	
12.5							1205	
15								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 07/28/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/28/17	CAVE IN DEPTH
WL	RIG FOREMAN	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	CD-HA-2	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

P.I. #: 0013369

STATION: 378+00, CL
Browns Bridge Community Church Driveway

CALIBRATED PENETROMETER TONS/FT^2
1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY
RQD% — — REC.%
20% 40% 60% 80% 100%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT
10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1223

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1222.5	
2.5						1220	
5						1217.5	
7.5						1215	
10						1212.5	
12.5						1210	
15							

Topsoil Depth [3"]

(SM FILL) SILTY SAND, contains rock fragments, reddish brown and tannish brown, moist

(SM) SILTY SAND, tannish brown, moist

HAND AUGER REFUSAL @ 2'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 07/28/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/28/17	CAVE IN DEPTH
WL	RIG FOREMAN	DRILLING METHOD Hand Auger Bucket

Ramp A

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RA-1	1 OF 1

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 2001+00, CL

Ramp A

P.I. #: 0013369

CALIBRATED PENETROMETER TONS/FT^2 (1, 2, 3, 4, 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20%, 40%, 60%, 80%, 100%) - REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

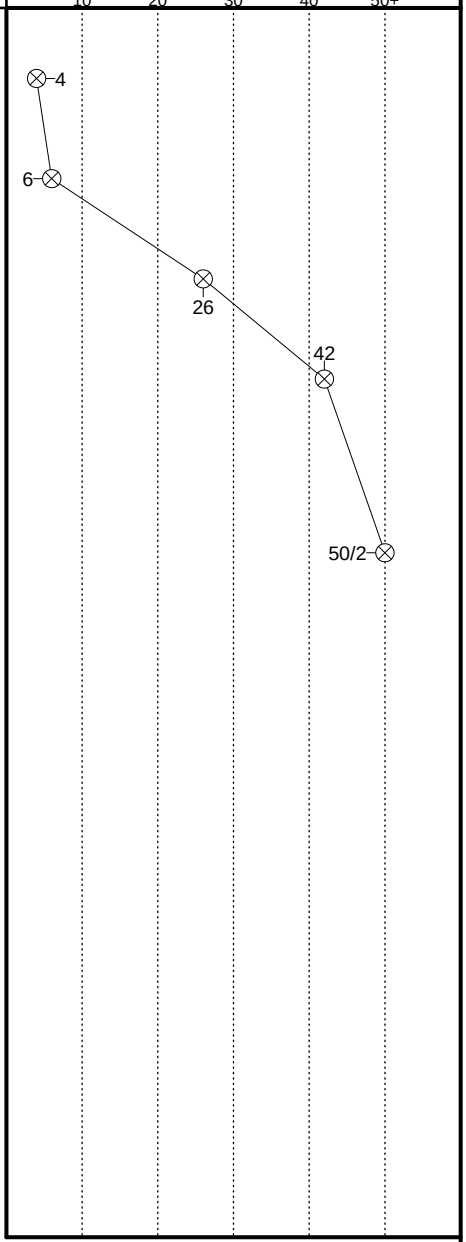
STANDARD PENETRATION BLOWS/FT (10, 20, 30, 40, 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1248

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
	S-1	SS	18	18	(SM FILL) SILTY SAND, contains rock fragments, reddish brown to dark brown, moist, loose		1245	2 2 2
	S-2	SS	18	18				1 2 4
5					(ML) SANDY SILT, reddish and tannish brown, moist, very stiff to hard			
	S-3	SS	18	18			1240	7 13 13
	S-4	SS	18	18				7 14 28
10					(SM) SILTY SAND, tannish brown and white, moist, dense			
	S-5	SS	2	2	PARTIALLY WEATHERED ROCK SAMPLED AS SILTY SAND, tan, moist, hard		1235	50/2
15								
					AUGER REFUSAL @ 17'		1230	
20							1225	
25							1220	
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 07/10/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/10/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RA-2	1 OF 2

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 2003+75, CL

P.I. #: 0013369

Ramp A

CALIBRATED PENETROMETER TONS/FT^2 (1, 2, 3, 4, 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20%, 40%, 60%, 80%, 100%) - REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

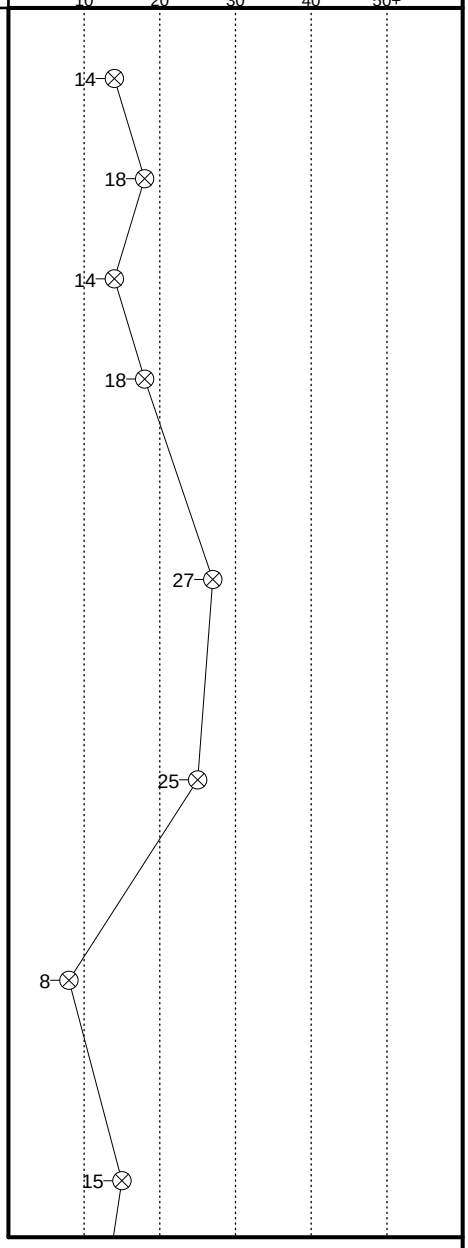
STANDARD PENETRATION BLOWS/FT (10, 20, 30, 40, 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1242

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
	S-1	SS	18	18	(SM FILL) SILTY SAND, contains slight asphalt, dark brown and gray, moist, medium dense		1240	5 6 8
	S-2	SS	18	18				14 10 8
5	S-3	SS	18	18			1235	5 6 8
	S-4	SS	18	18	(CL/SC) SANDY CLAY/CLAYEY SAND, reddish brown, moist, stiff to very stiff			7 8 10
10							1230	
	S-5	SS	18	18				9 11 16
15							1225	
	S-6	SS	18	18				7 10 15
20							1220	
	S-7	SS	18	18				10 4 4
25							1215	
	S-8	SS	18	18				7 3 12
30								



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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 07/10/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/10/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RA-2	2 OF 2

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 2003+75, CL

P.I. #: 0013369

Ramp A

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% REC.%

PLASTIC LIMIT | WATER CONTENT % | LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION 100%

SURFACE ELEVATION 1242

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
						1242	
							(CL/SC) SANDY CLAY/CLAYEY SAND, reddish brown, moist, stiff to very stiff
	S-9	SS	18	18		1210	6 5 6
35						1205	
	S-10	SS	18	18			6 10 14
40						1200	END OF BORING @ 40'
45						1195	
50						1190	
55						1185	
60							

11 24

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 07/10/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/10/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RA-3	1 OF 1

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 2007+00,CL

P.I. #: 0013369

Ramp A

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

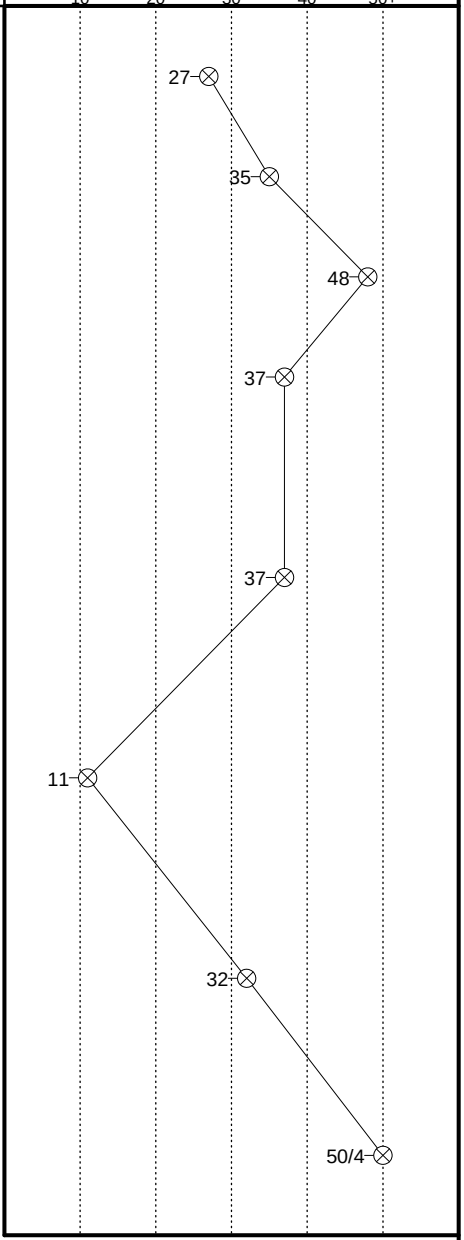
STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1229

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
	S-1	SS	18	18	(SM) SILTY SAND, reddish brown to tannish brown, moist, medium dense to dense			6 12 15
	S-2	SS	18	18			1225	13 21 14
5	S-3	SS	18	18				19 23 25
	S-4	SS	18	18			1220	10 16 21
10								
	S-5	SS	18	18			1215	17 18 19
15					(SC) CLAYEY SAND, white, moist, medium dense			
	S-6	SS	18	18			1210	6 5 6
20					(SM) SILTY SAND, tannish brown, moist, dense			
	S-7	SS	18	18			1205	13 11 21
25					PARTIALLY WEATHERED ROCK SAMPLED AS SILTY SAND, tannish brown, moist, very dense			
	S-8	SS	4	4			1200	50/4
30					END OF BORING @ 30'			



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 07/10/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/10/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RA-4	1 OF 2

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 2010+00, CL

P.I. #: 0013369

Ramp A

CALIBRATED PENETROMETER TONS/FT^2 (1, 2, 3, 4, 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20%, 40%, 60%, 80%, 100%) - REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10, 20, 30, 40, 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1237

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0							
	S-1	SS	18	18		1235	5 6 8
	S-2	SS	18	18			4 7 7
5							
	S-3	SS	18	18		1230	4 4 4
	S-4	SS	18	18			4 6 6
10						1225	
	S-5	SS	18	18			4 5 6
15						1220	
	S-6	SS	18	18			3 5 8
20						1215	
	S-7	SS	18	18			3 4 6
25						1210	
	S-8	SS	18	18			4 9 11
30							

Topsoil Depth [3"]

(SC) CLAYEY SAND, reddish brown, moist, medium dense

(SM) SILTY SAND, tannish brown to gray, moist, loose to medium dense

Penetrometer blows: 14, 14, 8, 12, 11, 13, 10, 20

CONTINUED ON NEXT PAGE.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 07/17/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/17/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RA-4	2 OF 2

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 2010+00, CL

P.I. #: 0013369

Ramp A

CALIBRATED PENETROMETER TONS/FT^2 (1, 2, 3, 4, 5+)

ROCK QUALITY DESIGNATION & RECOVERY: RQD% — REC.% (20%, 40%, 60%, 80%, 100%)

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

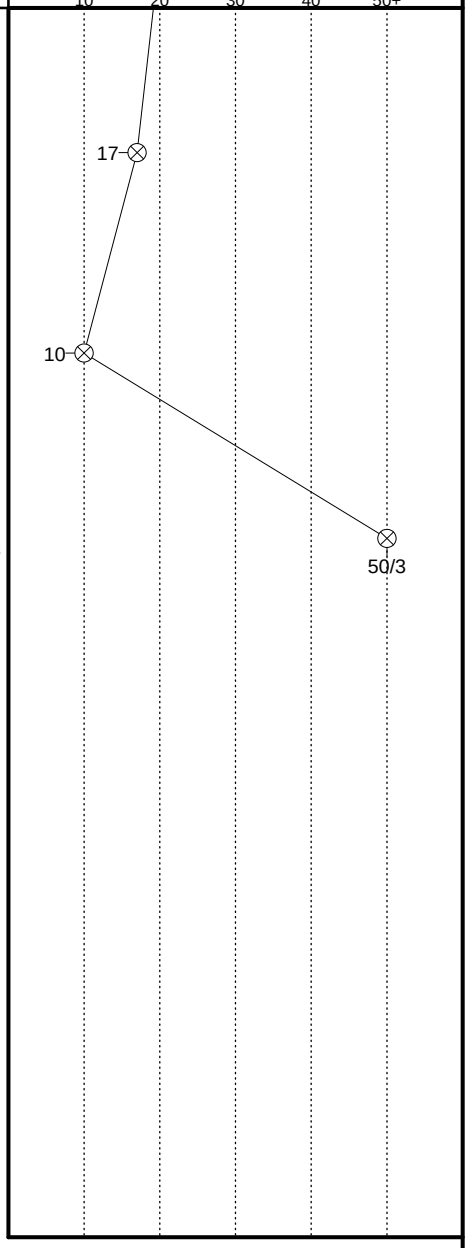
STANDARD PENETRATION BLOWS/FT (10, 20, 30, 40, 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1237

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					(SM) SILTY SAND, tannish brown to gray, moist, loose to medium dense		1205	
35	S-9	SS	18	18				5 6 11
							1200	
40	S-10	SS	18	18				5 5 5
					PARTIALLY WEATHERED ROCK SAMPLED AS SILTY SAND, reddish brown and dark gray, moist, very dense		1195	
45	S-11	SS	9	9	END OF BORING @ 45'			15 50/3
							1190	
50								
							1185	
55								
							1180	
60								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 07/17/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/17/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RA-HA-1	1 OF 1
PROJECT NAME	ARCHITECT-ENGINEER		
SR 369 Widening - Soil Survey			
SITE LOCATION			
Forsyth County, GA			
GDOT PROJ. #	STATION		
	2013+00, CL		
P.I. #			
0013369	Ramp A		

CALIBRATED PENETROMETER TONS/FT^2
1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY
RQD% — — REC.% ——
20% 40% 60% 80% 100%

PLASTIC LIMIT | WATER CONTENT % | LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT
10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1201

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1200	
2.5						1197.5	
5						1195	
7.5						1192.5	
10						1190	
12.5						1187.5	
15							

Topsoil Depth [3"]

(SC) CLAYEY SAND, reddish brown to tannish brown, moist

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 07/26/17	
WL(BCR) WL(ACR)	BORING COMPLETED 08/02/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RA-HA-2	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 2016+00, CL

P.I. #: 0013369

Ramp A

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% — REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1201

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1200	
2.5						1197.5	
5						1195	
7.5						1192.5	
10						1190	
12.5						1187.5	
15							

Topsoil Depth [3"]

(SM) SILTY SAND, reddish brown, moist

(SM) SILTY SAND, tannish brown, moist

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 07/26/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/26/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

