Albemarle County Service Authority

Serving Conserving

Scottsville Phase 4A Water Main Replacement Project

ACSA Project No.: 2019-03

Project Manual

June 2026

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SCOTTSVILLE PHASE 4A WATER MAIN REPLACEMENT
ACSA Project No. 2019-03

PROJECT MANUAL

ALBEMARLE COUNTY SERVICE AUTHORITY
ALBEMARLE COUNTY, VIRGINIA

Prepared for:
Albemarle County Service Authority
168 Spotnap Road
Charlottesville, Virginia 22911

Prepared by:
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ALBEMARLE COUNTY SERVICE AUTHORITY
Albemarle County, Virginia

SCOTTSVILLE PHASE 4A WATER MAIN REPLACEMENT PROJECT

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ADVERTISEMENT FOR BIDS

The Albemarle County Service Authority (ACSA) is seeking proposals from qualified contractors for the **Contract No. 2019-03 Scottsville Phase 4A Water Main Replacement Project**. Proposals will be received at the office of the ACSA, 168 Spotnap Road, Charlottesville, Virginia, until **2:00 p.m**. local prevailing time on **August 11, 2026**. Digital bids will be accepted via e-VA website until **August 11, 2026, 2:00 p.m. EST**. After 2:00 p.m., sealed or virtual bids are void, cannot be accepted. At 2:30 p.m., August 11, the bids will be opened and read aloud by live streaming video. A link to the virtual bid opening will be made available.

A non-mandatory virtual Pre-Bid Conference will be held **at 2:00 p.m., local prevailing time, on July 21, 2026**. A meeting link for the virtual Pre-Bid Conference will be made available on the ACSA's website. The purpose of the conference is for bidders to familiarize themselves with the project and to ask questions pertaining to the Contract Documents. Bidders are reminded that no oral interpretation of meaning of drawings and specifications can be made. Conflicts in the Contract Documents, if any, will be resolved by written Addendum.

This contract will be for the replacement of existing asbestos cement water mains located in the Town of Scottsville, VA. The replacement work will include furnishing and installing approximately 5,300 L.F. of 8-inch and 350 L.F. of 6-inch polyethylene encased zinc-coated ductile iron water main. Appurtenant work shall include crosses, bends, tees, sleeves, caps, plugs or other fittings; valves and valve boxes; tie-ins, fire hydrants (National threads), air release valves, water meters and meter boxes; water services and re-connections; temporary water main installation for in-place replacements; pressure reducing vault; restoration of pavement and associated work in the Town of Scottsville. Project includes abandonment of existing water mains, including asbestos-containing pipe material that requires proper disposal. The project will involve coordination with the ACSA and the Town for proper construction sequencing and maintenance of traffic. The contractor is required to obtain a Virginia Department of Transportation (VDOT) Land Use Permit for work within public right-of-way and must abide by VDOT permit requirements, guidance, stipulations, and conditions. The VDOT is reviewing project design. Any VDOT-related revisions to the plan will be published via Addendum issued not less than five days prior to bid receipt date.

This short description shall not in any way limit the contractor's obligation to complete the work. It is the bidder's responsibility to visit the site to determine the scope of work necessary.

The ACSA reserves the right to reject any or all proposals and to waive any irregularities or informalities in the proposals. Each proposal shall be accompanied by a bid guarantee in an amount equal to at least 5% (five percent) of the amount bid. At the option of the bidder, the guarantee may be certified check, bank draft, or bid guarantee. The bid guarantee shall ensure the execution of the contract as required by the specifications. The contract is to be awarded on the basis of the Bidder's qualifications and the total bid amount as stated in the Proposal (Bid Form).

The bidder agrees to commence work under its bid when given the "Notice to Proceed" which will be issued not later than September 15, 2026.

Electronic/digital bids will be accepted via e-VA website; it is important for electronic bids to include all documents required for a responsive bid; see Instructions to Bidders and General Terms, D. Receipt of Bids

The bidder and its subcontractors must comply with the provisions of Executive Orders 11246, as amended, and 11375, which prohibit discrimination in employment regarding race, creed, color, sex, or national origin.

Bidders must certify that they do not, and will not, maintain or provide for their employees any facilities that are segregated on a basis of race, color, creed, or national origin.

Electronic contract documents (Plans and Project Manual) can be requested from the office of the ASCA, 168 Spotnap Road, Charlottesville, VA 22911 at (434) 977-4511, ext. 118 or via email at janderson@serviceauthority.org at no cost. No partial sets of the drawings and/or Project Manual will be issued. Prospective bidders requesting printed copies are billed true cost of printing and shall furnish their complete street address with zip code, UPS or fed-ex account number, mailing address with zip code, email address, and telephone and facsimile numbers. Contract Documents may be shipped via UPS ground service. Bidders requesting shipment by other carriers shall include a separate non-refundable check to provide for charges, or a valid account number with the designated carrier.

Bidders must be licensed contractors in Virginia in accordance with Title 54, Chapter 11, of the Code of Virginia.

Questions concerning the project should be addressed to John Anderson of the Albemarle County Service Authority at the above address (or phone or email) and must be received no later than seven (7) calendar days preceding the date of “Bid Opening.”

Albemarle County Service Authority
Jeremy M. Lynn, P.E.
Director of Engineering

INSTRUCTIONS TO BIDDERS AND GENERAL TERMS

A. General

1. CONTACT INFORMATION: Questions concerning the project should be addressed to the following:

   John Anderson, PE
   ACSA
   168 Spotnap Road
   Charlottesville, Virginia 22911
   (434) 977-4511 x 118

2. COMPETITION INTENDED: It is the ACSA's intent that this solicitation permit competition. It shall be the bidder's responsibility to advise the ACSA in writing if any language, requirement, specification, etc., or any combination thereof, stifles competition or inadvertently restricts or limits the requirements stated in this solicitation to a single source. The ACSA must receive such notification not later than five (5) business days prior to the deadline set for acceptance of the bids.

3. TAX EXEMPTION: The ACSA is exempt from the payment of any federal excise or any Virginia sales tax. Tax exemption certificates will be furnished, if requested by the successful bidder. The successful bidder will not be covered by this exemption and will be required to pay all applicable Virginia sales and use tax and any applicable federal excise tax due. The Virginia Department of Taxation allows in certain cases for the successful bidder to seek and obtain a tax exemption from sales and use tax. The bidder is solely responsible for making any inquiry to the Virginia Department of Taxation to determine the potential availability of such exemption. The ACSA will reasonably cooperate as may be needed by the Department of Taxation administrative rules in any application by the successful bidder to obtain a sales and use tax exemption.

4. AVAILABILITY OF FUNDS: It is understood and agreed between the contractor and the ACSA that the ACSA shall be bound hereunder only to the extent of the funds available or which hereafter become available for the purpose of the contract.

5. PRECEDENCE OF TERMS: In the event there is a conflict between any of the following sections: the Instructions to Bidders and General Terms, Standard General Conditions and the ACSA Supplementary Conditions, the ACSA Supplementary Conditions shall first apply, followed by the Instructions to Bidders and General Terms and then the Standard General Conditions.

6. NONDISCRIMINATION OF CONTRACTORS: A bidder, offeror, or contractor shall not be discriminated against in the solicitations or award of this contract because of race, religion, color, sex, national origin, age or disability.

7. APPLICABLE LAW AND COURTS: Any contract resulting from this solicitation shall be governed in any respects by the laws of Virginia, and any litigation with respect thereto shall be brought in the Circuit Court or General District Court of Albemarle County, Virginia. The contractor shall comply with applicable federal, state and local laws and regulations.

B. Qualifications

1. STATE REGISTRATION OF CONTRACTORS: Attention is directed to Chapter 11, Title 54.1 of the Code of Virginia (Re: State registration of contractors), which requires that all bidders must show evidence of the proper license under the provision of this chapter before such bid is considered.

2. DEBARMENT STATUS: By submitting their bids, bidders certify that they are not currently debarred by the ACSA, the Commonwealth of Virginia, the Federal Government, any local government or government agency/entity/authority from submitting bids or proposals on contracts for the type of goods and/or services covered by this solicitation, nor are they an agent of any person or entity that is currently so debarred.

3. ETHICS IN PUBLIC CONTRACTING: The provisions contained in Sections 2.2-4367 through 2.2-4377, Code of Virginia, as amended, shall be applicable to all contracts solicited or entered into by the ACSA. By submitting their bids, all bidders certify that their bids are made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other bidder, supplier, manufacturer or subcontractor in connection with their bid, and that they have not conferred on any public employee having official responsibility for this procurement, transaction of any payment, loan, subscription, advance, deposit of money, services or anything of more than normal value, present or promised, unless consideration of substantially equal or greater value was exchanged.

   The bidder certifies that to the best of their knowledge, no employee of the ACSA, nor any member thereof, nor any public agency or official impacted by the solicitation or resulting contract has any pecuniary interest in the business of the bidder, and that no person associated with the bidder has any interest that would conflict in any manner with the performance of the contract resulting from this solicitation.

4. IMMIGRATION REFORM AND CONTROL ACT OF 1986: By submitting their bids, the bidders certify that they do not and will not, during the performance of this contract, employ illegal alien workers or otherwise violate the provisions of the federal Immigration Reform and Control Act of 1986, as amended.

5. ANTI-TRUST: By entering into a contract, the contractor conveys, sells, assigns, and transfers to the ACSA all rights, title and interest in and to all causes of the action it may now have or hereafter acquire under the antitrust law of the United States and

Albemarle County, relating to the particular goods or services purchased or acquired by the ACSA under said contract. Consistent and continued tie bidding could cause rejection of bids by the ACSA and/or investigation for Anti-Trust violations.

6. ANTI-DISCRIMINATION: By submitting their bid, bidders certify to the ACSA that they will conform to the provisions of the Federal Civil Rights Act of 1964, as amended, where applicable, the Virginians With Disabilities Act, the Americans With Disabilities Act and Code of Virginia § 2.2-4311, as amended. If the award is made to a faith-based organization, the organization shall not discriminate against any recipient of goods, services, or disbursements made pursuant to the contract on the basis of the recipient's religion, religious belief, refusal to participate in a religious practice, or on the basis of race, age, color, gender or national origin and shall be subject to the same rules as other organizations that contract with public bodies to account for the use of the funds provided; however, if the faith-based organization segregates public funds into separate accounts, they shall be subject to audit by the public body. (Code of Virginia § 2.2-4343.1.E).

7. DRUG-FREE WORKPLACE: During the performance of this contract, the contractor agrees to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

   For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

8. RESPONSIBLE LAND DISTURBER: The contractor will be required to have on staff, and assigned to this project, a Responsible Land Disturber (RLD) in accordance with the Contract Documents, and the provisions set forth in the Virginia Erosion and Sediment Control (ESC) Program, established by revisions to the Virginia Erosion and Sediment Control Law (Title 10.1, Chapter 5, Article 4 of the Code of Virginia). Proof of certification for the RLD is not required as a part of the bid package; however, this information may be requested at a later date during the bid evaluation phase.

C. Bid Period

1. BRAND NAME OR EQUAL ITEMS: Unless otherwise provided in the solicitation, the name of a certain brand, make or manufacturer does not restrict bidders to the specific brand, make or manufacturer named; it conveys the general style, type, character, and quality of the article desired. Any article which the ACSA, in its sole discretion determines to be the equal of that specified, considering quality, workmanship, economy of operation, and suitability for the purpose intended, may be accepted. The bidder is responsible to clearly and specifically indicate the product being offered and to provide sufficient descriptive literature, catalog cuts and technical detail to enable the ACSA to determine if the product offered meets the requirements of the solicitation.

2. FORMAL SPECIFICATIONS: When a solicitation contains a specification which states no substitutes, no deviation therefrom will be permitted and the bidder will be required to furnish articles in conformity with that specification.

3. OMISSIONS & DISCREPANCIES: Any items or parts of any equipment or materials listed in this solicitation which are not fully described or are omitted from such specification, and which are clearly necessary for the completion of such equipment or material and its appurtenances, shall be considered a part of such equipment or material although not directly specified or called for in the specifications. The bidder shall abide by and comply with the true intent of the specifications and not take advantage of any unintentional error or omission, but shall fully complete every part as the true intent and meaning of the specifications and drawings. Whenever the mention is made of any articles, material or workmanship to be in accordance with laws, ordinances, building codes, underwriter's codes, AWWA regulations, A.S.T.M. regulations or similar expressions, the requirements of these laws, ordinances, etc., shall be construed as to the minimum requirements of these specifications.

4. EQUIPMENT AND MATERIAL STANDARDS: Any equipment and material delivered shall be standard new equipment and material, latest model, the best quality, and the highest grade work, except as otherwise specifically stated in the bid. Any part of nominal appurtenances which are usually provided in the manufacturer's stock model shall be furnished.

5. BIDDERS INTERSTED IN MORE THAN ONE BID: If more than one bid is offered by any one party, either directly or by or in the name of their clerk, partner, or other persons, all such bids may be rejected. A party who has quoted prices on work, materials, or supplies to a bidder is not thereby disqualified from quoting prices to other bidders or firms submitting a bid directly for the work, materials or supplies.

D. Receipt of Bids

1. Sealed bids for the **Scottsville Phase 4A Water Main Replacement** will be received by the Albemarle County Service Authority, at the office of the ACSA, 168 Spotnap Road, Charlottesville, Virginia, until **2:00 pm**, local prevailing time on **August 11, 2026.**

The signed bid and requested documents shall be submitted in a sealed envelope and identified with the following information:

a. Bidder's name and complete mailing address
b. Contract number and title of project
c. Bid due date and time

Bids may also be submitted electronically through eVA.

2. OPENING: Bid opening will be conducted via virtual meeting. A meeting link to the virtual Bid Opening will be provided on the ACSA's website. At the time fixed for the opening of responses to a bid, all bids will be opened and the names of the bidders and the amount bid shall be read aloud and made readily available to the public.

   The bid package **must** include the following items and be signed by the individual signing the Bid Form; all signatures shall be in ink:

   a. A completed, signed, Bid Form, Section 00400 of these Contract Documents, including unit prices, if required, for performing the complete scope of work in accordance with these documents. The Contractor's Virginia license number will be required as a part of the bid package.

   b. A bid bond, a certified check upon a solvent bank or trust company, made payable to the order of the Albemarle County Service Authority, or cash escrow in the amount of five percent of the total bid price submitted.

   c. Completed Receipt of Addenda form, Section 00490 of these Contract Documents.

   d. Any additional information required.

   The Qualification Statement (Section 00431) and Contractor's Financial Statement (Section 00432) may be required by the ACSA after receipt of Bids, but are not required as a part of the bid package.
   A statement as to available machinery and equipment to undertake the work may also be requested.

3. NO CONTACT POLICY: No bidder shall initiate contact related to the solicitation with any ACSA employee, after the date and time established for receipt of bids. Any contact initiated by a bidder with any ACSA representative, concerning this solicitation, is prohibited and may cause the disqualification of the bidder from this procurement process.

4. USE OF ACSA BID FORM AND TERMS AND CONDITIONS: Failure to submit a solicitation on the official ACSA Bid Form provided for that purpose, or unauthorized modification of or additions to any portion of the solicitation

documents, may be a cause for rejection of the bid. The ACSA reserves the right to decide, on a case-by-case basis, in its sole discretion, whether to reject any bid which has been modified. The ACSA shall not be responsible for any errors or omissions of the bidder. The Bid Form shall be signed by a representative authorized to legally bind the firm. Claims, as a result of failure to inspect the job site, shall not be considered by the ACSA.

The bidder shall fully complete the Bid Form in the manner indicated. All prices shall be entered in ink; and all changes in prices made by the bidder after the original entry shall also be made in ink, and the bidder shall initial such changes.

The bidder must sign the Bid Form correctly and legibly; and the bidder shall state their interest, title, or office in the company or firm submitting the bid. If the bid should be made by an individual, the name and address of the organization, and the full name of the individual, shall be shown; if made by a firm or partnership, the name and address of the organization, and the full names of each partner or person holding interest in the firm, shall be shown; and if made by a corporation, the name and address of the corporation, and the full names of the officers of the corporation shall be shown.

5. LATE BIDS: No bid will be received after the time specified for receipt of the bids. Bids received after the time specified shall be returned unopened.

   The ACSA is not responsible for delays in the delivery of the mail by the U.S. Postal Service, private carriers or the inter-office mail system. It is the sole responsibility of the bidder to ensure their bid reaches the designated location by the date and hour specified.

6. WITHDRAWAL OF BIDS: A bidder for a contract other than for public construction may request withdrawal of their bid under the following circumstances:

   a. Bids received at the address shown in the solicitation, prior to the time of acceptance, may be withdrawn on written request from the bidder.

   b. No bid may be withdrawn after the time set for opening of bids has passed, except as provided for by the Code of Virginia, Chapter 43, Title 2.2, Section 4330, as amended, and in manner prescribed in the aforesaid Section 11.54, as amended. The ACSA reserves the right to hold the bids for a period of 90 days after the date set for receipt of bids.

   c. Bids shall not be withdrawn after award of a contract. No plea or claim of mistake in a solicitation or resulting contract shall be available as a defense in any legal proceeding.

      No bid may be withdrawn when the result would be the awarding of the contract on another bid from the same bidder or of another bidder in which the ownership

of the withdrawing bidder is more than five percent. If a bid is withdrawn, the lowest remaining bid shall be deemed to be the low bid. No bidder who is permitted to withdraw a bid shall, for compensation, supply any material or labor to, or perform any subcontract or other work agreement for the person or firm to whom the contract is awarded; or otherwise benefit, directly or indirectly, from the performance of the project for which the withdrawn bid was submitted.

7. ERRORS IN BIDS: When an error is made in extending total prices, the unit bid price will govern. When a discrepancy exists between the written word and the numeric amount, the written word shall govern.

8. FAMILIARITY: Each bidder, by making their bid, represents that they have read and understand the bidding documents, and have familiarized themselves with the local conditions under which the work is to be performed and all State laws and local ordinances and regulations which may affect the conduct of the work or those engaged or employed on the work.

E. Acceptance of Bids

1. ACCEPTANCE OF BIDS: Unless otherwise specified, all formal bids submitted shall be valid for a minimum period of ninety (90) calendar days following the date established for acceptance. At the end of the ninety (90) calendar days, the bid may be withdrawn at the written request of the Bidder. If the proposal is not withdrawn at that time, it remains in effect until an award is made or the solicitation is canceled.

2. PRICING:

   a. Prices should be stated in units of quantity as specified on the bid form.

   b. Life cycle cost analysis may be considered when determining the lowest responsive and responsible bid. This analysis may consider, in addition to purchase price, any proposed upward or downward escalator clauses proposed for the initial contract term and any potential renewal terms; operating and related costs over the life of the item including maintenance, down time, energy costs, salvage value, etc.

   c. Bid prices shall be for complete installation ready for ACSA use and shall include all applicable freight and installation charges; extra charges will not be allowed.

3. FACTORS OTHER THAN PRICE IN AWARD DECISION: The following factors, in addition to price (as they apply), shall be a consideration in the award decision:

   a. The quality of performance/workmanship of previous contracts, services or products, or references which attest to other specific experiences;

b. The timely completion of previous contracts or services or the timely delivery of past orders; or references which attest to other specific experiences;

c. The sufficiency of financial resources and its impact on ability of the bidder to perform the contract or provide the services;

d. The ACSA reserves the right to conduct on-site inspections of any bidder's facilities prior to award. The results of said inspection will be considered by the ACSA in determining the bidder's capabilities of successfully administering to this contract;

e. The ability and availability of the bidder to provide both quality and timely maintenance, service, and/or parts;

f. The resale value, life cycle costing, and value analysis of a product;

g. The availability and capability of local and regional vendor support as it affects the quantity, quality, and timeliness of the work or products required;

h. Delivery of a product and timely completion of a project as stated by a vendor in the bid;

i. Substantial compliance or noncompliance with specifications set forth in the bid as determined by the ACSA;

j. Product or parts inventory capability as it relates to a particular bid; and

k. Results of product testing.

4. TIE BIDS: In the case of a tie bid, the ACSA may give preference to goods, services and construction produced in Albemarle County. If such choice is not available, preference shall then be given to goods and services produced in the Commonwealth pursuant to the Code of Virginia § 2.2-4324. If no ACSA or Commonwealth choice is available, the tie shall be decided by lot.

5. BID SECURITY: The bid security of all except the three lowest responsive, responsible bidders will be returned within five days after the receipt of bids. The bid securities of the three lowest responsive, responsible bidders will be returned only after the required bonds and insurance are furnished and the contract executed with the successful bidder.

F. Award

1. AWARD OR REJECTION OF BIDS: The ACSA shall award the contract to the lowest, responsive and responsible bidder complying with all provisions of the

Contract Documents, provided the bid price is reasonable and it is in the best interest of the ACSA to accept it. A "responsive" bid shall be evidenced by:

a. a complete Bid Form;
b. a Bid Form not evidencing any apparent unbalanced pricing for performance of the items of work;
c. a Bid Form without excisions, alterations, special conditions or qualifications made by the bidder; and
d. a Bid Form containing no alternative bids or offerings (by inclusion, attachment, or otherwise) for any items unless such alternative bids or offerings are requested in the Contract Documents.

That a bidder is "responsible" may be evidenced by the following facts:

a. they maintain a permanent place of business;
b. they have adequate financial capability for meeting the obligations inherent in the work;
c. they have adequate equipment to properly perform the work within the time limit specified; and
d. they have a competent and experienced organization.
e. they have performed and completed similar work of similar magnitude in a satisfactory manner.

The ACSA may make such investigations as it deems necessary to determine the bidder's ability to perform the work and the bidder shall furnish to the ACSA all such information and data for this purpose as the ACSA may request. The ACSA reserves the right to reject any bid if investigation of such bidder fails to satisfy the ACSA that the bidder is properly qualified to carry out the obligations of the contract.

By the tender of a bid for performing the work, the bidder warrants that they are experienced in such construction and are familiar with all phases of the work necessary for a complete job.

The Contractor shall have on the project at all times a superintendent who shall also be experienced in the particular type of construction and shall be familiar with all phases of the work.

The bidder must satisfy themselves of the accuracy of the estimated quantities in the Bid Form by examination of the site and a review of the drawings and specifications, including Addenda. After a bid has been awarded, the Contractor shall not assert that there was misunderstanding concerning the quantities of work or of the nature of the work to be done as called for in the Contract Documents.

The Contract Documents contain the provisions required for the construction of the project. Information obtained from an officer, agent, or employee of the ACSA or any other person shall not affect the risks or obligations assumed by the Contractor or relieve them from fulfilling any of the conditions of the Contract Documents.

The ACSA reserves the right to award a contract by individual items, in the aggregate, or in combination thereof, or to reject any or all bids and to waive any informality in bids received whenever such rejection or waiver is in the best interest of the ACSA. The ACSA reserves the right to negotiate with the lowest responsive, responsible bidder should bids exceed available funds. The ACSA shall reject the bid if the bidder is deemed to be a non-responsive, or non-responsible bidder.

2. ASSIGNMENT OF CONTRACT: The Contractor shall not assign their Contract, nor any part thereof, nor any monies due, or to become due thereunder, without prior written approval of the ACSA.

3. PROTEST OF AWARD OR DECISION TO AWARD: Any bidder who desires to protest the award or decision to award a contract by the ACSA shall submit such protest in writing to the ACSA no later than ten (10) days after public notice of the award or announcement of the decision to award, whichever comes first. No protest shall lie for a claim that the selected bidder is not a responsible bidder. The written protest shall include the basis for the protest and the relief sought. The ACSA shall issue a decision in writing within five (5) days after receipt of the protest stating the reasons for the action taken. This decision shall be final unless the bidder appeals within ten (10) days of the written decision by instituting legal action. Nothing in this paragraph shall be construed to permit a bidder to challenge the validity of the terms or conditions of the solicitation.

G. Successful Bidder's Requirements

1. PERFORMANCE BOND, PAYMENT BOND AND INSURANCE: The bidder whose Bid is accepted shall enter into a written contract for the performance of the Work and furnish within 15 days after the date of a written Notice of Award by the ACSA, which has been delivered to such bidder personally or by mail to such bidder at the address given in their Bid, the following: (1) a performance bond in an amount equal to 100 percent of the contract sum conditioned on the faithful performance of the contract in strict conformity with the plans, specifications and conditions of the Contract Documents, (2) a payment bond in an amount equal to 100 percent of the contract sum, conditioned upon the prompt and faithful payment of all persons and entities who have and fulfill contracts which are directly with the Contractor for performing labor or furnishing materials in the prosecution of the work provided for in the Contract Documents, and (3) one or more certificates of insurance evidencing the types and amounts of insurance coverage required to be maintained by the Contractor under the contract documents.

2. CONTRACT SECURITY: If a bidder to whom the contract is awarded refuses or neglects to execute it or fails to furnish the required Performance and Payment Bonds and Insurance within fifteen (15) days of the date of Notice of Award, the amount of the bid security shall be forfeited and shall be retained by the ACSA as liquidated damages, and not as a penalty, since said sum is a fair estimate of the amount of

damages to the ACSA. However, no forfeiture under a bid bond shall exceed the difference between the bid for which the bond was written and the next low bid.

In addition, if the bidder to whom the Contract is awarded refuses or neglects to execute it or fails to furnish the required Performance and Payment Bonds and Insurance as herein provided, the award of the contract may be annulled and the contract awarded to the next lowest responsive, responsible bidder and such bidder shall fulfill every stipulation of these documents as if they were the original party to whom it was made; or ACSA may reject all of the bids as its interest may require. Except as provided in the Contract Documents, no plea of mistake in the bid shall be available to the bidder for the recovery of their bid security or as a defense to any action based upon the neglect or refusal to execute a contract.

Any performance or payment bond required hereunder shall be in the form included in these Contract Documents and shall be executed by a surety company legally authorized to do business as a surety in the Commonwealth of Virginia and meeting the requirements stated in Article 14 of the General Conditions. In lieu of a payment or performance bond, the successful bidder may furnish a cash escrow or certified check payable to the order of ACSA.

3. SUBCONTRACTORS: No part of the Contract shall be sublet without prior written approval of the ACSA. The bidder shall, prior to execution of the Contract, immediately submit to the ACSA the names of Subcontractors when they propose to employ on the project.

4. ESCROW AGREEMENT: In accordance with Virginia Public Procurement Act, Article 2.2-4334, adopted July 1, 2001, the Contractor shall have fifteen calendar days after notification of award by the ACSA in which to execute and submit to the ACSA an escrow agreement. If the escrow agreement form is not submitted within the fifteen day period, the Contractor shall forfeit their rights to the use of the escrow account procedure. A copy of an escrow agreement is included within these contract documents (Section 00850).

5. NOTICE TO PROCEED: The Contractor shall be notified by letter, giving Notice to Proceed, when work may begin under this Contract. Such notice will be issued as determined by the ACSA, but not before receipt and acceptance of the Contractor's Performance and Payment Bonds, Certificate of Insurance, and a fully executed Standard Form of Agreement.

SECTION 00400
BID FORM

TO: ALBEMARLE COUNTY SERVICE AUTHORITY

FOR: ACSA Project No. 2019-03 – Scottsville Phase 4A Water Main Replacement Project

The undersigned, bidder, proposes to enter into a contract with the ACSA in accordance with the attached documents, to furnish all necessary materials, equipment, machinery, tools, and labor necessary to complete the work described herein.

The bidder hereby agrees to commence work under this bid when given the "Notice to Proceed" and to fully complete the contract within ***270*** consecutive calendar days. The bidder agrees that they will not make any claim for extra compensation should completion of work under the contract be effected in advance of the time specified.

The Bidder has carefully examined the site of the Work and that, from his own investigations, has been satisfied as to the nature and location of the Work; the character, quality and quantity of existing materials and all conditions likely to be encountered; the kind and extent of equipment and other facilities needed for the performance of the Work; the general and local conditions; and all other items which reasonably may be expected to affect the Work or its performance.

The undersigned, as Bidder, also declares to have carefully examined and fully understand all the component parts of the Contract Documents and agrees to execute the Contract and furnish Performance and Payment Bonds and Insurance, if required by the Contract Documents, and will completely perform the Work in strict accordance with the terms of the Contract Documents for the prices set forth on the following page(s).

The bidder agrees that, upon receipt of a “Notice of Award” from the ACSA, they will, within ten (10) days from receipt of such notice, execute the Standard form of Agreement bound herein, and will furnish with the Agreement the following: Certificate of Insurance coverage of all of their operations associated with the project, Performance Bond, and Payment Bond.

The bidder understands that the ACSA reserves the right, in the ACSA's sole discretion to reject any or all bids, to waive any informality in any bid, and to accept any bid considered to be advantageous to the ACSA.

The bidder agrees that this bid shall not be withdrawn for a period of ninety (90) calendar days after the date set for receipt of bids, except as allowed by law.

The undersigned, as bidder, hereby declares that the name (or names) of the only person (or persons) interested in this proposal, as principal (or principals), is (are) as herein below set out and that no person other than that (or those) herein below stated has any interest in the proposal, or in the Agreement to be entered into, that this proposal is made without connection with any other person, firm, or corporation making a proposal; and that it is in all respects fair, in good faith, and without collusion or fraud.

ALBEMARLE COUNTY SERVICE AUTHORITY
SCOTTSVILLE PHASE 4A WATER MAIN REPLACEMENT PROJECT

INSTRUCTIONS: The Bidder shall fill in all blanks providing the following: The Bidder's proposed amount of cost per Unit Price in words; the Bidder's proposed Unit Price in figures; and the Bidder's proposed computed total price in figures, for each Contract Item described below. (The computed total price is obtained by multiplying the Estimated Quantity by the Bidder's Unit Price.) Written amounts shall govern in case of discrepancy between the amounts stated in writing and the amounts stated in figures. In case of discrepancy between unit prices and totals, unit prices will prevail. Refer to Section 01130 for a detailed description of each contract item number.

All blanks shall be filled in.