Ramp B

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RB-2	1 OF 1

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 3008+50, CL

P.I. #: 0013369

Ramp B

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% REC.%

PLASTIC LIMIT | WATER CONTENT % | LIQUID LIMIT %

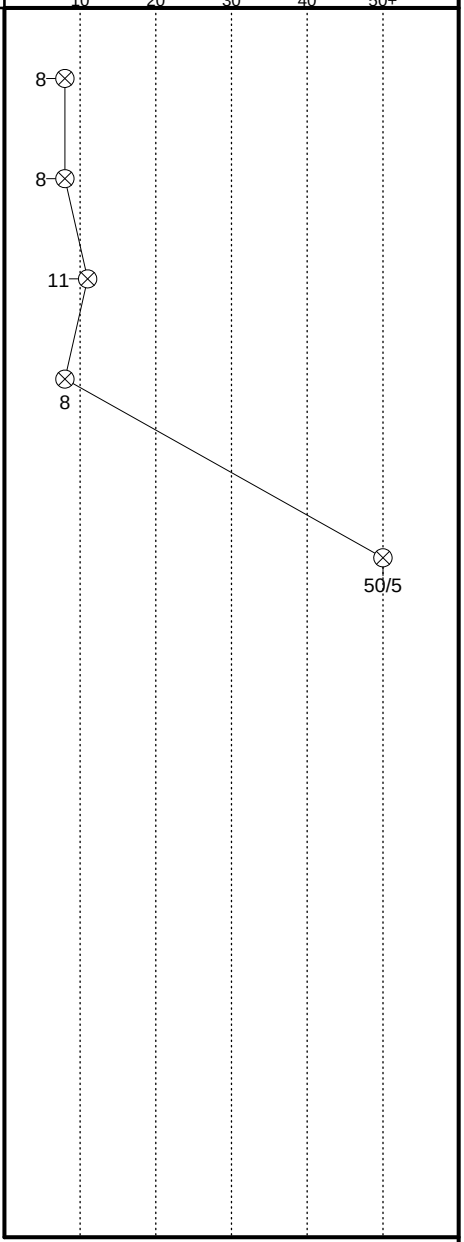
STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1200

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	ELEVATION (FT)	BLOWS/6"	DESCRIPTION OF MATERIAL
0					1200		Topsoil Depth [3"]
	S-1	SS	18	18		3 3 5	(SM FILL) SILTY SAND, contains slight rock fragments, reddish brown to dark gray, moist, loose to medium dense
	S-2	SS	18	18		3 4 4	
5					1195		
	S-3	SS	18	18		4 5 6	
	S-4	SS	18	18		3 3 5	
10					1190		
	S-5	SS	5	5		50/5	PARTIALLY WEATHERED ROCK SAMPLED AS SILTY SAND, tannish brown and dark gray, moist, very dense
15					1185		END OF BORING @ 15'
20					1180		
25					1175		
30					1170		



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 06/12/17	
WL(BCR) WL(ACR)	BORING COMPLETED 06/12/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RB-3	1 OF 1

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 3011+50, CL

P.I. #: 0013369

Ramp B

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% - REC.%

PLASTIC LIMIT | WATER CONTENT % | LIQUID LIMIT %

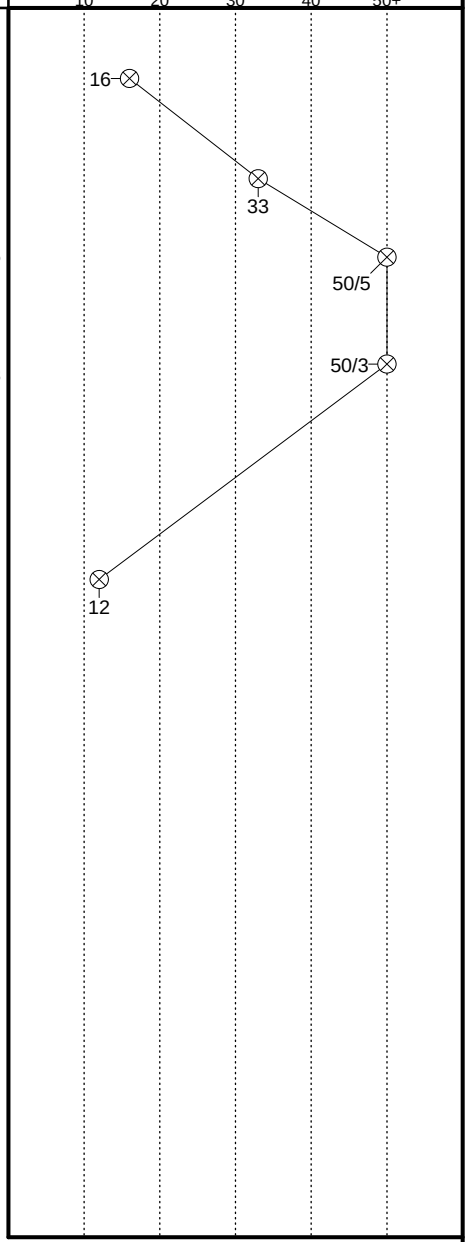
STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1214

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Asphalt Depth [2"] Gravel Depth [3"]			
	S-1	SS	18	18	(SC FILL) CLAYEY SAND, contains slight rock fragments, reddish brown, moist, medium dense to dense			4 7 9
	S-2	SS	18	18			1210	9 14 19
5	S-3	SS	5	5	PARTIALLY WEATHERED ROCK SAMPLED AS SILTY SAND, tan, moist, very dense			50/5
	S-4	SS	9	9			1205	29 50/3
10					(SM) SILTY SAND, reddish brown, moist, medium dense			
	S-5	SS	18	18			1200	4 4 8
15					END OF BORING @ 15'			
20							1195	
							1190	
25								
							1185	
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 06/12/17	
WL(BCR) WL(ACR)	BORING COMPLETED 06/12/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RB-4	1 OF 1

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 3014+00, CL

P.I. #: 0013369

Ramp B

CALIBRATED PENETROMETER TONS/FT^2 (1, 2, 3, 4, 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20%, 40%, 60%, 80%, 100%) - REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10, 20, 30, 40, 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1229

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Gravel Depth [6"]			
	S-1	SS	18	18	(SC FILL) CLAYEY SAND, contains wood, dark gray, moist, loose			2 2 3
	S-2	SS	18	18	(SC) CLAYEY SAND, reddish brown- tannish brown, moist, loose		1225	2 3 3
5	S-3	SS	18	18				4 4 4
	S-4	SS	18	18	(SM) SILTY SAND, tannish brown, moist, loose to very dense		1220	4 4 6
10								
	S-5	SS	18	18			1215	15 26 30
15								
	S-6	SS	2	2	PARTIALLY WEATHERED ROCK SAMPLED AS SILTY SAND, dark brown, moist, very dense		1210	50/2
20								
	S-7	SS	1	1			1205	50/1
25					END OF BORING @ 25'			
							1200	
30								

Penetrometer values: 5, 6, 8, 10, 56, 50/2, 50/1

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 06/12/17	
WL(BCR) WL(ACR)	BORING COMPLETED 06/12/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

Ramp C

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RC-1	1 OF 1

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 4002+00, CL

P.I. #: 0013369

Ramp C

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

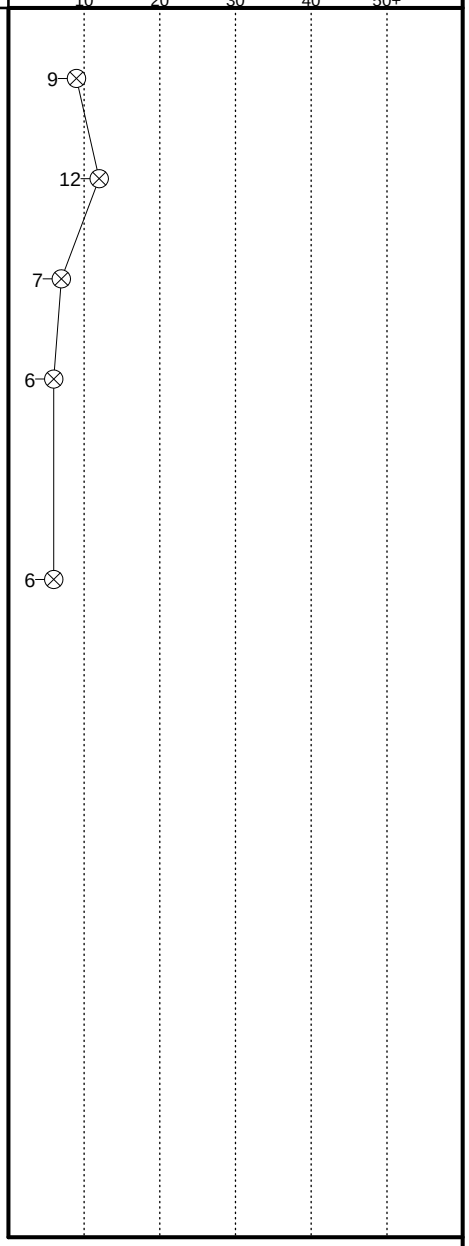
STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1168

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [2"]			
	S-1	SS	18	18	(SM FILL) SILTY SAND, reddish brown, moist, loose			3 4 5
							1165	
	S-2	SS	18	18	(ML) SANDY SILT, tannish brown, moist to wet, firm to stiff			4 5 7
5								
	S-3	SS	18	18				2 3 4
							1160	
	S-4	SS	18	18				3 3 3
10								
							1155	
	S-5	SS	18	18				3 3 3
15					END OF BORING @ 15'			
							1150	
20								
							1145	
25								
							1140	
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 13 WS ☐ WD ☒	BORING STARTED 07/17/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/17/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RC-2	1 OF 1

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 4005+00, CL

P.I. #: 0013369

Ramp C

CALIBRATED PENETROMETER TONS/FT^2 (1, 2, 3, 4, 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20%, 40%, 60%, 80%, 100%) - REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10, 20, 30, 40, 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1162

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [2"]			
	S-1	SS	18	18	(ML) SANDY SILT, tannish brown to tannish gray, moist to wet, firm		1160	2 3 4 (7)
	S-2	SS	18	18				3 3 3 (6)
5	S-3	SS	18	18			1155	4 2 3 (5)
	S-4	SS	18	18				3 3 4 (7)
10							1150	
	S-5	SS	18	18				2 2 4 (6)
15							1145	
	S-6	SS	18	18				3 3 3 (6)
20							1140	
	S-7	SS	18	18				3 3 4 (7)
25							1135	
	S-8	SS	18	18				2 3 4 (7)
30					END OF BORING @ 30'			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 13 WS ☐ WD ☒	BORING STARTED 08/14/17	
WL(BCR) WL(ACR)	BORING COMPLETED 08/14/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RC-HA-1	1 OF 1

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 4008+00, CL

P.I. #: 0013369

Ramp C

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% REC.%

PLASTIC LIMIT | WATER CONTENT % | LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION 100%

SURFACE ELEVATION 1158

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1157.5	
2.5						1155	
5						1152.5	
7.5						1150	
10						1147.5	
12.5						1145	
15							

(SC) CLAYEY SAND, tannish gray, moist

END OF HAND AUGER @ 5'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 07/11/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/28/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLP
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:9315-A
DATE STARTED: 07-11-2017
DATE COMPLETED: 07-11-2017

HOLE #: WDCP-3
CREW: AR/SL/CG
PROJECT: SR 369 Widening - Soil Survey P.I. No.: 0013369
STATION: 4008+00, CL Ramp C
LOCATION: Forsyth County, GA

SURFACE ELEVATION: 1158'
WATER ON COMPLETION: 18'
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 1 ft	3	13.3	•••	3	VERY LOOSE	SOFT
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	2	8.9	••	2	VERY LOOSE	SOFT
- 2 ft	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
- 3 ft	2	8.9	••	2	VERY LOOSE	SOFT
- 1 m	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	1	3.9	•	1	VERY LOOSE	VERY SOFT
- 4 ft	1	3.9	•	1	VERY LOOSE	VERY SOFT
-	3	11.6	•••	3	VERY LOOSE	SOFT
-	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
- 5 ft	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
-	6	23.2	••••••	6	LOOSE	MEDIUM STIFF
-	3	11.6	•••	3	VERY LOOSE	SOFT
- 6 ft	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
-	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
- 2 m	6	23.2	••••••	6	LOOSE	MEDIUM STIFF
- 7 ft	5	17.1	••••	4	VERY LOOSE	SOFT
-	8	27.4	•••••••	7	LOOSE	MEDIUM STIFF
-	4	13.7	•••	3	VERY LOOSE	SOFT
- 8 ft	2	6.8	•	1	VERY LOOSE	VERY SOFT
-	2	6.8	•	1	VERY LOOSE	VERY SOFT
-	3	10.3	••	2	VERY LOOSE	SOFT
- 9 ft	3	10.3	••	2	VERY LOOSE	SOFT
-	3	10.3	••	2	VERY LOOSE	SOFT
-	4	13.7	•••	3	VERY LOOSE	SOFT
- 3 m 10 ft	4	13.7	•••	3	VERY LOOSE	SOFT
-	8	24.5	•••••••	6	LOOSE	MEDIUM STIFF
-	10	30.6	••••••••	8	LOOSE	MEDIUM STIFF
-	12	36.7	•••••••••	10	LOOSE	STIFF
- 11 ft	27	82.6	••••••••••••••••••••••	23	MEDIUM DENSE	VERY STIFF
-	35	107.1	••••••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
-			WDCP Refusal @ 19' 0"			
- 12 ft						
-						
-						
- 4 m 13 ft						

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RC-4	1 OF 2

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 4012+00, CL

P.I. #: 0013369

Ramp C

CALIBRATED PENETROMETER TONS/FT^2 (1, 2, 3, 4, 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20%, 40%, 60%, 80%, 100%) - REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

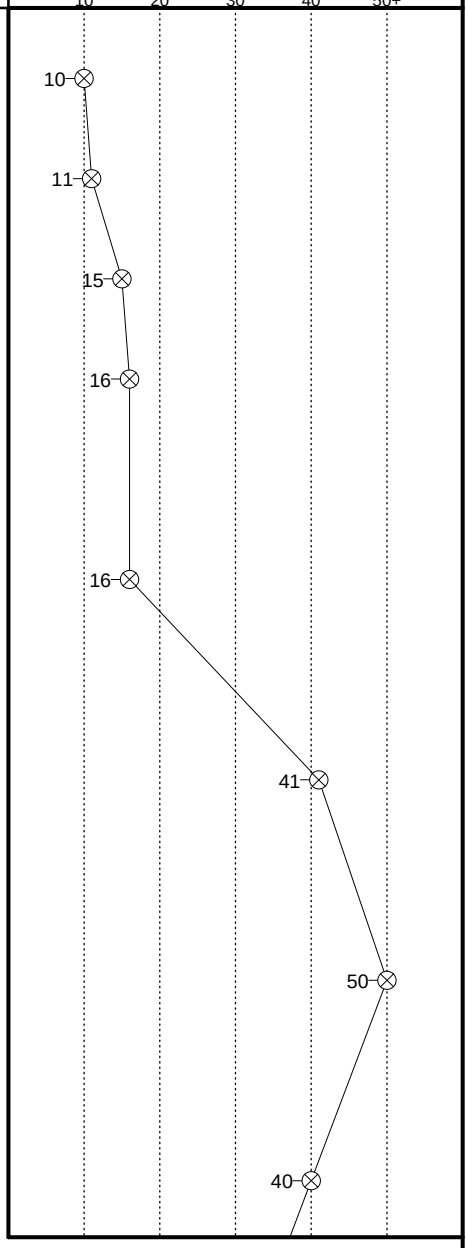
STANDARD PENETRATION BLOWS/FT (10, 20, 30, 40, 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1172

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
	S-1	SS	18	18	(ML) SANDY SILT, tannish brown, moist, stiff to hard		1170	2 5 5
	S-2	SS	18	18				4 5 6
5	S-3	SS	18	18			1165	4 7 8
	S-4	SS	18	18				9 7 9
10							1160	
	S-5	SS	18	18				5 6 10
15							1155	
	S-6	SS	18	18				11 17 24
20					(SM) SILTY SAND, tannish brown, moist, medium dense to dense		1150	
	S-7	SS	18	18				7 12 38
25							1145	
	S-8	SS	18	18				7 20 20
30								



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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 06/12/17	
WL(BCR) WL(ACR)	BORING COMPLETED 06/12/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RC-4	2 OF 2

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 4012+00, CL

P.I. #: 0013369

Ramp C

CALIBRATED PENETROMETER TONS/FT^2 (1, 2, 3, 4, 5+)

ROCK QUALITY DESIGNATION & RECOVERY: RQD% - REC.% (20%, 40%, 60%, 80%, 100%)

PLASTIC LIMIT | WATER CONTENT % | LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10, 20, 30, 40, 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1172

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					(SM) SILTY SAND, tannish brown, moist, medium dense to dense		1140	
	S-9	SS	18	18				6 9 21
35					PARTIALLY WEATHERED ROCK SAMPLED AS SILTY SAND, tan, moist, very dense		1135	
	S-10	SS	15	15				31 46 50/3
40					END OF BORING @ 40'		1130	
45							1125	
50							1120	
55							1115	
60								

30

96/9

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 06/12/17	
WL(BCR) WL(ACR)	BORING COMPLETED 06/12/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RC-5	1 OF 1

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 4015+00, CL

P.I. #: 0013369

Ramp C

CALIBRATED PENETROMETER TONS/FT^2 (1, 2, 3, 4, 5+)

ROCK QUALITY DESIGNATION & RECOVERY: RQD% (20%, 40%, 60%, 80%, 100%) - REC.%

PLASTIC LIMIT | WATER CONTENT % | LIQUID LIMIT %

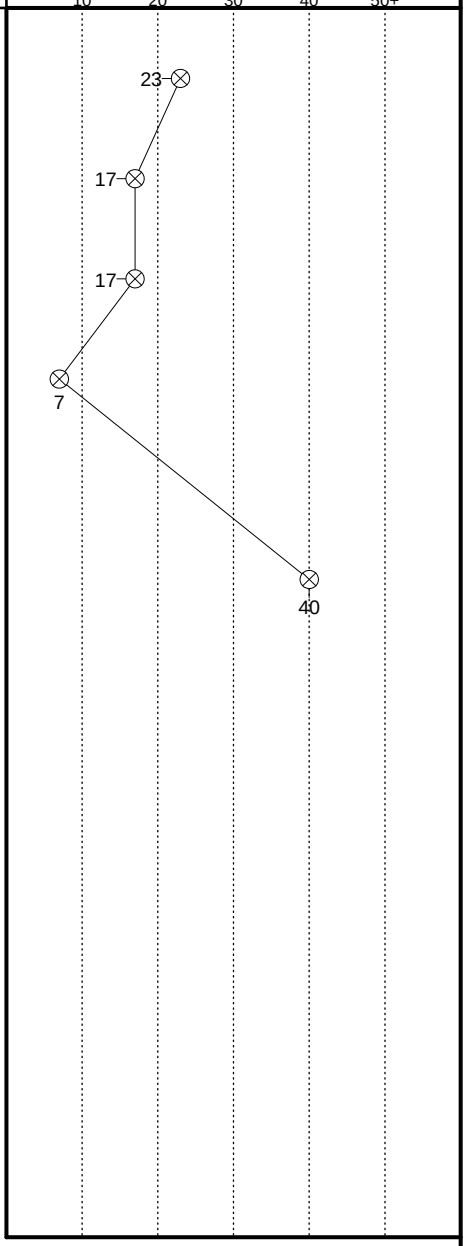
STANDARD PENETRATION BLOWS/FT (10, 20, 30, 40, 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1197

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [3"]			
	S-1	SS	18	18	(SC) CLAYEY SAND, contains slight rock fragments, reddish brown, moist, loose to medium dense		1195	7 11 12
	S-2	SS	18	18				4 6 11
5								
	S-3	SS	18	18			1190	4 11 6
	S-4	SS	18	18				2 2 5
10							1185	
	S-5	SS	18	18	(SM) SILTY SAND, tan, moist, dense			6 17 23
15							1180	
					AUGER REFUSAL @ 18'			
20							1175	
25							1170	
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☒	BORING STARTED 07/10/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/10/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

Ramp D/ Wall No. 3

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	WB 3-1	1 OF 1

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 5006+00, 60'L

P.I. #: 0013369

Ramp D/ Wall No. 3

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% - REC.%

PLASTIC LIMIT | WATER CONTENT % | LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT*: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION 100%

SURFACE ELEVATION 1162

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (FIELD)
0							
	S-1	SS	18	18		1160	3 4 6
	S-2	SS	18	18			2 1 1
5							
	S-3	SS	18	18		1155	2 3 4
	S-4	SS	18	18			4 5 9
10					▽	1150	
	S-5	SS	18	18			6 5 5
15						1145	
	S-6	SS	18	18			6 4 4
20						1140	
	S-7	SS	18	18			18 26 31
25						1135	
30							

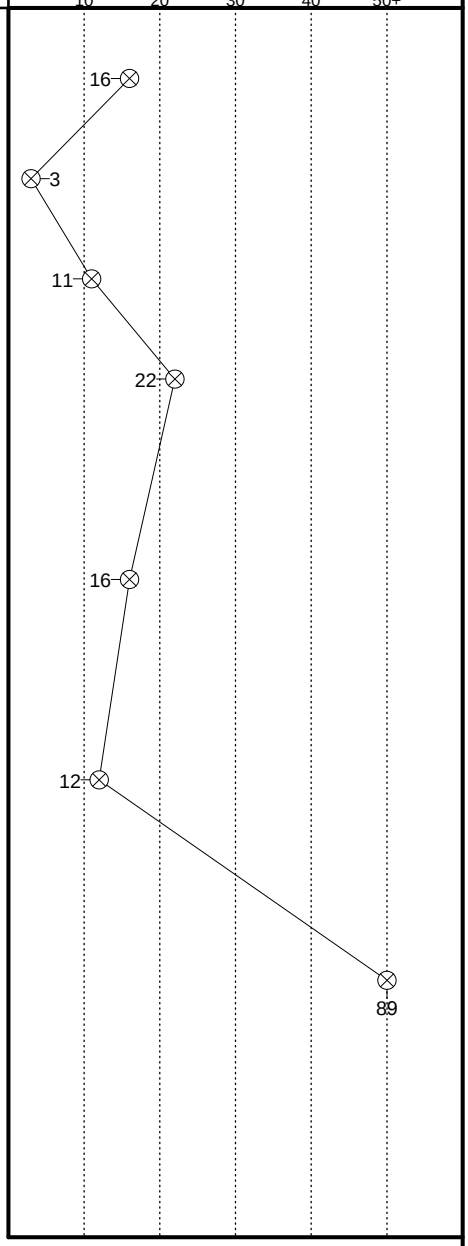
Topsoil Depth [3"]

(SC) CLAYEY SAND, tannish gray, moist to wet, loose to medium dense

(SM) SILTY SAND, tan and white, moist to wet, medium dense to very dense

END OF BORING @ 25'

*Surface Soils Saturated due to inundation (0'-2')



*Note: N-value has been corrected with 94% ER.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 12 WS ☐ WD ☒	BORING STARTED 06/13/17	
▽ WL(BCR) ▽ WL(ACR)	BORING COMPLETED 06/13/17	CAVE IN DEPTH
▽ WL	RIG Diedrich D-50 FOREMAN JD	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	WB 3-2	1 OF 2

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 5007+00, 30'L

P.I. #: 0013369

Ramp D/ Wall No. 3

CALIBRATED PENETROMETER TONS/FT^2 (1, 2, 3, 4, 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% - REC.% (20%, 40%, 60%, 80%, 100%)

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

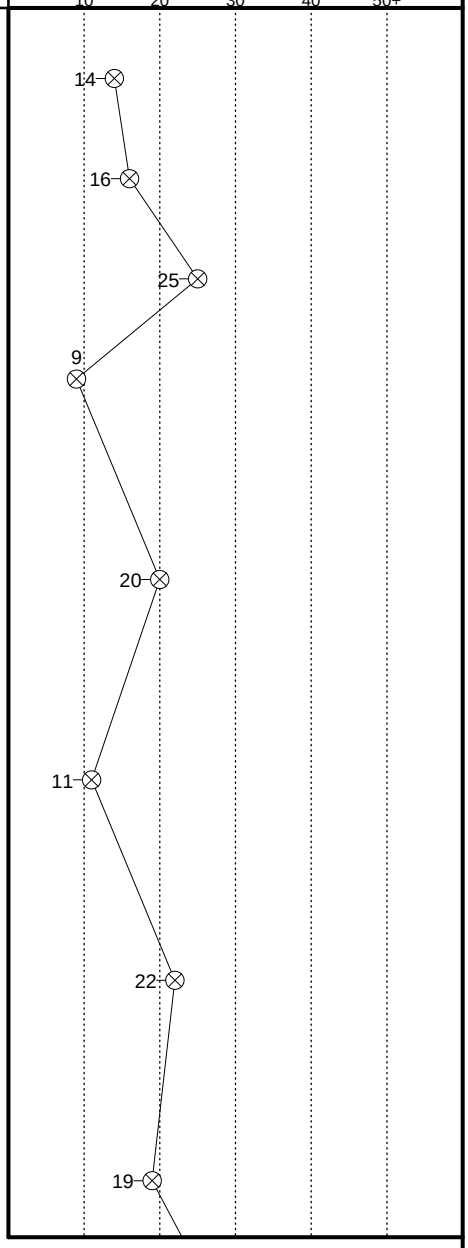
STANDARD PENETRATION BLOWS/FT* (10, 20, 30, 40, 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1160

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (FIELD)
0					Topsoil Depth [3"]		1160	
	S-1	SS	18	18	(SC) CLAYEY SAND, tannish brown and white, moist to wet, medium dense to dense			6 5 4
	S-2	SS	18	18				3 4 6
5							1155	
	S-3	SS	18	18				6 7 9
	S-4	SS	18	18				3 3 3
10							1150	
	S-5	SS	18	18				6 7 6
15						▽	1145	
	S-6	SS	18	18				4 4 3
20							1140	
	S-7	SS	18	18				5 7 7
25							1135	
	S-8	SS	18	18				4 6 6
30							1130	



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*Note: N-value has been corrected with 94% ER.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 15 WS ☐ WD ☒	BORING STARTED 06/12/17	
▽ WL(BCR) ▽ WL(ACR)	BORING COMPLETED 06/12/17	CAVE IN DEPTH
▽ WL	RIG Diedrich D-50 FOREMAN JD	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	WB 3-2	2 OF 2

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 5007+00, 30'L

P.I. #: 0013369

Ramp D/ Wall No. 3

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% REC.%

PLASTIC LIMIT | WATER CONTENT % | LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT*: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION 100%

SURFACE ELEVATION 1160

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (FIELD)
					(SC) CLAYEY SAND, tannish brown and white, moist to wet, medium dense to dense			
35	S-9	SS	18	18			1125	8 15 6
					PARTIALLY WEATHERED ROCK SAMPLED AS SILTY SAND, tannish brown and white, moist to wet, very dense			
40	S-10	SS	15	15			1120	8 22 50/3
					END OF BORING @ 40'			
					*Surface Soils Saturated due to inundation (0'-2')			
45							1115	
50							1110	
55							1105	
60							1100	

33

112/9

*Note: N-value has been corrected with 94% ER.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 15 WS ☐ WD ☒	BORING STARTED 06/12/17	
WL(BCR) WL(ACR)	BORING COMPLETED 06/12/17	CAVE IN DEPTH
WL	RIG Diedrich D-50 FOREMAN JD	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RD-HA-2	1 OF 1

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 5010+50, CL

P.I. #: 0013369

Ramp D/ Wall No. 3

CALIBRATED PENETROMETER TONS/FT^2 (1, 2, 3, 4, 5+)

ROCK QUALITY DESIGNATION & RECOVERY: RQD% (20%, 40%, 60%, 80%, 100%) - REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10, 20, 30, 40, 50+)

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1156

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					(SM) SILTY SAND, tannish brown to gray, moist		1155	
2.5							1152.5	
5					END OF HAND AUGER @ 5'		1150	
7.5							1147.5	
10							1145	
12.5							1142.5	
15								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS☐ WD☐	BORING STARTED 07/11/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/27/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLP
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:9315-A
DATE STARTED: 07-11-2017
DATE COMPLETED: 07-11-2017

HOLE #: WDCP-2
CREW: AR/SL/CG
PROJECT: SR 369 Widening - Soil Survey P.I. No.: 0013369
STATION: 5010+50, CL Ramp D
LOCATION: Forsyth County, GA

SURFACE ELEVATION: 1156'
WATER ON COMPLETION: Dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	2	8.9	••	2	VERY LOOSE	SOFT
- 1 ft	2	8.9	••	2	VERY LOOSE	SOFT
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
- 2 ft	2	8.9	••	2	VERY LOOSE	SOFT
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	2	8.9	••	2	VERY LOOSE	SOFT
- 3 ft	2	8.9	••	2	VERY LOOSE	SOFT
- 1 m	3	13.3	•••	3	VERY LOOSE	SOFT
-	4	15.4	••••	4	VERY LOOSE	SOFT
- 4 ft	2	7.7	••	2	VERY LOOSE	SOFT
-	3	11.6	•••	3	VERY LOOSE	SOFT
-	4	15.4	••••	4	VERY LOOSE	SOFT
- 5 ft	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
-	14	54.0	••••••••••••••	15	MEDIUM DENSE	STIFF
-	11	42.5	••••••••••••	12	MEDIUM DENSE	STIFF
- 6 ft	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
-	8	30.9	••••••••	8	LOOSE	MEDIUM STIFF
- 2 m	9	34.7	•••••••••	9	LOOSE	STIFF
- 7 ft	8	27.4	•••••••	7	LOOSE	MEDIUM STIFF
-	8	27.4	•••••••	7	LOOSE	MEDIUM STIFF
-	12	41.0	••••••••••	11	MEDIUM DENSE	STIFF
- 8 ft	18	61.6	•••••••••••••••••	17	MEDIUM DENSE	VERY STIFF
-	26	88.9	•••••••••••••••••••••••••	25	MEDIUM DENSE	VERY STIFF
-	25	85.5	•••••••••••••••••••••••	24	MEDIUM DENSE	VERY STIFF
- 9 ft	35	119.7	••••••••••••••••••••••••••••••••	25+	DENSE	HARD
-			WDCP Refusal @ 9' 0"			
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	RD-HA-1	1 OF 1

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 5011+75, 40'L

P.I. #: 0013369

Ramp D/ Wall No. 3

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% - REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION 100%

SURFACE ELEVATION 1157

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0						1155	
2.5						1152.5	
5						1150	
7.5						1147.5	
10						1145	
12.5						1142.5	
15							

(SC) CLAYEY SAND, tannish gray, moist to wet

END OF HAND AUGER @ 6'

*Surface Soils Saturated due to inundation (0'-2')

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL Dry WS ☐ WD ☐	BORING STARTED 07/11/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/27/17	CAVE IN DEPTH
WL	RIG FOREMAN AR	DRILLING METHOD Hand Auger Bucket

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLP
1281 Kennestone Circle, Suite 200
Marietta, GA 30066

PROJECT NUMBER: 10:9315-A
DATE STARTED: 07-11-2017
DATE COMPLETED: 07-11-2017

HOLE #: WDCP-1
CREW: AR/SL/CG
PROJECT: SR 369 Widening - Soil Survey P.I. No.: 0013369
STATION: 5011+75, 40'L Ramp D
LOCATION: Forsyth County, GA