CONTRACT ITEM NO.	DESCRIPTION OF WORK AND UNIT PRICE IN WORDS	ESTIMATED QUANTITY AND UNIT	UNIT PRICE	COMPUTED TOTAL PRICE
1	8-Inch Ductile Iron Water Main _____Dollars and _____Cents	5,259 LF	$_____	$_____
2	6-Inch Ductile Iron Water Main _____Dollars and _____Cents	145 LF	$_____	$_____
3	4-Inch Ductile Iron Water Main _____Dollars and _____Cents	20 LF	$_____	$_____
4	12-Inch Gate Valve, Valve Box, DIP Fittings _____Dollars and _____Cents	2 EA.	$_____	$_____

CONTRACT ITEM NO.	DESCRIPTION OF WORK AND UNIT PRICE IN WORDS	ESTIMATED QUANTITY AND UNIT	UNIT PRICE	COMPUTED TOTAL PRICE
5	8-Inch Gate Valve with Valve Box _____Dollars and _____Cents	18 EA.	$_____	$_____
6	6-Inch Gate Valve with Valve Box _____Dollars and _____Cents	13 EA.	$_____	$_____
7	4-Inch Gate Valve with Valve Box _____Dollars and _____Cents	1 EA.	$_____	$_____
8	Fire Hydrant _____Dollars and _____Cents	12 EA.	$_____	$_____
9	Meter Box and Setter (WSCB) _____Dollars and _____Cents	37 EA.	$_____	$_____

CONTRACT ITEM NO.	DESCRIPTION OF WORK AND UNIT PRICE IN WORDS	ESTIMATED QUANTITY AND UNIT	UNIT PRICE	COMPUTED TOTAL PRICE
10	Meter Boxes, Setter, and PRV (WSCB/PRV) _____Dollars and _____Cents	12 EA.	$	$
11	1-Inch Water Service Connection _____Dollars and _____Cents	49 EA.	$_____	$_____
12	Connection to Existing Water Service at New Meter Box and Water Meter Installation _____Dollars and _____Cents	49 EA.	$_____	$_____
13	1-Inch Copper Water Service _____Dollars and _____Cents	870 LF	$_____	$_____
14	PRV Valve Vault _____Dollars and _____Cents	1 Lump Sum	$_____	$_____

CONTRACT ITEM NO.	DESCRIPTION OF WORK AND UNIT PRICE IN WORDS	ESTIMATED QUANTITY AND UNIT	UNIT PRICE	COMPUTED TOTAL PRICE
15	Existing PRV Valve Vault Abandonment – Hardware Street _____Dollars and _____Cents	1 Lump Sum	$	$
16	Installation of 20-Inch Steel Casing and 8-inch Water Main _____Dollars and _____Cents	12 LF	$_____	$_____
17	8” X 8” Tapping Sleeve and Valve with Valve Box _____Dollars and _____Cents	3 EA.	$_____	$_____
18	6” X 6” Tapping Sleeve and Valve with Valve Box _____Dollars and _____Cents	1 EA.	$_____	$_____
19	1-Inch Air Release Valve Assembly _____Dollars and _____Cents	2 EA.	$_____	$_____

CONTRACT ITEM NO.	DESCRIPTION OF WORK AND UNIT PRICE IN WORDS	ESTIMATED QUANTITY AND UNIT	UNIT PRICE	COMPUTED TOTAL PRICE
20	Cut and Cap Existing Water Main _____Dollars and _____Cents	21 EA.	$_____	$_____
21	Temporary Above Ground Water Main and Services _____Dollars and _____Cents	1,950 LF	$_____	$_____
22	Temporary Pavement Restoration _____Dollars and _____Cents	4,000 S.Y.	$_____	$_____
23	Base Stone Aggregate (21A or B) _____Dollars and _____Cents	690 C.Y.	$_____	$_____
24	Asphalt Concrete Base Pavement (BM-25.0) _____Dollars and _____Cents	2,450 S.Y.	$_____	$_____

CONTRACT ITEM NO.	DESCRIPTION OF WORK AND UNIT PRICE IN WORDS	ESTIMATED QUANTITY AND UNIT	UNIT PRICE	COMPUTED TOTAL PRICE
25	Gravel Drive Restoration _____Dollars and _____Cents	350 S.Y.	$_____	$_____
26	Asphalt Drive Restoration _____Dollars and _____Cents	125 S.Y.	$_____	$_____
27	Removal and Disposal of Existing AC Water Main _____Dollars and _____Cents	1,800 LF	$_____	$_____
28	Moores Hill Drainage Improvements _____Dollars and _____Cents	1 Lump Sum	$	$
29	Miscellaneous Drainage and Restoration Allowance _____Dollars and _____Cents	Allowance	$ 50,000.00	$ 50,000.00

CONTRACT ITEM NO.	DESCRIPTION OF WORK AND UNIT PRICE IN WORDS	ESTIMATED QUANTITY AND UNIT	UNIT PRICE	COMPUTED TOTAL PRICE
30	Mobilization _____Dollars and _____Cents	1 Lump Sum	$_____	$_____
CONTINGENT BID ITEMS				
31	Asphalt Concrete Surface Course (SM-9.5A) _____Dollars and _____Cents	4,120 S.Y.	$_____	$_____
32	Surface Treatment – Pavement Restoration _____Dollars and _____Cents	7,160 S.Y.	$	$
33	Additional Unclassified Excavation Ordered by Engineer or Inspector _____Dollars and _____Cents	200 C.Y.	$_____	$_____
34	Additional Concrete – as Directed by the Engineer or Inspector _____Dollars and _____Cents	50 C.Y.	$_____	$_____

CONTRACT ITEM NO.	DESCRIPTION OF WORK AND UNIT PRICE IN WORDS	ESTIMATED QUANTITY AND UNIT	UNIT PRICE	COMPUTED TOTAL PRICE
35	Additional Select Fill _____Dollars and _____Cents	200 C.Y.	$_____	$_____
36	Over-Excavation of Unsuitable Subgrade with Porous Refill _____Dollars and _____Cents	750 C.Y.	$_____	$_____

COMPUTED TOTAL AMOUNT FOR ALL CONTRACT ITEMS (SUM OF CONTRACT ITEMS 1 THROUGH 36) _____ _____ _____DOLLARS AND _____CENTS	$_____

The Bid must be sworn to by the person signing it in one of the following forms:

(Form of affidavit where Bidder is an individual)

_____ of _____
(City or County) (State or Commonwealth)

_____,

being duly sworn, deposes and says: That I am the person described in and who executed the foregoing Bid and that the several matters therein stated are in all respects true.

_____
(Signature)

STATE OF VIRGINIA
CITY/COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, _____, by _____.

_____
Notary Public

My Commission Expires: _____

Notary Registration Number: _____

(SEAL)

(Form of affidavit where Bidder is a partnership)

_____ of _____
(City or County) (State or Commonwealth)

being duly sworn, deposes and says: That I am a general partner of

_____

_____

the partnership described in and which executed the foregoing Bid; that I duly subscribed the name of the partnership thereunto on behalf of the partnership; and that the several matters therein stated are in all respects true.

_____
(Signature)

STATE OF VIRGINIA
CITY/COUNTY OF _____

The foregoing instrument was acknowledged before me this_____ day of _____, _____, by _____.

_____
Notary Public

My Commission Expires: _____

Notary Registration Number: _____

(SEAL)

(Form of affidavit where Bidder is a corporation)

_____ of _____
(City or County) (State or Commonwealth)

being duly sworn, deposes and says: That I reside in the City of _____; that I am the _
_____ of _____
(Title) (Name of Company)

the corporation described in and which executed the foregoing instrument; that I know the seal of the corporation; that the seal affixed to this instrument is such corporate seal and was so affixed by order of the Board of Directors of the corporation; that I signed my name thereto by like order; and that I have knowledge of the several matters therein stated and they are in all respects true.

_____
(Signature)

STATE OF VIRGINIA
CITY/COUNTY OF _____

The foregoing instrument was acknowledged before me this_____ day of _____, _____, by _____.

_____
Notary Public

My Commission Expires: _____

Notary Registration Number: _____

(SEAL)

End of Section 00400

SECTION 00430
BID BOND

KNOW ALL PERSONS BY THESE PRESENTS: That we the undersigned, _____

as Principal (Bidder), and _____ as Surety, are hereby held and firmly bound unto Albemarle County Service Authority as Obligee (OWNER), in the amount of _____ Dollars ($_____),

being five (5) PERCENT OF THE DOLLAR VALUE OF THE BID, for the payment whereof Principal and Surety jointly and severally bind themselves, their heirs, executors, administrators, successors and assigns firmly by these presents.

WHEREAS, Principal has submitted a certain Bid attached hereto and hereby made a part hereof to enter into an AGREEMENT, in writing, for the _____.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION is such that, if Principal shall not withdraw his Bid during the period of 60 days following the opening of Bids, and if its Bid is accepted, enter into a formal Contract in accordance with the AGREEMENT included as a part of the Contract Documents and that the Performance Bond and the Payment Bond be given, then this obligation shall be void; otherwise it shall remain in full force and effect and the Principal and Surety will be liable to the Obligee for the lesser of: (1) the difference between the Bid for which the Bond was written and the next low Bid, or (2) the face amount of the Bid Bond.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its Bond shall be in no way impaired or affected by any extension of the time within which OWNER may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Signed and sealed this _____ day of _____ 20___.

_____
(Principal) **(Seal)**

By: _____
(Name and Title)

_____
(Surety) **(Seal)**

_____ **By:** _____
Resident Virginia Agent **(Attorney-in-Fact)**

IMPORTANT – Surety companies executing Bonds must be 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.

END OF SECTION 00430

SECTION 00431

STANDARD FORM OF
BIDDER'S QUALIFICATION STATEMENT

Note: If you have filed a Qualification Statement within the past 180 days, only answer question numbers 1 and 14 through 25.

QUALIFICATION STATEMENT

Submitted by _____) □ A Corporation
) □ A Co-partnership
) □ An Individual

Principal Office _____

The signatory of this questionnaire guarantees the truth and accuracy of all statements and of all interrogatories hereinafter made

1. Have you filed a Qualification Statement within the past 180 days? _____
2. How many years has your organization been in business as a general contractor under your present business name? _____
3. How many years' experience in the construction of work similar to that outlined in the Contract Documents has your organization had:
   (a) As a General Contractor _____
   (b) As a Sub-Contractor _____
4. Corporation or co-partnership information:

If a corporation, answer this:	If a co-partnership, answer this:
When incorporated _____ In what State_____ President's Name_____ Vice-President's Name_____ Secretary's Name_____ Treasurer's Name_____	Date of organization _____ State whether partnership is a general, limited or association _____ Name and address of partners:

5. List the construction projects your organization has under way on this date:

Contract Amount	Class of Work	Percent Completed	Name and Address of Owner or Contracting Officer

6. List projects your organization has completed in past three years:

Contract Amount	Class of Work	When Completed	Name and Address of Owner

Use blank sheet if additional space is needed.

7. Have you ever failed to complete any work awarded to you? _____

If so, where and why?

_____

_____

_____

8. Has any officer or partner of your organization ever been an officer or partner of some other organization that failed to complete a construction contract?

If so, state name of individual, other organization and reason therefore:

9. Has any officer or partner of your organization ever failed to complete a construction contract handled in his own name?

If so, state name of individual, name of Owner and reason therefore:

10. In what other lines of business are you financially interested?

11. Give the names and addresses of all banks with whom you have done business during the past five years.

12. Give the names and addresses of all surety companies with whom you have done business during the last five years.

13. What is the construction experience of the principal individuals of your organization?

Individual Name	Present Position or Office	Years of Construction Experience	Magnitude and Type of Work	In What Capacity

14. In what manner have you inspected this proposed work? Explain in detail.

_____

_____

15. Explain your plan or lay out for performing the proposed work.

_____

_____

_____

16. The work, if awarded to you, will have the personal supervision of whom?

_____

_____

17. Do you intend to sublet any other portions of the work? _____

If so, state amount of sub-contract, and, if known, the name and address of the sub-contractor, amount and type of his equipment and financial responsibility

_____

_____

18. From which sub-contractors or agents do you expect to require a bond?

_____

_____

_____

19. What equipment do you own that is available for the proposed work?

Quantity	Item	Description, Size, Capacity, Etc.	Condition	Years of Service	Present Location

20. What equipment do you intend to purchase for use on the proposed work, should the contract be awarded to you?

Quantity	Item	Description, Size, Capacity, Etc.	Approximate Cost

21. How and when will you pay for the equipment to be purchased? _____

_____

_____

22. Do you propose to rent any equipment for this work? _____
If so, state type, quantity and reasons for renting _____

_____

_____

23. Have you made contracts or received firm offers for all materials within prices used in preparing your proposal? _____

_____

24. It is required that the Standard Form of Contractor's Financial Statement be filed with this Statement. Have you done so? _____

Dated at _____

this _____ day of _____, _____

_____

Name of Organization

By_____

_____

Title of Person Signing

STATE OF _____)

COUNTY OF_____)

(SEAL)

_____ being duly sworn deposes

and says that he is_____ of _____

Title Name of Organization

and that the answers to the foregoing questions and all statements therein contained are true and correct.

STATE OF VIRGINIA

CITY/COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of

_____, 20___ by_____.

_____

Notary Public

My commission expires: _____

Notary Registration Number: _____

END OF SECTION 00431

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SECTION 00432

STANDARD FORM OF

CONTRACTOR'S FINANCIAL STATEMENT

*Submitted by*_____

)□ An Individual
)□ A Co-partnership
)□ A Corporation

*With principal office at*_____
*To*_____

*Condition at close of business*_____, *20* _____

Condition at close of business_____ 20_____

ASSETS	DOLLARS	¢
1. Cash (a) On Hand $_____ (b) In bank $_____ (c) Elsewhere $ _____		
Notes receivable:		
(b) Due within 90 days		
(b) Due after 90 days		
(c) Past due		
3. Accounts receivable from completed contracts, exclusive of claims not approved for payment		
4. Sums earned on uncompleted contracts as shown by Engineer's or Architect's estimate		
(a) Amount receivable after deducting retainage		
(b) Retainage to date, due upon completion of contracts		
5. Accounts receivable from source other than construction contracts		
6. Deposits for bids or other guarantees:		
(a) Recoverable within 90 days		
(b) Recoverable after 90 days		
7. Interest accrued on loans, securities, etc.		
8. Real estate:		
(a) Used for business purposes		
(b) Not used for business purposes		
9. Stocks and bonds:		
(a) Listed-present market value		
(b) Unlisted-present value		
10. Materials in stock not included in Item 4:		
(a) For uncompleted contracts (present value)		
(b) Other materials (present value)		
11. Equipment, book value		
12. Furniture and Fixtures, book value		
13. Other assets		
Total assets		
LIABILITIES		
1. Notes payable:		
(a) To banks regular		
(b) To banks for certified checks		
(c) To others for equipment obligations		
(d) To others exclusive of equipment obligations		
2. *Accounts Payable:		
(a) Not past due		
(b) Past due		
3. Real estate encumbrances		
4. Other liabilities		
5. Reserves		
6. Capital stock paid up		
(a) Column		
(b) Common		
(c) Preferred		
(d) Preferred		
7. Surplus (net worth) Earned $_____ Unearned $ _____		
Total Liabilities		
CONTINGENT LIABILITIES		
1. Liability on notes receivable, discounted or sold		
2. Liability on accounts receivable, pledged, assigned or sold		
3. Liability as Bondsman		
4. Liability as guarantor or contracts or on accounts of others		
5. Other contingent liabilities		

Total Contingent Liabilities										

DETAILS RELATIVE TO ASSETS

*List separately each item amounting to 10 percent or more of this total and combine the remainder.

1* (a) on hand _____ $_____ CASH
(b) deposited in banks named below _____ _____
(c) elsewhere - (state where) _____

NAME OF BANK	LOCATION	DEPOSIT IN NAME OF	AMOUNT

2* (a) due within 90 days _____ $_____ Notes Receivable (b) due after 90 days _____ _____ (c) past due _____
_____

RECEIVABLE FROM: NAME AND ADDRESS	FOR WHAT	DATE OF MATURITY	HOW SECURED	AMOUNT

Have any of the above been discounted or sold? _____ If so, state amount, to whom, and reason _____
_____
_____
_____

3* Accounts receivable from completed contracts exclusive of claims not approved for payment _____
_____ $

NAME AND ADDRESS OF OWNER	NATURE OF CONTRACT	AMOUNT OF CONTRACT	AMOUNT RECEIVABLE

Have any of the above been assigned, sold or pledged? _____ If so, state amount, to whom, and reason _____
_____
_____

4* Sums earned on uncompleted contracts, as shown by engineer's or architect's estimate:
(a) Amount receivable after deducting retainage _____ $_____ (b) Retainage to date due upon completion of contract _____ _____

DESIGNATION OF CONTRACT AND NAME AND ADDRESS OF OWNER	AMOUNT OF CONTRACT	AMOUNT EARNED	AMOUNT RECEIVED	RETAINAGE		AMOUNT EX-CLUSIVE OF RETAINAGE
				WHEN DUE	AMOUNT	

Have any of the above been sold, assigned, or pledged? _____If so, state amount, to whom, and reason_____

_____

_____

5* Accounts receivable not from construction contracts _____ $ _____

RECEIVABLE FROM: NAME AND ADDRESS	FOR WHAT	WHEN DUE	AMOUNT

What amount, if any, is past due $_____ $_____

6 Deposits with bids or otherwise as guarantees _____ $ _____

DEPOSITED WITH: NAME AND ADDRESS	FOR WHAT	WHEN RECOVERABLE	AMOUNT

7 Interest accrued on loans, securities, etc._____ $ _____

ON WHAT ACCRUED	TO BE PAID WHEN	AMOUNT

8 Real Estate (a) Used for business purposes _____ $_____
Book Value (b) Not used for business purposes_____

DESCRIPTION OF PROPERTY	IMPROVEMENTS		TOTAL BOOK VALUE
	NATURE OF IMPROVEMENTS	BOOK VALUE	
1.			
2.			
3.			
4.			
LOCATION	HELD IN WHOSE NAME	ASSESSED VALUE	AMOUNT OF ENCUMBRANCES
1.			
2.			
3.			
4.			

9 Stocks and Bonds: (a) Listed - present market value_____ $
(b) Unlisted - present value_____

DESCRIPTION	ISSUING COMPANY	LAST INT. OR DIV. PAID		FAIR VALUE	PRESENT MARKET VALUE	QUAN-TITY	AMOUNT
		DATE	%				
1.							
2.							
3.							

WHO HAS POSSESSION	IF ANY ARE PLEDGED OR IN ESCROW, STATE FOR WHOM AND REASON AMOUNT PLEDGED OR IN ESCROW							
1.								
2.								
3.								

10 Materials in stock and not included in Item 4, Assets:
(a) For use on uncompleted contracts (present value)_____ $ _____
(b) Other materials (present value) _____ $ _____

DESCRIPTION OF MATERIAL	QUANTITY	PRESENT VALUE	
		FOR UNCOMPLETED CONTRACT	OTHER MATERIALS

11*	Equipment at book value_____ $_____

QUANTITY	DESCRIPTION AND CAPACITY OF ITEMS	AGE OF ITEMS	PURCHASE PRICE	DEPRECIATION CHARGED OFF	BOOK VALUE

Are there any liens against the above? _____If so, state total amount _____

12	Furniture and fixtures at book value_____ $_____

13	Other assets_____ $_____

DESCRIPTION	Amount

TOTAL ASSETS _____

DETAILS RELATIVE TO LIABILITIES

*Include all amounts owing sub-contractors for all work in place and accepted on completed and uncompleted contracts including retainage.

1

(a) To banks, regular _____ $_____
(b) To banks for certified checks _____ _____ Notes Payable
(c) To others for equipment obligations _____ _____
(d) To others exclusive of equipment obligations _____

TO WHOM: NAME AND ADDRESS	WHAT SECURITY	WHEN DUE	AMOUNT

2*

Accounts Payable (a) Not past due _____ $
(b) Past due _____

TO WHOM: NAME AND ADDRESS	FOR WHAT	DATE PAYABLE	AMOUNT

3

Real Estate encumbrances (See Item 8, Assets) _____ $

4

Other Liabilities _____ $

DESCRIPTION	AMOUNT

5

Reserves _____ $

INTEREST	INSURANCE	BLDGS. & FIXT.	PLANT DEPT	TAXES	BAD DEBTS		
$	$	$	$	$	$	$	$

DETAILS RELATIVE TO LIABILITIES

6	Capital Stock paid up (a) Common_____ $ (b) Preferred _____

7	Surplus: $_____ $

TOTAL LIABILITIES **$_____**

If a corporation, answer this: Capital paid in cash, $_____ When incorporated _____ In what State _____ President's name_____ Vice-President's name_____ Secretary's name_____ Treasurer's name_____	If a co-partnership, answer this: Date of organization_____ State whether partnership is general, limited or association _____ _____ _____ Name and address of partners: _____ _____ _____

The undersigned hereby declares: that the foregoing is a true statement of the financial condition of the individual, co-partnership or corporation herein first named, as of the date herein first given; that this statement is for the express purpose of inducing the party to whom it is submitted to award the submitted a contract; and that any depository, vendor or other agency herein named is hereby authorized to supply such party with any information necessary to verify this statement.

NOTE: A co-partnership must give firm name and signatures of all partners. A corporation must give full corporate name, signature of official and affix corporate seal.

_____

_____

AFFIDAVIT FOR INDIVIDUAL

_____ being duly sworn, deposes and says that the foregoing financial statement, taken from his books, is a true and accurate statement of his financial condition as of the date thereof and that the answers to the foregoing interrogatories are true.

_____
(Applicant must also sign here)
(Applicant must also sign here)

STATE OF VIRGINIA

CITY/COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of

_____, 20___ by_____.

_____
Notary Public

My Commission Expires: _____

Notary Registration Number: _____

(SEAL)

AFFIDAVIT FOR CO-PARTNERSHIP

_____ being duly sworn, deposes and says that a member of the firm of _____; that they are familiar with the books of the said firm showing its financial condition; that the foregoing financial statement, taken from the books of the said firm, is a true and accurate statement of the financial condition of the said firm as of the date thereof and that the answers to the foregoing interrogatories are true.

_____

_____

_____
(All members of firm must also sign here)

STATE OF VIRGINIA
CITY/COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, 20___ by_____.

_____
Notary Public

My commission expires: _____

Notary Registration Number: _____

(SEAL)

AFFIDAVIT FOR CORPORATION

_____ being duly sworn, deposes and says that he is _ _____ of the _____the corporation described in and which executed the foregoing statement; that he is familiar with the books of the said corporation showing its financial condition; that the foregoing financial statement, taken from the books of the said corporation, is a true and accurate statement of the financial condition of said corporation as of the date thereof and that the answers to the foregoing interrogatories are true.

_____
(Signature of Applicant)

_____
(Title of Applicant)

STATE OF VIRGINIA
CITY/COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, 20___ by_____.

_____
Notary Public

My commission expires: _____

Notary Registration Number: _____

(SEAL)

END OF SECTION 00432

SECTION 00490

RECEIPT OF ADDENDA

As a matter of convenience at the opening of bids, the Bidder is requested to acknowledge below the numbers of the Addenda received. Failure of any bidder to receive any addenda or interpretation shall not relieve said bidder from any obligation under their proposal as submitted.

This form should be included in the bid submittal.

The undersigned bidder has received the following addenda:

Addendum Number	Date
_____	_____
_____	_____
_____	_____

_____
(Name of Bidder)

By _____
(Signature)

_____
(Printed Name and Title)

END OF SECTION 00490

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SECTION 00500

STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR ON THE BASIS OF A STIPULATED PRICE

THIS AGREEMENT is by and between the Albemarle County Service Authority (ACSA) (hereinafter called **OWNER**) and *[Name of Bidder]* (hereinafter called **CONTRACTOR**).

OWNER and **CONTRACTOR**, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 – WORK

A. CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

1. Clearing and grubbing along roadway or easement.
2. Furnish and install 8”, 6”, and 4” Ductile Iron water mains.
3. Furnish and install 8”, 6”, and 4” valves.
4. Furnish and install fire hydrants and air release valves.
5. Furnish and install all water services, meter boxes, and meters.
6. Furnish, install and remove temporary water mains and services along Warren Street, Moores Hill, Page Street, and Bird Street to facilitate in place replacement of existing AC water mains.
7. Remove and properly dispose of existing AC water main and appurtenances.
8. Locate and connect to existing water mains.
9. Furnish and install the new PRV vault, SCADA RTU panel, all instrumentation, and complete SCADA integration.
10. Abandon the existing Hardware Street PRV vault and associated piping as shown on the contract drawings.
11. Restoration of all easements, yards, parking lot.
12. Place asphalt pavement and surface treatment according to VDOT specifications and when authorized by the ACSA.
13. Test all pipe (water and sewer) and all appurtenances.
14. Disinfection of water main.
15. Provide maintenance of traffic and required traffic control measures as needed.
16. Any incidental work to complete project.

ARTICLE 2 – THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

ACSA Project No. 2019-03 – Scottsville Phase 4A Water Main Replacement Project

ARTICLE 3 – ENGINEER

3.01 The Director of Engineering for the Albemarle County Service Authority is hereinafter called ENGINEER and is to act as OWNER's representative, assume all duties and responsibilities, and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Days to Achieve Substantial Completion and Final Payment*

A. The Work will be substantially completed within ***240*** calendar days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the Standard General Conditions, and completed and ready for final payment in accordance with paragraph 14.07 of the Standard General Conditions within ***270*** calendar days after the date when the Contract Times commence to run.

4.03 *Liquidated Damages*

A. CONTRACTOR and OWNER recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the Standard General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration preceding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty), CONTRACTOR shall pay OWNER $500 for each day that expires after the time specified in paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if CONTRACTOR, shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR, shall pay OWNER $500 for each day that expires after the time specified in paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01. OWNER shall pay CONTRACTOR for completion of all the Work at the prices stated in the CONTRACTOR'S bid, attached hereto as an exhibit.

As provided in paragraph 11.03 of the Standard General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by ENGINNER as provided in paragraph 9.08 of the Standard General Conditions. Unit prices have been computed as provided in paragraph 11.03 of the Standard General Conditions.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the Standard General Conditions. Applications for Payment will be processed by OWNER as provided in the Standard General Conditions.

6.02 *Progress Payments; Retainage*

A. OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's Applications for Payment on or about the 30th day of each month during performance of the Work as provided in paragraphs 6.02.A.1 and 6.02.A.2. All such payments will be measured by the schedule of values established in paragraph 2.07.A of the Standard General Conditions (and in the case of Unit Price Work based on the number of units completed).

B. OWNER shall handle retainage as follows:

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as ENGINEER may determine or OWNER may withhold, in accordance with paragraph 14.02 of the Standard General Conditions:

    a. 95% of Work completed (with the balance being retainage).
    b. 95% of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

2. Upon Substantial Completion, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR to 95% of the Work completed, less such amounts as ENGINEER shall determine in accordance with paragraph 14.02.B.5 of the Standard General Conditions and less 100% of ENGINEER's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the Standard General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said paragraph 14.07.

ARTICLE 7 – INTEREST

7.01 It is the option of the CONTRACTOR to establish an escrow account for deposit of retained funds. Forms and requirements to establish such an account are available from the OWNER upon request. Funds retained, but not so deposited, will not be subject to accrued interest.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations:

A. CONTRACTOR has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. CONTRACTOR has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. CONTRACTOR is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, including applying the specific means, methods, techniques, sequences, and procedures of construction, if any, expressly required by the Contract Documents to be employed by CONTRACTOR, and safety precautions and programs incident thereto.

E. CONTRACTOR does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

F. CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Contract Documents.

G. CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

H. CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that CONTRACTOR has discovered in the Contract Documents, and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents include the following:

1. This Agreement (Section 00500, inclusive);
2. Performance Bond (Section 00600, inclusive);
3. Payment Bond (Section 00610, inclusive);
4. Standard General Conditions (Section 00700, inclusive);
5. Supplementary Conditions (Section 00800, inclusive);
6. Specifications as listed in the Table of Contents of the Project Manual;
7. Drawings consisting of a cover sheet and sheets numbered 1 through 33, inclusive, with each sheet bearing the following general title: **Scottsville Phase 4A Water Main Replacement – ACSA Project No. 2019-03**;
8. All addenda (Section 00900, inclusive);
9. Exhibits to this Agreement (enumerated as follows):

    a. CONTRACTOR's Bid (as provided in Section 00400, inclusive);
    b. Certificate of Insurance;

10. The following which may be delivered or issued on or after the Effective Date of the Agreement are not attached hereto:

    a. Written Amendments
    b. Work Change Directives
    c. Change Order(s)
    d. Notice to Proceed

B. The documents listed in paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. The Contract Documents may only be amended, modified, or supplemented as provided in paragraph 3.04 of the Standard General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

A. Terms used in this Agreement will have the meanings indicated in the Standard General Conditions.

10.02 *Assignment of Contract*

A. No assignment by a party hereto of any rights under or interests in the Agreement will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 *Successors and Assigns*

A. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 *Severability*

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Other Provisions*

IN WITNESS WHEREOF, OWNER and **CONTRACTOR** have signed this Agreement in duplicate. One counterpart each has been delivered to **OWNER** and **CONTRACTOR**. All portions of the Contract Documents have been signed or identified by **OWNER** and **CONTRACTOR** or on their behalf.

This Agreement will be effective on *[Date of Agreement]*, which is the Effective Date of the Agreement.

OWNER:

Albemarle County Service Authority

By: _____

[CORPORATE SEAL]

_____

Attest

Address for giving notices:

168 Spotnap Road

Charlottesville, Virginia 22911

(If OWNER is a corporation, attach evidence of authority to sign. If OWNER is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of OWNER – CONTRACTOR Agreement).

CONTRACTOR:

[Contractor]

By: _____

[CORPORATE SEAL]

_____

Attest

Address for giving notices:

_____
(Contractors Name)

_____
(Contractors Address)

Va. Contractor's Registration No.:

_____

Agent for Service of Process:

_____

(If CONTRACTOR is a corporation or a partnership, attach evidence of authority to sign).

Designated Representatives:	Designated Representatives:
Name: Alexander Morrison, P.E.	Name: _____
Title: Senior Civil Engineer	Title: _____
Address: 168 Spotnap Road	Address: _____
Charlottesville, Virginia 22911	_____
Phone: (434) 977-4511	Phone: _____
Facsimile: (434)-979-0698	Facsimile: _____

END OF SECTION 00500

SECTION 00600
Performance Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

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

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

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

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

Signature: _____
Name and Title:

SURETY
Company: (Corp. Seal)

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

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

Signature: _____
Name and Title:

SURETY
Company: (Corp. Seal)

Signature: _____
Name and Title:

EJCDC No. 1910-28-A (1996 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Contract, which is incorporated herein by reference.

2. If the CONTRACTOR performs the Contract, the Surety and the CONTRACTOR have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.