SURFACE ELEVATION: 1157'
WATER ON COMPLETION: 15'
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	2	8.9	••	2	VERY LOOSE	SOFT
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
- 1 ft	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	1	4.4	•	1	VERY LOOSE	VERY SOFT
- 2 ft	1	4.4	•	1	VERY LOOSE	VERY SOFT
-	2	8.9	••	2	VERY LOOSE	SOFT
-	2	8.9	••	2	VERY LOOSE	SOFT
- 3 ft	2	8.9	••	2	VERY LOOSE	SOFT
- 1 m	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
- 4 ft	3	11.6	•••	3	VERY LOOSE	SOFT
-	2	7.7	••	2	VERY LOOSE	SOFT
-	2	7.7	••	2	VERY LOOSE	SOFT
- 5 ft	1	3.9	•	1	VERY LOOSE	VERY SOFT
-	1	3.9	•	1	VERY LOOSE	VERY SOFT
-	2	7.7	••	2	VERY LOOSE	SOFT
- 6 ft	2	7.7	••	2	VERY LOOSE	SOFT
-	3	11.6	•••	3	VERY LOOSE	SOFT
- 2 m	3	11.6	•••	3	VERY LOOSE	SOFT
- 7 ft	3	10.3	••	2	VERY LOOSE	SOFT
-	3	10.3	••	2	VERY LOOSE	SOFT
-	3	10.3	••	2	VERY LOOSE	SOFT
- 8 ft	5	17.1	••••	4	VERY LOOSE	SOFT
-	7	23.9	••••••	6	LOOSE	MEDIUM STIFF
-	6	20.5	•••••	5	LOOSE	MEDIUM STIFF
- 9 ft	7	23.9	••••••	6	LOOSE	MEDIUM STIFF
-	7	23.9	••••••	6	LOOSE	MEDIUM STIFF
-	8	27.4	•••••••	7	LOOSE	MEDIUM STIFF
- 3 m 10 ft	7	23.9	••••••	6	LOOSE	MEDIUM STIFF
-	6	18.4	•••••	5	LOOSE	MEDIUM STIFF
-	9	27.5	•••••••	7	LOOSE	MEDIUM STIFF
-	9	27.5	•••••••	7	LOOSE	MEDIUM STIFF
- 11 ft	9	27.5	•••••••	7	LOOSE	MEDIUM STIFF
-	9	27.5	•••••••	7	LOOSE	MEDIUM STIFF
-	10	30.6	••••••••	8	LOOSE	MEDIUM STIFF
- 12 ft	10	30.6	••••••••	8	LOOSE	MEDIUM STIFF
-	10	30.6	••••••••	8	LOOSE	MEDIUM STIFF
-	10	30.6	••••••••	8	LOOSE	MEDIUM STIFF
- 4 m 13 ft	16	49.0	••••••••••••••	13	MEDIUM DENSE	STIFF
	17	47.1	••••••••••••	13	MEDIUM DENSE	STIFF

PROJECT: SR 369 Widening - Soil Survey P.I. No.: 0013369 PROJECT NUMBER: 10:9315-A

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	TESTED CONSISTENCY COHESIVE
-	17	47.1	••••••••••••		VERY DENSE	HARD
-	15	41.6	••••••••••••	11	MEDIUM DENSE	STIFF
- 14 ft	15	41.6	••••••••••••	11	MEDIUM DENSE	STIFF
-	15	41.6	••••••••••••	11	MEDIUM DENSE	STIFF
-	16	44.3	••••••••••••	12	MEDIUM DENSE	STIFF
- 15 ft	15	41.6	••••••••••••	11	MEDIUM DENSE	STIFF
-	15	41.6	••••••••••••	11	MEDIUM DENSE	STIFF
-	15	41.6	••••••••••••	11	MEDIUM DENSE	STIFF
- 16 ft	17	47.1	••••••••••••	13	MEDIUM DENSE	STIFF
- 5 m	18	49.9	••••••••••••••	14	MEDIUM DENSE	STIFF
-	17	43.2	••••••••••••	12	MEDIUM DENSE	STIFF
- 17 ft	18	45.7	••••••••••••	13	MEDIUM DENSE	STIFF
-	17	43.2	••••••••••••	12	MEDIUM DENSE	STIFF
-	23	58.4	•••••••••••••••	16	MEDIUM DENSE	VERY STIFF
- 18 ft	24	61.0	•••••••••••••••	17	MEDIUM DENSE	VERY STIFF
-	25	63.5	••••••••••••••••••	18	MEDIUM DENSE	VERY STIFF
-	26	66.0	•••••••••••••••••••	18	MEDIUM DENSE	VERY STIFF
- 19 ft	25	63.5	••••••••••••••••••	18	MEDIUM DENSE	VERY STIFF
-			WDCP Refusal @ 19' 0"			
- 6 m						
- 20 ft						
-						
-						
- 21 ft						
-						
-						
- 22 ft						
-						
-						
- 7 m 23 ft						
-						
-						
- 24 ft						
-						
-						
- 25 ft						
-						
-						
- 26 ft						
- 8 m						
-						
- 27 ft						
-						
-						
- 28 ft						
-						
-						
- 29 ft						
-						
- 9 m						

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	WB 3-3	1 OF 2

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 5013+00, CL

P.I. #: 0013369

Ramp D/ Wall No. 3

CALIBRATED PENETROMETER TONS/FT^2 (1 2 3 4 5+)

ROCK QUALITY DESIGNATION & RECOVERY — RQD% (20% 40% 60% 80% 100%) - REC.%

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1159

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT* (10 20 30 40 50+)

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (FIELD)	STANDARD PENETRATION BLOWS/FT*
0					Topsoil Depth [3"]				
	S-1	SS	18	18	(ML) SANDY SILT, tannish brown, moist, stiff			2 3 3	9
	S-2	SS	18	18			1155	3 4 4	12
5	S-3	SS	18	18	(SM) SILTY SAND, tannish brown, moist to wet, loose to medium dense			2 3 4	11
	S-4	SS	18	18			1150	2 2 3	8
10									
	S-5	SS	18	18			1145	1 1 2	5
15									
	S-6	SS	18	18			1140	1 1 2	5
20									
	S-7	SS	18	18			1135	3 3 4	11
25									
	S-8	SS	18	18			1130	5 8 12	30
30									

CONTINUED ON NEXT PAGE.

*Note: N-value has been corrected with 90% ER.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 16 WS ☐ WD ☒	BORING STARTED 07/17/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/17/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	WB 3-3	2 OF 2

PROJECT NAME: SR 369 Widening - Soil Survey

ARCHITECT-ENGINEER:

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

STATION: 5013+00, CL

P.I. #: 0013369

Ramp D/ Wall No. 3

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% REC.%

PLASTIC LIMIT | WATER CONTENT % | LIQUID LIMIT %

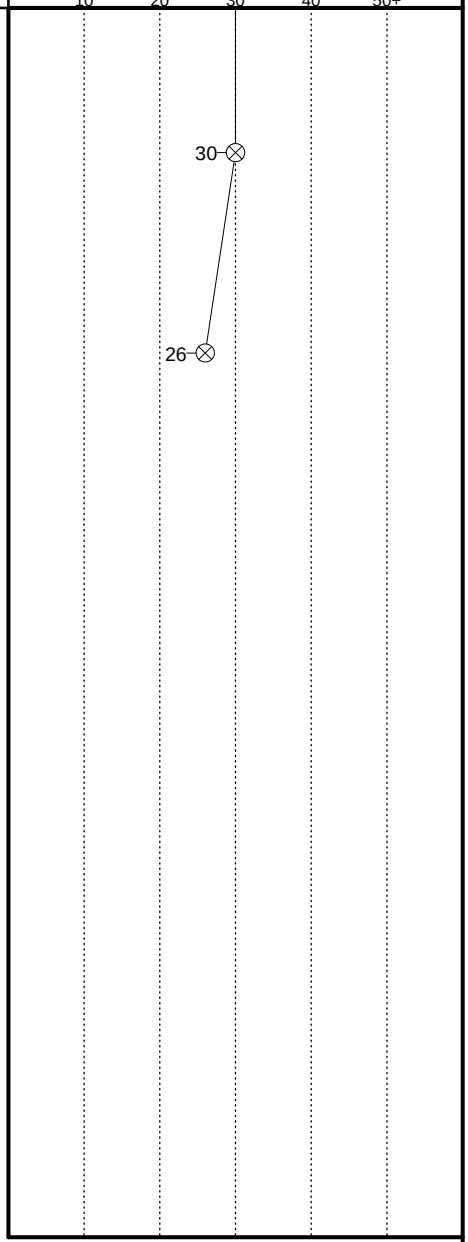
STANDARD PENETRATION BLOWS/FT*: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION 100%

SURFACE ELEVATION 1159

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (FIELD)
					(SM) SILTY SAND, tannish brown, moist to wet, loose to medium dense			
					(SC) CLAYEY SAND, tannish to reddish brown, wet, medium dense			
	S-9	SS	18	18			1125	5 6 14
35								
	S-10	SS	18	18			1120	6 7 10
40					END OF BORING @ 40'			
45							1115	
							1110	
50								
							1105	
55								
							1100	
60								



*Note: N-value has been corrected with 90% ER.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 16 WS ☐ WD ☒	BORING STARTED 07/17/17	
WL(BCR) WL(ACR)	BORING COMPLETED 07/17/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

CLIENT	JOB #	BORING #	SHEET
American Engineers, Inc.	10:9315-B	WB 3-4	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
SR 369 Widening - Soil Survey	

SITE LOCATION: Forsyth County, GA

GDOT PROJ. #:

P.I. #: 0013369

STATION: 5014+50, 60'L

Ramp D/ Wall No. 3

CALIBRATED PENETROMETER TONS/FT^2: 1 2 3 4 5+

ROCK QUALITY DESIGNATION & RECOVERY: RQD% 20% 40% 60% 80% 100% REC.%

PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT*: 10 20 30 40 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION (100%)

SURFACE ELEVATION 1159

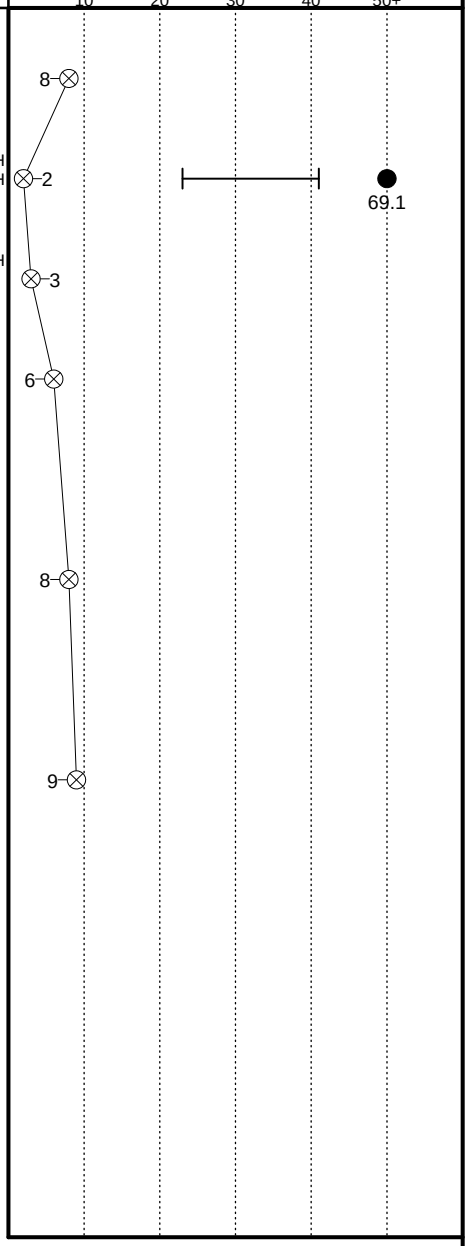
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (FIELD)
0							
	S-1	SS	18	18			2 2 3
	S-2	SS	18	18		1155	WOH WOH 1
5							
	S-3	SS	18	18			WOH 1 1
	S-4	SS	18	18		1150	2 1 3
10							
	S-5	SS	18	18		1145	2 2 3
15							
	S-6	SS	18	18		1140	3 3 3
20							
						1135	
25							
						1130	
30							

Topsoil Depth [2"]

(CL) SANDY LEAN CLAY, tannish gray to tannish brown, moist, very soft to firm

(SM) SILTY SAND, tannish gray to tannish brown, moist to wet, very loose to loose

END OF BORING @ 20'



*Note: N-value has been corrected with 90% ER.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 13 WS ☐ WD ☒	BORING STARTED 08/14/17	
WL(BCR) WL(ACR)	BORING COMPLETED 08/14/17	CAVE IN DEPTH
WL	RIG CME 550x FOREMAN Chad	DRILLING METHOD 2-1/4" HSA

Permits

Georgia DOT

DOT 8413 A
Sept 2005

DEPARTMENT OF TRANSPORTATION

State of Georgia

Atlanta,Georgia 30308

APPLICATION AND PERMIT FOR UTILITY FACILITY ENCROACHMENT

APPLICATION IS HEREBY MADE TO THE GEORGIA DEPARTMENT OF TRANSPORTATION BY:

FORSYTH COUNTY WATER and SEWER

(UTILITY - NAME AND ADDRESS)

110 East Main Street Suite 150 , Cumming GA-30040

FOR PERMISSION TO CONSTRUCT OPERATE AND MAINTAIN THE FOLLOWING DESCRIBED UTILITY FACILITY WITHIN OR FROM THE RIGHT-OF-WAY OFSTATE HIGHWAY NO. 040000 COUNTY ROAD NO. _____ IN Forsyth COUNTY.

DESCRIPTION: install 1,777LF of 42inch DIP,3,632LF of 36inch DIP, and 62LF of 24inch DIP transmission line

LOCATION: Mile Point(14.62) TO Mile Point(15.02)

THE UTILITY SHALL COMPLY WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) CURRENT EDITION. IT IS ANTICIPATED THAT THE TEMPORARY TRAFFIC CONTROL UTILIZED FOR THIS INSTALLATION WILL BE IN ACCORDANCE WITH ONE OF THE FOLLOWING:

[X] MUTCD 6-TYPICAL APPLICATION PLAN	[ ] DETAILED TRAFFIC CONTROL PLAN (ATTACHED)	[ ] COMBINATION TYPICAL APPLICATION & DETAIL TRAFFIC CONTROL PLAN (ATTACHED)

THE UTILITY FACILITIES COVERED HEREBY SHALL BE INSTALLED IN ACCORDANCE WITH THE PLANS ATTACHED HERETO AND MADE A PART HEREOF. UTILITY AGREES TO COMPLY WITH AND BE BOUND BY THE DEPARTMENTS UTILITY ACCOMMODATION POLICY AND STANDARDS, CURRENT EDITION, ON FILE IN THE GENERAL OFFICE OF THE DEPARTMENT OF TRANSPORTATION, MADE A PART HEREOF BY REFERENCE, AND ALL GENERAL PROVISIONS AND SPECIAL PROVISIONS SHOWN ON THE REVERSE HEREOF, OR ATTACHED HERETO, DURING THE INSTALLATION, OPERATION AND MAINTENANCE OF SAID UTILITY FACILITIES WITHIN OR FROM THE RIGHT-OF-WAY.

PERMIT REQUESTED THIS 17 DAY OF January, 2019

100115

(MEMBER CODE)

Johnny Millwood — Jay Kile

WITNESS TO SIGNATURE — (SIGNATURE - Electronic)

Construction Inspector Supervisor 770-886-2790

(TITLE & PHONE NUMBER)

PERMISSION IS GRANTED FOR THE ABOVE DESCRIBED UTILITY FACILITY ENCROACHMENT IN ACCORDANCE WITH THE PLANS AND PROVISIONS HEREOF.

THIS PERMIT IS TO BE STRICTLY CONSTRUED AND NO WORK OTHER THAN THAT SPECIFICALLY DESCRIBED ABOVE IS HEREBY AUTHORIZED.

PERMIT GRANTED THIS 1 DAY OF FEBRUARY 20 19. DEPARTMENT OF TRANSPORTATION

BY: BRENT E. COOK

(DISTRICT ENGINEER)

DISTRICT NO. 1 COUNTY Forsyth	STATE ROUTE NO.040000 U.S._____ CO. RD. NO.
PROJECT NO. 0013369 ACTIVE_____	PERMIT NO. 1189175
UNDER CONSTR_____	

GENERAL PROVISIONS

IT IS EXPRESSLY STIPULATED THAT THIS PERMIT IS A LICENSE FOR PERMISSIVE USE ONLY, AND THE PLACING OF UTILITY FACILITIES UPON PUBLIC PROPERTY, PURSUANT TO THIS PERMIT, SHALL NOT OPERATE TO CREATE OR VEST ANY PROPERTY RIGHT IN THE HOLDER.