3. If there is no OWNER Default, the Surety's obligation under this Bond shall arise after:

3.1. The OWNER has notified the CONTRACTOR and the Surety at the addresses described in paragraph 10 below, that the OWNER is considering declaring a CONTRACTOR Default and has requested and attempted to arrange a conference with the CONTRACTOR and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Contract. If the OWNER, the CONTRACTOR and the Surety agree, the CONTRACTOR shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the OWNER's right, if any, subsequently to declare a CONTRACTOR Default; and

3.2. The OWNER has declared a CONTRACTOR Default and formally terminated the CONTRACTOR's right to complete the Contract. Such CONTRACTOR Default shall not be declared earlier than twenty days after the CONTRACTOR and the Surety have received notice as provided in paragraph 3.1; and

3.3. The OWNER has agreed to pay the Balance of the Contract Price to:

3.3.1. The Surety in accordance with the terms of the Contract;

3.3.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.

4. When the OWNER has satisfied the conditions of paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

4.1. Arrange for the CONTRACTOR, with consent of the OWNER, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the OWNER and the contractor selected with the OWNER's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the OWNER the amount of damages as described in paragraph 6 in excess of the Balance of the Contract Price incurred by the OWNER resulting from the CONTRACTOR Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances;

4.4.1 After investigation, determine the amount for which it may be liable to the OWNER and, as soon as practicable after the amount is determined, tender payment therefor to the OWNER; or

4.4.2 Deny liability in whole or in part and notify the OWNER citing reasons therefor.

5. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the OWNER to the Surety demanding that the Surety perform its obligations under this Bond, and the OWNER shall be entitled to enforce any remedy available to the OWNER. If the Surety proceeds as provided in paragraph 4.4, and the OWNER refuses the payment tendered or the Surety has denied pliability, in whole or in part, without further notice the OWNER shall be entitled to enforce any remedy available to the OWNER.

6. After the OWNER has terminated the CONTRACTOR's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the OWNER shall not be greater than those of the CONTRACTOR under the Contract, and the responsibilities of the OWNER to the Surety shall not be greater than those of the OWNER under the Contract. To a limit of the amount of this Bond, but subject to commitment by the OWNER of the Balance of the Contract Price to mitigation of costs and damages on the Contract, the Surety is obligated without duplication for:

6.1. The responsibilities of the CONTRACTOR for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional and delay costs resulting from the CONTRACTOR's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the CONTRACTOR.

7. The Surety shall not be liable to the OWNER or others for obligations of the CONTRACTOR that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the OWNER or its heirs, executors, administrators, or successors.

8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after CONTRACTOR Default or within two years after the CONTRACTOR ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the Contract was be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by the OWNER to the CONTRACTOR under the Contract after all proper adjustments have been made, including allowance to the CONTRACTOR of any amounts received or to be received by the OWNER in settlement of insurance or other Claims for damages to which the CONTRACTOR is entitled, reduced by all valid and proper payments made to or on behalf of the CONTRACTOR under the Contract.

12.2. Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.

12.3. CONTRACTOR Default: Failure of the CONTRACTOR, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. OWNER Default: Failure of the OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR as required by the Contract or to perform and complete or comply with the other terms thereof.

(FOR INFORMATION ONLY--Name, Address and Telephone)
AGENT or BROKER: OWNER'S REPRESENTATIVE (Engineer or other party):

SECTION 00610
Construction Payment Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Principal Place of Business):

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Date (Not earlier than Construction Contract Date):
Amount:
Modifications to this Bond Form:

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	(Corp. Seal)	Company:	(Corp. Seal)
Signature: _____		Signature: _____	
Name and Title:		Name and Title:	

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	(Corp. Seal)	Company:	(Corp. Seal)
Signature: _____		Signature: _____	
Name and Title:		Name and Title:	

EJCDC No. 1910-28-B (1996 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors

1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER to pay for labor, materials and equipment furnished for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to the OWNER, this obligation shall be null and void if the CONTRACTOR:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies and holds harmless the OWNER from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract, provided the OWNER has promptly notified the CONTRACTOR and the Surety (at the addresses described in paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the CONTRACTOR and the Surety, and provided there is no OWNER Default.

3. With respect to Claimants, this obligation shall be null and void if the CONTRACTOR promptly makes payment, directly or indirectly, for all sums due.

4. The Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with the CONTRACTOR have given notice to the Surety (at the addresses described in paragraph 12) and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with the CONTRACTOR:

1. Have furnished written notice to the CONTRACTOR and sent a copy, or notice thereof, to the OWNER, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from the CONTRACTOR, or not received within 30 days of furnishing the above notice any communication from the CONTRACTOR by which the CONTRACTOR had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to the Surety and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the CONTRACTOR.

5. If a notice required by paragraph 4 is given by the OWNER to the CONTRACTOR or to the Surety, that is sufficient compliance.

6. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

6.1. Send an answer to the Claimant, with a copy to the OWNER, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

8. Amounts owed by the OWNER to the CONTRACTOR under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the CONTRACTOR furnishing and the OWNER accepting this Bond, they agree that all funds earned by the CONTRACTOR in the performance of the Contract are dedicated to satisfy obligations of the CONTRACTOR and the Surety under this Bond, subject to the OWNER's priority to use the funds for the completion of the Work.

9. The Surety shall not be liable to the OWNER, Claimants or others for obligations of the CONTRACTOR that are unrelated to the Contract. The OWNER shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by paragraph 4.1 or paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the OWNER or the CONTRACTOR, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is, that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, the CONTRACTOR shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with the CONTRACTOR or with a Subcontractor of the CONTRACTOR to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the CONTRACTOR and the CONTRACTOR's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.2. Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes pthereto.

15.3. OWNER Default: Failure of the OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR as required by the Contract or to perform and complete or comply with the other terms thereof.

(FOR INFORMATION ONLY – (Name, Address and Telephone)
AGENCT or BROKER: OWNER's REPRESENTATIVE (Engineer or other party):

SECTION 00620
CERTIFICATE OF INSURANCE

* Attach Certificate of Insurance Hereto.

Coverage shall comply with the requirements of SECTION 00800 – Supplemental Conditions

END OF SECTION 00620

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SECTION 00630
NOTICE OF AWARD

Dated: *[Date of Award]*

TO: ***[Contractor's Name]***

ADDRESS: ***[Contractor's Address]***

PROJECT: **ACSA Project No. 2019-03 – Scottsville Phase 4 Water Main Replacement Project**

You are notified that your bid, dated *[Contractor's Bid Date]*, for the above Project has been considered. You are the apparent successful bidder and have been awarded a contract for:

ACSA Project No. 2019-03 – Scottsville Phase 4 Water Main Replacement Project

The Contract Price of your Contract is: $ *[Total Contract Price]*

Three copies of the Standard Form of Agreement and Contract Drawings accompany this Notice of Award.

You must comply with the following conditions within fifteen days of the date of this Notice of Award:

1. Deliver to the ACSA (3) three fully executed Standard Form of Agreements.
2. Deliver with the executed Standard Form of Agreements: Payment, Performance and other bonds as specified in the Standard General Conditions (Article 5) and the Instructions to Bidders and General Terms.
3. Deliver Certificate of Insurance as specified in the Standard General Conditions (Paragraph 5.03) and amended per the ACSA Supplemental Conditions.

Failure to comply with these conditions within the time specified will entitle the ACSA to consider your bid in default and to annul this Notice of Award.

Within ten days after you comply with the above conditions, the ACSA will return to you one fully executed counterpart of the Standard Form of Agreement

Albemarle County Service Authority

By: _____
Executive Director

End of Section 00630

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SECTION 00640
NOTICE TO PROCEED

To: *[Contractor's Name]*
[Contractor's Address]

Project: ACSA Project No. 2019-03 – Scottsville Phase 4 Water Main Replacement Project

Amount of Contract: $*[Total Contract Price]*

You are hereby notified to commence work on the referenced Project on or before *[Date of Notice to Proceed]*, and shall fully complete all of the work of said Project within *[Number of Allowed Days]* consecutive calendar days thereafter. Your completion date is therefore *[Date of Completion]*.

The Contract provides for an assessment of the sum of $500 as liquidated damages for each consecutive calendar day after the above established Project completion date that the work remains incomplete.

Dated this ___ day of _____.

By: _____
Peter C. Gorham, P.E.

Title: Director of Engineering

Acceptance of Notice

Receipt of the foregoing Notice to Proceed is hereby acknowledged.

By ___*[Contractor's Name]*_____

this _____ day of _____ 20___.

By _____

Title _____

End of Section 00640

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This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the Controlling Law.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

ACEC
American Council of Engineering Companies

National Society of Professional Engineers
Professional Engineers in Private Practice

ASCE American Society of Civil Engineers

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
a practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

_____

AMERICAN COUNCIL OF ENGINEERING COMPANIES

_____

AMERICAN SOCIETY OF CIVIL ENGINEERS

This document has been approved and endorsed by

The Associated General Contractors of America

Knowledge for Creating and Sustaining the Built Environment

Construction Specifications Institute

National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314

American Council of Engineering Companies
1015 15th Street, N.W., Washington, DC 20005

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Nos. C-520 or C-525 (2002 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC Construction Documents, General and Instructions (No. C-001) (2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800) (2002 Edition).

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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*--The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*--The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*--The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*--A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*-- Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*--The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*--The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*--See Paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*--The individual or entity named as such in the Agreement.

20. *Field Order*--A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

23. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*--The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*--A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*--The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*--Polychlorinated biphenyls.

31. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*--A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Related Entity* -- An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative*--The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Schedule of Submittals*--A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *Schedule of Values*--A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

41. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. *Site*--Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. *Specifications*--That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain

administrative requirements and procedural matters applicable thereto.

44. *Subcontractor*--An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

45. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

46. *Successful Bidder*--The Bidder submitting a responsive Bid to whom Owner makes an award.

47. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

48. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.

49. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

50. *Unit Price Work*--Work to be paid for on the basis of unit prices.

51. *Work*--The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. *Work Change Directive*--A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. *Intent of Certain Terms or Adjectives*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered", "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents, or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or

c. has been damaged prior to Engineer's - recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review**:**

1. a preliminary Progress Schedule; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. Resolving Discrepancies

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work

(unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or

2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.

B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party..

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. Possible Price and Times Adjustments

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified

in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 *Contractor's Liability Insurance*

A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

   a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

   b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, (other than caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any

deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order .

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract

Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,

3) it has a proven record of performance and availability of responsive service; and

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times, and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified , and

b) available engineering, sales, maintenance, repair, and replacement services;

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued . No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor

2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual

or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer,, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. Limitation on Use of Site and Other Areas

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Draw-

ings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. Shop Drawings

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:* Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals , any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Submittal Procedures

1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents

with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or

arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 - OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and

properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment , a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall

promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A.Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim, shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have

resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation , overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. Contingency Allowance

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted

by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times , or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to

be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications .

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress

payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent

inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

c. there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, , Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial

Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. Application for Payment

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

b. consent of the surety, if any, to final payment;

c. a list of all Claims against Owner that Contractor believes are unsettled; and

d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations

under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and , will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be

governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or

2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 - MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

END OF SECTION 00700

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SECTION 00800
ACSA SUPPLEMENTARY CONDITIONS

SUPPLEMENTS

These supplementary conditions modify, change, delete from, or add to the Standard General Conditions of the Construction Contract, EJCDC Document C-700, 2002 edition, to the extent indicated. Where any article, paragraph, subparagraph, or clause of the Standard General Conditions is altered by these supplements, the unaltered provisions of the article, paragraph, subparagraph, or clause shall remain in effect.

DEFINITIONS

Revise Article 1 - Definitions as follows: Revise the definition of the term "Engineer" to read "The Albemarle County Service Authority or the representative of the owner as designated by the Albemarle County Service Authority."

INDEMNIFICATION

Delete 4.06G in its entirety.

INSURANCE

Add the following to paragraph 5.03 as subparagraph 5.03.C and 5.03.D:

5.03.C The contractor shall assume and agree to hold harmless, indemnify, save, protect, and defend the Albemarle County Service Authority, its officers, agents and employees, against any and all liability for injuries and damages to contractor himself and to contractor's employees, agents, subcontractors, and guests, third parties or otherwise, incident to or resulting from any and all operations performed under the terms of this contract. In addition to any other forms of insurance or bonds required under contracts and specifications pertaining to this project, the following public liability insurance schedule shall apply to all work performed under the terms of this contract. The insurance specified shall be with an insurance company acceptable to the parties hereto and licensed to do business in the Commonwealth of Virginia.

5.03.D Insurance Schedule: The contractor shall carry public liability insurance in amount not less than those specified below, including the contractual liability assumed by the contractor, and shall deliver certificates of insurance from carriers, acceptable to the owner specifying such limits, with the Albemarle County Service Authority, its officers, agents and employees named as additional insureds.

5.03.D.1 Workman's Compensation and Employer's Liability Insurance shall be in strict accordance with the requirements of the current and applicable Workman's Compensation Laws of the State. The insurance shall cover all of the contractor's employees employed or associated with the project; and where any part of the work is subcontracted, the contractor shall require the subcontractor to provide similar Workman's Compensation and Employer's Liability Insurance for all

employees of the subcontractor unless such employees are covered by the protection afforded by the contractor. In case any class of employees engaged in hazardous work under this contract is not protected under the Workman's Compensation Statute, the contractor shall provide, and shall cause such subcontractor to provide, adequate coverage for the protection of all employees on the project not otherwise protected under applicable provisions of the Statutes relating to Workman's Compensation and Employer's Liability Insurance. The minimum limits of coverage shall be as follows:

A. State	Statutory
B. Applicable Federal	Statutory
C. Employer's Liability	$500,000
D. Benefits required by union labor contracts	As Applicable
E. Voluntary Compensation	$500,000
F. Broad Form All States Endorsement	

5.03.D.2 Comprehensive General Liability Insurance shall protect the contractor and any subcontractors performing work under this contract from any claims for bodily injury, for sickness or disease, for death, for personal injury, and for property damages which may arise either directly or indirectly out of, or in connection with, the performance of work under this contract. The Comprehensive General Liability Insurance Coverage shall include: Premises Operations; Independent Contractor's Protection; Products Liability and Completed Operations; and Broad Form Property Damage. The minimum limits of coverage shall be as follows:

A. Bodily Injury	$1,000,000 Each Occurrence $1,000,000 Annual Aggregate
B. Property Damage	$1,000,000 Each Occurrence $1,000,000 Annual Aggregate
C. Property Damage Liability shall provide Explosion, Collapse and Underground coverages	

5.03.D.3 Contractual Liability: Minimum limits of coverage shall be as follows:

A. Bodily Injury	$1,000,000 Each Occurrence
B. Property Damage	$1,000,000 Each Occurrence $1,000,000 Annual Aggregate

5.03.D.4 Personal injury (with Employment Exclusion deleted). The minimum limits of coverage shall be as follows:

Annual Aggregate	$1,000,000

5.03.D.5 Comprehensive Automobile Liability Insurance (owner, nonowner, hired) shall protect the contractor and any subcontractor performing work under this contract from any claims for bodily injury, for death, and for property damages which may arise either directly or indirectly out of, or in connection with, the performance of work under this contract. The minimum limits of coverage shall be as follows:

Combined single limits for bodily injury and property damage.

A. Bodily	$1,000,00 Each Occurrence
B. Property Damage	$1,000,000 Each Occurrence

5.03.D.6 Aircraft Liability (owned and nonowned), when applicable. The minimum limits of coverage shall be as follows:

Combined single limits for bodily injury and property damage.

A. Bodily Injury	$1,000,000 Per Seat
B. Property Damage	Included

5.03.D.7 Umbrella Excess Liability over Primary Insurance. The minimum limits of coverage shall be as follows:

A. Each Occurrence	$3,000,000
B. Aggregate	$3,000,000

5.03.D.8 Contractual Liability covers the following indemnity agreement:

The contractor shall indemnify and hold harmless the Albemarle County Service Authority, its officers, agents and employees against and from all liability, claims, damages, demands and costs, including attorney fees of every kind in nature and attributable to bodily injury, sickness, disease or death or to damage or destruction of property resulting from or in any manner arising out of or in connection with the project and the performance of the work under this contract.

5.03.D.9 Additional liability coverage for owner will be provided by endorsement as additional insureds on contractor's general liability policy.

Delete paragraph 5.05 in its entirety.

Delete paragraph 5.06.B, and replace with the following:

"B. Contractor shall purchase and maintain such boiler and machinery insurance as may be required by the Special Conditions or by law."

Delete paragraph 5.06.C in its entirety.

Delete paragraph 5.06.E in its entirety.

Delete the last sentence in paragraph 5.07.A in its entirety.

Delete paragraph 5.08.A in its entirety.

Delete paragraph 5.08.B in its entirety.

Delete paragraph 5.09.A, and replace with the following:

"A. If Owner has any objections to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by Contractor on the basis of its not complying with the Contract Documents, owner will notify Contractor in writing thereof within ten days of the date of delivery of such certificates to Owner."

PERMITS

Concerning Article 6, paragraph 6.08.A, the permits to be obtained and the utility connection charges to be paid by the Owner are specified in Special Conditions. All other permits and charges shall be the responsibility of the Contractor.

NONDISCRIMINATION IN EMPLOYMENT

Add the following paragraph to Article 6, Contractor's Responsibilities:

6.09.D The provisions of Section 2.2-4201, 2.2-4311 and 2.2-4312 of the Code of Virginia, as amended, prohibiting employment discrimination by the Contractor and the contractor's responsibility to maintain a drug free work place, are made a part of the Contract Documents. The Contractor shall familiarize themselves and comply with the provisions of Section 2.2-4201, 2.2-4311 and 2.2-4312.

PROGRESS PAYMENTS

Progress payments shall conform to the requirements specified in the Standard Form of Agreement. For requirements not covered in the Standard Form of Agreement, Article 14, Payments to Contractor and Completion shall apply.

Subject to the provisions of Article 14 of the Standard General Conditions, the Agreement will stipulate that the Owner will make progress payments on or about the 30th day of the month following each application for payment. The Contractor shall submit their application for payment

on or about the 1st day of the month. The application shall include work through the last day of the preceding month.

It is the Contractor's option to utilize the Owner's escrow accounting procedures for retainage held on this contract. If the Contractor desires to utilize these procedures, they must complete an Escrow Agreement available from the Owner and return it with the executed Standard Form of Agreement.

ARTICLE 16 - DISPUTE RESOLUTION

Add the following paragraph to Article 16, Section 16.01C as paragraph 4:

4. Venue for purposes of resolution in the court system shall be in the Albemarle County General District Court or the Albemarle County Circuit Court.

End of Section 00800

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SECTION 00810
ACSA SPECIAL CONDITIONS

The following special conditions apply for this project:

In the event any provision of this Section modifies, differs or contradicts a provision contained elsewhere in this Contract, the provisions of this Section shall govern.

1. CONTRACT AND SPECIFICATIONS

The Contractor is hereby advised that the Albemarle County Service Authority General Water and Sewer Construction Specifications and Sewer Approved Products List are made a part of this contract. The Contractor may obtain a copy of the referenced documents from the Authority's website and shall always keep it on the job site.

2. LIMITATIONS ON THE SEQUENCE OF CONSTRUCTION

Limitations on the sequence of construction are as follows. Refer to Specification Section 01106 and the Contract Drawings for additional sequencing requirements.

1. Notice to Proceed preferred by September 15, 2026.

2. Shutdowns of existing water mains to facilitate pipeline removals, cutting and capping, installation of connections and tie-ins shall be coordinated with the ACSA inspector and RWSA as required. Refer to sections below for notification requirements.

3. Provide required traffic control and maintenance of traffic along Warren Street, from James River Road to Harrison Street as required in accordance with the final Land Use Permit conditions and MOT plans provided by the contractor.

4. Temporary water main and services and existing water main replacement along Warren Street is contingent upon the reconstruction of the existing retaining wall along the north side of Warren Street as performed under a separate VDOT project. If the retaining wall has not been reconstructed, the existing water main along Warren Street will not be replaced. Refer to contract drawings for additional requirements.

5. Warren Street closure and detour will be required for work under and around existing box culvert at the Valley Street intersection. Warren Street closure and detour will also be required if the temporary water main and services and the existing water main is replaced in-place.

6. Water main replacements and installations in Valley Street including the open cut crossing from Moores Hill to Warren Street are to be performed during nighttime hours. Confirm hours of operation with final Land Use Permit conditions from VDOT.

7. Steel plating of open excavations is only allowed from April 3 to October 31 of any given calendar year unless authorized by VDOT.

8. Assistance with the ACSA in coordinating with Appalachian Power for the electrical service extension to the new PRV vault will be required.

9. Abandonment of the Hardware Street PRV vault will be performed in cooperation with the ACSA and following the successful installation, testing, startup, and SCADA integration of the new PRV vault and RTU.

10. Moores Hill drainage improvements are required to be scheduled and coordinated with the ACSA and the property owner prior to pavement restoration along Moores Hill. Refer to contract drawings for additional requirements.

11. For all VDOT approved road closures and roads affected by traffic control operations, access to homes for existing residents must be maintained.

12. For temporary water main and service installations and usage, provisions for freeze protection must be provided and maintained until the corresponding water main has been successfully installed, tested, disinfected and accepted and the new water services have installed and accepted.

13. Bird Street, from Page Street to Harrison Street, may be closed to thru traffic during water main installation if approved by VDOT. Provide detour plan and signage as required by VDOT and in accordance with the Land Use Permit conditions.

14. The West Main Street water main installation (from Harrison Street to Valley Street) may take place with the Valley Street water main installations. The block along West Main Street may be closed to thru traffic if in accordance with the final Land Use Permit conditions and allowed by VDOT. Access to residents and businesses along this block of West Main Street shall be provided.

15. Fleet Street from Harrison Street to Valley Street may be closed for water main installation. Coordinate street closure and required traffic control with VDOT and the Town.

16. Surface treatment and pavement restoration areas shown except where noted on the contract drawings and pavement restoration details are intended to be performed by VDOT under a separate contract. Contingent bid items for surface treatment and pavement restoration may apply if authorized by the ACSA.

3. EROSION CONTROL DEVICES AND REQUIREMENTS

Erosion control devices shall be installed as directed by the Owner or other regulatory agencies. The Contractor shall be responsible for installing all erosion control devices required to minimize soil erosion (silt fence, sediment traps, diversion ditches, check dams, etc.). Erosion control shall be in accordance with standards established by VDOT, Virginia Department of Conservation and Recreation, the Virginia Erosion and Sediment Control Handbook, latest edition, Virginia Regulations VR 625-02-00 Erosion and Sediment Control Regulations and the Albemarle County Service Authority. Installing all necessary and required erosion control devices shall be considered incidental to the work, and the costs shall be included in the various bid items. Where a device must be placed before construction,

removed during construction and replaced following construction, no extra payment will be made for the removal and replacement operations.

4. CONSTRUCTION CONFERENCES

A pre-construction conference will be held prior to any work being performed.

The Contractor will be accompanied at this conference by his Project Manager, General Superintendent, and each Foreman and by a representative of any subcontractor with whom he has executed a binding agreement. The Contractor shall submit his detailed and complete project schedule for any assigned work orders, materials/manufacturer's list, request for subcontractor approval, and emergency contact list at the pre-construction conference. The Contractor will also submit the name(s) of his "competent person" for OSHA trenching regulations. If the required parties do not attend, the conference will be canceled and rescheduled. No additional payment will be made for attendance at the rescheduled pre-construction conference.

Additional construction conferences will be scheduled as needed, when requested by the Owner, the Contractor, the Virginia Department of Transportation, or other controlling agency.

It is anticipated that at least one conference (progress meeting) will be required each month. At the monthly progress meetings, the Contractor will be required to present (distribute handouts to all attendees) updated schedules, status of the work, remaining work, work planned for the next month, etc. for his work and all subcontractors. The Contractor's handouts will be used to conduct the meeting.

Weekly meetings with the on-site representative are also anticipated.

5. CONTRACT TIME AND LIQUIDATED DAMAGES

The Contractor will be required to submit a schedule upon receipt of each work order assigned under this Contract. The schedule shall include proposed Substantial and Final Completion dates for the individual task order; these dates will be negotiated by the Owner, as necessary, finalized and agreed upon by both parties. The Contractor will be required to complete all work, including testing and complete restoration, associated with each individual work order within the time negotiated and agreed upon by both parties at the start of each task order from the date specified in the individual task order Notice to Proceed from the Owner to the Contractor. Liquidated Damages of $250.00 per calendar day shall be applied to each calendar day exceeding the completion date.

The unit prices bid shall remain in effect during the Contract Period. Projects may be assigned to the Contractor an any time within the Contract period.

6. BID ITEMS

The Bid Form in Section 00400 includes bid items that may or may not be used throughout this Contract. The quantities in the Bid Form have been estimated to allow for a comparison of bids only; no minimum quantities are guaranteed. Payment shall be based on actual quantities installed of each

bid item. The Contractor shall not be due any adjustments in unit prices because of quantity over-runs or under-runs.

7. SUBSTITUTIONS AND PRODUCT OPTIONS

The Specifications include specific product names that are approved for installation in this Contract. Whenever a product name is specified followed by the phrase "or equal," the specific product mentioned shall be the basis upon which bids are to be prepared, and shall be understood as establishing the type, function, dimension, appearance and quality desired.

Other manufacturer's or vendor's products not named will be considered as substitutions if a written request for such substitution is made at least seven (7) days prior to the scheduled bid opening. The requests for substitution shall include complete data (including product literature, reference standards and performance and test data) substantiating compliance of the proposed substitution with the requirements stated in the Specifications. A list of product installations by the Contractor and proposed superintendent/foreman including quantities installed, dates of installation, and references (name, address, and phone numbers) shall also be submitted. Any approved substitutions and/or additions shall be made by addendum only.

The requests for substitution must include a written and signed statement from the Contractor and/or manufacturer stating that the Contractor/manufacturer will adhere to all parts and requirements of the Specifications outlined herein and that no exceptions to any part of the Specifications will be taken.

The Owner's decision regarding evaluation and acceptance of substitutions shall be final and binding.

8. UTILITY PROTECTION PLAN

The Contractor shall submit a Utility Protection Plan (UPP) prior to starting any construction on this Project. The UPP shall be a detailed and thorough description of the plans the Contractor will employ to protect existing in-service utilities from initial excavation through final backfill. The UPP may include plans, descriptions, drawings and/or calculations. The plan shall include documentation that all Commonwealth laws will be adhered to at all times and shall include step- by-step processes starting with calling in utility locates per State codes to documentation of locates to excavation around utilities to final backfill. Internal documentation, communication procedures, processes shall also be defined, including employee training, safety meetings, and disciplinary procedures for not following the UPP. A complete listing of the Contractor's available equipment (such as shoring) shall be noted. All Subcontractors shall abide by the General Contractor's UPP. A detailed Safety Plan shall also be submitted with the UPP.

9. SAFETY

The Contractor agrees to perform all work in a safe and careful manner, to furnish and use and require its employees to use safety devices and equipment as necessary, and to comply with all laws, rules, codes and regulations applicable to the safe performance of the work. The Contractor's employees shall be required to wear safety vests or orange shirts (orange shirts cannot be substituted for safety vests at night or when they are not allowed by ACSA or Virginia Law) and hard hats while in construction

areas. The Contractor shall provide traffic control signs, signals, flashing lights, guards, plates, enclosures, barricades and notices, including all special design signs as may be required by the ACSA or the Virginia Department of Transportation, as necessary to protect both its employees, the ACSA's employees, and the public at large against damage to property and bodily injury or death. Truck mounted crash cushions, if needed, shall be negotiated on an individual basis. The Contractor shall comply with the Virginia Department of Transportation Flagging Certification Program. The contractor shall also comply with OSHA Regulation 29 CFR, Part 1926, Subpart P – Excavations.

10. GENERAL CONTRACTOR EXPERIENCE

The General Contractor shall be experienced in performing and managing large sewer rehabilitation projects as documented by verifiable project references. The Contractor and Subcontractors shall be fully qualified and experienced to perform the work included in this Project. Specific experience requirements are included in the Specifications for various rehabilitation methods.

For the excavation work, the Contractor shall be fully experienced in sewer rehabilitation construction including handling wastewater flow through bypass pumping, working around existing utilities and in tight corridors, trench shoring and sheeting including around existing utilities, connecting new sewers to existing sewers and manholes, grass and asphalt restoration including patching, dealing with the public and residents, providing thorough traffic control, and all else required to replace existing sewers and service laterals.

Specific project references may be requested by the Owner after receipt of bids and prior to award of this Contract as part of the bid review process. Experience with rehabilitation projects is a mandatory requirement for this Contract.

11. SUBCONTRACTORS

The Bidder shall submit with the bid a list giving the names and addresses of subcontractors proposed to be used, together with the scope of their respective parts of the work. Should any subcontractor be disapproved by the ACSA, the Contractor shall submit additional names for approval. The ACSA will act promptly in the approval of subcontractors, and when approval of the list is given, no changes of subcontractors will be permitted except for cause or reason considered justifiable by the ACSA. All subcontractors shall have experience performing the specific rehabilitation work that they are proposed for as documented by verifiable project references. All subcontractors must be approved by the ACSA prior to performing any work on this project.

12. PROJECT MANAGEMENT AND SUPERVISION

A. The Contractor shall provide adequate project management and supervision throughout this Contract. At a minimum, the Contractor shall provide a full-time, Project Manager and a full- time, on-site General Superintendent. In addition, each crew, including subcontractor’s crews, must have an experienced, English-speaking foreman. The Contractor’s General Superintendent(s) must be on-site to observe the work at all times when work is being performed, including work performed by subcontractors. Work shall cease whenever the General Superintendent(s) is not on-site to observe the work. The Owner may allow the Contractor’s foremen to act on behalf of the General

Superintendent if so requested but will not allow subcontractor's foremen to act in such a manner. The Contractor's General Superintendent(s) must observe all work performed by subcontractors.

B. The Contractor's full-time Project Manager shall manage and supervise this Contract throughout its duration. The Project Manager shall have a minimum of 5 years of experience managing and supervising this type of construction, including excavation, sewer rehabilitation work, and manhole rehabilitation, backed up by project references. The references must clearly indicate that the proposed person acted as the Project Manager. The Project Manager's obligations, duties and responsibilities shall include, but not be limited to, the following:

1. serve as main point of contact for Owner with authority to act on behalf of the Contractor
2. prepare, process, submit and administer shop drawings and other submittals
3. perform field engineering
4. coordinate with property owners and the public
5. coordinate with other utilities
6. coordinate with VDOT
7. prepare and process proposals, change orders, field orders, etc.
8. administer and coordinate subcontracts to ensure that quality work is being performed
9. coordinate, prepare and submit all required schedules and accurately update schedules for presentation at progress meetings
10. prepare, modify, coordinate and administer payment applications
11. prepare accurate and complete record drawings
12. provide general quality control to ensure that all Contract work meets or exceeds the Contract requirements
13. attend all project meetings

C. The Contractor's full-time, on-site General Superintendent(s) shall be on-site during all construction activities including work by subcontractors. The General Superintendent shall have at least 5 years of experience managing and supervising this type of construction, including excavation, sewer rehabilitation work, sewer lining, and manhole rehabilitation, and supervising subcontractors as backed up by project references. The references must clearly indicate that the proposed person(s) acted as the General Superintendent. The General Superintendent's obligations, duties and responsibilities shall include, but not be limited to, the following:

1. serve as main contact point for Owner's on-site representative
2. work with Owner's on-site representative to ensure a high-quality project that meets the Owner's expectations and the Contract requirements - failure to work with the Owner's representative in good faith shall result in removal of the superintendent from the job and replacement with a suitable superintendent
3. coordinate all work and work schedules with the Owner's representative
4. supervise all field work including work of Contractor's forces (foreman, laborers, etc.) and subcontractors
5. ensure that all discussions with the Owner's representative are implemented by Contractor's forces
6. coordinate with property owners and the public and supervise the distribution of project notifications

7. ensure that all approved submittals and traffic control plans are being followed and implemented by Contractor's forces
8. review quantities being requested for monthly payment applications with the Owner's representative
9. provide general quality control to ensure that all Contract work meets or exceeds the Contract requirements
10. attend all project meetings

D. Each foreman proposed to act as such on this Contract must have a minimum of 2 years of experience as a foreman for the specific work he/she is proposed to supervise. References must be submitted to demonstrate that the proposed person(s) have the required experience. The references must clearly indicate that the proposed person(s) acted as a foreman.

E. The resumes and project references (names and phone numbers) of the proposed Project Manager, General Superintendent(s) and foremen shall be submitted to the Owner for review and approval prior to the preconstruction conference. The Owner will contact references to determine if the proposed persons meet the requirements specified herein. The findings of the Owner will be issued prior to the preconstruction conference if adequate time is available or at the preconstruction conference. The Owner may request interviews with the proposed person(s). The Owner's decision on the acceptability of the proposed person(s) shall be final, and the Contractor shall immediately propose alternate personnel that meet the specified requirements if the proposed person(s) is denied. No waivers of these requirements shall be permitted. No work shall begin until the Project Manager, General Superintendent and foremen are approved and are on-site working on this project.

F. The Contractor shall not replace or substitute the Project Manager, General Superintendent(s) and foremen without obtaining prior approval from the Owner. The Contractor shall make any such request to change supervision in writing, and the Owner will respond within 10 business days of the request. Work shall cease on the project any time such a change is made until approval of new supervision is granted to the Contractor. Additional or alternate supervisory personnel must meet all of the above requirements.

G. Payment for all project management and supervision shall be a mandatory subsidiary obligation under the Contract, and no separate payment will be made by the Owner

14. PAY ESTIMATES

Pay estimates shall conform to Section 00800 of these Contract Documents.

Sample pay estimate forms are included in these Contract Documents. The Contractor will be required to modify all forms and pay estimate documentation to meet the needs of the Owner. Detailed breakdowns for all work performed will be required (broken down into specific work per specific work order, etc.). The Contractor shall work with the Owner at the first pay estimate submittal to develop all final forms for pay estimates.

A. The Contractor will provide the following documents with each payment request:

1. Signed Estimate Forms.
2. Schedule of values showing work completed.
3. Detailed breakdowns of all work performed by work order.
4. Microsoft Excel files of all breakdowns and schedule of values.
5. Survey of all new waterlines, and services (including meter boxes), installed where payment is being requested.
6. Acceptance testing as specified including all pressure testing and disinfection performed.

B. Contract Closeout Documents: The Contractor will provide the following documents with the final payment request:

1. Consent of Surety to Final Payment.
2. Contractor's affidavit - Release and Waiver of Claim.
3. Signed estimate forms.

C. Final payment will not be authorized until these documents have been properly completed and submitted by the Contractor, and all deficiencies noted at the final inspection have been corrected and approved.

D. No payment will be made for stored materials.

15. PEDESTRIAN ACCESSIBILITY IN THE PUBLIC RIGHT-OF-WAY DURING CONSTRUCTION

Prior to initiating work, the Contractor shall submit a plan to the Owner detailing the Contractor's methods for maintaining pedestrian access in work areas located within the public right-of-way, including streets and sidewalks. The submitted plan must be approved by the Owner prior to initiating work; changes to the plan shall be made, as required, based upon the Owner's review.

16. WARRANTY PERIOD

The Contractor shall warrant all work and materials installed in this Contract for one year from the date of final acceptance unless a longer warranty period is dictated in a separate specification section of these Contract Documents; the longer warranty period shall govern. The date of final acceptance shall be the date that final payment (for the initial contract or any subsequent renewals) is made to the Contractor. Prior to final acceptance, the Contractor shall submit a written plan on how warranty issues will be addressed including manhole issues and restoration issues.

17. PROJECT FORMS

Forms that will/may be used in this Project are available from the ACSA and include:

- Application for Payment Summary Page
  NOTE: this is just the summary page; the Contractor shall attach a schedule of values summarizing all quantities included in the invoice and paid to date and shall also provide a detailed breakdown of work by work order/area as specified. The Owner may revise the summary page as deemed

necessary to comply with their accounting requirements and needs.

- Work Change Directive (1 page)
- Change Order (2 pages)
- Field Order (1 page)
- Change Proposal Request (1 page)
- Shop Drawing Transmittal (1 page)
- Contractor's Affidavit of Release and Waiver of Claim (1 page).

END OF SECTION 00810

SECTION 00850

ALBEMARLE COUNTY SERVICE AUTHORITY

ESCROW AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of_____, 20___ by and among the Albemarle County Service Authority, a public body politic and corporate, organized and existing under the laws of the Commonwealth of Virginia (the "ACSA"), _____

_____

a _____ corporation,

("Contractor"),

_____

(Name of Bank)

_____

(Address of Bank)

a trust company, bank or savings and loan institution with its principal office located in the Commonwealth (hereinafter referred to as "Bank"); and _____ _____ (the "Surety") provides:

ACSA and Contractor have entered into a contract for the ACSA's **Scottsville Phase 4 Water Main Replacement Project – ACSA Project No. 2019-03**. This Agreement is pursuant to, but in no way amends or modifies, the Contract. Payments made hereunder or the release of funds from escrow shall not be deemed approval or acceptance of performance by the Contractor.

In order to assure full and satisfactory performance by the Contractor of its obligations under the Contract, the ACSA is required thereby to retain certain amounts otherwise due the Contractor. The Contractor has, with the approval of the ACSA, elected to have these retained amounts held in escrow by the Bank. This Agreement sets forth the terms of the escrow. The Bank shall not be deemed a party to, bound by, or required to inquire into the terms of the Contract or any other instrument or agreement between the ACSA and the Contractor.

The ACSA shall, from time to time, pursuant to the Contract, pay to the Bank amounts retained by it under the Contract. Except as to amounts actually withdrawn from escrow by the ACSA, the Contractor shall look solely to the Bank for the payment of funds retained under the Contract and paid by the ACSA to the Bank.

The risk of loss by diminution of the principal of any funds invested under the terms of this Contract shall be solely upon the Contractor.

Funds and securities held by the Bank pursuant to this Escrow Agreement shall not be subject to levy, garnishment, attachment, lien, or other process whatsoever. The Contractor

agrees not to assign, pledge, discount, sell or otherwise transfer or dispose of his interest in the escrow account or any part thereof, except to the Surety following written notice to ACSA.

Upon receipt of checks or warrants drawn by the ACSA and made payable to the Bank as escrow agent, the Bank shall promptly notify the Contractor, negotiate the same and deposit or invest and reinvest the proceeds in approved securities in accordance with the written instructions of the Contractor. In no event, shall the Bank invest the escrowed funds in any security not approved in accordance with the terms hereof.

The following securities, and none other, are approved securities for all purposes of this Agreement:

1. United States Treasury Bonds, United States Treasury Notes, United States Treasury Certificates of Indebtedness or United States Treasury Bills;

2. Bonds, notes and other evidences of indebtedness unconditionally guaranteed as to the payment of principal and interest by the United States;

3. Bonds or notes of the Commonwealth of Virginia;

4. Bonds of any political subdivision of the Commonwealth of Virginia, if such bonds carried, at the time of purchase by the Bank or deposit by the Contractor, a Standard and Poor's or Moody's Investors Service rating of at least "A"; and

5. Certificates of deposit issued by commercial banks located within the Commonwealth of Virginia, including, but not limited to, those insured by the Bank and its affiliates.

Any bonds, notes, or other evidences of indebtedness listed in Section (1) through (3) above, may be purchased pursuant to a repurchase agreement with a bank, within or without the Commonwealth of Virginia having a combined capital, surplus and undivided profit of not less than $25,000,000, provided the obligation of the Bank to repurchase is within the time limitations established for investments as set forth herein. The repurchase agreement shall be considered a purchase of such securities even if title, and/or possession of such securities is not transferred to the escrow agent, so long as the repurchase obligation of the Bank is collaterized by the securities themselves, and the securities have on the date of the repurchase agreement a fair market value equal to at least 100% of the amount of the repurchase obligation of the Bank, and the securities are held by a third party, and segregated from other securities owned by the Bank.

No security is approved hereunder which matures more than five years after the date of its purchase by Bank or deposit by Contractor.

In the event that the amounts paid to the Bank by the ACSA constitute proceeds of bonds issued by the ACSA, then, to the extent that the rate of interest paid on any funds invested under the terms of the Contract exceeds the rate of interest on the ACSAs bonds, such "excess interest" shall be paid to the ACSA.

The Contractor may from time to time withdraw the whole or any portion of the escrowed funds by depositing with the Bank approved securities in an amount equal to, or in excess of, the amount so withdrawn. Any securities so deposited or withdrawn shall be valued at such time of deposit or withdrawal at the lower of par or market value, the latter as determined by the Bank. Any securities so deposited shall thereupon become a part of the escrowed fund.

Upon receipt of a written direction signed by an authorized representative of the ACSA, the Bank shall pay and deliver the principal of the fund, or any specified amount thereof, to the Contractor, in cash or in kind, as may be specified by the Contractor. Such payment and delivery shall be made as soon as possible after receipt of the direction.

For its services hereunder the Bank shall be entitled to a reasonable fee in accordance with its published schedule of fees or as may be agreed upon by the Bank and the Contractor. Such fee and any other costs of administration of this Escrow Agreement shall be paid from the income earned upon the escrowed fund and, if such income is not sufficient to pay the same, by the Contractor.

The net income earned and received upon the principal of the escrowed fund shall be paid over to the Contractor in quarterly or more frequent installments. Until so paid or applied to pay the Bank's fee or any other costs of administration, such income shall be deemed a part of the principal of the fund.

The Surety undertakes no obligation, hereby, but joins in this Escrow Agreement for the sole purpose of acknowledging that its obligation as surety for the Contractor's performance of the contract are not affected hereby.

WITNESS the following signatures, all as of the day and year first above written.

Albemarle County Service Authority

By: _____
Executive Director

COMMONWEALTH OF VIRGINIA)
) to-wit:
ALBEMARLE COUNTY)

Subscribed and sworn to before me, the undersigned Notary Public, by _____, Executive Director of Albemarle County Service Authority, a public body politic and corporate organized and existing under the laws of the Commonwealth of Virginia, this _____ day of _____, 20____.

_____
Notary Public

_____
Notary Registration Number

My Commission Expires:

_____

(SEAL)

[CONTRACTOR]

By: _____

Name: _____

Title: _____

COMMONWEALTH OF VIRGINIA)
) to-wit:
_____ COUNTY/CITY)

Subscribed and sworn to before me, the undersigned Notary Public, by _____, of _____, this _____ day of _____, 20____.

_____
Notary Public

_____
Notary Registration Number

My Commission Expires:

_____

(SEAL)

[BANK]

By: _____

Name: _____

Title: _____

COMMONWEALTH OF VIRGINIA)
) to-wit:
_____ COUNTY/CITY)

Subscribed and sworn to before me, the undersigned Notary Public, by _____, of _____, this _____ day of _____, 20____.

_____
Notary Public

_____
Notary Registration Number

My Commission Expires:

_____

(SEAL)

[SURETY]

By: _____
Attorney-in-fact

COMMONWEALTH OF VIRGINIA)
) to-wit:
_____ COUNTY/CITY)

Subscribed and sworn to before me, the undersigned Notary Public, by _____, of _____, this _____ day of _____, 20____.

_____
Notary Public

_____
Notary Registration Number

My Commission Expires:

_____

(SEAL)

End of Section 00850

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SECTION 00900

ADDENDA

PART 1 – GENERAL

1.01 Addenda, if issued, shall be inserted following this page. Addendum No. 1 will begin on page 00910-1, Addendum No. 2 will begin on page 00920-1, etc.

1.02 The bidder is reminded to complete Section 00490 entitled “Receipt of Addenda” when preparing Bid Form for submission.

End of Section 00900

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SECTION 01010

SUMMARY OF WORK

PART 1 – GENERAL

1.01 SUMMARY

A. Conditions of the Contract, this section and other sections of Division 1 – General Requirements, apply to the entire work of the contract.

1.02 WORK COVERED BY THE CONTRACT DOCUMENTS

A. Work under this Contract includes: the Scottsville Phase 4A Water Main Replacement Project construction and other related work, including, but not limited to the following:

1. Clearing and grubbing along roadway or easement.
2. Furnish and install 8”, 6”, and 4” Ductile Iron water mains.
3. Furnish and install 8”, 6”, and 4” valves.
4. Furnish and install fire hydrants and air release valves.
5. Furnish and install all water services, meter boxes, and meters.
6. Furnish, install and remove temporary water mains and services along Warren Street, Moores Hill, Page Street, and Bird Street to facilitate in place replacement of existing AC water mains.
7. Remove and properly dispose of existing AC water main and appurtenances.
8. Locate and connect to existing water mains.
9. Furnish and install the new PRV vault, SCADA RTU panel, all instrumentation, and complete SCADA integration.
10. Abandon the existing Hardware Street PRV vault and associated piping as shown on the contract drawings.
11. Restoration of all easements, yards, parking lot.
12. Place asphalt pavement and surface treatment according to VDOT specifications and when authorized by the ACSA.
13. Test all pipe (water and sewer) and all appurtenances.
14. Disinfection of water main.
15. Provide maintenance of traffic and required traffic control measures as needed.
16. Any incidental work to complete project.

B. Work consists of providing labor, materials, equipment, services and administration required in conjunction with or properly incidental to construction of the project. All work shall be performed in accordance with Federal, State and Local regulations and OSHA requirements.

C. Consideration will not be given for misunderstanding the amount of work to be performed. Work includes all items and conditions specified, indicated in the Specifications or required by nature of the building or site. Any questions on the Scope of Work should be submitted to the Engineer, in writing, for resolution.

D. The Contractor shall submit a health and safety plan outlining fall protection and confined space measures etc. to be taken at the site. See Section 01300 - Submittals and Procedures for details.

PART 2 - PRODUCTS **(Not Used)**

PART 3 - EXECUTION **(Not Used)**

END OF SECTION

SECTION 01050

FIELD SERVICES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Work contained in this section consists of furnishing all labor, tools, equipment and services necessary to provide all field services required in the execution of the work including but not limited to: surveying, staking, establishment of horizontal and vertical controls and any other incidental items required for the proper completion of the work.

1.02 QUALITY ASSURANCE

A. The Contractor shall retain the services of a registered Land Surveyor, licensed in the Commonwealth of Virginia, to identify existing control points and maintain a survey during construction.

B. The method of field staking for the construction of the work shall be at the option of the Contractor.

C. The accuracy of any method of staking shall be the responsibility of the Contractor. All engineering for vertical and horizontal controls shall be the responsibility of the Contractor.

D. The Contractor shall be responsible for the preservation of all stakes, marks and property pins/corners. If any stake or mark is carelessly or willfully disturbed by the Contractor, the Contractor shall not proceed with any work until he has reestablished such points, marks, lines and elevations as may be required for the prosecution of the work.

E. Civil, structural or other professional engineering services specified or required to execute Contractor’s construction methods shall be obtained by the Contractor at no additional cost to the Owner.

F. Engineer will provide CADD and points list to Contractor at construction start-up.

1.03 QUALIFICATIONS OF SURVEYOR OR ENGINEER

A. Registered Professional Engineer, of the discipline required for the specific service, shall be currently licensed in the Commonwealth of Virginia.

B. Registered Land Surveyor shall be currently licensed in the Commonwealth of Virginia.

C. Professional Engineer and Land Surveyor qualifications shall be submitted to the Owner and Engineer for review and approval.

1.04 SURVEY REFERENCE POINTS

A. Locate and protect control points prior to starting site work and preserve all permanent reference points during construction.

1. Make no changes or relocation of the reference points without prior written notice of the Engineer.

2. Report to the Engineer when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

3. Require the surveyor to replace Project control points that may be lost or destroyed at no additional cost to the Owner.

4. Property corners that are disturbed or destroyed must be re-established at the Contractor's expense by a Certified Land Surveyor licensed in Virginia.

1.05 PROJECT SURVEY REQUIREMENTS

A. Establish permanent benchmarks at the site and along the water main alignment. Permanent benchmarks shall be referenced to data established by survey control points.

B. Record the location of the permanent benchmarks, with horizontal and vertical data, on the Project Record Documents.

C. Establish lines and levels, locate and lay out, by instrumentation and similar appropriate means:

1. Site improvements:

a. Stakes for grading, fill and topsoil replacement.
b. Water main invert elevations.

2. Batter boards for structures, if required.

3. Structure foundations and floor levels, if required.

D. Periodically, verify layouts by same methods.

1.06 RECORDS

A. Maintain a complete, accurate log of all control and survey work as it progresses.

B. At the end of the Project, submit a certified site survey, at 1" = 50' scale, on reproducible tracing sheets (24"x 36") indicating the centerline of the water main, and the locations of all valves.

1.07 SUBMITTALS

A. Submit names and addresses of the Surveyor and Professional Engineer to the Engineer.

B. On request of the Engineer, submit documentation to verify accuracy of field engineering work.

C. On request of the Engineer, submit documentation to verify accuracy of field measuring and survey equipment.

D. Submit certificate, signed by registered engineer or surveyor, certifying that the elevations and locations of improvements are in conformance, or non-conformance, with the Contract Documents.

E. Submit drawings showing locations of all structures constructed. This drawing shall be included with the Project Record Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01106

CONSTRUCTION SCHEDULING, COORDINATION AND SEQUENCING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Construction work under this contract shall have the least number of interferences with the operations of existing facilities and private properties. Existing facilities must be maintained in continuous operation at all times during the course of the work under this contract.

B. Operation of all valves required to perform the work shall be done by the Owner. The Owner, or his designated agent, shall be informed in writing at least 48 hours, or longer where specified, in advance of the need to operate valves or other actions which could affect system operations.

C. To achieve reliable, continuous operation, new equipment and facilities shall be tested and in operating condition before final tie-ins are made which connect new equipment and facilities to the existing system.

D. The Contractor shall submit to the Engineer and Owner, drawings showing details of all temporary connections or facilities as required.

E. When removing a facility from service, the Contractor shall allow the facility to drain naturally or be pumped to its lowest level. All remaining fluids shall be removed by the Contractor at his expense. Solids shall be disposed of off-site by the Contractor at his expense. Disposal of these solids must be in accordance with federal, state and local codes.

F. No extra payment shall be made for any labor, materials, tools, equipment or temporary facilities required during the construction of facilities. All costs therefore shall be considered to have been included in the appropriate unit or lump prices bid.

1.02 SEQUENCE OF CONSTRUCTION

A. A plan for the sequence of construction and delivery dates is necessary to keep shutdowns and the construction to a minimum. The Contractor shall develop a sequence of construction and submit it to the Owner and Engineer for review and approval prior to beginning work. The plan shall include all work to be performed and shall be broken down to allow coordination with “Requests for Payment”. The Sequence of Construction shall be such that all work under this contract shall be completed within the construction time stated in these specifications. Temporary pumping, if required, shall be at the Contractor’s expense.

B. Limitations on the Sequence of Construction

The work sequence for the project is subject to the limitations outlined below. The limitations provide a general guideline for the Contractor's development of a Sequence of Construction submittal. The limitations generally describe or outline specific coordination requirements to perform the work. The limitations outlined below are not inclusive of all required installations or specified procedures. The Contractor is required to account for the limitations as part of the required Sequence of Construction submittal to be provided to the ACSA and Engineer for review and approval in accordance with all specified requirements.

1. Notice to Proceed preferred by September 15, 2026.

2. Shutdowns of existing water mains to facilitate pipeline removals, cutting and capping, installation of connections and tie-ins shall be coordinated with the ACSA inspector and RWSA as required. Refer to sections below for notification requirements.

3. Provide required traffic control and maintenance of traffic along Warren Street, from James River Road to Harrison Street as required in accordance with the final Land Use Permit conditions and MOT plans provided by the contractor.

4. Temporary water main and services and existing water main replacement along Warren Street is contingent upon the reconstruction of the existing retaining wall along the north side of Warren Street as performed under a separate VDOT project. If the retaining wall has not been reconstructed, the existing water main along Warren Street will not be replaced. Refer to contract drawings for additional requirements.

5. Warren Street closure and detour will be required for work under and around existing box culvert at the Valley Street intersection. Warren Street closure and detour will also be required if the temporary water main and services and the existing water main is replaced in place.

6. Water main replacements and installations in Valley Street including the open cut crossing from Moores Hill to Warren Street are to be performed during nighttime hours. Confirm hours of operation with final Land Use Permit conditions from VDOT.

7. Steel plating of open excavations is only allowed from April 3 to October 31 of any given calendar year unless authorized by VDOT.

8. Assistance with the ACSA in coordinating with Appalachian Power for the electrical service extension to the new PRV vault will be required.

9. Abandonment of the Hardware Street PRV vault will be performed in cooperation with the ACSA and following the successful installation, testing, startup, and SCADA integration of the new PRV vault and RTU.

10. Moores Hill drainage improvements are required to be scheduled and coordinated with the ACSA and the property owner prior to pavement restoration along Moores Hill. Refer to contract drawings for additional requirements.

11. For all VDOT approved road closures and roads affected by traffic control operations, access to homes for existing residents must be maintained.

12. For temporary water main and service installations and usage, provisions for freeze protection must be provided and maintained until the corresponding water main has been successfully installed, tested, disinfected and accepted and the new water services have been installed and accepted.

13. Bird Street, from Page Street to Harrison Street, may be closed to thru traffic during water main installation if approved by VDOT. Provide detour plan and signage as required by VDOT and in accordance with the Land Use Permit conditions.

14. The West Main Street water main installation (from Harrison Street to Valley Street) may take place with the Valley Street water main installations. The block along West Main Street may be closed to thru traffic if in accordance with the final Land Use Permit conditions and allowed by VDOT. Access to residents and businesses along this block of West Main Street shall be provided.

15. Fleet Street from Harrison Street to Valley Street may be closed for water main installation. Coordinate street closure and required traffic control with VDOT and the Town.

16. Surface treatment and pavement restoration areas shown except where noted on the contract drawings and pavement restoration details are intended to be performed by VDOT under a separate contract. Contingent bid items for surface treatment and pavement restoration may apply if authorized by the ACSA.

1.03 FACILITY SHUTDOWNS

A. Temporary shutdown periods shall not extend more than 8 hours unless authorized by the Owner.

B. Scheduled shutdowns shall be mutually agreed upon by the Owner and the Contractor, with the Engineer's approval.

C. Contractor shall notify the ACSA, which will, in turn, notify each resident, business and/or facility to be affected by the shutdown. Notification shall include the date of

the shutdown and the expected duration of the shutdown. Notification shall be mailed or delivered at least seven (7) days prior to the shutdown.

D. In order to keep each shutdown period to a minimum, the Contractor shall, prior to each shutdown, expedite completion of the work to the fullest extent. The Contractor shall have completed all necessary preparatory work including testing and shall have adequate personnel available to keep each shutdown period to a minimum. All equipment and materials required to complete the work during a shutdown period shall be on the job site before the shutdown is commenced.

E. The Contractor shall carefully coordinate all work and schedules and shall provide the Owner and Engineer with 10 calendar days minimum written notice prior to each shutdown period, unless otherwise approved by the Owner.

F. Prior to a shutdown, the Contractor shall submit to the Engineer and Owner in writing, detailed descriptions and schedules of the proposed construction procedures during the shutdown period. Information submitted to the Engineer shall include a complete inventory of materials and equipment needed to perform the work. No shutdown of a facility or operation will be permitted until the Engineer has reviewed and approved, in writing, the proposed construction plans and procedures.

G. If during any temporary shutdown periods, the work performed is not satisfactory, as planned, or not completed within the maximum time allocated, the Owner may order the Contractor to place the facility back in service and reschedule the work, or he may order the work required to place the facility or operation back in service to be performed with other forces.

H. During scheduled shutdowns the Contractor shall be responsible for all damages and costs thereof due to negligence.

1.04 COORDINATION

A. Contractor, Subcontractors and Owner Personnel

1. The Contractor is responsible for the proper coordination of his work and his subcontractor's work, to assure timely completion of the work and to assure that the Owner is made aware in advance of proposed construction activities.

2. There will be no basis for claim for extra compensation or contract time extension due to delay caused by the Contractor's failure to give proper notice for requested shutdowns or to advise the Owner of proposed construction activities that in the judgement of the Owner and Engineer will interfere with operation of the distribution system.

3. Should an emergency condition arise, the Owner has the authority to require the Contractor and his subcontractors to suspend their operations temporarily

until conditions return to normal, without claim for extra cost or contract time extension by the Contractor and his subcontractors.

B. Subcontractors

1. Where the work of any subcontractor will be installed in close proximity to work of other subcontractors, or where there is evidence that the work of any subcontractor will interfere with the work of other subcontractors, the Contractor shall work out space allocations to make a satisfactory adjustment. If so ordered by the Engineer, the Contractor shall prepare composite working drawings and sections at a suitable scale, not less than 1/4 inch equals 1 foot, clearly showing how work is to be installed in relation to the work of others. If the Contractor permits any work to be installed before coordinating with the various subcontractors; or so as to cause interference with work of other subcontractors, he shall make necessary changes in the work to correct the condition without extra cost to the Owner.

1.05 PERMITS

A. Virginia Department of Transportation (VDOT)

1. The Contractor shall be required to apply for and obtain a Land Use Permit from the Charlottesville Residency Office of VDOT. The Contractor will be required to post a separate bond for the work covered by the Land Use Permit in the contract documents. The Contractor will also be responsible for a Land Use Permit for any construction entrances off of VDOT maintained roads and rights-of-way.
2. The Contractor will be required to provide supporting documentation or plan work and signage requirements for planned road closures, detours, and maintenance of traffic operations as required by VDOT.

B. Land Disturbance Permit and Virginia Stormwater Management Program (VSMP) Permit and Fee

1. The Contractor will be responsible for obtaining the Land Disturbance Permit from Community Development.

2. The ACSA will obtain and pay the VSMP permit and applicable fee if required.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION (Not used)

END OF SECTION

SECTION 01130

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 GENERAL

A. The Contractor shall receive and accept the compensation provided in the Proposal and the Contract as full payment for furnishing all labor, materials, tools, equipment and services for performing all operations necessary to complete the Work under the Contract, and also in full payment for all loss or damages arising from the nature of the Work, or from any discrepancy between the actual quantities of work and the quantities herein estimated by the Engineer, or from action of the elements or from any unforeseen difficulties which may be encountered during the prosecution of the Work until the final acceptance by the Owner.

B. The prices stated in the Proposal include all costs and expenses for taxes, labor, equipment, materials, commissions, transportation, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the Work as shown on the Contract Drawings and specified herein. The basis of payment for an item at the lump sum price in the Proposal shall be in accordance with the description of that item in this section.

C. The Contractor's attention is called to the fact that the quotations for the various items of the Work are intended to establish a total price for completing the Work in its entirety. Should the Contractor feel that the cost for any item of work has not been defined by a Bid Form Pay Item, he shall include the cost for that work in some other applicable bid item, so that his proposal for the Work reflects his total price for completing the Work in its entirety.

D. Items listed in the proposal as contingent or to be authorized by the Engineer and Owner are to be used and will be paid for only at the written direction and authorization of the Engineer, if agreed to by the Owner. Payment under this section will be made for materials furnished and placed in addition to those shown or beyond the limits indicated or reasonably inferred by the Contract Documents. Measurement and payment will be in accordance with the Proposal and will include, but not necessarily be limited to, furnishing, hauling, placing, and installing of materials and the furnishing of such manpower and equipment as required to accomplish the work as directed in writing by the Engineer.

E. Alterations

1. The Owner reserves the right to change the alignment, grade, form, length, dimensions, or materials of the Work under the Contract, whenever

conditions or obstructions are met that render the changes desirable or necessary. All such alterations shall be paid for under the total lump sum bid or at a unit price bid for these items of work, except as follows:

a. In the case that such alterations make the Work less expensive to the Contractor, a proper deduction shall be made from the contract prices and the Contractor shall have no claim on this account for damages or for anticipated profits on the work that may be dispensed with.

b. In the case such alterations make the Work more expensive to the Contractor, a proper addition shall be made to the contract prices.

c. Any additions or subtractions to the contract prices shall be proposed by the Contractor and then reviewed by the Engineer and approved by the Owner.

d. In case the quantity of Work in individual unit price items of work increases or decreases greater than 25% of the bid quantity, unit prices may be renegotiated.

F. Engineer May Increase or Decrease Quantities

1. The Engineer reserves the right to increase or decrease the quantity of material to be furnished or work to be done under the Contract whenever he deems it advisable or necessary. Such increase or decrease shall in no way violate or invalidate the Contract.

2. For the unit price items included in the bid, the Contractor will be paid for the actual amount of the authorized work done or material furnished under each item of the Proposal, at the unit price bid for that item. In case the quantity of any item is increased, the Contractor shall not be entitled to compensation over and above the unit price bid for each item. In case the quantity is decreased, the Contractor shall have no claim for damages on account of loss of anticipated profits because of such decrease.

3. For the contingency items, the Contractor shall be paid for actual quantities installed, on written order of the Engineer.

G. Except as modified herein, measurement and payment shall be in accordance with the General Terms and Conditions and Section 00700.

1.02 MEASUREMENT

A. The quantities for payment under this Contract shall be determined by actual measurement of the completed items, in place and accepted by the Owner, in

accordance with the General Conditions. A representative of the Contractor shall witness all field measurements.