WHENEVER NECESSARY FOR THE CONSTRUCTION, REPAIR, IMPROVEMENT, MAINTENANCE, SAFE AND EFFECTIVE OPERATION, ALTERATION OR RELOCATION OF ALL OR ANY PORTION OF THE HIGHWAY, AS DETERMINED BY THE DEPARTMENT, ANY OR ALL OF SAID FACILITIES AND APPURTENANCES AUTHORIZED HEREUNDER SHALL BE IMMEDIATELY REMOVED FROM THE RIGHT-OF-WAY, OR RESET OR RELOCATED THEREON, AS REQUIRED BY THE CHIEF ENGINEER, AND AT THE SOLE EXPENSE OF THE UTILITY, UNLESS REIMBURSEMENT IS AUTHORIZED BY SEPARATE AGREEMENT. SHOULD THE UTILITY FAIL TO REMOVE OR RELOCATE ITS FACILITIES UPON DUE NOTICE FROM THE DEPARTMENT, THE UTILITY SHALL BE LIABLE FOR ANY EXTRAORDINARY COSTS OR DAMAGES INCURRED BY THE DEPARTMENT AS A RESULT THEREOF.

IF THE DEPARTMENT UNDERTAKES TO IMPROVE THIS HIGHWAY, IT SHALL BE THE RESPONSIBILITY OF THE UTILITY TO PLAN, WITH THE DEPARTMENT AND ITS CONTRACTOR, A SCHEDULE WHICH WILL CLEARLY SETS FORTH AT WHICH STAGE OF OPERATIONS THE UTILITY WILL BE REQUIRED TO PERFORM ANY ADJUSTMENT TO ITS FACILITIES NECESSARY TO ACCOMMODATE THE HIGHWAY IMPROVEMENTS.

DURING THE INITIAL INSTALLATION OR CONSTRUCTION OF FACILITIES AUTHORIZED BY THIS PERMIT, OR DURING ANY FUTURE REPAIR, REMOVAL OR RELOCATION THEREOF OR ANY MISCELLANEOUS OPERATIONS, THE UTILITY SHALL, AT ALL TIMES, MAINTAIN FLAGMEN, SIGNS, LIGHTS, FLARES, BARRICADES, AND OTHER SAFETY DEVICES IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), CURRENT EDITION, AND, AS MAY BE NECESSARY, TO PROPERLY PROTECT TRAFFIC UPON THE HIGHWAY AND TO WARN AND SAFEGUARD THE PUBLIC AGAINST INJURY OR DAMAGE.

IT IS EXPRESSLY PROVIDED THAT, WITH RESPECT TO ANY LIMITED ACCESS HIGHWAY, THE UTILITY SHALL NOT HAVE OR GAIN DIRECT ACCESS, EITHER INGRESS OR EGRESS, FROM THE MAIN TRAVELED WAY OF SAID HIGHWAY OR ITS ON OR OFF RAMPS TO ANY FACILITIES AUTHORIZED BY THE PERMIT EXCEPT UPON SPECIFIC APPROVAL BY THE DEPARTMENT.

IT IS THE UTILITY'S RESPONSIBILITY TO VERIFY THE LIMITS OF RIGHT-OF-WAY FOR LOCATION OF THE UTILITY FACILITIES AUTHORIZED HEREBY.

NO INHERENT OR RETAINED RIGHT OR PRIVILEGE OF ANY ABUTTING PROPERTY OWNER IS AFFECTED BY THIS PERMIT NOR IS THE DEPARTMENT RESPONSIBLE FOR ANY CLAIM WHICH MAY DEVELOP BETWEEN THE UTILITY AND ANY PROPERTY OWNER CONCERNING USE OF THE RIGHT OF WAY. THE UTILITY IS RESPONSIBLE FOR MAINTAINING REASONABLE ACCESS TO PRIVATE DRIVEWAYS DURING INSTALLATION OF ITS FACILITIES AND FOR RESTORATION OF DRIVEWAYS TO THE PROPERTY OWNER'S SATISFACTION.

APPROVAL OF THIS PERMIT DOES NOT CONSTITUTE APPROVAL OF DESIGN OR CONSTRUCTION DETAILS FOR THE PROPOSED UTILITY FACILITIES. THE UTILITY IS RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE GOVERNMENTAL CODES AND REGULATIONS.

THE UTILITY SHALL GIVE THE DEPARTMENT A MINIMUM OF 24 HOURS NOTICE PRIOR TO BEGINNING ANY WORK UNDER THIS PERMIT.

THIS PERMIT SHALL BE VOID UNLESS WORK HEREUNDER IS BEGUN WITHIN TWELVE (12) MONTHS OF THE DATE OF ITS APPROVAL.

THE PROVISIONS OF THIS PERMIT ARE REGULATORY AND NOT CONTRACTUAL. NO INTEREST OR RIGHT OF A UTILITY GRANTED BY THIS PERMIT MAY BE TRANSFERRED TO ANOTHER EXCEPT BY WRITTEN CONSENT OF THE DEPARTMENT. THIS PERMIT MAY BE REVOKED AT THE PLEASURE OF THE DEPARTMENT UPON THIRTY (30) DAYS WRITTEN NOTICE TO THE UTILITY.

PLAN

SCALE: 1" = 500'

0 1000 2,000

GRAPHIC SCALE

LOCATION MAP

FOR AGENCY APPROVAL

APPLICANT: FORSYTH COUNTY DEPARTMENT OF WATER AND SEWER		DATE: 1-9-19
PROJECT ENGINEER: CONSTANTINE ENGINEERING, INC.		PROJECT NUMBER: 100182.15
PROJECT TITLE: HWY 400 WATERLINE RELOCATION		SCALE: AS SHOWN

PERMIT DATA FOR PERMIT APPLICATION 1189175

The work category of your project is **Potable Water**

in Forsyth County/Counties

TPro Project ID **0013369**

Location Information

The Utility installation location was narrowed down to

Beginning Mile Point **14.62** and Ending Mile Point **15.02**

on Route No **040000**

General Encroachment Information

Traffic Control type is **MUTCD Part 6 - Typical Application Plan**

Traffic Control Plan Upload

Utility Information

Work description **install 1,777LF of 42inch DIP,3,632LF of 36inch DIP, and 62LF of 24inch DIP transmission line**

Work days estimate	**220**	Bridge and Wall Attachments	**No**
Facility Placement Type	**Both**	Installation Length	**5568**
Facility Type	**Transmission**	Service Type	**Both**
Pipe Size	**42**	Pipe Material	**DIP**
Pressure	**160**	Casing Material	**Steel**
Casing Diameter	**54**	Valve Quantity	**9**
Main Type	**Pressure**		
Manhole Quantity	**0**	Handhole Quantity	**0**
Minimum Depth	**4**	Maximum Depth	**18**

Number of Test Holes		**0**	Involves Pavement Cutting		**No**
Joint Trench	**No**	Underground Construction Type(s)	**Jack and Bore ,Trench**	**Drawings Upload**	Upload #
1	File Name	**Brown 11_20.pdf**	File Description	**Permit Plans**	Upload #
2	File Name	**Brown 1_10.pdf**	File Description	**Permit Plans**	Upload #
3	File Name	**Brown 21_30.pdf**	File Description	**Permit Plans**	Upload #
4	File Name	**Brown 31_40.pdf**	File Description	**Permit Plans**	Upload #
5	File Name	**Brown 41_50.pdf**	File Description	**Permit Plans**	Upload #
6	File Name	**Brown 51_60.pdf**	File Description	**Permit Plans**	Upload #
7	File Name	**Brown 61_70.pdf**	File Description	**Permit Plans**	Upload #
8	File Name	**Brown 71_80.pdf**	File Description	**Permit Plans**	Upload #
9	File Name	**Brown 81_90.pdf**	File Description	**Permit Plans**	Upload #
10	File Name	**Brown 91_96.pdf**	File Description	**Permit Plans**	Upload #
11	File Name	**LOCATION MAP-400.pdf**	File Description	**Permit Plans**	**Blasting Information**
Blasting Required is No.	**General Utility Adjustment Schedule**	Plan Date	**Jan 10, 2018**	Project Number	**0013369**
Schedule Type	**Original**	Facility Identificatio	Record/Map Field Review	Special Requirements	**none**

		n			
Plan Type	**Original**	Cost Borne By	**Utility Owner**	Cost Approval Status	**Yes**
Existing Utility Details: # 1	Service Provided	**42 inch DIP water main instillation**	Quantity	**1777**	Unit
NA	**Existing Utility Details: # 2**	Service Provided	**36 inch DIP water main instillation**	Quantity	**3632**
Unit	**NA**	**Existing Utility Details: # 3**	Service Provided	**24 inch DIP water main instillation**	Quantity
62	Unit	**NA**	**Existing Utility Details: # 4**	Service Provided	**12 inch DIP water main instillation**
Quantity	**72**	Unit	**NA**	**Existing Utility Details: # 5**	Service Provided
10 inch DIP water main instillation	Quantity	**25**	Unit	**NA**	Project Phase
Preliminary Engineering	Is Applicable	**Yes**	**Work Plan Details: # 1**	Work Plan Description	**Entire project**
Dependent Activities	**receipt of preliminary plans**	Plan Stage	**NA**	Average Number of Workers	**1**
Begin Day	**-30**	Duration in Calendar Days:	**30**	Productive Days/Week	**5**
Project Phase	**Construction Engineering**	Is Applicable	**Yes**	**Work Plan Details: # 1**	Work Plan Description
Entire Project	Dependent Activities	**NTP and final plans from Forsyth**	Plan Stage	**NA**	Average Number of Workers

1	Begin Day	**1**	Duration in Calendar Days:	**49**	Productive Days/Week
5	Project Phase	**Material Procurement**	Is Applicable	**Yes**	**Work Plan Details: # 1**
Work Plan Description	**Entire Project**	Dependent Activities	**Completion of construction engineering and award of contract**	Plan Stage	**NA**
Average Number of Workers	**1**	Begin Day	**50**	Duration in Calendar Days:	**40**
Productive Days/Week	**5**	Project Phase	**Construction**	Is Applicable	**Yes**
Work Plan Details: # 1	Work Plan Description	**Start at STA 5004+31 and end at STA 1052+00**	Dependent Activities	**Receipt of materials**	Plan Stage
NA	Average Number of Workers	**8**	Begin Day	**90**	Duration in Calendar Days:
130	Productive Days/Week	**5**			

		Original schedule
Project:	County: Forsyth	Route/Road :040000
Description: SR 400 FROM CR 458/MCFARLAND ROAD TO SR 369		

A. SUMMARY OF UTILITY FACILITIES AND UTILITY ADJUSTMENT SCHEDULE.

List of all existing facilities within project (exclude minor items)

Quantity, Type of facility, Type of service	Quantity in conflict	Units
42 inch DIP water main instillation	1777	NA
36 inch DIP water main instillation	3632	NA
24 inch DIP water main instillation	62	NA
12 inch DIP water main instillation	72	NA
10 inch DIP water main instillation	25	NA

Existing facility locations were identified using **Record/Map Field Review** dated: **Jan 24, 2019**

This schedule is based on **Preliminary** dated: **Jan 10, 2018**

If any changes are made to the plans after this date, which affect the utility, then this schedule may require modification.

Prepared by	Title	Phone	Date
Jay Kile	*Construction Inspector Supervisor*	*678-410-3953*	*Jan 17, 2019*
Approved by GDOT	Title	Phone	Date
Comments			

B. SPECIAL REQUIREMENTS (staging required, dependent activities, joint-use coordination, etc.).

none

C. WORK PLAN - provide disposition of all existing and proposed facilities on project.

Location	Description of utility work	Dependent activities	Plan Stage No.	Days	Average number of workers
Preliminary Engineering					
Entire project	Review preliminary plans for conflicts	receipt of preliminary plans	NA	30	1
Construction Engineering					
Entire Project	review final plans for any changes and attend preco meeting, Approval by Board, Advertisement and award of Bid	NTP and final plans from Forsyth	NA	49	1
Material Procurement					
Entire Project	Order and delivery to work site	Completion of construction engineering and award of contract	NA	40	1
Construction					
Start at STA 5004+31 and end at STA 1052+00	Install 2600LF ofnew 42inch water main that reduces to a 36 inch water main and to clear project limits time includes any tie in work	Receipt of materials	NA	130	8

D. SCHEDULE SUMMARY FOR WORK PLAN.

Exclude weekends, weather delays and non-productive time:

Work Phase	Total estimated days	Prior to project award	After project award
Preliminary Engineering	30	30	
Construction Engineering	49		50
Material Procurement	40		90
Construction	130		220

Project duration for non-concurrent activities in days: 220

EPD

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

Watershed Protection Branch
2 Martin Luther King, Jr. Drive
Suite 1152, East Tower
Atlanta, Georgia 30334
404-463-1511

March 4, 2019

Mr. Jefferey Duplantis, P.E.
Constantine Engineering
368 West Pike Street
Lawrenceville, GA 30046

Re: **HWY 400 Waterline Relocation**
Forsyth County Water and Sewer Authority (WSID#1170050)
Forsyth County, Georgia

Dear Mr. Duplantis:

The Plans and Specifications for the above referenced water system project, prepared by Constantine Engineering, have been reviewed and are hereby approved by the Drinking Water Permitting & Engineering Program of the Environmental Protection Division contingent upon the following conditions:

1. Upon completion of the construction or modification, submit a statement from the registered professional engineer and affixed with their professional engineering seal stating that construction was completed in accordance with the approved plans and specifications. The statement shall be based upon observations during and upon completion of construction by the engineer or a representative of the engineer's office who is under the engineer's supervision. [See section 1.2.3. of the Division's *Minimum Standards for Public Water Systems*]

2. Construction or modification must be completed in accordance with Forsyth County Water and Sewer Authority's standards and specifications approved by EPD.

3. Forsyth County must own, operate, and maintain the water system improvements and additions.

4. The wastewater/sewer portion of this project must be approved by Wastewater Regulatory Program at 404-463-4949 prior to construction.

5. All materials that are used and come into contact with drinking water during its treatment, storage, transmission or distribution shall not adversely affect drinking water quality and public health and must be certified for conformance with American National Standards Institute/National Sanitation Foundation Standard 61 (ANSI/NSF Standard 61).

6. In addition, any pipe, pipe fittings, plumbing fittings or fixtures, solder, or flux used in the installation or repair of a public water system must meet the new definition of lead free meaning: (a) not containing more than 0.2 percent lead when used with respect to solder and flux; and (b) not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.

7. Water mains shall be laid at least ten (10) feet horizontally from any existing or proposed sanitary sewer, storm sewer or sewer manhole. The distance shall be measured edge-to edge.

8. Water mains crossing house sewer, storm sewers or sanitary sewers shall be laid to provide a separation of at least 18 inches between the bottom of the water main and the top of the sewer.

9. Valves are to be placed at all intersections of water mains. Valves should be located at not more than 500 foot intervals in commercial districts and at not more than one block or 800 foot intervals in other districts. Where systems serve widely scattered customers, the valve spacing should not exceed 4000 feet.

10. All distribution mains shall be provided with sufficient earth and other suitable cover to prevent freezing. This shall be not less than 24 inches measured above the top of pipe.

11. Pressure and leakage tests shall be performed in accordance with the latest edition of AWWA Standard C600.

12. Disinfection of the water line and related appurtenances shall be accomplished in accordance with the latest edition of AWWA Standard C651. The continuous-feed method of chlorination shall be used for the disinfection of all newly installed water mains. The "tablet method" and "slug method", which consists of placing calcium hypochlorite granules or tablets in the water main as it is being installed and then filling the main with potable water when installation is complete is not allowed.

13. Reminder, following installation, all new and repaired water lines and appurtenances shall be flushed, pressure tested and disinfected. Samples shall be collected and tested for satisfactory microbiological quality of the water, prior to placing the lines into service.

14. Finally, if applicable, a land disturbing activity permit must be obtained (either from local government or EPD) prior to the start of any construction. Depending on your site, you may also be required to file a Notice of Intent (NOI) with EPD to be covered under the General Permit for Stormwater Discharge Associated with Construction.