1.03 PAYMENT

A. Payments during the course of the Work for unit price items will be made on the basis of actual amount of the work item installed at the end of the pay period. Determination of the amount of the work item installed shall be made by the Contractor and reviewed and approved by the Engineer. Payments during the course of the Work for lump sum items will be made on the basis of percentage of completion of the work items listed in the Schedule of Values for each lump sum or unit price item. The Schedule of Values shall be prepared by the Contractor and submitted to the Engineer within 15 days of the execution of the Contract and shall serve as a breakdown of the lump sum bid for the purpose of arriving at a basis for the monthly estimate. The Schedule of Values shall be broken down into categories and each category further broken down into each applicable specification section. The schedule shall add up to 100% of the total Bid.

B. Example:

1. Mobilization

2. 8” Diameter Ductile Iron Pipe

3. Fire Hydrant

4. 8” Gate Valves

1.04 BID ITEMS

A. Contract Item No. 1: 8-inch Ductile Iron Water Main Installation

1. Payment for furnishing and installing 8-inch diameter, Class 52 Ductile Iron Pipe water main shall be made at the unit price bid per linear foot for the lengths of pipe actually installed.

2. Measurement of lengths will be made horizontally, along the centerline of pipe, and no deduction will be made for the lengths of fittings or valves.

3. The unit price bid per linear foot shall include all labor, materials, tools, equipment and services for furnishing and installing 8-inch diameter, Class 52 D.I.P. water main including, but not limited to: surveying, layout, and measurement; temporary controls and facilities; traffic control measures; pavement removal; installation and maintenance of all required erosion and sediment control measures; test pitting all existing utilities; excavation, storage, and reuse of excavated materials; clearing and grubbing; excavation of offsite disposal of rock and unsuitable soil;

backfill; stone backfill in road areas; trench support; dewatering; furnishing and installing pipe and all required fittings; making of plain and restrained joints; stone bedding; thrust blocks if required; temporary blocking; removal and replacement of existing driveway culverts; ditch grading; temporary and permanent seeding; testing; disinfection and any other incidental items required for the proper operation of the water main.

B. Contract Item No. 2: 6-inch Ductile Iron Water Main Installation

1. Payment for furnishing and installing 6-inch diameter, Class 52 Ductile Iron Pipe water main shall be made at the unit price bid per linear foot for the lengths of pipe actually installed.

2. Measurement of lengths will be made horizontally, along the centerline of pipe, and no deduction will be made for the lengths of fittings or valves.

3. The unit price bid per linear foot shall include all labor, materials, tools, equipment and services for furnishing and installing 6-inch diameter, Class 52 D.I.P. water main including, but not limited to: surveying, layout, and measurement; temporary controls and facilities; traffic control measures; pavement removal; installation and maintenance of all required erosion and sediment control measures; test pitting all existing utilities; excavation, storage, and reuse of excavated materials; clearing and grubbing; excavation of offsite disposal of rock and unsuitable soil; backfill; stone backfill in road areas; trench support; dewatering; furnishing and installing pipe and all required fittings; making of plain and restrained joints; stone bedding; thrust blocks if required; temporary blocking; removal and replacement of existing driveway culverts; ditch grading; temporary and permanent seeding; testing; disinfection and any other incidental items required for the proper operation of the water main.

C. Contract Item No. 3: 4-inch Ductile Iron Water Main Installation

1. Payment for furnishing and installing 4-inch diameter, Class 53 Ductile Iron Pipe water main shall be made at the unit price bid per linear foot for the lengths of pipe actually installed.

2. Measurement of lengths will be made horizontally, along the centerline of pipe, and no deduction will be made for the lengths of fittings or valves.

3. The unit price bid per linear foot shall include all labor, materials, tools, equipment and services for furnishing and installing 4-inch diameter, Class 53 D.I.P. water main including, but not limited to: surveying, layout, and measurement; temporary controls and facilities; traffic control measures; pavement removal; installation and maintenance of all required erosion and sediment control measures; test pitting all existing utilities; excavation, storage, and reuse of excavated materials; clearing and

grubbing; excavation of offsite disposal of rock and unsuitable soil; backfill; stone backfill in road areas; trench support; dewatering; furnishing and installing pipe and all required fittings; making of plain and restrained joints; stone bedding; thrust blocks if required; temporary blocking; removal and replacement of existing driveway culverts; ditch grading; temporary and permanent seeding; testing; disinfection and any other incidental items required for the proper operation of the water main.

D. Contract Item No. 4: 12-inch Gate Valve, Valve Box, DIP Fittings

1. Payment for furnishing and installing 12-inch diameter gate valves with boxes and DIP fittings at the beginning of Phase 4A shall be made at the unit price bid per each for each valve actually installed.

2. Measurement will be made per each valve and box installed at the locations shown on the plans and as directed by the Engineer.

3. The unit price bid per each shall include all labor, materials, tools, equipment and services for furnishing and installing 12-inch diameter buried service gate valves and boxes including, but not limited to; 12" fittings required for connections at beginning of Phase 4A, excavation, storage, and reuse of excavated materials, excavation of offsite disposal of rock and unsuitable soil; backfill, trench support, dewatering, handling and placing of valves, handling and setting of boxes, restrained caps or plugs, making of restrained connections, stone bedding, temporary blocking, testing and any other incidental items required for the proper operation of the valves.

E. Contract Item No. 5: 8-inch Gate Valve with Valve Box

3. Payment for furnishing and installing 8-inch diameter gate valves with box shall be made at the unit price bid per each for each valve actually installed.

4. Measurement will be made per each valve and box installed at the locations shown on the plans and as directed by the Engineer.

3. The unit price bid per each shall include all labor, materials, tools, equipment and services for furnishing and installing 8-inch diameter buried service gate valves and boxes including, but not limited to; pavement removal, excavation, storage, and reuse of excavated materials, excavation of offsite disposal of rock and unsuitable soil; backfill, trench support, dewatering, handling and placing of valves, handling and setting of boxes, making of restrained connections, stone bedding, temporary blocking, testing and any other incidental items required for the proper operation of the valves.

F. Contract Item No. 6: 6-inch Gate Valve with Valve Box

1. Payment for furnishing and installing 6-inch diameter gate valves with box shall be made at the unit price bid per each for each valve actually installed.

2. Measurement will be made per each valve and box installed at the locations shown on the plans and as directed by the Engineer.

3. The unit price bid per each shall include all labor, materials, tools, equipment and services for furnishing and installing 6-inch diameter buried service gate valves and boxes including, but not limited to; pavement removal, excavation, storage, and reuse of excavated materials, excavation of offsite disposal of rock and unsuitable soil; backfill, trench support, dewatering, handling and placing of valves, handling and setting of boxes, making of restrained connections, stone bedding, temporary blocking, testing and any other incidental items required for the proper operation of the valves.

G. Contract Item No. 7: 4-inch Gate Valve with Valve Box

1. Payment for furnishing and installing 4-inch diameter gate valves with box shall be made at the unit price bid per each for each valve actually installed.

2. Measurement will be made per each valve and box installed at the locations shown on the plans and as directed by the Engineer.

3. The unit price bid per each shall include all labor, materials, tools, equipment and services for furnishing and installing 4-inch diameter buried service gate valves and boxes including, but not limited to; pavement removal, excavation, storage, and reuse of excavated materials, excavation of offsite disposal of rock and unsuitable soil; backfill, trench support, dewatering, handling and placing of valves, handling and setting of boxes, making of restrained connections, stone bedding, temporary blocking, testing and any other incidental items required for the proper operation of the valves.

H. Contract Item No. 8: Fire Hydrant

1. Payment for furnishing and installing a fire hydrant at the locations shown on the plans shall be made at the unit price bid per each for each fire hydrant actually installed.

2. Measurement will be made per each fire hydrant installed at the locations shown on the plans and as directed by the Engineer.

3. The unit price bid per each shall include all labor, materials, tools, equipment and services for furnishing and installing a fire hydrant including, but not limited to: excavation, storage, and reuse of excavated materials; excavation of offsite disposal of rock and unsuitable soil; backfill; handling and connecting hydrant to pipe; making of restrained joints; thrust blocking if required; stone bedding, temporary blocking, testing and any other incidental items required for the proper operation of the fire hydrant.

4. All 6-inch piping and 6-inch gate valves for fire hydrant laterals are excluded from this bid item.

I. Contract Item No. 9: Meter Box and Setter (WSCB)

1. Payment for installing a new meter box and setter shall be made at the unit price bid per each meter box and setter actually installed.

2. Measurement will be made per each meter box and setter installed at the locations shown on the plans and as directed by the Engineer.

3. The unit price bid per each shall include all labor, materials, tools, equipment and services for each meter box and setter include but are not limited to: excavation, storage, and reuse of excavated materials; excavation of offsite disposal of rock and unsuitable soil; backfill; trench support; dewatering; furnishing and installing meter box and setter; testing and any other incidental items required for the proper installation and operation of the water meter, meter box and setter.

J. Contract Item No. 10: Meter Boxes, Setter, and PRV (WSCB/PRV)

1. Payment for installing a new meter box, setter, and PRV shall be made at the unit price bid per each meter box, setter, and PRV actually installed.

2. Measurement will be made per each meter box, setter, and PRV installed at the locations shown on the plans and as directed by the Engineer.

3. The unit price bid per each shall include all labor, materials, tools, equipment and services for each meter box, setter, and PRV include but are not limited to: excavation, storage, and reuse of excavated materials; excavation of offsite disposal of rock and unsuitable soil; backfill; trench support; dewatering; furnishing and installing 2 meter boxes, 1 setter, and 1 PRV; testing and any other incidental items required for the proper installation and operation of the water meter, meter boxes, setter, and PRV.

The PRV will be supplied to the contractor by the ACSA.

K. Contract Item No. 11: 1-inch Water Service Connection

1. Payment to furnish and install water service connections to the new water main shall be made at the unit price bid per each for the number of services transferred.

2. Measurement will be made per each service connection installed at the locations shown on the plans and as directed by the Engineer.

3. The unit price bid per each shall include all labor, materials, tools, equipment and services to furnish and install water services to the new water main including, but not limited to: locating existing water services; excavation, storage, and reuse of excavated materials; excavation of offsite disposal of rock and unsuitable soil; backfill; trench support; dewatering; tapping new water main; installation of corporation stop; and any other incidental items required for the proper operation of the water service connection.

L. Contract Item No. 12: Connection to Existing Water Service at New Meter Box and Water Meter Installation

1. Payment for connection to existing water service at the new meter box shall be made at the unit price bid per each connection actually installed. The ACSA will provide new touch-read meters for the installations.

2. Measurement will be made per each connection installed and tested at the new meter box locations shown on the plans and as directed by the ACSA inspector.

3. The unit price bid per each shall include all labor, materials, tools, equipment and services for the connection to the existing water service at the new water meter but is not limited to: excavation, storage and reuse of excavated materials; excavation of offsite disposal of rock and unsuitable soil; backfill; trench support; dewatering; making of all required connections to existing copper pipe on the customer side of the new meter box; testing and any other incidental items required for the proper installation of the connections to the existing water service at the new meter boxes.

M. Contract Item No. 13: 1-inch Copper Water Service

1. Payment to furnish and install 1-inch copper pipe shall be made at the unit price bid per linear foot of copper water service pipe actually installed.

2. Measurement of lengths will be made horizontally, along the centerline of pipe.

3. The unit price bid per each shall include all labor, materials, tools, equipment and services to furnish and install copper water service pipe include but are not limited to: excavation, storage and reuse of excavated materials; excavation of offsite disposal of rock and unsuitable soil; backfill; trench support; dewatering; trenchless installation of copper pipe across existing roads if chosen; handling and installation of copper pipe; making of restrained connections; connection of new pipe to corporation stop and meter setter, testing and other incidental items required for the proper installation of the copper pipe.

N. Contract Item No. 14: PRV Valve Vault

1. Payment for furnishing and installing a pressure reducing valve and vault at location shown on plans shall be made at the lump sum unit price.

2. No measurement will be made for vault.

3. Lump sum cost for pressure reducing valve and vault shall include all labor, materials, tools, equipment and services for furnishing and installing a watertight vault coated on the outside face with a mastic or bituminous coating to prevent infiltration, but not limited to; excavation, storage, and reuse of excavated materials, excavation of offsite disposal of rock and unsuitable soil, backfill, handling and connecting of all piping, fittings, drainage sump, aluminum ladder, aluminum access door, and other features of PRV vault as shown in details on contract drawings, all instrumentation and controls for the PRVs, flow control module for large PRV, RTU cabinet and foundation, all conduits and conductors, coordination with the ACSA and Appalachian Power for the electrical service extension, meter base installation, SCADA integration, SCADA signal strength coordination with ACSA, thrust blocking if required, stone bedding, testing, disinfection and any other incidental items required for the proper operation of a pressure reducing valve vault.

O. Contract Item No. 15: Existing PRV Valve Vault Abandonment – Hardware Street

1. Payment for abandonment work associated with the existing pressure reducing valve and vault on Hardware Street at location shown on plans shall be made at the lump sum unit price.

2. No measurement will be made for abandonment work.

3. Lump sum cost for pressure reducing valve and vault abandonment shall include but not limited to all labor, materials, tools, equipment and services for coordinating with the ACSA for the abandonment, disconnecting and isolating the water main running through the PRV vault, maintaining the PRV bypass main, cutting, capping, and restraining

the existing tees on the outside of the PRV vault, excavation, storage, and reuse of excavated materials, excavation of offsite disposal of rock and unsuitable soil, backfill, restoration of excavations, seeding, and any other incidental items required for the proper abandonment of a pressure reducing valve vault.

P. Contract Item No. 16: Installation of 20-Inch Steel Casing and 8-inch Water Main

1. Payment to furnish and install 20-inch steel casing and 8-inch water main shall be made at unit price bid per linear foot for the lengths of casing actually installed.

2. Measurement of lengths will be made horizontally, along the center line of casing.

3. The unit price bid per linear foot shall include all labor, materials, tools, equipment and services for furnishing and installing 20-inch steel casing under roadway including, but not limited to surveying, layout, temporary controls and maintenance of all required erosion and sediment control measures, construction entrances and work zones, test pitting all utilities, excavation, storage, and reuse of excavated materials, temporary steel plating of open excavations, nightwork for work in Valley Street and intersection, maintenance of traffic and Warren Street closure and detour as required, temporary support of existing utilities and box culvert, excavation of off-site disposal of rock and unsuitable soil, backfill, compaction, stone backfill in road areas, trench support, dewatering, stone bedding, ditch grading, temporary and permanent seeding, furnishing and installing 8-inch D.I. pipe class 52 restrained joint pipe with casing spacers through steel casing, sealing of each end of casing and any other incidental items required for the proper operation of the water main.

Q. Contract Item No. 17: 8”x8” Tapping Sleeve and Valve with Valve Box

1. Payment for furnishing and installing an 8”x8” diameter tap, sleeve and valve and making a wet tap on the existing 8” water main shall be made at the unit price bid per each number of 8”x8” diameter tap, sleeves and gate valves installed at the locations shown on the plans.

2. Measurement will be made per each tap, sleeve and valve installed.

3. The unit price bid per each shall include all labor, materials, tools, equipment and services for installing 8”x8” diameter tap, sleeve and valve and making a wet tap on the existing 8” water main including, but not limited to: unclassified excavation; handling and storage of excavated materials; backfill; compaction; coordination of the connection with the ACSA; trench support; dewatering; handling and placing of tapping sleeve; handling and placing of tapping valve; making

of restrained joints; stone bedding; temporary blocking; testing and any other incidental items required for the proper operation of the tapping sleeve and valve.

R. Contract Item No. 18: 6”x6” Tapping Sleeve and Valve with Valve Box

1. Payment for furnishing and installing a 6”x6” diameter tap, sleeve and valve and making a wet tap on the existing 6” water main shall be made at the unit price bid per each number of 6”x6” diameter tap, sleeves and gate valves installed at the locations shown on the plans.

2. Measurement will be made per each tap, sleeve and valve installed.

3. The unit price bid per each shall include all labor, materials, tools, equipment and services for installing 6”x6” diameter tap, sleeve and valve and making a wet tap on the existing 6” water main including, but not limited to: unclassified excavation; handling and storage of excavated materials; backfill; compaction; coordination of the connection with the ACSA; trench support; dewatering; handling and placing of tapping sleeve; handling and placing of tapping valve; making the wet tap; making of restrained joints; stone bedding; temporary blocking; testing and any other incidental items required for the proper operation of the tapping sleeve and valve.

S. Contract Item No. 19: 1-inch Air Release Valve Assembly

1. Payment for furnishing and installing the 1-inch air release valve assembly shall be made at the unit price bid per each for each air release valve assembly actually installed.

2. Measurement will be made per each air release valve assembly installed at the locations shown on the plans and as directed by the Engineer.

3. The unit price bid per each shall include all labor, materials, tools, equipment, and services for furnishing and installing the 1-inch air release valve assembly including, but not limited to; excavation, storage and disposal of excavated materials, gate valve, air release valve, copper piping, corporation stop, backfill, all items shown on detail W-9, and any other incidental items required for the proper installation of the 1-inch air release valve assembly.

T. Contract Item No. 20: Cut and Cap Existing Water Main

1. Payment for furnishing and installing plugs and/or caps at locations as shown on the plans and as directed by the Engineer or the ACSA, including draining and the abandonment of the existing water main and associated tasks.

2. No measurement will be made. Partial payments shall be made for the work completed in accordance with the General Conditions of the Contract.

3. The unit price bid shall include all labor, materials, tools, equipment and services for cutting and capping the existing water main, abandonment of the existing water main as shown in the contract documents and as directed by the Engineer or the ACSA; unclassified excavation, backfill, handling, storage and reuse of excavated material; handling and placing of plugs or caps on the existing water main, making and installation of any required restrained joints or thrust blocks (if required), disinfection and draining for in place abandonment of existing water main taken out of service by installations of plugs or caps; disposal of water removed from abandoned water main removal of existing fire hydrants in coordination with the ACSA inspector, or coordination for the operation of any existing valves or appurtenances as needed, stone bedding, temporary blocking if needed, testing, and any other incidental items required for the proper cutting and capping of the existing water mains.

4. Removal and disposal of existing AC water mains shall be measured and paid by a separate bid item.

U. Contract Item No. 21: Temporary Above Ground Water Main and Services

1. Payment for furnishing and installing temporary above ground water main and services shall be made at the unit price bid per linear foot for the lengths of temporary water main actually installed.

2. Measurement of lengths will be made horizontally, along the centerline of pipe, and no deduction will be made for the lengths of fittings or other appurtenances.

3. The unit price bid per linear foot shall include all labor, materials, tools, equipment and services for furnishing and installing the temporary water main and temporary services including, but not limited to: surveying, layout, and measurement; temporary controls and facilities; traffic control measures; installation and maintenance of all required erosion and sediment control measures; installation and maintenance of temporary access ramps and/or stairs to provide access; coordination with the ACSA for notifications and service installations; test pitting all existing utilities; excavation, storage, and reuse of excavated materials; excavation of offsite disposal of rock and unsuitable soil; backfill; trench support; dewatering; furnishing and installing pipe and all required fittings; making of all joints; freeze protection and/or insulation of temporary main and services if required, thrust blocks if required; temporary blocking; removal and replacement of existing driveway culverts if required; ditch grading;

temporary and permanent seeding; testing; disinfection and any other incidental items required for the proper operation of the temporary water main and temporary services.

V. Contract Item No. 22: Temporary Pavement Restoration

1. Payment for temporary pavement restoration shall be made at the unit price bid per square yard for restoring existing pavement in kind as directed by Engineer or Owner.

2. No measurement will be made. Payments will be made per calculated square yard of pavement satisfactorily furnished and installed, as directed by the Engineer or Owner.

3. The unit price bid per square yard shall include all labor, materials, tools, equipment, and services for pavement restoration including, but not limited to: milling of existing pavement; unclassified excavation, storage, and disposal of milled and excavated materials: traffic control, stone backfill, subgrade preparation, tack coat, and any other incidental items required for temporarily restoring pavement prior to finished surface course.

W. Contract Item No. 23: Base Stone Aggregate (21A or B)

1. Payment for furnishing and placing base stone aggregate will be made at the unit price bid per cubic yard. Measurement shall be for VDOT No. 21A or 21B material, compacted, in-place as directed in writing by the Engineer or Inspector.

2. Payment will be made for this item for each cubic yard of material actually installed.

3. The unit price bid per cubic yard shall include all labor, materials, tools, equipment, and services for furnishing and placing material including, but not be limited to; excavation, disposal of excess and unsuitable materials, subgrade preparation; transportation and stone placement; traffic control; placing of material, compaction, dewatering, and any other incidental items required for the proper installation of the base stone aggregate.

X. Contract Item No. 24: Asphalt Concrete Base Pavement (BM-25.0)

1. Payment for replacement of roadway base asphalt shall be made at the unit price bid per square yard of asphalt concrete base pavement at the locations shown on the Contract Drawings and as specified herein.

2. No measurement will be made. Payments will be made for calculated areas of paved roadway based on the limits of pavement shown on the Contract Drawings.

3. The unit price bid per square yard shall include all labor, materials, tools, equipment, and services for replacement of asphalt concrete base pavement including, but not limited to: milling of existing pavement if required; excavation, storage, and disposal of milled and excavated materials: subgrade preparation; traffic control; tack coat; and any other incidental items required for the proper replacement of the paving.

Y. Contract Item No. 25: Gravel Drive Restoration

1. Payment for gravel drive restoration shall be made at the unit price bid per square yard for restoring existing gravel in kind as directed by Engineer or Owner.

2. No measurement will be made. Payments will be made per calculated square yard of gravel satisfactorily furnished and installed, as directed by the Engineer or Owner.

3. The unit price bid per square yard shall include all labor, materials, tools, equipment, and services for gravel drive restoration including, but not limited to: temporary removal of existing gravel; unclassified excavation, storage, and disposal of excavated materials: traffic control, stone backfill, subgrade preparation, and any other incidental items required for restoring gravel in kind.

Z. Contract Item No. 26: Asphalt Drive Restoration

1. Payment for asphalt drive restoration shall be made at the unit price bid per square yard for restoring existing pavement in kind as directed by Engineer or Owner.

2. No measurement will be made. Payments will be made per calculated square yard of pavement satisfactorily furnished and installed, as directed by the Engineer or Owner.

3. The unit price bid per square yard shall include all labor, materials, tools, equipment, and services for asphalt drive restoration including, but not limited to: milling of existing pavement; unclassified excavation, storage, and disposal of milled and excavated materials: traffic control, stone backfill, subgrade preparation, tack coat, and any other incidental items required for restoring pavement in kind.

AA. Contract Item No. 27: Removal and Disposal of Existing AC Water Main

1. Payment for removal and disposal of existing AC water main shall be made at the unit price bid per linear foot for the lengths of pipe actually removed, transported, and disposed of at a permitted facility.

2. Measurement of lengths will be made horizontally, along the centerline of the removed pipe.

3. The unit price bid per linear foot shall include all labor, materials, tools, equipment and services for removal and disposal of the existing AC water main including, but not limited to: temporary abatement controls and facilities for the safe removal of the pipe; proper containment measures for the removed pipe; hauling and disposal at a permitted disposal facility; providing manifests for transport and disposal as required; traffic control measures; temporary plating in roadways if required; pavement removal; removal of existing water services as needed; test pitting all existing utilities; excavation, storage, and reuse of excavated materials; excavation of offsite disposal of rock and unsuitable soil; trench support; dewatering; temporary blocking; and any other incidental items required for the proper removal, disposal, and operation of the water main.

BB. Contract Item No. 28: Moores Hill Drainage Improvements

1. Payment for Moores Hill drainage improvements shall be made at the lump sum price bid for the improvements shown on the contract drawings and as specified.

2. No measurement will be made. Payments will be made based on percentage of work completed as directed and approved by the Engineer or Owner.

3. The lump sum price shall include all labor, materials, tools, equipment, and services for the drainage improvements including, but not limited to: coordination with the property owner and the ACSA as required; milling of existing pavement; unclassified excavation, storage, and disposal of milled and excavated materials: traffic control along Moores Hill if needed, concrete channel installation, level spreader installation, subgrade preparation, coordination with pavement restoration along Moores Hill, fine grading, permanent seeding and restoration, and any other incidental items required for completion of the drainage improvements.

CC. Contract Item No. 29: Miscellaneous Drainage and Restoration Allowance

BIDDER shall include in the Computed Total Bid Amount an allowance of $50,000.00 for additional drainage, landscaping or restoration as directed by the ACSA or Engineer. The $50,000.00 allowance is in addition to the scope of Work identified in the Contract Documents. The Engineer or ACSA will request proposals for the additional work,

negotiate cost and authorize the additional work. The ACSA and Engineer shall be the sole judge for use of this allowance. If the ACSA and Engineer deem a use under this allowance an Allowance Directive shall be issued to Contractor. Unused portions of this allowance shall be credited to the ACSA in the closeout change order that will be issued prior to final payment.

DD. Contract Item No. 30: Mobilization

1. Lump sum cost to mobilize/demobilize labor, materials, tools, and equipment to perform the work as specified in the Specifications.

2. No measurement shall be made for mobilization.

2. Lump sum cost for mobilization shall include such items as bonds, insurance, stakeout, equipment and labor mobilization/demobilization, field office, progress photographs, project sign, permits and permit fees, shop drawings, Contractor's test pits and other incidental items required prior to commencement of construction.

3. Mobilization shall not exceed 5.0% of the total bid. No more than 50% of the mobilization may be applied for on the first "Request for Payment". The remaining 50% shall be paid on the final "Request for Payment" and shall cover cleanup and demobilization.

1.05 CONTINGENT BID ITEMS

EE. Contract Item No. 31: Asphalt Concrete Surface Course (VDOT SM-9.5A)

1. Payment for replacement of roadway surface course shall be made at the unit price bid per square yard for installing roadway surface course replacement at the locations shown on the Contract Drawings and as specified herein.

2. No measurement will be made. Payments will be made for calculated areas of paved roadway based on the limits of pavement shown on the Contract Drawings.

3. The unit price bid per square yard shall include all labor, materials, tools, equipment, and services for replacement of roadway surface course including, but not limited to: milling of existing pavement; excavation, storage, and disposal of milled and excavated materials; stone backfill; fine grading of road shoulders if required; tack coat; traffic control; and any other incidental items required for the proper replacement of the asphalt concrete surface course.

FF. Contract Item No. 32: Surface Treatment – Pavement Restoration

1. Payment for surface treatment of roadways shall be made at the unit price bid per square yard for installing surface mix and treatment at the locations shown on the Contract Drawings and as specified herein.

2. No measurement will be made. Payments will be made for calculated areas of treated roadway based on the limits of pavement shown on the Contract Drawings.

3. The unit price bid per square yard shall include all labor, materials, tools, equipment, and services for furnishing and installing roadway surface treatment including, but not limited to: all required preparation of existing pavement surface; excavation, storage, and disposal of milled and excavated materials; fine grading of road shoulders if required; tack coat if required; traffic control; and any other incidental items required for the proper installation of the surface treatment.

GG. Contract Item No. 33: Additional Unclassified Excavation Ordered by the Engineer or Inspector

1. Payment for additional excavation outside structure or trench limits, as directed by the Engineer or Inspector, and backfilling with acceptable material, either in-situ or borrow materials, shall be made at the unit price bid per cubic yard.

2. Measurement shall be for compacted material, in place as directed in writing by the Engineer or Inspector.

3. The unit price bid per cubic yard of excavation shall include all labor, materials, tools, equipment, and services for excavating materials at the locations directed by the Engineer or Inspector and furnishing, installing, and compacting fill including, but not limited to; excavation, disposal of excess and unsuitable materials, trench support, transportation, placing of select material, compaction, dewatering, and any other incidental items required for the proper completion of the work.

HH. Contract Item No. 34: Additional Concrete – as Directed by the Engineer or Inspector

1. Payment for furnishing and placing additional concrete will be made at the unit price bid per cubic yard. The concrete shall meet the requirements in the Albemarle County Service Authority's Standards and Supplementary Specifications.

2. Measurement shall be per cubic yard of concrete, in place as directed in writing by the Engineer or Inspector.

3. The unit price bid per cubic yard shall be full compensation for all labor, materials, tools, and equipment necessary to install additional concrete at the locations indicated by the Engineer or Inspector including, but not limited to; excavation, backfill, erecting and removing forms, placing reinforcing, pouring concrete and any other incidental items required for the proper installation of the work.

II. Contract Item No. 35: Additional Select Fill

1. Payment for furnishing and placing borrow material (obtained offsite) will be made at the unit price bid per cubic yard. Measurement shall be for material, compacted, in-place as directed in writing by the Engineer.

2. Payment will not be made for this item under Additional Unclassified Excavation nor for select borrow material placed beyond the limits directed by the Engineer.

3. The unit price bid per cubic yard shall include all labor, materials, tools, equipment, and services for furnishing and placing borrow material including, but not be limited to; excavation, disposal of unsuitable materials, transportation, placing of borrow material, compaction, dewatering, and any other incidental items required for the proper operation of the backfill.

JJ. Contract Item No. 36: Over-Excavation of Unsuitable Subgrade with Porous Refill

1. Payment for excavation below the trench subgrade due to unsuitable soil conditions and furnishing and backfilling with VDOT No. 21A or 21B, Type 1 material shall be made at the unit price bid per cubic yard for over-excavation of unsuitable sub-grade with porous material refill, in-place and compacted, as directed in writing by the Engineer.

4. Measurement shall be for compacted material, in-place as directed in writing by the Engineer.

3. Porous refill shall consist of 12 inches of VDOT No. 21A or B wrapped in a min. 8 oz non-woven geotextile, installed below trench subgrade.

4. The unit price bid per cubic yard of material shall include all labor, materials, tools, equipment, and services for excavating unsuitable materials and furnishing, installing, and compacting select fill including, but not limited to: excavation; disposal of unsuitable materials; transportation; furnishing and placing of select material; furnishing and placing non-woven geotextile; compaction; dewatering; and any other incidental items required for the proper execution of the work.

1.06 PAYMENT FOR MATERIALS NOT INCORPORATED INTO THE WORK

A. Storage of Materials

1. Payment for equipment and materials stored on the site, or elsewhere as specified in the General Conditions, and not actually incorporated in the work will be made on the basis of 95% of the amount of paid invoices submitted to the Engineer for incorporation in the monthly estimate.

B. Authorization for Payment

1. Payment will be authorized after the delivery to the construction site or other approved location and after being certified by the Engineer as being stored in conformation with the manufacturer's recommendations and satisfactory evidence is provided that the items are as specified.