The Division's approval includes the installation of 3273 LF of 42-inch and 3606 LF of 36 inch Ductile Iron water mains, valves, hydrants, and all with related appurtenances as detailed in the submitted Drinking Water Project Submittal Form, Plans, Specifications and other project related documentation.

This approval is for Forsyth County Water and Sewer Authority and valid for one (1) year from the date of this letter. If the construction has not begun by that date, the Division may choose to reevaluate the project with regard to the Rules and Regulations in effect at that time. One (1) set of the approved plans and specs are returned herewith.

If you have any questions or if we can assist, please do not hesitate to call.

Sincerely,

DK Thakkar

Disha Thakkar
Environmental Engineer
Drinking Water Permitting & Engineering Program
(404) 463-8010

USACOE

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT
1590 ADAMSON PARKWAY, SUITE 200
MORROW, GEORGIA 30260

March 5, 2019

Regulatory Branch
SAS-2019-00096

Forsyth County Department of Water and Sewer
Attention: Mr. Barry Lucas
110 East Main Street, Suite 150
Cumming, Georgia 30040

Dear Mr. Lucas:

I refer to the Pre-Construction Notification submitted on your behalf by Calyx Engineers and Consultants, requesting verification for use of Nationwide Permit (NWP) No. 12 for impacts to 0.27-acres of wetlands and 47 linear feet of streams for installation of a new 42-inch water line beginning in the southwest quadrant of the State Road 400/ Brown's Bridge Road intersection, extending north along the west side of State Road 400, then extending east along Martin Road, the impacts to aquatic resources are shown in detail on, attached, "Plan Sheets C1, C2, C3, C6, C7, C8A, and C16, HWY 400, Waterline Relocation," prepared by Constantine Engineering, dated November 2018. Appropriate best management practices will be utilized during construction for all wetland impacts and stream crossings and all aquatic resources will be returned to pre-construction contours and re-vegetated with native vegetation upon completion of the project. No impacts are proposed or authorized in Wetlands 6, 7 and 8 or in perennial stream 3 and intermittent stream 4 and best management practices will be utilized to prevent sediment from entering these waters during construction. **No tree clearing shall occur between May 15 and July 31.** The project site is located at Brown's Bridge Road at State Road 400, Cumming, Forsyth County, Georgia, (latitude: 34.2639, longitude: -84.0907). This project has been assigned number SAS-2019-00096 and it is important that you refer to this number in all communication concerning this matter.

The enclosed exhibits entitled, "Figures 1a and 1b, Federal Waters Map", received on January 30, 2019, identifies the delineation limits of all aquatic resources within the project area. The wetlands were delineated in accordance with criteria contained in the 1987 "Corps of Engineers Wetland Delineation Manual," as amended by the most recent regional supplements to the manual. This delineation will remain valid for a period of 5-years unless new information warrants revision prior to that date.

We understand that by the end of the first full growing season after the authorized work has been completed, you will inspect all authorized stream and wetland crossing sites that have been temporarily filled in order to verify that excess fill material has been

removed, and to confirm that all affected areas have been stabilized to prevent erosion and sedimentation of surrounding wetlands/waters. This monitoring event may be summarized in a report containing photographs of all the authorized temporary impact locations and a brief summary of site conditions that includes: a) a statement on whether all excess fill has been removed; and, b) a description of the condition of vegetative growth in the wetland area in proximity to the impact location. Reporting may utilize the latest version of the Draft Temporary Post-Construction Aquatic Resource Monitoring (v. 01/17 or later) to document the condition of all authorized stream and wetland crossings for this project. Effort will be made to safeguard that any fill identified as remaining in areas designated for temporary impact is removed within two weeks of the monitoring event, and that measures are taken to address all unstable or eroding areas within two weeks of monitoring. Any corrective actions necessary to remediate stream channels or wetland areas identified in the initial monitoring event may be documented using the latest version of the Draft Temporary Post-Construction Aquatic Resource Monitoring document (v. 01/17 or later), subsequent to completion of the proposed corrective actions.

We have completed coordination with other federal and state agencies as described in Part C (32)(d) of our NWP Program, published in the January 6, 2017, Federal Register, Vol. 82, No. 4, Pages 1860-2008 (82 FR). The NWPs and Savannah District's Regional Conditions for NWPs can be found on our website at http://www.sas.usace.army.mil/Missions/Regulatory/Permitting/GeneralPermits/NationwidePermits.aspx. During our coordination procedure, no adverse comments regarding the proposed work were received.

As a result of our evaluation of your project, we have determined that the proposed activity is authorized as described in Part B of the NWP Program. Your use of this NWP is valid only if:

a. The activity is conducted in accordance with the information submitted and meets the conditions applicable to the NWP, as described at Part C of the NWP Program and the Savannah District's Regional Conditions for NWPs.

b. You shall obtain and comply with all appropriate federal, state, and local authorizations required for this type of activity. A stream buffer variance may be required from the Georgia Department of Natural Resources, Environmental Protection Division (Georgia EPD), as defined in the Georgia Erosion and Sedimentation Control Act of 1975, as amended. Information concerning variances can be obtained at the Georgia EPD's website at www.epd.georgia.gov, or by calling (404) 463-1511.

c. All work conducted under this permit shall be located, outlined, designed, constructed and operated in accordance with the minimal requirements of the Georgia Erosion and Sedimentation Control Act of 1975, as amended. Utilization of plans and specifications contained in the "Manual for Erosion and Sediment Control," (Latest

Edition), published by the Georgia Soil and Water Conservation Commission, will aid in achieving compliance with the aforementioned minimal requirements.

d. You shall install and maintain erosion and sediment control measures in upland areas of the project site, in accordance with the Georgia Erosion and Sedimentation Control Act of 1975, as amended, to minimize the introduction of sediment into and the erosion of streams, wetlands and other waters of the United States. This permit does not authorize installation of check-dams, weirs, riprap, bulkheads or other erosion control measures in streams, wetlands or other waters of the United States. Authorization would be required from the U.S. Army Corps of Engineers prior to installing any erosion control measures in waters of the United States.

e. You shall install and maintain erosion and sediment control measures for all fill material that is authorized to be discharged in streams, wetlands and other waters of the United States, in accordance with the Georgia Erosion and Sedimentation Control Act of 1975, as amended, and permanently stabilize fill areas at the earliest practicable date.

f. You shall notify the Corps, in writing, at least 10 days in advance of commencement of work authorized by this permit.

g. You shall fill out and sign the enclosed certification and return it to our office within 30 days of completion of the activity authorized by this permit.

This proposal was reviewed in accordance with Section 7 of the Endangered Species Act. Based on the information we have available, we have determined that the project may affect, but is not likely to affect northern long-eared bats, and the 4d Rule applies, per EDGES. Authorization of an activity by a NWP does not authorize the "take" of threatened or endangered species. In the absence of separate authorization, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act. See Part (C) of 82 FR for more information.

This verification is valid until the NWP is modified, reissued or revoked. All of the existing NWPs are scheduled to expire on March 18, 2022. It is incumbent upon you to remain informed of changes to the NWPs. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant NWP is modified or revoked, you will have 12 months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this NWP.

This authorization should not be construed to mean that any future projects requiring Department of the Army authorization would necessarily be authorized. Any new proposal, whether associated with this project or not, would be evaluated on a case-by-case basis. Any prior approvals would not be a determining factor in making a decision on any future request.

Revisions to your proposal may invalidate this authorization. In the event changes to this project are contemplated, I recommend that you coordinate with us prior to proceeding with the work.

This communication does not relieve you of any obligation or responsibility for complying with the provisions of any other laws or regulations of other federal, state or local authorities. It does not affect your liability for any damages or claims that may arise as a result of the work. It does not convey any property rights, either in real estate or material, or any exclusive privileges. It also does not affect your liability for any interference with existing or proposed federal projects. If the information you have submitted and on which the Corps bases its determination/decision of authorization under the NWP is later found to be in error, this determination may be subject to modification, suspension, or revocation.

A copy of this letter is being provided to the following party: Calyx Engineers and Consultants, Attention: Mr. Blake Ellett, 1255 Canton Street, Suite G, Roswell, Georgia 30075.

Thank you in advance for completing our on-line Customer Survey Form located at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey. We value your comments and appreciate your taking the time to complete a survey each time you have interaction with our office.

If you have any questions, please call Jade R. Bilyeu, Regulatory Specialist, at (678) 422-6572 or jade.r.bilyeu@usace.army.mil.

Sincerely,

for Philip A. Shannin
Team Lead, Piedmont Section

Enclosures

Regulatory Division

CERTIFICATION OF COMPLIANCE
WITH
DEPARTMENT OF THE ARMY

PERMIT FILE NUMBER: SAS-2019-00096

PERMITTEE ADDRESS: Forsyth County Department of Water and Sewer, Attention: Mr. Barry Lucas, 110 East Main Street, Suite 150, Cumming, Georgia 30040.

LOCATION OF WORK: The project site is located at Brown's Bridge Road at State Road 400, Cumming, Forsyth County, Georgia, (latitude: 34.2639, longitude: -84.0907).

PROJECT DESCRIPTION: Installation of a new water line that would temporarily impact a total of 0.27-acres of wetlands (0.15-acres in wetland 1, and 0.12-acres in wetland 5) and 55 linear feet of perennial streams (30 linear feet of PS02a, 12 linear feet of PS02b and 13 linear feet of PS09).

ACRES AND/OR LINEAR FEET OF WATERS OF THE UNITED STATES IMPACTED: 0.27-acres of two wetlands and 47 linear feet of three perennial streams.

DATE WORK IN WATERS OF UNITED STATES COMPLETED: _____

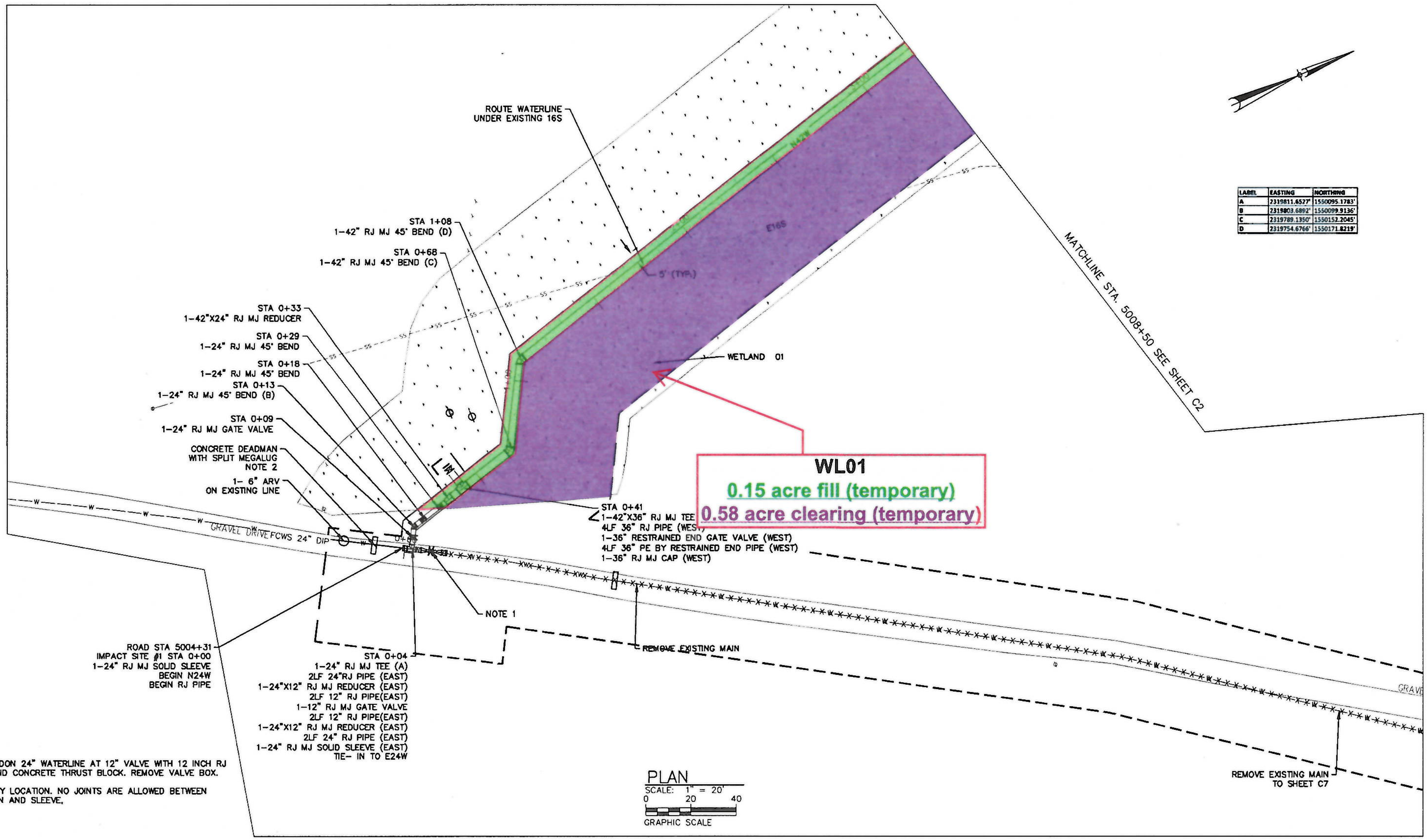
COMPENSATORY MITIGATION REQUIRED: None.

DATE MITIGATION COMPLETED OR PURCHASED (include name of bank):
Not applicable.

I understand that the permitted activity is subject to a U.S. Army Corps of Engineers' Compliance Inspection. If I fail to comply with the permit conditions at Part C of the Nationwide Permit Program, published in the January 6, 2017, Federal Register, Vol. 82, No.4, Pages 1860-2008, it may be subject to suspension, modification or revocation.

I hereby certify that the work authorized by the above referenced permit as well as any required mitigation (if applicable) has been completed in accordance with the terms and conditions of the said permit.

_____ _____
Signature of Permittee Date



LABEL	EASTING	NORTHING
A	2319811.6527'	1550095.1783'
B	2319803.6892'	1550099.9136'
C	2319789.1350'	1550152.2045'
D	2319754.6766'	1550171.8219'

PLAN
SCALE: 1" = 20'
0 20 40
GRAPHIC SCALE

NOTES:
1. ABANDON 24" WATERLINE AT 12" VALVE WITH 12 INCH RJ PLUG AND CONCRETE THRUST BLOCK. REMOVE VALVE BOX.
2. VERIFY LOCATION. NO JOINTS ARE ALLOWED BETWEEN DEADMAN AND SLEEVE.