2. Title to all items of equipment and materials upon which payment has been made shall rest with the Owner and documents transferring title shall be executed by the Contractor. Transfer of ownership shall not relieve the Contractor of continuing insurance coverage and of protecting stored items against damage, deterioration, theft, or loss of any kind.

3. Should materials or equipment become damaged or be stored improperly or contrary to the manufacturer's recommendations, being therefore subject to later damage, then the Engineer will reduce the next following monthly payment by an amount sufficient to repair or replace such units.

4. To initiate a request for partial payment the Contractor shall submit his request in writing to the Engineer with all necessary evidence.

5. Examples of material or equipment to which partial payment applies include the following:

   a. 8" Diameter Ductile Iron Pipe
   b. 4" Diameter Ductile Iron Pipe
   c. 8" PVC Pipe
   d. Fire Hydrant
   e. 8" Diameter Gate Valves
   f. 4" Diameter Gate Valves
   g. Manholes
   h. Asphalt Concrete Base Pavement (BM-25)
   i. Asphalt Surface Course Pavement (SM-9.5A)
   j. Asphalt Driveway Replacement

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01380

PRECONSTRUCTION VIDEO

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. This Section includes, but is not limited to, Preconstruction Video consisting of color video recording, with audio description, of surface features along the entire length of the project. Recording includes all Work areas, easements, and storage areas and all access roadways, and, prior to audio-video recording, visual investigation of all areas to be inventoried with notations made to items not readily visible by recording methods including, but not limited to, size, type and condition of roadway, driveway, culverts, headwalls, etc. Audio-video recording shall be done prior to commencement of the construction or delivery of any equipment, material, or supplies to the site or areas of Work.

B. The purpose of the color audio-video recording of the project is to provide the necessary information for restoration of surface features after completion of the project. This recording must, therefore, cover the project area in its entirety to assist in restoring those areas affected by construction to their original condition with as little controversy as possible. Video recording shall be performed no more than two (2) weeks prior to construction in the area, and any areas recorded more than two (2) weeks prior to the construction shall be redone at no additional cost to the OWNER.

C. Special attention must be given to recording existing home/residential areas to ensure adequate recording of pre-existing conditions. Videos must be approved by the ENGINEER and the ACSA prior to the beginning of any cleaning, inspection, and/or construction Work.

1.2 OWNERSHIP OF VIDEOS

A. All videos produced will become the permanent property of the OWNER. The Contractor shall deliver all videos to the ENGINEER and OWNER prior to the beginning of any construction Work.

B. Any portion of the video coverage deemed unacceptable by the ENGINEER or OWNER must be re-televised by the Contractor at no additional cost to the OWNER, prior to the beginning of any construction Work.

PART 2 - PRODUCTS

2.1 ELECTRONIC REQUIREMENTS

A. All video recording shall be provided through download options or services. Unless otherwise approved by the OWNER, the videos shall be able to be viewed on Windows Media Player or compatible video applications.

PART 3 - EXECUTION

3.1 COVERAGE OF RECORDING

A. The area to be taped shall include, but not be limited to, all existing driveways, sidewalks, curbs, ditches, streets, landscaping, trees, culverts, catch basins, headwalls, retaining walls, fences, visible utilities including telephone and electrical poles with any overhead lines crossing the site, and all buildings located within the zone of influence of construction. Of particular concern are any existing faults, fractures, defects, or other imperfections exhibited by the above-mentioned surface features. Audio description shall be made simultaneously with and support the video coverage.

1. Streets. Streets shall be recorded from the traveled lane adjacent to the work areas where streets are located and runs along one side of the street except where specifically noted otherwise by the ENGINEER.

2. Easement Areas. Easement areas shall be recorded for the full width of the permanent and temporary easements and all other adjacent areas lying within the zone of influence of "SURFACE" construction as directed by ENGINEER. The size and locations of all easements to be recorded shall be shown on the plans or otherwise supplied by the ENGINEER.

3. Access Ways and/or Routes. Any access ways and/or routes, regardless of whether they are located within a right-of-way or not, shall be recorded for the full width of the access way and/or route and all other adjacent areas lying within the zone of influence of "SURFACE" construction as directed by ENGINEER. The size and locations of all ways and routes to be recorded shall be shown on the plans or otherwise supplied by the ENGINEER.

4. Building Exteriors. The Contractor shall record all exterior surfaces of buildings specifically identified by the ENGINEER to receive such coverage. At a minimum, any structure or building

shall be video recorded if located above the pipeline and within and adjacent to any permanent easement. Buildings so identified may include houses, sheds, apartments, factories, warehouses, retail stores and other structures. Exterior building coverage shall include, but not be limited to, walls, visible foundations, chimney, porches, carports, and trim.

3.2 LOCATION INFORMATION

A. All recordings shall be properly identified by a defined number, location and project name in a manner acceptable to the ENGINEER and OWNER.

B. A record of the contents of each recording shall be supplied on a run sheet identifying each segment in the recording by location, i.e., street or easement number and viewing direction, traveling direction, sewer stationing, and all referenced by video or recording counter numbers.

C. A brief report and inventory of all recordings completed, referenced by location and recording number, shall be furnished to the ENGINEER and OWNER upon completion of the Work and delivery of the recordings.

D. All video recordings shall begin with the date and time of recording, the project name, the sheet numbers or engineering stationing as shown on the Plans, the name of the street, easement number or building address being taped, the direction of travel, and the viewing side.

E. Houses and buildings shall be identified visually by house or building number, when possible, in such a manner that the progress of the taping and the proposed system may be located by reference to the houses and buildings.

F. Unless an alternate format is proposed by the Contractor and approved by the OWNER, the Contractor shall provide the following information, in the format specified. The engineering stationing numbers must be continuous and correspond to the project sewer or water stationing and reference, as appropriate, the physical surface sewer and water features depicted on the plans. This information must appear in the viewing screen. Below the engineering stationing shall appear the name of the project, name of the area covered, direction of travel, viewing side, date, time, etc.

G. In easements, local landmarks on the route or other recognizable features off to the side of the sewer routes shall be visually and audibly noted at frequent intervals to identify the camera location.

3.3 Entering Property. When working in the existing easement or right-of-way, the contractor shall notify the respective property owners at least 72 hours prior to entering the property. Notification letters must be submitted to the OWNER for approval a minimum of two weeks prior to entering any property. If access on private property outside of the existing easement or right-of-way is necessary, the Contractor shall obtain approval from the OWNER prior to contacting the property owner. The Contractor shall be held liable for entry made other than stated above.

3.4 SITE RECORDING CONDITIONS

A. All recording shall be done during times of good visibility. No outside recording shall be done during periods of visible precipitation or when the ground area is covered with snow, leaves, or debris unless otherwise authorized by the ENGINEER.

B. In order to produce the proper detail and perspective, adequate auxiliary lighting will be required to fill in shadow areas caused by trees, utility poles, road signs, and other such objects, as well as other conditions requiring artificial illumination.

C. The average rate of speed in the general direction of travel of the conveyance used during taping shall not exceed 48 feet per minute. Panning rates and zoom-in/zoom-out rates shall be controlled sufficiently such that playback will produce adequate clarity of the objects being viewed.

D. When conventional wheeled vehicles are used as conveyance for recording, the distance from the camera lens to the ground shall not be less than 8 feet to insure proper perspective. In instances where coverage will be required in areas not accessible to conventional wheeled vehicles, such coverage shall be obtained by walking or by special conveyance approved by the ENGINEER, but with the same requirements for recording quality and content as specified herein except as may be specifically exempted by the ENGINEER or OWNER.

END OF SECTION

SECTION 02200

EARTHWORK, EXCAVATION, TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall provide all labor, materials, equipment and services necessary for, and incidental to, the preparation of the site, excavating, trenching, drainage, dewatering, sheeting, bracing, backfilling, compacting, grading, topsoiling, seeding, mulching and protection of the work as shown on the Drawings, as herein specified, and in accordance with the Standard Specifications.

B. The Contractor shall accept the site in the condition in which it exists at the time of the award of the Contract.

C. The Engineer will determine whether materials that are to be used in the work are suitable or unsuitable. All excavated excess or unsuitable materials shall be removed from the site by the Contractor. Materials removed from the site shall be disposed of at a permitted, off-site disposal location of the Contractor's choosing, at no additional expense to the Owner.

1.02 RELATED WORK INCLUDED ELSEWHERE:

A. Section 01130 - MEASUREMENT AND PAYMENT

B. Section 01300 - SUBMITTALS

C. Section 02500 – PAVEMENT

1.03 QUALITY ASSURANCE

A. Codes and Standards

1. Standard Specifications: References in this Section to Standard Specifications or Standard Details shall mean the following, along with the latest revisions thereto, and are hereby made part of this specification. In case of conflict between the Standard Specifications or Standard Details and this contract specification, this contract specification shall govern.

    a. Albemarle County Service Authority, Construction Specifications Regulating the Construction and Expansion of Water and Sewer Systems.

b. Virginia Department of Transportation "Road and Bridge Specifications", dated 2020, and "Road and Bridge Standards", dated 2016, with the latest incorporated revisions dated April 2026.
c. "Virginia Erosion and Sediment Control Handbook", dated 1993, with the latest incorporated revisions.

2. The following American Association of State Highway and Transportation Officials (AASHTO) Standards in effect on the date bids are received form a part of this Specification to the extent indicated by the following references:

M6 Fine Aggregate for Portland Cement Concrete
M43 Standard Sizes of Coarse Aggregate for Highway Construction
M145 Classification of Soils and Soil-Aggregate Mixtures
T89 Determining the Liquid Limit of Soils
T90 Determining the Plastic Limit and Plasticity Index of Soils
T99 Moisture-Density Relations of Soils Using a 5.5-lb. Rammer and 12-in. Drop
T119 Slump of Portland Cement Concrete
T180 Moisture-Density Relations of Soils Using a 10-lb. Rammer and 18-in. Drop
T191 Density of Soil In-Place by the Sand-Cone Method
T206 Penetration Test and Split-Barrel Sampling of Soils
T238 Density of Soils and Soil-Aggregate In-Place by Nuclear Methods
T239 Moisture Content of Soil and Soil-Aggregate In Place by Nuclear Methods
T265 Laboratory Determination of Moisture Contents of Soils

3. All work shall comply with Occupational Safety and Health Regulations for Construction of the Code of Federal Regulations.

B. Supervision and Testing

1. Supervision and testing shall be in accordance with the following. The Contractor shall employ the services of an independent, professional testing consultant, specializing in field sampling, field testing, and laboratory testing. Field and laboratory testing of concrete, pavement and soils shall be the responsibility of the Contractor. Payment shall be included in the appropriate price bid. Costs incidental to the transportation of samples shall be borne by the Contractor.

2. Construction of controlled fills shall be done under continuous supervision of the Engineer. The Contractor shall provide 48 hours notice to the Engineer, and no controlled fills shall be constructed unless the Engineer is on the site. The Contractor shall allow safe access for the Engineer to all parts of the project at all times. The Contractor shall keep the Engineer informed of all construction activity of the project and the Contractor’s anticipated daily schedules. The Contractor shall perform excavation and subgrade preparation under the direction and approval of the Engineer.

3. All materials to be used in the work shall be tested by a certified, independent laboratory paid for by the Contractor, prior to use to show conformance with the requirements of these Specifications. Test reports or material certifications shall be submitted to the Engineer prior to use of any material in the work. Any change in the source or change in the character of the material shall require the Contractor to retest and resubmit for approval.

4. Field compaction tests of the density and moisture content of fill and backfill shall be performed by the Contractor's qualified testing consultant at no additional cost the Owner. Upon completion of each layer of fill in a designated area, the Contractor shall be required to allow time for the Engineer to inspect the tests. Copies of test results shall be furnished to the Engineer within 24 hours of conclusion of tests.

5. Where sheepsfoot rollers are used, the soil may be disturbed to a depth of several inches. Compaction tests shall be taken in the compacted material below the disturbed surface. In this case the Contractor shall be required to use its equipment (such as bulldozer blade) to cut out a smooth surfaced spot at any point requested by the Engineer on which to perform the test.

6. When test results indicate, as determined by the Engineer, that compaction is not as specified, the material shall be removed, replaced and recompacted to meet the specification requirements. Tests on recompacted areas shall be performed to determine conformance with the specification requirements. Inspections and test results shall be certified by a registered professional Engineer, stating that the tests and observations were performed by or under the direct supervision of the Engineer, the results are representative of the materials or conditions being certified by the tests, and the results are in conformance with the project specifications.

7. Tests shall be performed in randomly selected locations and in sufficient numbers to insure that the specified density is being obtained. The following number of field density tests shall be the minimum acceptable for each type operation:

   a. Bedding and backfill in trenches: One test per 100 linear feet in each lift.
   b. Structures: Two tests in each lift.

1.04 SUBMITTALS

A. Sources of borrow, aggregate, porous fill and furnished topsoil shall be submitted to the Engineer for approval.

B. Gradation curves for all borrow, aggregate, porous fill, and furnished topsoil to be used shall be submitted to the Engineer for approval.

C. Standard Proctor (AASHTO T99), Modified Proctor (AASHTO T180), Natural Moisture Content (AASHTO T265), and Atterberg Limits (AASHTO T89 and T90) test results for all proposed on-site material, borrow and aggregate shall be submitted to the Engineer for approval.

D. Delivery Tickets

1. The Contractor shall submit delivery tickets with each load of borrow, aggregate, porous fill and furnished topsoil material brought to the site under the authorization of the Engineer showing the following information:

   a. Name and location of supplier or source.
   b. Type and amount of material delivered by volume and weight.
   c. Test information on the material as required by this Specification.

E. Manufacturer's product catalog data for filter fabric to be furnished shall be submitted to the Engineer for approval, showing compliance with the specification requirements of PART 2 – PRODUCTS.

F. A Compaction Plan shall be submitted to the Engineer for approval, including a list of proposed compaction equipment to be used, manufacturer's specifications and catalog data, and the Contractor's plan for compaction in the work.

G. Excavation Support and Dewatering Systems

1. For all excavations requiring sheeting and shoring, the Contractor shall submit working drawings and calculations for the design of the excavation support and dewatering systems. The Contractor shall design the excavation support and dewatering systems in accordance with any design criteria shown on the Contract Drawings. The working drawings and calculations shall be certified by a professional Engineer licensed to practice in the Commonwealth of Virginia.

2. The working drawings and calculations for the dewatering systems shall include the following information:

   a. Planned method of dewatering.
   b. Excavation plan.
   c. Location of the water table before and during dewatering.
   d. Location and capacity of such facilities as dewatering wells, well points, sumps, collection and discharge lines, proposed standby unit, and protective fills and ditches required for control of ground water and surface water.

3. The Contractor shall obtain and submit copies of all permits that may be required for installation of well points and dewatering wells.

4. The Contractor shall be responsible for determining the existing subsurface conditions for the excavation support systems and dewatering systems. The Owner does not guarantee or warrant the conditions actually encountered on this project. The Owner will not be held responsible for the basis of claims by the Contractor or any other parties in the execution of the excavation support system. The Contractor's submittal of the Excavation Support Systems and Dewatering Systems is for information purposes only.

1.05 JOB CONDITIONS

A. Subsurface Investigations

1. The Owner has performed a limited geotechnical investigation. The limited geotechnical investigation is included for informational purposes, as an appendix to the project manual.

2. The Contractor shall determine to its own satisfaction the ground water conditions and character and type of soil, decomposed rock, rock and other material to be encountered in the work to be done under this Contract.

B. Existing Utilities

1. The existing utilities shown on the Drawings are from available records and field surveys. The Contractor shall verify all information to its own satisfaction. The Contractor shall test pit existing utilities which impact construction two weeks in advance of excavation.

2. Should uncharted piping or other utilities be encountered during excavation, the Contractor shall notify the Engineer and the utility Owner immediately. The Contractor shall cooperate with the Engineer and the utility owners in keeping services and facilities in operation.

3. Utilities designated to remain in place or which serve adjacent structures are to be protected and maintained at all times during construction. Active utility lines damaged in the course of construction operations shall be repaired or replaced immediately at no cost to the Owner, the Engineer, or utility owner.

4. The Contractor shall demolish and completely remove from the site existing underground utilities which are designated to be removed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Borrow material shall meet the requirements of AASHTO M145 soil groups A-1, A-2-4, A-2-6, or A-3 and shall be furnished from a specific source or sources approved in

writing by the Engineer. Group A-3 (Fine Sand) material shall be used only where specified on the Drawings or as required by the Engineer.

B. Select material shall meet the following requirements and shall be used only where specified on the Drawings or as required by the Engineer, and shall be furnished from a specific source or sources approved in writing by the Engineer:

1. VDOT No. 21B, Types I or II (Dense Graded Aggregate)

C. Porous fill material shall meet the following requirements and shall be used only where specified on the Drawings or as required by the Engineer, and shall be furnished from a specific source or sources approved in writing by the Engineer:

1. VDOT No. 57 Aggregate (AASHTO M43)
2. VDOT No. 68 Aggregate (AASHTO M43)
3. VDOT No. 8 Sand (AASHTO M43)

D. Filter Fabric

1. Filter fabric shall be a nonwoven fabric consisting of continuous filaments of polyester or polypropylene formed into a stable network by needle punching. The fabric shall be inert to commonly encountered chemicals and hydrocarbons, mildew and rot resistant, and insect and rodent resistant. Fabric shall have a mass per unit area of at least 5 ounces per square yard as determined by ASTM D5261.

2. The fabric shall provide a permeable layer or media, while retaining the soil matrix. It shall be provided in rolls wrapped with protective covering to protect the fabric from mud, dirt, and debris. The fabric shall be “Trevira” as manufactured by Hoechst or “Fibretex” as manufactured by Acme STW, Inc., or approved equal.

3. The fabric shall be used only where specified on the Drawings or as required by the Engineer.

E. Class B riprap for slope protection and stabilization shall meet the following requirements and shall be used only where specified on the drawings or as required by the Engineer. The stone shall be hard, durable, resistant to weathering, angular in shape, free from overburden, spoil, shale, slate and organic material, and shall meet the quality and size requirements of Section 204 of the VDOT Standard Specifications.

F. Suitable material for backfills may be from the excavation or from other sources. The material shall be free from vegetable matter, organic material, sludge, grit, trash, muck, roots, logs, stumps, frozen material or other deleterious substances. Material shall be clean earth. Rubble and construction debris shall not be used in the work. Rubber, ashes, cinders and other miscellaneous inorganic fill substances removed from required excavations within the project and which in the judgment of the Engineer will

decompose, consolidate further, or shrink appreciably within the fill may not be incorporated in the fill. Except as otherwise specified or approved, the material shall not contain rocks or lumps larger than 6 inches in greatest dimension. No rocks or lumps larger than 3 inches in greatest dimension will be permitted within 12 inches of subgrade, or within 24 inches of pipes in all directions, or within 24 inches of any structure during backfill. The material shall not contain mica in quantities which, in the judgment of the Engineer, are sufficient to affect compaction characteristics. Materials having a maximum dry density of less than 105 pounds per cubic foot (AASHTO T99) and materials having a Unified Soil Classification of CH or MH, shall not be used unless specifically approved in writing by the Engineer.

Prior to placing and compacting suitable material as fill and backfill, the moisture content shall be brought to the specified moisture content by either aerating the material if it is too wet, or spraying the material if it is too dry. The material shall by thoroughly mixed before compaction for uniform distribution of moisture content.

Suitable material is any material meeting the quality requirements specified above, for the particular location and application specified, which is not frozen and which has a moisture content at the time it is placed that enables the material to be compacted to the density specified. Excavated onsite soils that are not within an acceptable moisture range for initial backfill and compaction shall not automatically necessitate the need for select backfill.

G. Unsuitable material is any material not meeting all the requirements for suitable material.

H. Topsoil shall meet the requirements of Paragraph 3.16 TOPSOIL.

1. Salvaged topsoil shall be existing topsoil stripped from the site within the prescribed limits.

2. Furnished topsoil shall be the Contractor's responsibility to obtain from approved off-site sources.

PART 3 - EXECUTION

3.01 SITE PREPARATION

A. All rubble, trash, unusable and unsuitable material, pavements, concrete structures, piping, sludge, grit, etc. within areas required to be filled, excavated or graded, except as otherwise specified or shown, shall be fully removed from the site and disposed of by the Contractor, at no additional expense to the Owner. Such material may exist on the site. The Contractor shall obtain and pay for all necessary permits related to this disposal.

3.02 CLEARING AND GRUBBING

A. All trees, stumps, roots, brush, grass, etc., shall be fully removed within the areas required to be filled, excavated or graded. Contractor may store removed materials for reinstallation, weather dependant. Stored materials shall be moved to a storage area to allow for proper care and watering. All stored trees, shrubs, bushes, etc. shall have the root ball wrapped in burlap for protection.

B. Roots larger than 2" diameter shall be removed to minimum depth of 24 inches.

C. All materials resulting from the clearing and grubbing operation, not to be stored for reinstallation, shall be disposed of by the Contractor off the site, at his expense. The Contractor shall obtain and pay for all necessary permits related to this disposal. No burning shall be allowed on this project.

D. Trees outside of the immediate area of construction and noted on the contract drawings shall be protected from damage.

3.03 BLASTING

A. Blasting shall be performed in accordance to Section 02223 of this project manual.

3.04 EXCAVATION AND SUBGRADE PREPARATION

A. Excavation for grading, pavements, walls, piers, slabs, footings, structures, trenches, utility systems and their appurtenances shall be unclassified and shall consist of the excavation of whatever material is encountered to the lines, grades, and sections shown on the Drawings and specified, including such excavation as is necessary for all ditches, curbs and other features.

B. Suitable material removed from the excavation shall be reused in the grading, filling, backfilling and preparation of subgrade for pavements, structures, and trenches and at such other places as directed, to the extent required to complete the work. The Contractor shall properly store or stockpile and protect in approved manner, all materials that are to be reused in the work. Prior to placing and compacting the material as fill and backfill, the moisture content shall be brought to the specified moisture content by either aerating the material if it is too wet, or spraying the material if it is too dry. The material shall by thoroughly mixed before compaction for uniform distribution of moisture content. The Contractor shall replace, at his own expense, material that was suitable when excavated, which has subsequently become unsuitable because of careless, neglectful, wasteful or unprotected storage. All unsuitable or excess material removed from the excavation shall be removed from the site and disposed of by the Contractor at no additional expense to the Owner, except where disposal on the site is specifically provided for and approved in writing by the Engineer.

C. During construction, the grading operations shall be performed in such a manner that the excavations shall be well drained at all times. Sufficient grading shall be performed during the progress of the work so that no water, at any time, is allowed to flow towards

the walls of the structures or trenches. The entire site shall be well drained and free from water pockets. When necessary, sumps shall be provided and pumped continuously. The Contractor shall maintain and keep all ditches open and free from soil and debris while in service or until final acceptance of the work, and all grading shall be done on neat, regular lines. All work shall be done in proper sequence with all other associated operations. Before any slab or surfacing is placed, all utilities to be covered shall be installed and all drainage facilities shall be installed which are required to permit free and uninterrupted flow of the surface and ground water from the site or to pumping sumps.

D. Preparation of the surface: Before depositing fill material, the surface of the ground shall be cleared of all refuse, rubble, and other debris. All vegetable matter, mud, muck, sludge and unsuitable soils shall be removed from the surfaces upon which fills are to be placed and the surface shall be leveled. Openings, animal burrows, stump holes, old pipes and other holes and depressions shall be eliminated, filled or cleaned as required.

E. Where fills are made on hillsides or slopes, the slope of the original ground upon which the fill is to be placed shall be plowed or scarified deeply or where the slope ratio of the original ground or rock surface is steeper than five horizontal to one vertical, the ground or rock shall be stepped or benched.

F. The areas shall then be proofrolled with a minimum of 3 passes of a large vibratory roller capable of exerting a dynamic force of at least 10 tons. Proofrolling shall be performed to densify the areas and to locate soft areas. Soft areas shall be removed, under direction of the Engineer, and replaced with controlled, compacted fill as hereinafter specified.

G. Where, in the opinion of the Engineer, unsuitable subgrade conditions are encountered under pavements, structures, or utilities, a determination will first be made by the Engineer whether the condition is due to the in-situ condition, or is caused by the Contractor’s construction methods.

H. Unsuitable foundation materials, which in the judgment of the Engineer are due to in-situ conditions, shall be excavated when ordered in writing by the Engineer, to the extent directed by the Engineer. All unsuitable material shall be removed to a firm bottom below subgrade elevations. The excavation below subgrade shall be refilled using suitable material as defined in PART 2 - PRODUCTS, and compacted in accordance with Paragraph 3.12 COMPACTED FILLS AND BACKFILLS. Under these conditions, payment for excavation below subgrade and backfill will be made in accordance with Section 01130 MEASUREMENT AND PAYMENT.

I. Unsuitable foundation conditions or areas disturbed or rendered unstable, which in the judgment of the Engineer are caused by the Contractor's construction methods or equipment, shall be corrected by the Contractor to the satisfaction of the Engineer, at no additional expense to the Owner. These corrections shall include the necessary excavations and backfills.

J. Overexcavation: Where excavations for pavements, structures or utilities are made to a depth below the subgrade elevations shown on the Drawings or specified, without authorization, the excess excavation shall be filled, at no additional expense to the Owner to the required level as described above.

K. Subgrade for all pavements, structures, and utility excavations, shall be firm, undisturbed earth/rock except where drainage courses or compacted fills are specified or are required in areas where unsuitable material has been removed.

L. Whenever a condition is encountered where subgrade is at the bottom of a structure and subgrade is part rock and part soil, the rock shall be removed to a depth of 6 inches below subgrade and replaced with suitable material as directed by the Engineer and as defined in PART 2 - PRODUCTS, and compacted in accordance with Paragraph 3.12 COMPACTED FILLS AND BACKFILLS.

M. Subgrade for trenches shall be as defined in Paragraph 3.09 TRENCH EXCAVATION. Subgrade for structures shall be as defined in Paragraph 3.13 FILLS AND BACKFILLS FOR STRUCTURES. Subgrade for areas to receive topsoil shall be as defined in Paragraph 3.16 TOPSOIL. Subgrade for pavement shall be at the bottom of the pavement cross-section, in accordance with the details shown on the Drawings, or as specified in Section 02500 PAVEMENT of this Specification.

3.05 DEWATERING, DRAINAGE AND PUMPING

A. The Contractor shall provide, continuously operate and maintain all temporary dewatering, drainage and pumping systems required to satisfactorily perform all work under the Contract.

B. Should soil, ground water or local conditions require dewatering systems other than ditches, sumps, and pumps, such systems shall be provided, operated and maintained at no additional expense to the Owner.

C. The Contractor shall exercise every precaution to prevent flotation of any of the work constructed under this Contract, and the Contractor shall be responsible for all damage due to flotation.

D. Such grading shall be done as necessary to prevent surface water from flowing into trenches or other utility excavations, and any water accumulating therein shall be continuously removed and properly filtered to remove sediment.

E. Methods of dewatering excavations shall be at the Contractor's discretion. Continuous investigations and checks shall be made by the Contractor to assure that the dewatering system employed is functioning properly, not causing damage or settlement to adjacent surfaces or structures. Temporary pipes or flumes shall be used to carry surface water across open and/or unstabilized construction areas. The system shall be modified as

required and repairs for damage caused by the system shall be the responsibility of the Contractor.

3.06 TEMPORARY EXCAVATION SUPPORT SYSTEM

A. The Contractor shall temporarily support the sides and ends of all excavations, where necessary or where directed by the Engineer, with braces, sheeting, shoring, stringers or other methods of the type, size and quality required. The Contractor will not necessarily be permitted to use any particular type of excavation support system it selects. The Contractor shall be entirely responsible for the design and adequacy of the excavation support system.

B. The temporary excavation support systems shall be removed as backfilling proceeds, in a manner so as not to damage any structures, roadbed, fill or private property. If, in the judgment of the Engineer, removal of temporary excavation support systems will jeopardize any of the work performed under this Contract, or any existing facilities, the Engineer may direct the Contractor to leave all or part of the temporary excavation support systems in place.

C. There will be no extra compensation to the Contractor for use of the required temporary excavation support systems.

D. Pile driving hammers or vibratory hammers shall only be used to drive or extract temporary excavation support systems when approved in writing by the Engineer. However, the Contractor shall be responsible for any damage caused by its operations involving vibrations.

3.07 RESPONSIBILITY FOR CONDITION OF EXCAVATIONS

A. The Contractor shall be entirely responsible for the condition of all excavations made by him, for the entire period of the Contract. All slides, caves or other unacceptable conditions shall be promptly corrected whenever they occur, without extra compensation.

B. The neglect, failure or refusal of the Engineer to order or approve any excavation support system shall not in any way or to any extent relieve the Contractor of any responsibility concerning the conditions of excavations or of any of its obligations under the Contract; nor shall any delay whether caused by an action or want of action on the part of the Contractor or by any action or want of action of the Owner or its agents or employees, or the Engineer, resulting in the keeping of an excavation open longer than would otherwise have been necessary, relieve the Contractor from the necessity of properly and adequately protecting the excavation from caving or slipping, nor from any of its obligations under the Contract relating to injury of persons or property nor entitle it to any claim for extra compensation.

3.08 PROTECTION OF PROPERTY, STRUCTURES AND UTILITIES

A. The Contractor shall, at its own risk and at no additional expense to the Owner, maintain, support-in-place, and protect all pipes, poles, cables, utilities, walls, buildings, and other structures or property in the vicinity of the work, whether above or below ground, or that may appear in the excavation. The Contractor shall at all times have available on site sufficient quantity of timber, planks, beams, chains, ropes, etc., and shall use them as necessary for supporting any structures and utilities that are uncovered, undermined, endangered, threatened or weakened. The Contractor shall be responsible for all damage, shall take all risks, and shall assume all expense for injury or damage, to any person or property of every kind and description, caused directly or indirectly by the Contractor's work, whether such structures or utilities are or are not shown on the Drawings.

B. In the event that the Contractor damages any existing utility lines report thereof shall be made immediately to the Engineer. If it is determined that repairs are to be made by the Contractor, such repairs will be ordered under the appropriate clause of the Standard Specifications.

3.09 TRENCH EXCAVATION

A. Subgrade for trenches shall be the bottom of granular bedding, as shown on the Drawings or the Standard Details.

B. Trenches shall be excavated to the necessary widths and depths as may be shown on the Drawings. The maximum clearance between each face of trench and external surface of barrel of pipe or hubs, however, shall not be greater than indicated in the Standard Details or on the Drawings. This maximum width is intended to minimize disruption of existing grades and conditions. All excavation will be unclassified and shall be included in the lump sum or unit price bid for the appropriate bid item. No separate or additional payments will be made for excavation except for removal of unsuitable materials below the subgrade.