PROFILE: SEE C20

FOR AGENCY APPROVAL

Constantine
388 WEST PIKE ST. SUITE 104
LAWRENCEVILLE, GA 30046
PH. 878-241-4070

APVD	BY	REVISIONS	DATE	NO.	APVD
					DSGN
					DRN
					CHK

FORSYTH

AEI

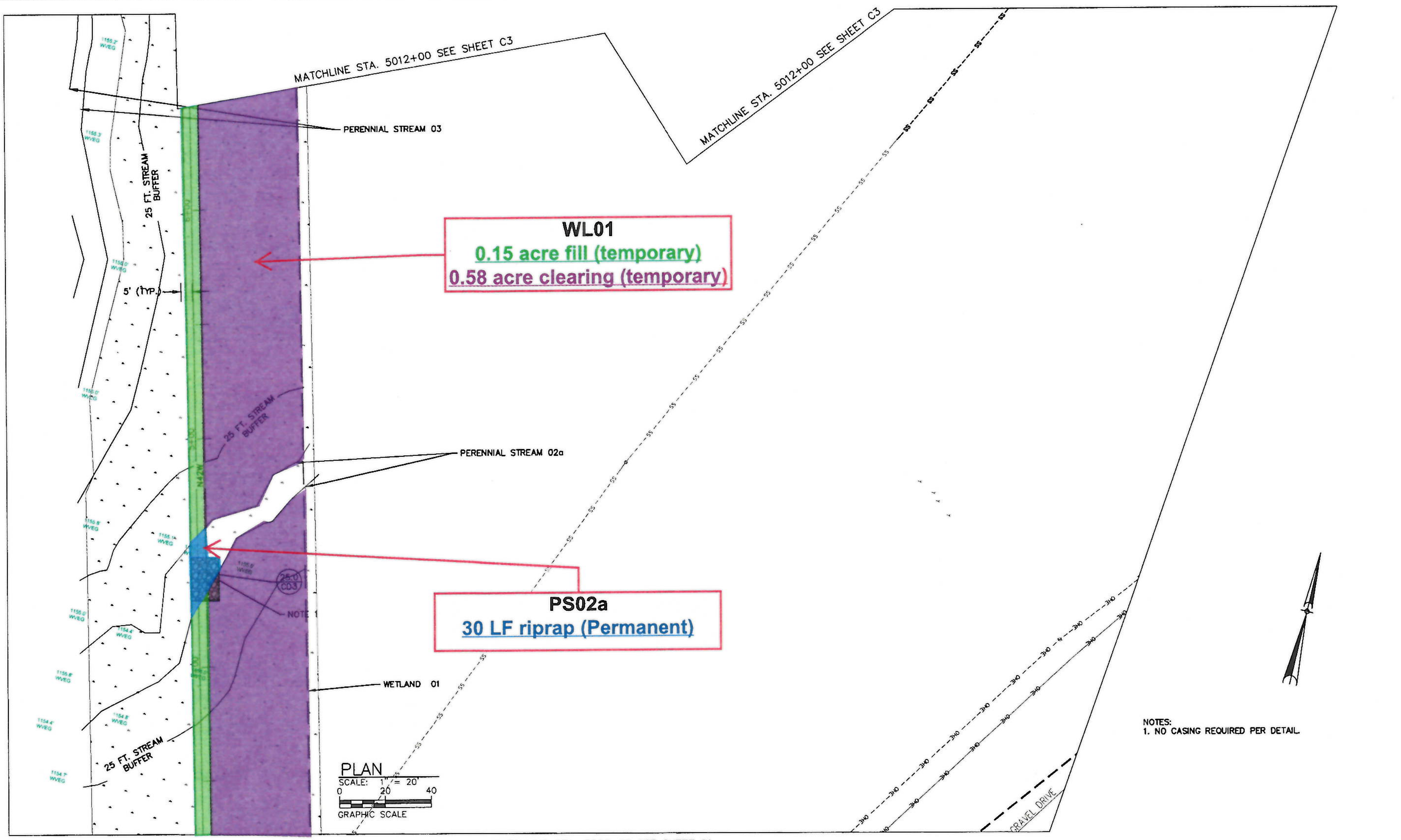
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

ENGINEERS SEAL

HWY 400
WATERLINE RELOCATION

ROAD: STA. 5004+50 TO STA. 5008+50
MAIN: IMPACT SITE #1- STA. 0+00 TO STA. 3+27

SHEET: C1
DWG NO:
DATE: NOVEMBER, 2018
PROJ NO: 100182.15



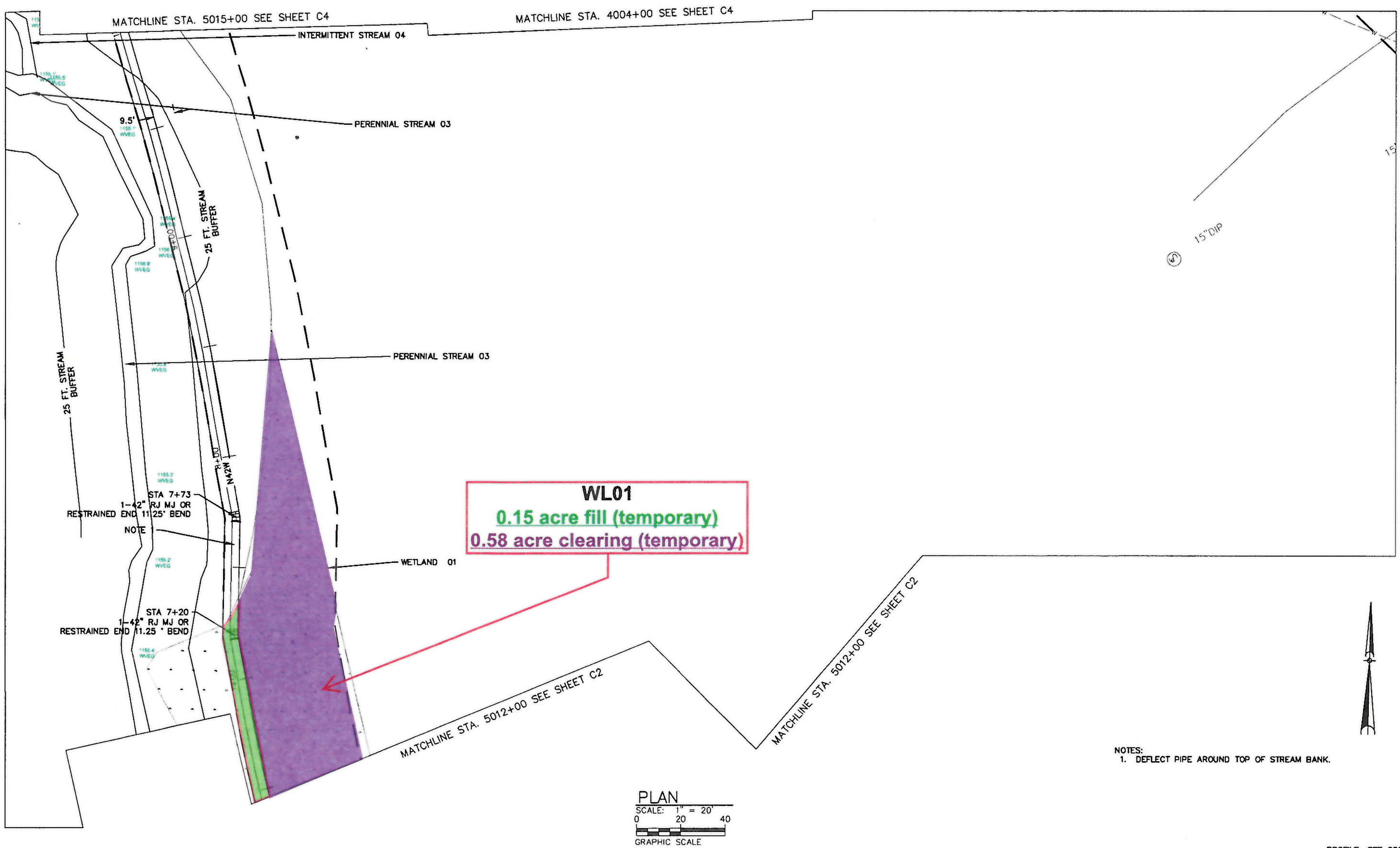
MATCHLINE STA. 5008+50 SEE SHEET C1

PROFILE: SEE C21

FOR AGENCY APPROVAL

Constantine Engineering, 366 West Pike St. Suite 104, Lawrenceville, GA 30046, PH. 678-241-4070	APVD / BY / REVISIONS / DATE / NO.	DSGN / DRN / CHK / APVD	FORSYTH / AEI	VERIFY SCALE: BAR IS ONE INCH ON ORIGINAL DRAWING 0 — 1". IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	ENGINEERS SEAL	HWY 400 WATERLINE RELOCATION	ROAD: STA. 5008+50 TO STA. 5012+00 MAIN: IMPACT SITE #1- STA. 3+27 TO STA. 6+46

SHEET: C2
DWG NO:
DATE: NOVEMBER, 2018
PROJ NO: 100182.15



NOTES:
1. DEFLECT PIPE AROUND TOP OF STREAM BANK.

PROFILE: SEE C22

FOR AGENCY APPROVAL

Constantine Engineering
368 WEST PIKE ST SUITE 104
LAWRENCEVILLE, GA 30046
PH. 678-241-4070

APVD	BY	REVISIONS	DATE	NO.	APVD

DSGN / DRN / CHK / APVD

FORSYTH

AEI

VERIFY SCALE: BAR IS ONE INCH ON ORIGINAL DRAWING 0 — 1". IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

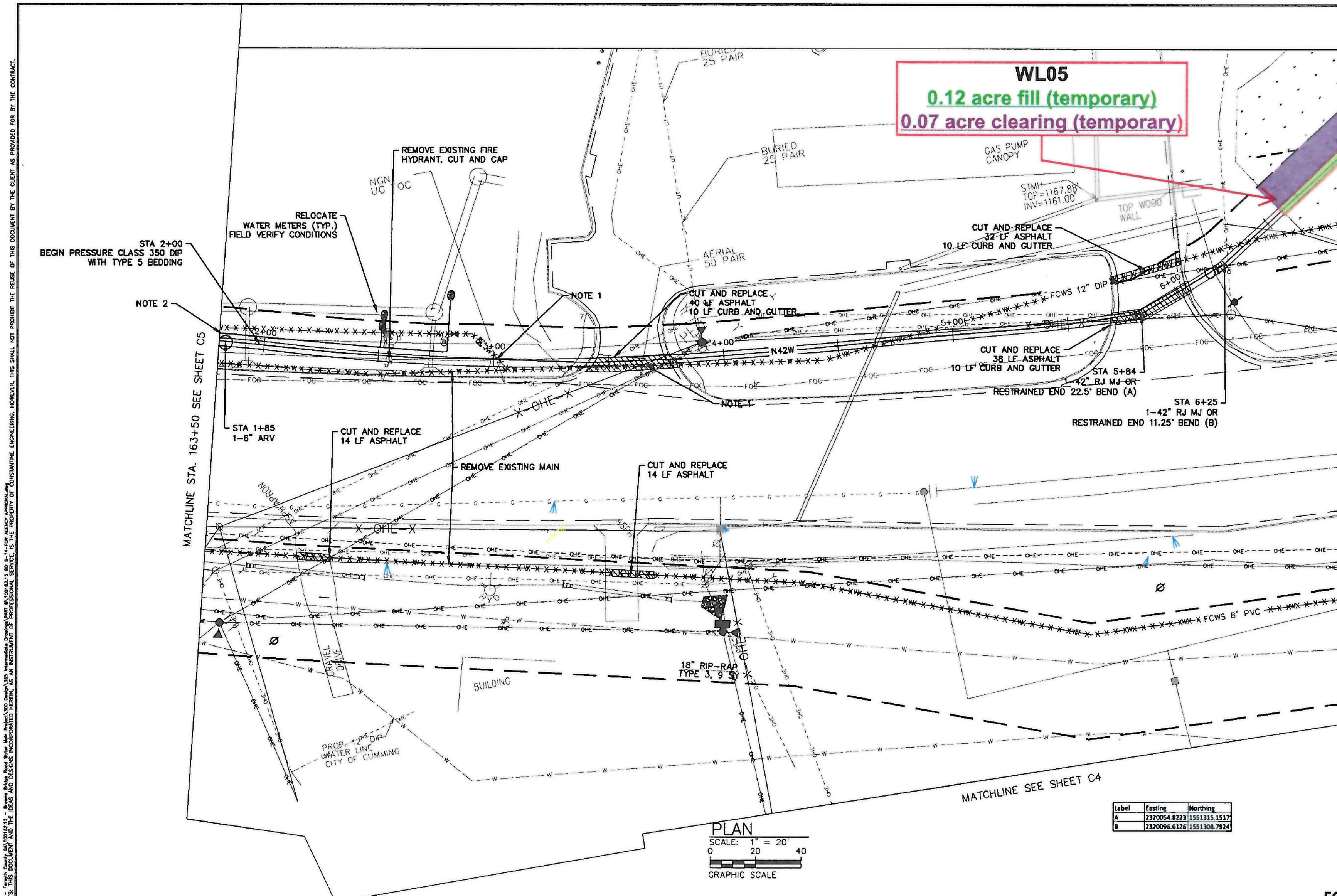
ENGINEERS SEAL

HWY 400
WATERLINE RELOCATION

ROAD: STA. 5012+00 TO STA. 5015+00
MAIN: IMPACT SITE #1- STA. 6+46 TO STA. 9+99

SHEET:	C3
DWG NO:	
DATE:	NOVEMBER, 2018
PROJ NO:	100182.15

REUSE OF DOCUMENTS: THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF CONSTANTINE ENGINEERING. HOWEVER, THIS SHALL NOT PROHIBIT THE REUSE OF THIS DOCUMENT BY THE CLIENT AS PROVIDED FOR BY THE CONTRACT.



Label	Easting	Northing
A	2320054.8223	1551315.1517
B	2320096.6126	1551308.7924

NOTES:
1. REMOVE EXISTING 12" DIP WATER AFTER 2" SERVICE IS ACTIVE.
2. 2" SERVICE TO GAS STATION.

PROFILE: SEE C26

FOR AGENCY APPROVAL

Constantine Engineering, Inc.
366 WEST PIKE ST. SUITE 104
LAWRENCEVILLE, GA 30046
PH. 678-241-4070

APVD	BY	REVISIONS	DATE	NO	APVD

DSGN
DRN
CHK

FORSYTH

AEI

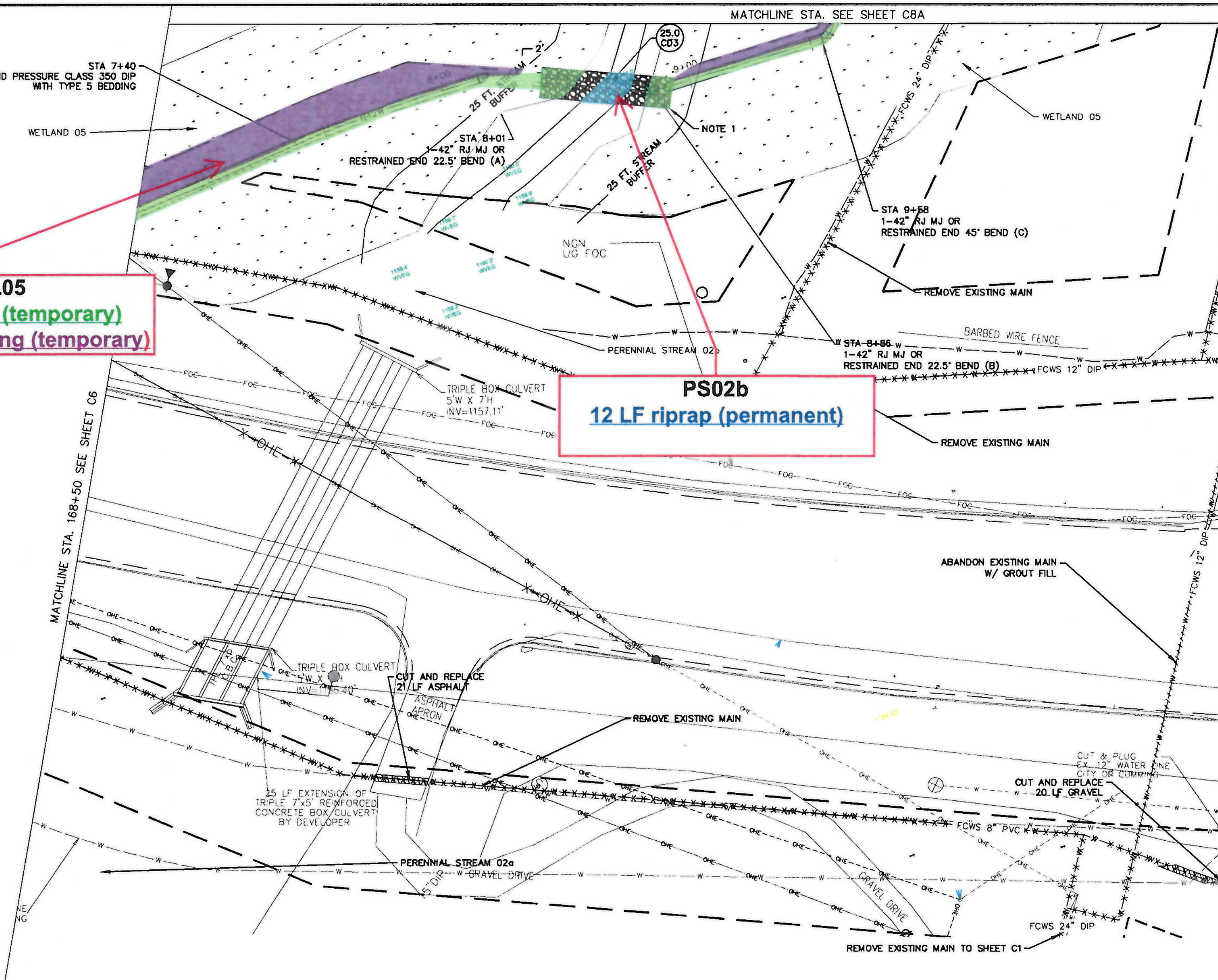
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

ENGINEERS SEAL

HWY 400
WATERLINE RELOCATION

ROAD: STA. 163+50 TO STA. 168+50
MAIN: IMPACT SITE #2- STA. 1+77 TO STA. 6+90

SHEET: C6
DWG NO:
DATE: NOVEMBER, 2018
PROJ NO: 100182.15



Label	Easting	Northing
A	2320284.8397	1551317.5288
B	2320351.7747	1551285.7132
C	2320421.2426	1551280.9972

PLAN
SCALE: 1" = 20'
0 20 40
GRAPHIC SCALE

NOTES:
1. NO CASING REQUIRED PER DETAIL.