C. The sides of the trenches from trench subgrade to an elevation 12 inches above the crown of the pipe shall be practically plumb and under no circumstances will they be permitted to be sloped.

D. No trench length greater than 60 feet at any location shall be left open in advance of the complete pipe placed therein. The Engineer shall be empowered, at any time, to require the backfilling of open trenches over completed pipelines or structures if, in his judgment, such action is necessary. The Contractor shall have no claim for extra compensation even though to accomplish this backfilling it is compelled temporarily to stop excavation or other work at any place. If work is stopped on any trench for any reasons except by order of the Engineer, and the excavation is left open for an unreasonable length of time in advance of construction, the Contractor shall, if so directed, backfill such trench at no additional expense to the Owner, and shall not again open this trench until it is ready to complete the construction therein. If the Contractor shall refuse or fail to backfill such trench completely within 48 hours after said notice, the Engineer shall be authorized to have the work done and the Owner shall charge the

expense thereof to the Contractor and retain the same out of any moneys due or to become due it under the Contract.

E. Length of open trench shall be limited to only that length sufficient to advance the trench box or sheeting ahead of the pipe construction operation and to provide a minimum safe working distance between the backfilling operation and the pipe construction operation. No trenches are to be left open at night or weekends. Trenches shall be backfilled or plated in such a manner as to not impede pedestrians or vehicles.

3.10 TRENCH BACKFILL

A. The Contractor shall undercut below trench subgrade, where in the opinion of the Engineer, soft or unstable material is encountered. Remove the unsuitable material to a firm bottom, and replace up to trench subgrade using suitable material compacted as a controlled fill, as described elsewhere, or remove the unsuitable material to the extent directed by the Engineer and replace up to trench subgrade using compacted porous fill No. 68 aggregate. A nonwoven geotextile shall be placed directly onto the soft material prior to placing the No. 68 aggregate, in order to prevent movement of the soft material into the No. 68 aggregate. The geotextile shall wrap around the No. 68 aggregate and overlap for the full trench width. Normal bedding and pipe shall be placed directly onto the refill or geotextile.

B. During backfilling, great care shall be taken not to disturb the pipes by dropping or throwing anything on them from the bank above, or by walking on top or alongside of them.

C. Trench backfill material shall meet the requirements of PART 2 - PRODUCTS.

D. Pipe bedding depth shall be from trench subgrade, from a point below the underside of the pipe barrel, to a point above the underside of the pipe barrel. Distances from trench subgrade to underside of pipe barrel varies with pipe size and shall correspond with details on the contract drawings. Distance of bedding above pipe barrel varies with pipe size and shall correspond with details on the contract drawings. Pipe bedding material shall be No. 68 stone or sand bedding, as defined in PART 2 - PRODUCTS, and as indicated on the Drawings, and shall be thoroughly compacted by hand operated mechanical tampers before laying the pipe to provide a uniform and continuous bearing and support for the pipe. Bell holes shall be excavated in the bottoms in all cases to permit the proper making of joints.

E. Initial backfill, from the top of the pipe bedding to two feet above the crown of the pipe, shall be placed in 6-inch layers and compacted by approved hand-operated mechanical tampers or approved compaction equipment. Initial backfill may include suitable material originating on the job except within existing roads as defined in PART 2 - PRODUCTS. Compaction requirements shall be the same as for bedding.

F. In improved areas, within State and County Rights-of-Way, under paved areas, or where specified in this Section, on the Drawings or in the Standard Specifications final backfill, from two feet above the crown of the pipe to finish subgrade, shall be placed in 6 inch layers and compacted in accordance with Paragraph 3.12 COMPACTED FILLS AND BACKFILLS, using full trench compaction. Final backfill may include suitable material originating on the job if outside of road rights-of-way as defined in PART 2 - PRODUCTS.

G. In unimproved areas, final backfill, from two foot above the crown of the pipe to finished subgrade, shall be placed in 6 inch layers and compacted in accordance with Paragraph 3.12 COMPACTED FILLS AND BACKFILLS and in such a manner that a completely dense refill is obtained which is free of voids and not susceptible to settlement. The backfill may include suitable material originating on the site as defined in PART 2 - PRODUCTS. No rock or lump greater than 6 inches in greatest dimension shall be used for trench backfill.

3.11 CHANGE OF TRENCH LOCATION

A. In case the Engineer shall direct that the location of a trench be changed from that shown on the Drawings on account of the presence of an obstruction or from other cause, or if changed location shall be authorized upon the Contractor's request, the Contractor shall not be entitled to extra compensation or to a claim for damage provided that the change is made before the excavation is begun. If however, the change in trench location is directed by the Engineer after the excavation has begun but before the trench has been excavated to its ultimate depth, the abandoned portion of the excavation shall be measured and paid at the appropriate stipulated price in the Proposal for the depth actually excavated. If the abandonment is ordered after the trench has been excavated to its ultimate depth, payment will be made, as stated above, to a depth called for on the Drawings or as directed by the Engineer. In both instances, the payment width shall be as indicated on the Drawings or in the Standard Details for the size pipe to be installed.

B. If an obstruction occurs within the trench in such manner that the trench has to be excavated to extra width in order that sheeting or bracing may be properly placed, or in order that the structure to be placed in the trench may be properly built, such extra width of trench shall be measured and paid for under the appropriate item in the Bid Form. No sloping of sides of excavations, for the purposes of avoiding the necessity of placing sheeting or bracing, either in the presence or absence of obstruction, will be paid for.

3.12 COMPACTED FILLS AND BACKFILLS

A. Prior to placing any fill or backfill, notice shall be given the Engineer so that the work may be inspected, and filling or backfilling shall not proceed without his approval.

B. Placing, spreading and compacting suitable material for fills and backfills:

1. Fill and backfill material shall be placed in approximately horizontal layers which, before compaction, shall not exceed 8 inches in thickness. Fill and backfill material within 5 feet of structures and for railroad track subgrade shall be placed in approximately horizontal layers which, before compaction, shall not exceed 6 inches in thickness. Each layer shall be spread uniformly and evenly. All rocks shall be distributed throughout the earth materials and all voids shall be carefully filled and the material properly compacted by rolling, tamping, vibratory compactors, or other methods specified herein and approved by the Engineer. Compaction by heavy rollers or other heavy equipment is prohibited within 5 feet of any structure.

2. a). Fill/backfill Within State and/or County Road Right of Way (Improved Areas):

   Moisture content of the fill material shall be within 3% above or below the optimum moisture content for the material while placing and during compaction. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to not less than 95% of maximum dry density for cohesionless soils and not less than 92% of maximum dry density for cohesive soils. Unless otherwise noted, fills and backfills within 12 inches of slab or pavement subgrade shall be compacted to not less than 95% of maximum dry density. Cohesionless soils are defined as granular soils containing less than 15% by weight passing the No. 200 sieve. Optimum moisture content and maximum dry density shall be determined by AASHTO T99. Weaving or creeping of the soil beneath the roller shall be sufficient evidence that the moisture content of the fill or subsoils is excessive, and that required compaction has not been achieved.

   b). Fill/backfill Non-Paved Areas (Unimproved Areas):

   For the initial fill over the placed pipe, as shown on the contract drawing details, the moisture content of the fill material shall be within 3% above or below the optimum moisture content for the material while placing and during compaction. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to not less than 95% of maximum dry density for cohesionless soils and not less than 92% of maximum dry density for cohesive soils. The final backfill (cohesionless and cohesive material) shall be compacted to not less than 90% of maximum dry density and the moisture content of the fill material shall be within 5% above or below the optimum moisture content for the material while placing and during compaction. Cohesionless soils are defined as granular soils containing less than 15% by weight passing the No. 200 sieve. Optimum moisture content and maximum dry density shall be determined by AASHTO T99. Weaving or creeping of the soil beneath the roller shall be sufficient evidence that the moisture content of the fill or subsoils is excessive, and that required compaction has not been achieved.

3. The fill or backfill shall be constructed in such a manner that the surface will be sloped to drain at all times and shall be sealed by rolling at the completion of each day or prior to rain. No fill or backfill shall be placed, spread or rolled while it is frozen or thawing or be placed upon frozen or thawing ground or during unfavorable weather conditions. Any compacted layer which has been previously frozen shall be reworked or removed before the next layer is placed. Materials containing free water or having a moisture content higher than specified shall not be deposited upon the fill or backfill until after they have been dried to the specified moisture content.

3.13 FILLS AND BACKFILLS FOR STRUCTURES

A. Subgrade for structures shall be 6 inches below the underside of the slab, unless otherwise noted.

B. Bedding for structures shall be 6 inches of porous fill No. 57 Aggregate, as defined in PART 2 - PRODUCTS, unless otherwise noted.

C. After completing the construction of structure foundations, footings, walls, etc., below finished grade, all forms shall be removed and the excavation cleaned of all trash and debris. The excavation shall not be used for the disposal of refuse. Any refuse or other foreign materials shall be removed before backfilling. Prior to placing any backfill, notice shall be given the Engineer so that the work may be inspected, and backfilling shall not proceed without its approval. No backfill shall be placed against any structure until 7 days after the concrete forms have been removed.

D. The fill or backfill may include suitable material originating on the job, as defined in PART 2 - PRODUCTS, unless otherwise noted. Compaction shall be in accordance with Paragraph 3.12 COMPACTED FILLS AND BACKFILLS.

3.14 TOPSOIL

A. Upon completion of grading, all debris shall be cleaned up and removed from the premises.

B. Subgrade shall be the surface upon which the topsoil is placed, defined as follows: For all non-paved disturbed areas of the site, place a 4-inch depth of topsoil on areas to be seeded, and place a 2-inch depth of topsoil on areas to be sodded, as noted on the Drawings, or specified.

C. Fine grading and placement of salvaged or furnished topsoil shall conform to Virginia Department of Transportation “Road and Bridges Specifications”.

3.15 SEEDING AND MULCHING

A. All non-paved disturbed areas shall be seeded and mulched, unless otherwise noted on the Drawings or specified. Seeding and mulching shall conform to Virginia Department of Transportation “Road and Bridges Specifications”.

END OF SECTION

SECTION 02223

VIBRATION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. This work shall consist of the Contractor employing the services of a Vibration Control Consultant for use in monitoring rock excavation using explosives, or using mechanical or chemical methods, pile driving, excavation support system installation, and all other construction activities involving vibrations. Work under this item includes performing a pre- and post-construction survey, and monitoring and recording the vibrations due to construction operations. A detailed description of the means, methods, equipment and materials used, and methods for controlling vibration by limiting ground motion and airblast shall be submitted to the Engineer.

B. The Contractor shall be responsible for reading the geotechnical data, located in the Appendix of these Specifications, and shall become familiar with the site and the subsurface conditions, as required in Section 02200 EARTHWORK, EXCAVATION, TRENCHING AND BACKFILLING. Ignorance of conditions will not be accepted as a basis of claim for additional compensation. The Owner and Engineer do not warrant or guarantee that the conditions actually encountered in the execution of the work under this contract will be the same as the conditions indicated in the geotechnical data.

C. Vibration control requirements specified in this Section will be incidental to the Proposal, except as described in Section 02200 EARTHWORK, EXCAVATION, TRENCHING AND BACKFILLING.

1.02 RELATED WORK INCLUDED ELSEWHERE

Section 01130 MEASUREMENT AND PAYMENT
Section 01300 SUBMITTALS
Section 02200 EARTHWORK, EXCAVATION, TRENCHING AND BACKFILLING

1.03 SUBMITTALS

Submittals to the Engineer, and compliance by the Contractor with provisions for protection of life and property, shall not relieve the Contractor of the responsibility or liability for the safety of persons and property. The Contractor's submittals to the Engineer shall not constitute nor shall they be construed to be a guarantee by the Engineer that the desired results will be achieved. Submittals to the Engineer shall not relieve the Contractor from the responsibility of complying with the requirements of these specifications. The Contractor shall submit the following in accordance with the Proposal:

A. Contractor Submittals

A Conceptual Construction Plan shall be submitted describing the proposed general concept for construction activities and the Contractor's proposed efforts regarding the safety of structures and utilities.

B. Vibration Control Consultant Submittals

1. Vibration Control Consultant Documentation

The Contractor shall employ the services of an independent consultant, specializing in the field of monitoring vibrations as a result of construction activities, and their effects on structures and utilities. The Vibration Control Consultant shall submit to the Engineer for approval, documentation of at least five (5) years of experience, evidence of the satisfactory completion of at least five (5) monitoring programs or operations comparable in scope to this work, and three (3) examples of pre- and post-construction survey reports.

2. Pre- and Post-Construction Plan and Surveys

A Survey Plan shall be submitted by the approved Vibration Control Consultant, describing the locations of proposed pre- and post-construction surveys to be performed at each potentially affected property, structure, or utility, and shall provide for two (2) additional locations, as may be specified by the Engineer. The surveys shall be conducted and documented as described herein, and in accordance with the requirements of regulatory authority, and shall be considered as those on record. The pre-construction survey shall be performed in the presence of the respective owner of each structure or utility, or his duly authorized representative. The Engineer may accompany the Consultant during the survey.

The existing structures and utilities shown on the Drawings are for the Contractor’s information only. The Contractor shall verify the existence and exact location of all structures and utilities in the vicinity of work involving vibrations, which the Consultant deems necessary. The Contractor’s attention is directed to the existing interceptor sewer. The integrity of the existing interceptor sewer must be maintained throughout construction activities.

Pre-construction surveys shall be performed by the Consultant to determine the condition of any property or structure, and to document any pre-existing defects, cracks, or irregularities. The contents of structures shall also be identified and their condition documented. Each property or structure surveyed shall have a separate bound survey report and shall include identification of the property or structure, owner, date and time of survey, and shall accurately relate all photographs, tape {or digital} records, measurements and sketches to the body of the report. A commercial photographer, approved by the Engineer, shall provide color eight-inch by ten-inch

(8" x 10") photographs. Three (3) copies of each survey report shall be furnished to the Engineer 30 days prior to any construction operations. The Contractor, the Vibration Control Consultant and the photographer shall furnish a notarized statement, to the Engineer, certifying the date(s) of the pre-construction survey. This certification shall include a statement that the pre-construction survey was made in the presence of and to the satisfaction of each respective structure or utility owner. Should the property or structure owner disagree with any item of the report, provisions shall be made so that such a disagreement is documented and distributed to all parties involved.

Post-construction surveys shall be performed by the Consultant upon completion of all operations involving vibrations, at the same locations as the pre-construction surveys. The Consultant shall re-examine the condition of structures, and document all defects, cracks or irregularities noted in the pre-construction survey. Additionally, any defects, cracks or irregularities not noted in the pre-construction survey shall be documented. Each property or structure surveyed shall have a separate bound survey report, independent of the pre-construction survey report. Each report shall include identification of the property or structure, owner, date and time of survey, shall accurately relate all photographs and tape records to the body of the report, and shall include documentation and photographs of any damage and a comparison to the pre-construction survey. Three (3) copies of each post-construction survey report shall be furnished to the Engineer.

3. Vibration Monitoring Instrument Specifications

   The Vibration Control Consultant shall submit to the Engineer for approval, manufacturer's specifications describing instrument characteristics of all ground motion monitoring instruments to be used.

4. Vibration Monitoring Plan

   The Vibration Control Consultant shall submit a Vibration Monitoring Plan, describing the locations of each instrument and methods of monitoring. In addition to the location(s) described on the Vibration Monitoring Plan, the Consultant shall include provisions for up to two (2) additional instruments located at monitoring sites as specified by the Engineer.

5. Vibration Monitoring Records

   The Vibration Control Consultant shall submit to the Engineer daily monitoring records as described herein.

6. Certification of Calibration

   The Vibration Control Consultant shall submit to the Engineer for approval a current

certification of calibration, traceable to the National Bureau of Standards, for all seismic instruments, indicating dynamic shake-table calibration by a competent vibration testing facility.

C. Blasting Contractor Submittals

1. Blasting Contractor Documentation

Blasting Contractor Documentation shall be submitted to the Engineer for approval documenting that the Blasting Contractor has at least five (5) years of experience and evidence of the satisfactory completion of at least five (5) blasting programs or operations comparable in scope to this work. The Blasting Contractor shall submit documentation of licensing required by County, State, Federal or other regulatory authorities having jurisdiction. The Blasting Contractor shall apply for and obtain all required blasting permits, and shall submit documentation to the Engineer.

2. Blasting Schedule

A Blasting Schedule shall be developed by the Blasting Contractor detailing the date, time and location of proposed blasts. The Blasting Schedule shall be published in a local newspaper and submitted to the Engineer for information and record purposes at least ten days, but not more than 20 days, before the start of the blasting program. Should a change occur to the schedule, it shall be re-published and re-distributed. The Blasting Contractor shall also provide a Blasting Schedule to any public utilities, private residence, or others possibly affected. Blasting operations shall be restricted to between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday. Any variation to this restriction must be approved in writing by the Engineer.

3. Conceptual Blasting Plan

A Conceptual Blasting Plan shall be submitted by the Blasting Contractor to the Engineer for information and record purposes, and shall include the following:

a. A complete summary of proposed transportation, handling, storage, and use of explosives, and shall include the names of personnel who will supervise blasting operations, written evidence of past experience and competency, and a minimum of three (3) references for each such person.

b. The proposed general concept for the blasting, including individual blasthole and delay patterns and loading diagrams to cover each type of shot anticipated, controlled blasting techniques, and controls of noise, dust, fly rock, airblast, and vibrations.

c. Data necessary to support the adequacy of the Blasting Contractor's proposed efforts regarding the safety of structures and slopes and to assure that an adequate

foundation is obtained.

d. Information on test blasts planned by the Blasting Contractor.

e. Individual shot plans shall be submitted on a day-to-day basis for information and record purposes. Individual shot plans shall include drilling patterns; number, spacing, location, inclination, diameter, and depth of drilled holes; amount, type, diameter, and distribution of explosive per hole; pounds of explosives per lineal foot for controlled perimeter holes; powder factor; delay patterns, type of initiators, time of each delay, and pounds of explosive for each delay; time of blast; and total pounds of explosives in place at any one time within the area to be excavated under this Contract.

D. Other Data

The Contractor shall also submit any other data which the Engineer may deem pertinent to the Owner or Engineer's determination of the Contractor's intent and purpose to produce smooth and sound rock surfaces at the lines of excavation, and to protect the safety of persons and adjacent structures.

1.04 PRE-CONSTRUCTION MEETING

The Engineer will review the required submittals for conformance with the Contract Drawings and Specifications. Within 30 days after receipt of the submittals, the Engineer will notify the Contractor of any additional information required and/or changes necessary to meet the contract requirements. Any parts of the submittals that are unacceptable will be rejected and the Contractor shall resubmit changes for re-evaluation. All procedural approvals given by the Engineer shall be subject to trial in the field and shall not relieve the Contractor of the responsibility to satisfactorily complete the work in this specification. Prior to construction, the Contractor shall arrange a pre-construction meeting with the Engineer to discuss rock excavation procedures for this project.

PART 2 - PRODUCTS

2.01 EXPLOSIVES

A. Pre-packaged explosives only shall be used in blasting. Free flowing ANFO (ammonium nitrate and fuel oil) shall not be permitted.

B. No electrical-type blasting system shall be used within 500 feet of energized electrical lines or equipment.

2.02 BACKFILL

Materials furnished as suitable material for backfill in place of excavated rock shall be as specified in Section 02200 EARTHWORK, EXCAVATION, TRENCHING AND BACKFILLING.

PART 3 - EXECUTION

3.01 VIBRATION MONITORING

A. Where construction activity involving vibration is performed, vibration monitoring shall be required. The Contractor shall employ a Vibration Control Consultant to monitor and analyze results from seismographic recordings and to provide advice in order to eliminate the occurrence of damage due to construction operations. Initial tests of construction activity shall be monitored under the supervision of the vibration consultant who will determine the maximum vibration limitations and maintain the vibration effects at or below the limitation levels at existing structures or utilities.

B. After completion of the tests, the Vibration Control Consultant shall monitor and record ground motion caused by all subsequent vibration, and provide the Engineer with daily monitoring records. Should data indicate that limiting levels have been exceeded; the Contractor shall take necessary measures to reduce vibrations to acceptable levels. Should conditions warrant, the Engineer reserves the right, at any time, to require the Contractor to submit a revised Plan to reduce the vibrations. Nothing presented in these specifications shall in any way relieve the Contractor of any responsibility for any and all damage to existing structures, utilities, or the work. Any damage incurred as a result of the Contractor’s construction operations shall be repaired by the Contractor at his sole cost to the complete satisfaction of the property owner and Engineer.

C. The Vibration Control Consultant's monitoring instruments shall be located immediately adjacent to the nearest structure(s) and at other locations as designated on the approved Monitoring Plan. The record shall consist of the seismographic records identified by instrument number, location of each instrument, date, time and location of vibration origin, and all other data necessary to control the operations. These records, as a formal report, shall be submitted to the Engineer on a weekly basis and provided in tabulated form at all other times.

3.02 GROUND MOTION MONITORING

A. The seismographs shall be capable of providing a permanent record of the three components of ground motion in terms of "particle velocity", with velocity transducers having a flat response over a range of at least 6 to 200 Hertz, and in addition shall be capable of internal dynamic calibration.

B. Peak Particle Velocity shall be the measure of the level of ground vibration and is defined as the maximum of any one of the three mutually perpendicular components of motion. Vibrations shall be limited such that the maximum peak particle velocity as

measured shall not exceed the recommendation of the Vibration Control Consultant, as approved by the Engineer, and shall be related to Paragraph 3.09 U.S. BUREAU OF MINES CRITERIA.

3.03 AIRBLAST MONITORING

A. The airblast monitoring instrument shall be capable of recording full waveform time histories and in addition shall be capable of internal dynamic calibration.

B. A constant recording instrument shall be used and shall be located at the nearest structure to the blast, preferably adjacent to the seismograph. All instruments used for airblast monitoring shall be equipped with windscreens over the microphones, which shall be placed in an area not masked by trees or buildings, at least 5 feet to the side of any structure, and 3 to 5 feet above the ground.

C. Airblast, as recorded at the closest structure, shall be limited to a maximum value of 110 dB peak when measured by an instrument having a flat response over a range of at least 6 to 200 Hertz. The Engineer may authorize an airblast value of 130 dB where, in the Engineer's judgement, maintaining 110 dB is not practical.

3.04 ROCK EXCAVATION

A. All material excavated shall be unclassified. Where encountered, the Contractor shall excavate rock (as defined below), to the lines and grades indicated on the Drawings or as directed by the Engineer, and shall dispose of the excess and unsuitable excavated material and furnish suitable material for backfill in place of the excavated rock, as described in Section 02200 EARTHWORK, EXCAVATION, TRENCHING AND BACKFILLING.

B. The word “rock” wherever used as the name of an excavated material or material to be excavated, shall mean only boulders and pieces of concrete or masonry exceeding ½ cubic yards in volume, solid ledge rock, or bedrock which, in the opinion of the Engineer, requires for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power-operated tool. No soft, weathered, decomposed or disintegrated rock which can be removed with a hand pick or power-operated excavator or shovel, no loose, shaken, or previously blasted rock or broken stone and no rock beyond the maximum limits of excavation, which may fall into the excavation, will be considered as “rock”.

C. Rock excavation methods employing the use of explosives, or employing mechanical or chemical methods other than the use of explosives, shall be submitted to the Engineer for approval. Regardless of the methods for rock excavation, the Contractor shall conform to the requirements for vibration control. The Contractor is responsible for operating in a safe manner, for producing smooth and sound rock surfaces at the lines of excavation; and for controlling damage and vibration.

3.05 EXCESS ROCK EXCAVATION

A. Rock, below normal subgrade, which is shattered due to drilling and blasting, shall be removed. Any and all excess rock excavation, whether resulting from over-breakage or other causes, which is below the normal elevation of subgrade shall be backfilled in pipe trenches and under pavements as for "Overexcavation" as described in Section 02200 EARTHWORK, EXCAVATION, TRENCHING AND BACKFILLING, and shall be backfilled for structures using concrete, at the Contractor's expense.

B. If rock is excavated within a pipe trench beyond the limits of payment, the excess rock excavation, whether resulting from over-breakage or other causes shall be backfilled in accordance with Section 02200.

3.06 DISPOSAL OF EXCAVATED ROCK

A. The Contractor shall stockpile sufficient quantities of the excavated rock material for use in controlled fills and backfills, or for use as riprap, as described in Section 02200 EARTHWORK, EXCAVATION, TRENCHING AND BACKFILLING.

B. Excavated rock material shall not be used in backfilling trenches, except as described in Section 02200.

C. All excess or unsuitable excavated rock material shall be disposed of by the Contractor as described in Section 02200 at no additional expense to the Owner.

3.07 EXPLOSIVES

The Contractor shall keep explosives on the site only in such quantity as may be needed for the work under way and only during such time as they are being used. No on-site overnight storage of explosives shall be permitted. The Engineer shall be notified in advance of daily storage and use of explosives. Explosives shall be stored in a secure manner and away from all tools. Caps of detonators shall be safely stored at least 100 feet from the explosives when not secured in approved containers on approved vehicles during daily blasting operations. Upon completion of daily construction, all explosives and appurtenances remaining on site shall be promptly removed from the premises. In addition to observing all County ordinances and State and Federal laws relating to the transportation, storage, handling and use of explosives, the Contractor shall conform to any further regulations which the Engineer may deem necessary. Should any of the above mentioned laws, ordinances, or regulations require a licensed blaster to perform or supervise the work, said blaster shall, at all times, have his license on-site and shall permit examination thereof by the Engineer or other regulatory authorities having jurisdiction.

3.08 BLASTING CONTROL

A. The Engineer reserves the right to observe the drilling and loading of shot holes for test

blasting and any excavation blasting to ensure that they are in accordance with the submitted plans. The Contractor shall inform the Engineer with ample notice before the start of these operations.

B. The Contractor shall at all times be responsible for any damage caused by vibrations or fly rock due to blasting or any of his other operations.

C. All blasts shall be designed to prevent flyrock. It shall be the Contractor's responsibility to ensure that no hazards exist to people or structures in the area. Blasting mats shall be used at all times.

D. Blasting shall be performed only with such quantities and strengths of explosives and in such manner as will break the rock approximately to the lines and grades shown leaving the rock not to be excavated in an unshattered condition. Controlled blasting techniques shall be used for all perimeter surfaces when blasting to final grades or lines. Controlled blasting is excavation of rock in which the various elements of the blast (hole size, depth, spacing, burden, charge size, explosive charge weight per delay, distribution, delay sequence) are carefully balanced and controlled to provide a distribution of charge that will excavate the rock to the required contours to minimize overbreak and fracturing of the rock beyond the contour line. Smooth wall blasting, pre-splitting, cushion blasting and line drill are examples of operations included in the term "controlled blasting". Where the nature of the rock is such that excessive overbreak beyond these limits may occur, the Engineer may require that no blasting be done and that mechanical means be used for rock excavation.

E. All necessary precautions shall be taken to preserve the material below and beyond the established lines of all excavation in the soundest possible condition. The Contractor is responsible for taking proper account of the geology and formation competency to prevent damage to foundation or perimeter rock, or structures resulting from permanent blast-induced rock movements or blast-induced gas pressures. The Engineer will inspect an excavation following the blast and cleanup to determine acceptability.

   The Engineer may require a change in the controlled blasting technique, perimeter hole spacing, and/or loading density if unsatisfactory results are obtained.

F. Where concrete is to be placed directly upon or against rock surfaces, the excavation shall be sufficient at all points to provide for minimum dimensions of concrete shown on the Drawings, and the required minimum dimensions of concrete shall be exceeded as little as possible.

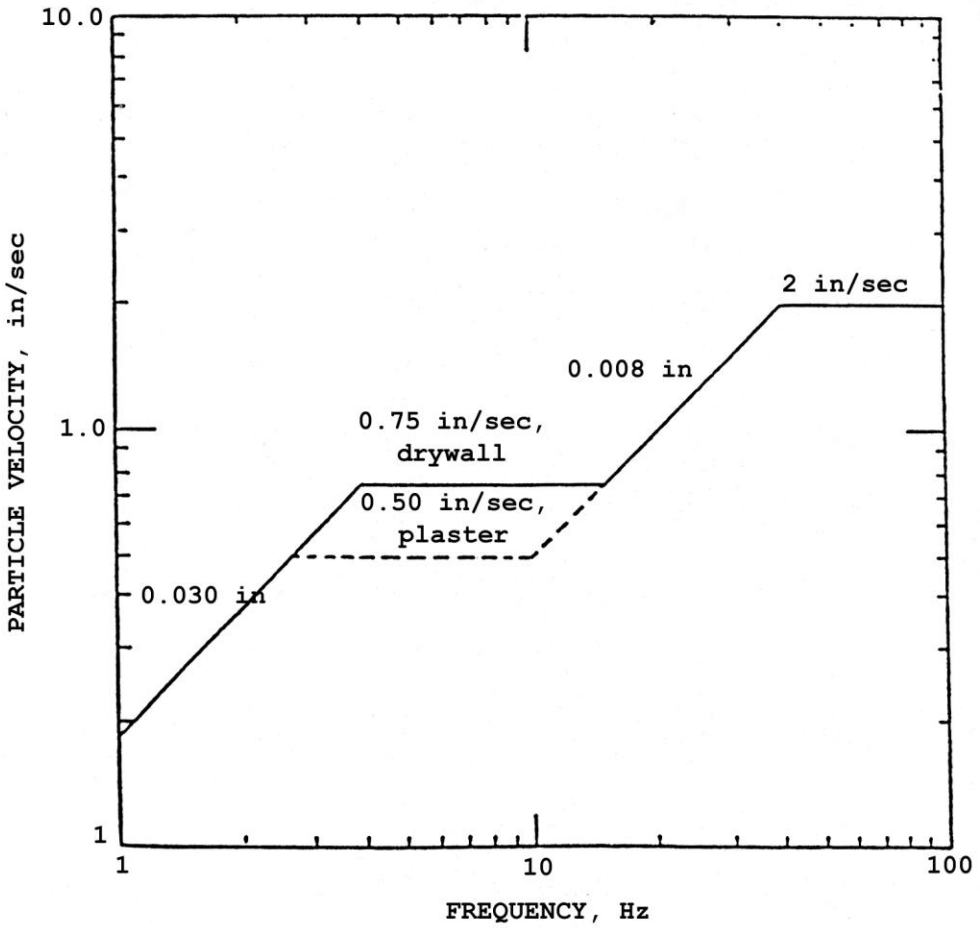
G. The Contractor shall only employ competent personnel qualified by training and experience to blast, particularly in potentially high damage areas near any above and below ground structures, underground vaults, manholes, roadways and utilities. The Contractor shall maintain close supervision of the blasting personnel and ensure that the blasting operations comply with all Federal, State, and County authority blasting

regulations, explosive manufacturer's instructions and the requirements of the vibration limitations.