PROFILE: SEE C27

FOR AGENCY APPROVAL

Constantine Engineering
368 WEST PIKE ST. SUITE 104
LAWRENCEVILLE, GA 30046
PH. 678-241-4070

APVD	BY	REVISIONS	DATE	NO.	DSGN / DRN / CHK / APVD

FORSYTH | AEI

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

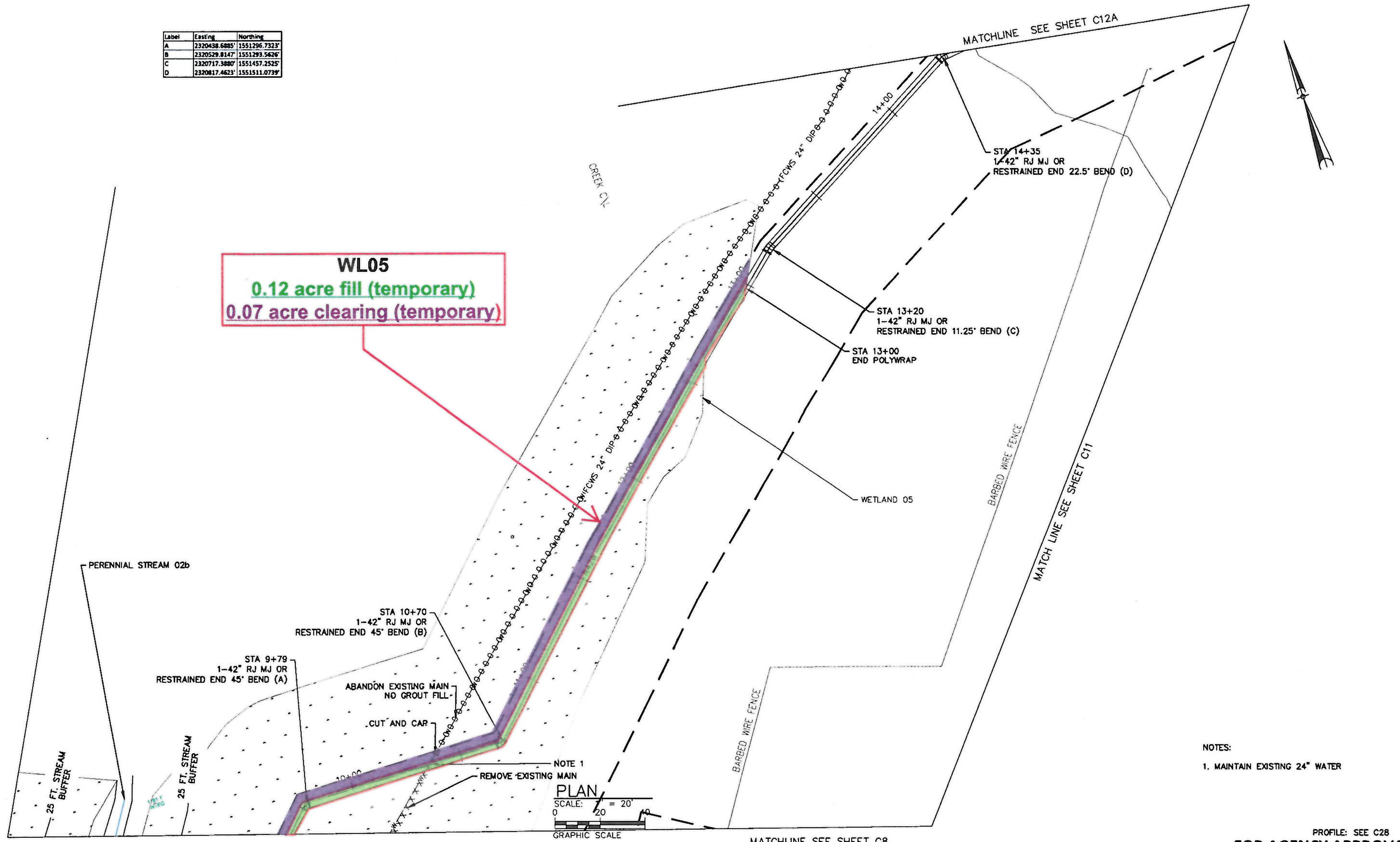
ENGINEERS SEAL

HWY 400
WATERLINE RELOCATION

ROAD: STA. 168+50 TO STA. 173+00
MAIN: IMPACT SITE #2- STA. 6+90 TO STA. 9+65

SHEET: C7
DWG NO:
DATE: NOVEMBER, 2018
PROJ NO: 100182.15

Label	Easting	Northing
A	2320438.6885'	1551296.7323'
B	2320529.8147'	1551293.5626'
C	2320717.3880'	1551457.2525'
D	2320817.4623'	1551511.0739'



NOTES:

1. MAINTAIN EXISTING 24" WATER

MATCHLINE SEE SHEET C8

PROFILE: SEE C28

FOR AGENCY APPROVAL

					DSGN
					DRN
					CHK
APVD	BY	REVISIONS	DATE	NO.	APVD

Constantine Engineering, Inc.
368 WEST PIKE ST. SUITE 104
LAWRENCEVILLE, GA 30046
PH: 678-241-4070

FORSYTH

AEI

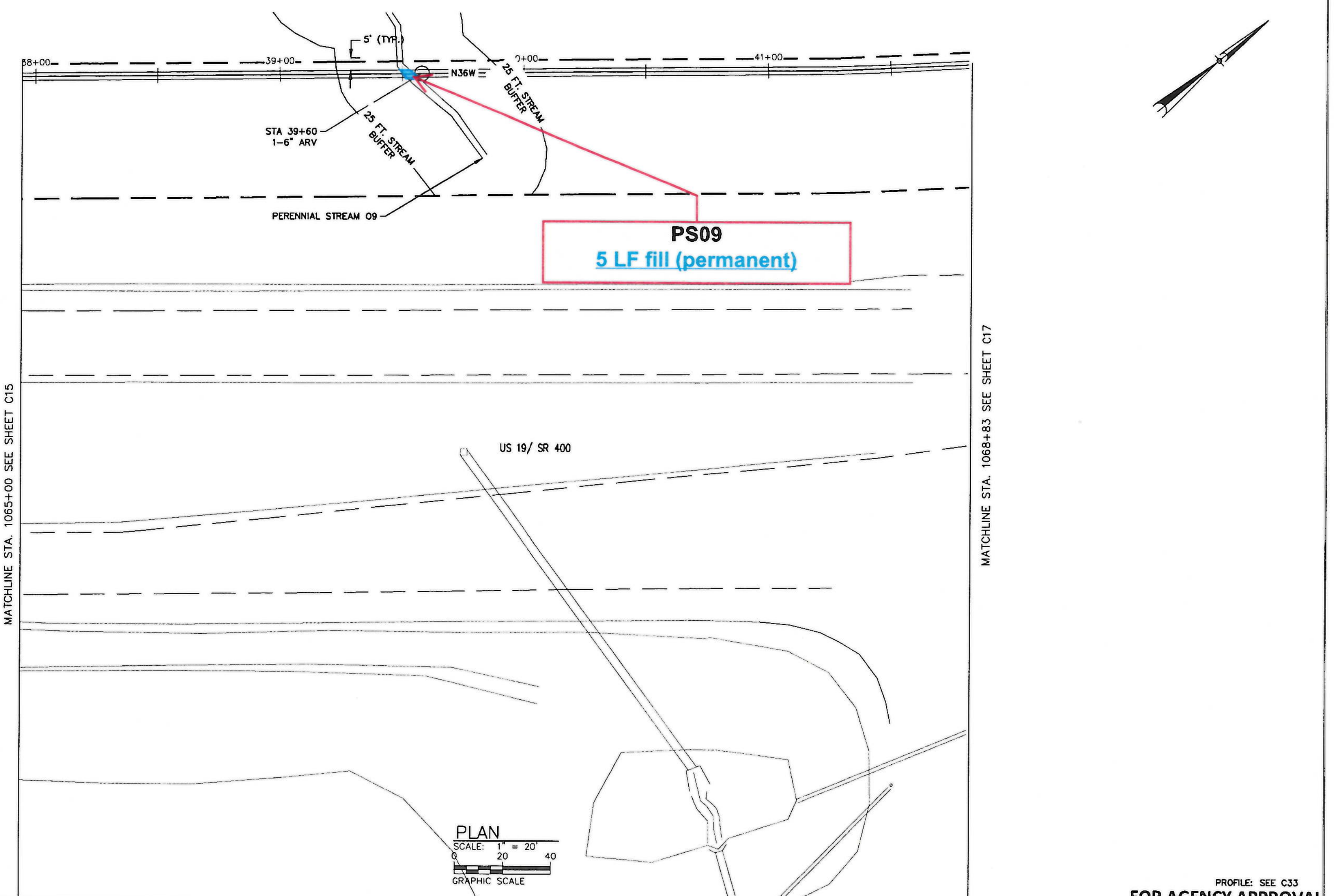
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

ENGINEERS SEAL

HWY 400
WATERLINE RELOCATION

NOT IN DOT SHEETS
IMPACT SITE: #2- STA. 9+65 TO STA. 14+39

SHEET:	C8A
DWG NO:	
DATE:	NOVEMBER, 2018
PROJ NO:	100182.15



PROFILE: SEE C33

FOR AGENCY APPROVAL

Constantine Engineering
368 WEST PIKE ST. SUITE 104
LAWRENCEVILLE, GA 30046
PH 678-241-4070

APVD	BY	REVISIONS	DATE	NO.	APVD

DSGN
DRN
CHK

FORSYTH

AEI

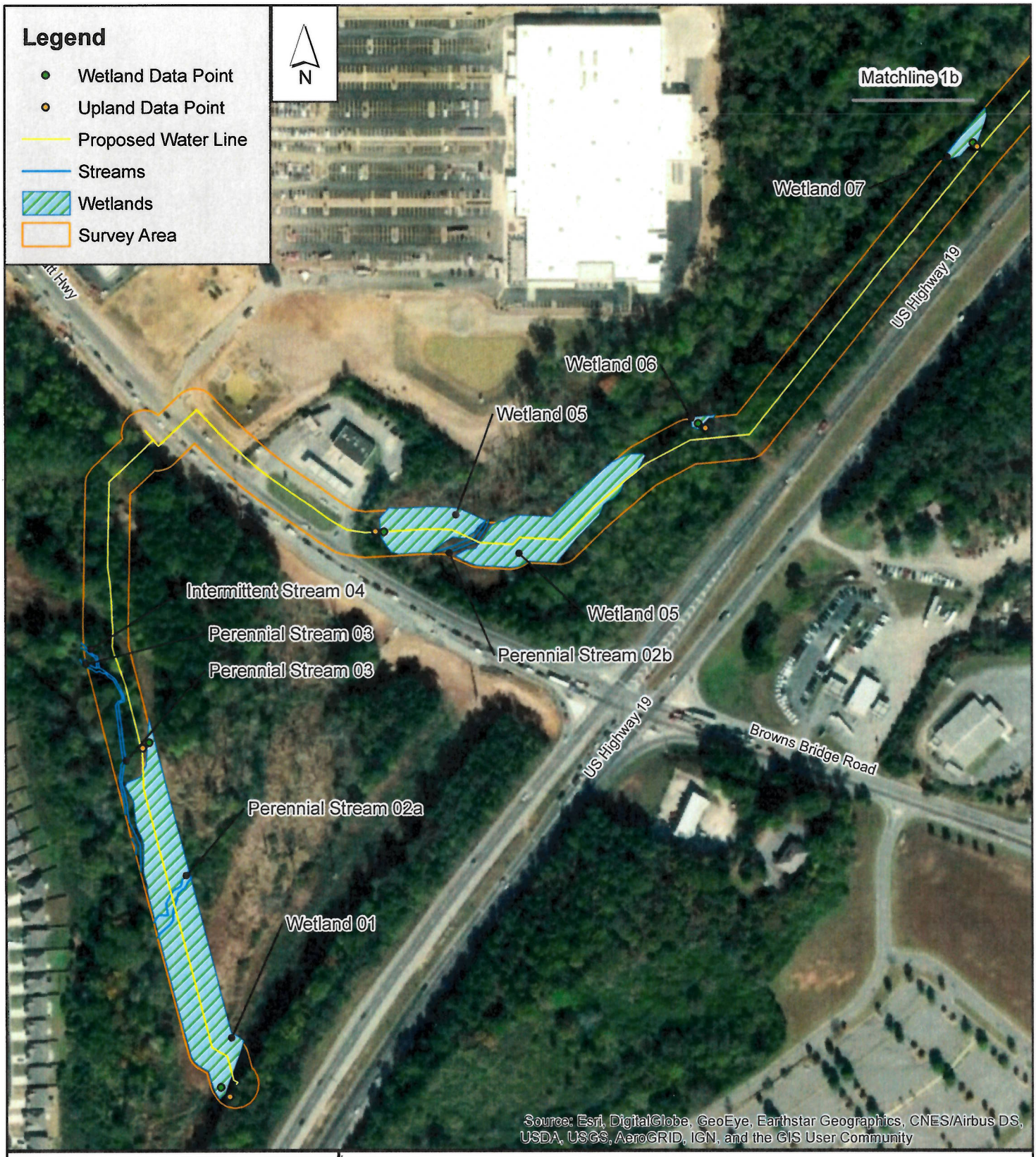
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

ENGINEERS SEAL

HWY 400
WATERLINE RELOCATION

NOT SHOWN ON DOT PLANS
ROAD: STA. 1065+00 TO STA. 1068+83
MAIN: IMPACT SITE #2- STA. 37+91 TO STA. 41+75

SHEET:	C16
DWG NO:	
DATE:	NOVEMBER, 2018
PROJ NO:	100182.15



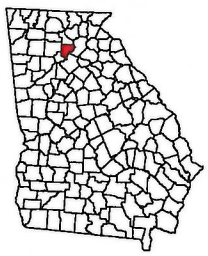


Figure 1a - Federal Waters Map (aerial)

Browns Bridge Road @ SR400 Water Line Relocation
Forsyth County, GA

0 100 200 400 600 800
Feet

Figure 1b - Federal Waters Map (aerial)

Browns Bridge Road @ SR400 Water Line Relocation
Forsyth County, GA

0 100 200 400 600 800
Feet

Stream Buffer Encroachment

Notice of Intent (NOI)