H. Blasting shall not be performed closer than 10 feet to existing water, gas, sewer or conduit utilities unless such facilities have been completely exposed, definitely located, and then backfilled prior to the blast. In any case, blasting shall be no closer than 2 feet from definitely located existing utilities, 10-inch or smaller diameter and no closer than 5 feet from utilities larger than 10-inch diameter.

3.09 U.S. BUREAU OF MINES CRITERIA

U.S. Bureau of Mines Criteria from Report RI-8507 (November, 1980):



END OF SECTION

SECTION 02500

PAVEMENT

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall provide all labor, materials, equipment and services necessary for, and incidental to, the construction or repair of all paved areas, as shown on the Drawings, as specified herein and in accordance with the VDOT's Road and Bridge Standards and Specifications (See 2.01A)

PART 2 - PRODUCTS

2.01 ASPHALT CONCRETE PAVEMENT

A. Asphalt Concrete Pavement shall be in accordance with the requirements of Virginia Department of Transportation "Road and Bridge Specifications", dated 2020, and "Road and Bridge Standards", dated 2016, with the latest incorporated revisions dated April 2026, also referred to as the Standard Specifications.

B. Pavement shall be furnished as shown on the Drawings, to the existing cross-sections and grades and in accordance with the Standard Specifications.

1. Dense Graded Aggregate Base Course shall consist of VDOT No. 21A or 21B, to the limits and depths shown on the details on the Contract Drawings, compacted to a density of at least 95% of maximum dry density as determined by AASHTO designation T-99.

2. Asphalt Concrete Base Course shall consist of BM-25.0 to the limits and thicknesses shown in the details on the Contract Drawings, in accordance with Section 211 of the Standard Specifications.

3. Asphalt Concrete Surface Course shall consist of SM-9.5a, to the limits and thicknesses shown in the details on the Contract Drawings, in accordance with Section 211 of the Standard Specifications.

4. Surface Treatment Pavement Restoration as shown to the limits on the Contract Drawings, shall comply with Section 314, the Special Provisions included as a Appendix, and all referenced sections of the Standard Specifications.

PART 3 - EXECUTION

3.01 GENERAL

A. Pavement shall be constructed to the finished grades shown on the Drawings or to match existing grade.

B. Subgrades shall be prepared in accordance with Section 02200 - Earthwork, Excavation, Trenching and Backfilling and the Standard Specifications.

C. Asphalt concrete surface courses for paved areas shall not be placed until completion of all earthwork, backfilling and finish grading. Upon completion, tracked vehicles shall be prohibited from traveling on paving.

END OF SECTION

SECTION 02615

DUCTILE IRON PIPE AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section covers the requirements for furnishing all labor, materials, equipment and appurtenances necessary for the complete and satisfactory construction of all exterior ductile iron piping and fittings shown on the Drawings and as specified herein.

B. All work, materials and incidentals necessary to the construction of the piping, including excavation and refill, excavation support, laying and joining of pipe, and other miscellaneous work shall meet the requirements of Part IV of the Albemarle County Service Authority's (ACSA's) General Water and Sewer Specifications and to the applicable requirements of other Sections and as modified herein.

C. The Contractor shall verify all dimensions of valves, special fittings, pipe, equipment, etc., so that all of the pipe work performed will fit together properly and will conform to the arrangement as shown on the Drawings. In selecting laying lengths of fittings, the Contractor shall be guided by the dimensions of fittings and existing pipe systems to which connections are made and by the indicated dimensions on the Drawings. All pipe and specials shall be accurate to the dimensions shown. Bells, spigots, and flanges shall be at right angles to the axis of the opening, and openings shall be at the exact angle specified.

D. The Contractor shall verify the type of pipe, the joint type, configuration and direction of bell and spigot and the exact horizontal and vertical location for connections at the locations indicated on the Drawings, finalize all lay lengths, and confirm pipe layout prior to shop drawings submittal. Any deviation from the connection concept indicated which prevents construction as shown shall be brought to the Engineer's attention for resolution prior to shop drawing preparation. The Contractor shall provide the pipe material to match the existing pipe and/or provide the required adapters to connect to the existing pipe.

1.02 RELATED SECTIONS

A. Section 02200 – Earthwork, Excavation, Trenching and Backfilling

B. Section 02640 – Valves, Hydrants and Appurtenances

1.03 SHOP DRAWINGS

A. The Contractor shall submit shop drawings for all piping systems. Manufacturers' data and/or materials lists shall be submitted for standard fittings, inlets, materials and standard pipe sections in sufficient detail to show compliance with all requirements of the Specifications. Certificates shall be submitted as required by AWWA standards for pipeline

and fittings including factory applied linings and joint material; cast iron frames covers and grates, and precast structure sections.

B. Contractor shall coordinate and furnish submittals in accordance with Section 01300.

C. Contractor shall submit certifications by the manufacturer indicating compliance with the specified requirements.

1.04 EXISTING UTILITIES

A. Existing utilities have been indicated on the Drawings in accordance with the best information available for the information of the Contractor. The Owner expressly disclaims any responsibility for accuracy or completeness of information shown. The locations of existing utilities shall be determined by the Contractor and any deviations from the information shown on the Drawings shall be brought to the Engineer's attention for resolution of any conflicts which prevent the construction as shown on the Drawings. Existing utilities and services shall be carefully protected; any damage to utilities caused by the work shall be immediately repaired by the Contractor to the satisfaction of the Owner, using materials that meet current code. No additional compensation will be allowed for such repair work.

B. The Contractor shall bear the entire cost of any and all monetary penalties which may be assessed by utilities whose facilities are damaged and/or put out of service by the Contractor during the prosecution of the work under this Contract.

C. The Contractor shall notify Miss Utility 48 hours in advance of digging.

1.05 DELIVERY, STORAGE AND HANDLING

A. Delivery and Storage

1. Piping - Inspect materials delivered to site for damage; store with minimum of handling. Store piping, jointing materials and rubber gaskets under cover. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

2. Metal Items - Check upon arrival; identify and segregate as to types, functions, and sizes. Store off the ground in a manner affording easy accessibility and not causing excessive rusting or coating with grease or other objectionable materials.

B. Handling

1. Handle and transport pipe, fittings, and other accessories in a manner to ensure delivery to the trench in sound undamaged condition.

PART 2 - PRODUCTS

2.01 GENERAL

A. All pipe and fittings shall be new and of the sizes indicated on the Drawings and as specified herein.

B. It shall be the Contractor's responsibility to verify dimensions of all pipes, valves, special castings, closures and fittings so that all of the pipe work performed will fit together properly and will conform to the arrangements shown on the Drawings.

C. The Contractor shall furnish and install all necessary fittings and special pieces required for closures, bends, branches, inlets, vaults, manholes and connections to other pipes. All fittings and specials shall be designed and constructed to meet the same pressure classification as that of the adjoining pipe, and shall conform to the standard details of the manufacturer.

D. Bells and spigots shall be at right angles to the axis of the opening and openings shall be at the exact angle shown.

2.02 CONNECTIONS TO EXISTING PIPE JOINTS

A. Where new piping is to be connected to existing piping the connection may be made by one of the following methods and as shown on the Drawings:

1. Use of standard manufacturer's adapters.

2. Use of custom manufactured adapters.

2.03 DUCTILE IRON PIPE AND FITTINGS

SERVICE	PIPE MATERIAL	PIPE FITTINGS
4”, 6” and 8” Water Main	Ductile Iron - AWWA C151, Thickness Class 52 Thickness Class 53 for 4”	Ductile Iron, AWWA C110 ANSI A21.10, Class 250

A. Ductile iron pipe for buried service shall be furnished in accordance with ANSI A21.51-02 (AWWA C151-93) or latest revision thereof. Pressure classes for buried pipe shall be as noted on the drawings or as listed in the above schedule. Pipe shall be as manufactured by the American Cast Iron Pipe Company, U.S. Pipe and Foundry Company, Griffin Pipe Products Co., Atlantic States Cast Iron Pipe Co., or equal.

B. Joints for buried 20-inch diameter and smaller ductile iron pipe, fittings and specials shall conform to ANSI A21.11-00 (AWWA C-111) and shall be push-on or mechanical joint pipe. All pipe furnished with push-on joints shall meet the requirements of AWWA C111 and

shall be jointed in accordance with AWWA C111 and the manufacturer's recommendations. Mechanical joint pipe shall meet the requirements of AWWA C111.

C. Restrained pipe shall be mechanical joint and equipped with a mechanical joint restraint device that shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1. The joint restraint device shall be "Megalug" by EBAA Iron, Inc. or equal. Restrained pipe lengths for pipe are indicated on the Drawings. Ductile iron retainer glands or welds will not be accepted. Field and joint restraint gaskets such as Field Lok will not be accepted.

D. All rubber gasket joints for ductile iron pressure pipe and fittings shall comply with ANSI A21.11-00 (AWWA C111).

E. Fittings and specials shall be manufactured in accordance with ANSI A21.10-03/AWWA C-110, or latest revision thereof, and shall have a minimum pressure rating 250 psi. The ductile iron used in the manufacture of ductile iron fittings and specials shall have a minimum tensile strength of 70,000 psi. Compact fittings manufactured in accordance with ANSI A21.53/AWWA C153 will be permitted. Approved ductile iron fittings are Tyler with ductile iron T-bolts or Corten steel bolts, Standard International with Corten steel bolts, Union Foundry Co., or approved equal.

F. Coatings and Linings

1. The inside of ductile iron pipe and fittings for water pipe as specified in the pipe schedule shall be cement mortar lined in accordance with ANSI A21.4-03/AWWA C104 or latest revision thereof. Exterior pipe coating shall be arc-sprayed pure zinc with a purity of 99.99% per ISO 8179 latest revision. Application rate shall be a minimum of 200 g/m^2 of pipe surface area. A finishing layer topcoat compatible with the zinc-based coating shall be applied to the zinc.

2. All exposed ductile iron pipe and fittings shall be shop primed (with primer compatible with field painting) on exterior surfaces and given required finish coats in the field.

3. Fitting exteriors shall be coated with arc-sprayed zinc per ISO 8179. The application rate shall be a minimum of 200 grams per square meter of surface area. Bolts utilized shall also be poly-coated to ensure corrosion protection.

G. V-Bio Enhanced Polyethylene Encasement – all ductile iron pipe shall be provided and installed with V-Bio Enhanced Polyethylene Encasement. Polyethylene encasement shall meet all requirements for ANSI/AWWA C105/A21.5. Encasement shall consist of three layers of co-extruded linear low density polyethylene (LLDPE), fused into a single thickness not less than 8 mils.

Provide affidavit stating compliance with the requirements and practices of ANSI/AWWA C150/A21.50, ANSI/AWWA C151/A21.51, ANSI/AWWA C105/A21.5, AWWA C600 and M41.

Repair kits or materials for the encasement shall also be provided and utilized during installation as required in accordance with the manufacturer's recommendations.

H. Each piece of ductile iron pipe shall have the weight and class designation conspicuously painted on it as near as possible to the flanged or bell end of the pipe and these designations shall be clearly legible.

I. All materials that may be in contact with potable water shall be in accordance with and approved by NSF Standard 61.

J. Pipe shall be supplied in standard lengths not to exceed 20 feet.

K. Ductile iron pipe shall have a minimum tensile strength of 60,000 psi with a minimum yield strength of 42,000 psi. Design shall be done for external and internal pressure separately using the larger of the two for the net design thickness. An additional allowance shall be made for corrosion and casting tolerances in accordance with AWWA C150.

1. The following design conditions shall apply for pipe used as water pipe:

a. Working Pressure: 90 psi
b. Test Pressure: 200 psig
c. Surge Allowance: 100 psi
d. Cover: As shown on the plans.
e. Wheel Load: AASHTO HS-20, with impact factor of 1.5
f. Soil Density: 120 pounds per cubic foot
g. Safety Factor: 1.5
h. Soil Modulus E': 300 psi
i. Design Pressure: 90
j. Trench Width: Transition
k. Laying condition: AWWA C150, or as shown on the drawings

PART 3 - EXECUTION

3.01 EXISTING PIPING

A. Where new piping is to be connected to existing piping, the Contractor shall drain or purge the existing piping, cut, remove, grind and prepare the existing piping in every respect in order that it is suitable for connecting to the new piping.

B. Where existing pipe is to be abandoned and removed, the Contractor shall not reuse the existing pipe on this project. Pipes that have been removed shall be removed from the project sites and disposed of by the Contractor at an approved disposal site.

3.02 LAYING OF PIPE and FITTINGS

A. General

1. For buried pipe, before joints are made, each pipe shall be properly bedded and no pipe shall be brought into position until the preceding length has been thoroughly bedded and secured in place. All defects due to settlement shall be corrected by the Contractor at no additional expense to the Owner. Pipe installation shall be in accordance with AWWA C600-05 or the latest revision. Bell holes shall be dug sufficiently large to insure proper pipe joint construction. Pipe shall be bedded for the full length of barrel between bells. No springing of the pipe bells will be permitted during jointing. Each bell will be inspected for laying damage prior to backfilling. Trenching and backfilling details and requirements are shown on the Drawings and included in Section 02200.

2. Pipe joints shall be made in strict accordance with the pipe manufacturer's instructions. Allowable joint deflection shall be up to three quarters of the manufacturer's recommendations. All fins and burrs shall be removed from pipe and fittings.

3. The interior of all pipes shall be thoroughly cleaned before they are laid and shall be kept clean until the acceptance of the completed work. At the end of the day, the open ends of all pipelines shall be provided with a stopper carefully fitted so as to keep dirt and other substances from entering. The stopper shall be kept in the end of the pipeline at all times when laying is not in actual progress.

4. The Contractor shall be responsible for keeping trenches free of water until the trench is completely backfilled and compacted.

5. Cut pipe accurately to length established at the site and work into place without springing or forcing. Replace by one of the proper length any pipe or fitting that does not allow sufficient space for proper installation of jointing material.

6. Blocking or wedging between bells and spigots will not be permitted. Lay bell-and-spigot pipe with bell end pointing in the direction of flow.

7. Ductile iron pipe, fittings, and appurtenances shall be unloaded, handled, and stored in accordance with AWWA C600.

8. Whenever ductile iron pipe requires cutting in the field, the work shall be done in a manner satisfactory to the Engineer with approved cutting tools which will leave a smooth end at right angles to the axis of the pipe and not otherwise damage the pipe or lining.

9. Field cutting and welding of ductile iron pipe will be permitted. Cutting shall be done in a neat and workmanlike manner without damaging the pipe or the cement lining. Cutting shall leave a smooth end at right angles to the axis of the pipe. Flame cutting of ductile iron pipe **shall not** be allowed.

10. Jointing

a. Make push-on joints with the gaskets and lubricant specified herein; assemble in accordance with the applicable requirements of AWWA C600-05, or the latest revision, for joint assembly.
b. Make mechanical joints with the gaskets, glands, bolts and nuts specified for this type joint, assemble in accordance with the applicable requirements of AWWA C600 for joint assembly and with the recommendations of Appendix A to AWWA C111/A21.11.
c. Contractor shall not exceed the manufacturers maximum recommended allowable deflection of the pipe joint. Where the pipe joint allows slip in the joint for restrained pipe, such as TR FLEX pipe by U.S. Pipe, the joint shall be pulled out to the maximum extension, where surfaces of the bell and spigot ends of the joint are in contact, before the next pipe section is installed.

3.03 TESTING

A. General

1. The Contractor shall schedule all tests with the Engineer at least 48 hours in advance, and shall conduct all acceptance testing in the presence of the Engineer. All testing and disinfection shall be in accordance with Part VII of the ACSA's General Water and Sewer Construction Specifications unless otherwise noted in the Contract Documents.

2. If the piping or any section or component thereof fails the tests and/or inspection, the Contractor shall, at his own expense, repair and replace any defective component and re-test until all requirements are met.

3. All defects revealed by testing shall be corrected without cost to the ACSA. Testing and repairing shall be continued until test requirements are met. Repairs shall be made with new materials. No caulking of threaded joints, cracks, or holes will be acceptable. When it is necessary to replace pieces of pipe, the replacement shall be of the same material and thickness as the defective piece. Tests shall be repeated after defects disclosed thereby have been made good.

4. All piping including test bulkhead, caps or plugs shall be adequately braced and supported during the tests so that no movement, displacement or damage will result from the application of the test pressure. Relief devices in the various systems shall be capped or plugged during the tests.

5. All equipment used in testing shall be provided by the Contractor, shall be subject to the approval of the Engineer, and shall be such as to properly develop, maintain and measure hydrostatic test pressures and leakage rates. Where devices such as meters, recorders, charts, plugs, caps, blind flanges, corporation stops or bulkheads are

required to develop, maintain and measure test pressures, these devices shall be furnished and installed by the Contractor.

6. The Contractor shall submit to the Engineer and Owner a record of all leakage tests conducted.

7. The ACSA will not make any taps in the pipeline nor insert plugs in tapped locations.

3.04 PRESSURE TESTING OF PIPE

A. Water usage required for the initial flushing and testing of the water mains will be provided by the ACSA at no additional cost to the Contractor. The Contractor will be charged for water usage required for retesting or additional disinfection due to rework to remedy failed pressure tests or disinfection activities. The Contractor shall supply all pumps, calibrated gauges and meters, and all necessary apparatus to perform the tests.

B. Hydrostatic Pressure Test:

1. After the pressure pipe has been backfilled and at least seven (7) days after the last concrete thrust block was poured, a hydrostatic pressure test shall be performed.

2. Carefully fill the pressure pipe with water at a velocity of approximately 1.0 fps while necessary measures are taken to purge all air from the pipe.

3. After the system has been filled, raise the pressure in the pipe, by pump, to the test pressure of 200 psi. Measure pressure at the lowest point in the system. Gage pressure shall be compensated for the elevation.

4. Maintain this pressure for at least two (2) hours. If the pressure cannot be maintained, the Contractor shall determine the cause, make repair(s) and retest at no additional cost to the Owner.

C. Leakage Test:

1. A leakage test shall be performed in concurrently with the pressure test.

2. Leakage shall be determined with a calibrated test meter. Contractor shall furnish documented calibration tests for the meter if requested by the Owner. Leakage is defined as the quantity of water required to maintain a pressure within 5 psi of the specified test pressure.

3. Leakage shall not exceed the following formula:

$$L = \frac{S*D\sqrt{P}}{148{,}000}$$

L = Leakage Rate
S = Length of Pipe
D = Nom. Pipe Diameter (inches)
P = Ave. Test Pressure (psi)

When testing against closed metal-seated valves an additional leakage per closed valve of 0.0078 gal/hr/in of nominal valve size shall be allowed.

4. If the leakage exceeds the specified amount, the Contractor shall determine the cause, make repair(s) and retest at no additional cost to the Owner.

5. All visible leaks shall be repaired regardless of the amount of leakage.

3.05 DISINFECTION

A. Precautions shall be taken to protect pipe interior, fittings and valves against contamination. When pipe laying is not in progress, all openings in the pipeline shall be closed with watertight plugs. If water accumulates in the trench, plugs shall remain in place until the trench is dry. All pipe and fittings shall be kept free of dirt or any foreign material likely to cause contamination.

B. Mains shall be disinfected by the continuous feed method or the tablet method in accordance with AWWA C651-05 or current revision, except as specified otherwise or approved in writing by the ACSA.

1. Continuous Feed Method

a. Prior to feeding chlorine, the water line shall be thoroughly flushed with potable water to remove any debris that may have entered the line during construction. Potable water shall be introduced into the pipe line at a constant flow rate protected by an approved backflow prevention device. Chlorine shall be added at a constant rate to this flow so that the chlorine concentration in the water in the pipe is at least 50 mg/l. The chlorinated water shall remain in the pipe line at least 24 hours, after which, the chlorine concentration in the water shall be at least 10 mg/l.

2. Tablet Method

b. Tablets of calcium hypochlorite, containing 70 percent available chlorine by weight, shall be affixed to the top of each section of pipe and in appurtenances by a food grade adhesive. Tablets shall not be completely covered by adhesive. After completion of the construction the main shall be filled with water at a velocity of less than one (l) foot per second in accordance with the following schedule:

Schedule of Maximum Flow Rates

Pipe Diameter	Flow Rate	Pipe Diameter	Flow Rate
4"	40 GPM	14"	500 GPM
6"	90 GPM	16"	600 GPM

8"	160 GPM	18"	800 GPM
10"	260 GPM	20"	1000 GPM
12"	350 GPM	24"	1400 GPM

3. A minimum concentration of 50 mg/l of chlorine solution shall be in the system at this time. A concentration of 25 mg/l residual chlorine must be present after 24 hours.

4. Number of Hypochlorite Tablets of 5-G Required for Dose of 50 mg/l (based on three and three-quarters grams of 70% available chlorine per tablet):

Joint Length (Ft.)	Diameter of Pipe (In.)					
	2	4	6	8	10	12
13 or less	1	1	2	2	3	5
18	1	1	2	3	5	6
20	1	1	2	3	5	7
30	1	2	3	5	7	10
40	1	2	4	6	9	14

5. Grams of HTH Powder Required for Dose of 50 mg/l (based on 65% available chlorine in HTH powder):

Joint Length (Ft.)	Diameter of Pipe (In.)					
	2	4	6	8	10	12
13	0.6	2.5	5.56	9.88	15.45	22.24
18	0.85	2.5	7.69	13.69	21.39	30.80
20	0.95	3.8	8.56	15.21	23.76	34.22
30	1.43	5.7	12.83	22.81	35.65	51.33
40	1.90	7.6	17.11	30.42	47.53	68.44

C. The cost of all such testing will be the responsibility of the Contractor. All valves and appurtenances shall be operated while chlorinated water is in the pipe line. After the retention period, the main shall be flushed of the high chlorine water until the water leaving the system shows a chlorine concentration of less than 1 mg/l or no higher than that prevailing in the water used for flushing. Water with a chlorine concentration greater than 2.0 mg/l shall either be dechlorinated or the high chlorine water shall be discharged directly to sanitary sewer line. After final flushing, two (2) water samples shall be collected 24 hours apart for bacteriological tests. The samples shall be collected at regular intervals not to exceed 2,000 feet throughout the length of the pipe. All bacteriological samples collected following disinfection shall be analyzed by a lab certified by the Virginia Department of General Services, Consolidated Laboratory Services. The results of these samples must indicate the absence of coliform contamination.

D. Disinfection shall include hydrants and other special pipe, taps and fittings used at connections to existing piping. These shall be thoroughly disinfected before installation. Excavation for

such connections shall be kept free from water until the connection is completed and great care shall be exercised to prevent contamination of the pipe and connection fittings.

E. It is the Contractor's responsibility to ensure their operations do not contaminate the public water supply. If at any time, the water in the existing system becomes contaminated, they shall be held financially accountable for any corrective action taken by the ACSA, as well as for cost of defending and settlement of all claims resulting from their negligence, including, but not limited to, costs and attorney's fees.

3.06 PIPE CLEANLINESS

A. For all pipe furnished in the work, the following requirements shall be required. When installed pipe is left overnight, water tight plugs will be used to prevent any dirt, debris or dust from entering the pipe. The Contractor will be responsible for pipe cleanliness at all times.

B. All pipe joint and lubricant compounds used in the pipe assembly shall be non-toxic in any form or amount and shall not impart any taste or odor to the water. The substance shall be non-biodegradable.

END OF SECTION

SECTION 02626

HIGH DENSITY POLYETHYLENE PIPING

PART 1- GENERAL

1.1 SUMMARY

A. Furnish all labor, materials, equipment, and incidentals required to install High Density Polyethylene (HDPE) for temporary water mains as shown on the Drawings and as specified herein.

B. Where the word "pipe" is used, it shall refer to pipe, fittings, or appurtenances unless otherwise noted.

1.2 RELATED WORK

A. Section 01106 – Construction Scheduling, Coordination and Sequencing

B. Section 01300 – Submittals and Procedures

C. Section 02200 – Earthwork, Excavation, Trenching and Backfilling

1.3 SUBMITTALS

A. Submit to the Engineer shop drawings and product data required to establish compliance with this Section.

B. Submittals shall be in accordance with this Section and Section 01300 Submittals and Procedures.

C. Prior to shipment of pipe, submit a certified affidavit of compliance from the pipe manufacturer stating that the pipe and fittings for this project have been manufactured and tested in accordance with AWWA and ASTM Standards and requirements specified herein.

D. Quality Control records shall be submitted within five (5) days after installation using the butt fusion method.

1.4 REFERENCE STANDARDS

A. American National Standards Institute (ANSI).

1. NSF/ANSI 61 Drinking Water System Components - Health Effects.

B. American Society for Testing and Materials (ASTM).

1. ASTM D3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
2. ASTM D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.

3. ASTM F714 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter.
4. ASTM F1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing.
5. ASTM F2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.

C. American Water Works Association (AWWA).

1. AWWA C901 – Polyethylene (PE) Pressure Pipe and Tubing, ½ In. Through 3 In., for Water Service.

D. Plastic Pipe Institute (PPI)

1. TR-4 - Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe.

E. Safe Drinking Water Act

F. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.5 QUALITY ASSURANCE

A. All HDPE pipe and fittings shall be from a single manufacturer, unless otherwise approved by the FCWSA.

B. All HDPE pipe and fittings to be installed under this Contract shall be inspected and tested at the manufacturing plant as required by the standard specifications to which the material is manufactured. Furnish in duplicate to the ACSA sworn certificates of such tests and their results, prior to the shipment of the pipe.

C. Inspection of the pipe and fittings will also be made by the Owner after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the specified requirements, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the project site.

D. All pipe and fittings shall be permanently marked with the following information:

1. Nominal size,
2. Standard material code designation,
3. Dimension ratio,
4. Pressure class,
5. AWWA designation,
6. Manufacturer’s production code, including date of manufacture.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe. Under no circumstances shall the pipe be dropped or skidded against each other. Slings, hooks, or pipe tongs shall be padded and used in such a manner as to prevent damage to the pipe.

B. Materials, if stored, shall be kept safe from damage. The interior of all pipes, fittings, and other appurtenances shall be kept free from dirt or foreign matter at all times.

C. Pipe shall not be stacked or coiled greater than the limits recommended by its manufacturer. The bottom tier shall be kept off the ground on timbers, rails, or concrete. Storage shall conform to manufacturer's recommendations.

PART 2 – PRODUCTS

2.1 HDPE PIPE

A. Pipe shall meet or exceed the requirements of AWWA C901 for ½-inch through 3-inch nominal diameter and AWWA C906 for 4-inch through 63-inch nominal diameter. Pipe shall be certified for use with potable water in accordance with NSF/ANSI 61 and the Safe Drinking Water Act.

B. Pipe shall be manufactured from a PE 3408/3608/4710 resin as listed with the Plastic Pipe Institute (PPI) TR-4. The resin material will meet the specifications of ASTM D3350 and have a UV stabilization code of C. Pipe shall have a manufacturing standard of ASTM F714. Pipe shall have a Pressure Class rating of 160 psi unless otherwise specified on the plans. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification and from the same raw material.

C. Pipe shall be designated in accordance with the outside ductile iron sizing diameter system.

D. Pipe shall be visually identified as potable water pipe by blue continuous longitudinal striping, or circumferential rings spaced along the length of the pipe no greater than 5 feet apart.

2.2 HDPE FITTINGS

A. Fittings shall be of equal material standards and Pressure Class as the pipe supplied.

B. Butt Fusion Fittings - Molded butt fusion fittings shall have a manufacturing standard of ASTM D3261. Fabricated fittings are to be manufactured using a Data Logger, recording temperature, fusion pressure and a graphic representation of the fusion cycle and shall be part of the Quality Control records.

C. Electrofusion Fittings - Electrofusion Fittings shall have a manufacturing standard of ASTM F1055.

D. Mechanical Joint Adapters – Fittings for joining HDPE pipe to other types of pipe shall be made by mechanical methods. Flanged assemblies shall not be used. Fittings for joining HDPE pipe to DIP and PVC pipe shall be Megalug 3800.

E. Fusion Parameters – When joining HDPE pipe to existing HDPE pipe, the manufacturer shall be consulted and shall provide recommended fusion parameters and procedures.

PART 3 - EXECUTION

3.1 GENERAL

A. Pipe and Fittings: Size shall be 4-inches. Temporary service sizes to be ¾-inch or match existing service sizes. Install as shown in accordance with manufacturer's recommendations.

B. If, during installation, the presence of petroleum contaminated soil is suspected, stop work immediately and notify the Engineer. Do not continue with installation of HDPE pipe until notice and direction by the Engineer is given.

3.2 EXCAVATION AND TRENCHING

A. See Section 02200 – Earthwork, Excavation, Trenching and Backfilling.

3.3 FUSION

A. Sections of polyethylene pipe shall be joined into continuous lengths on the project site above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with ASTM F2620 and the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures shall be capable of meeting all conditions recommended by ASTM F2620 and the pipe manufacturer, including, but not limited to, temperature requirements of 400-450 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 psi. The butt fusion joining will produce a joint with weld strength equal to or greater than the tensile strength of the pipe itself. All field welds shall be made with fusion equipment equipped with a Data Logger. The Data Logger shall record, at a minimum, temperature, fusion pressure and a graphic representation of the fusion cycle and shall be included in the Quality Control records.

B. Sidewall fusions for connections to outlet piping shall be performed in accordance with ASTM F2620 and the manufacturer's recommendations. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be ¼ inch larger than the size of the outlet branch being fused.

C. Socket fusion, hot gas fusion, threading, adhesives, solvents, epoxies, and flanged assemblies shall not be used to join HDPE pipe.

3.4 MECHANICAL JOINING

A. Mechanical joining shall be used where the butt fusion method cannot be used. Mechanical joining shall be accomplished by using an HDPE Mechanical Joint adapter with a ductile iron back-up ring.

3.5 INSPECTION

A. Inspect the pipe for defects before installation and fusion. Defective, damaged or unsound pipe will be rejected.

3.6 TESTING AND DISINFECTION

A. Hydrostatic testing and disinfection shall be in accordance with Section 02615 unless otherwise specified or directed.

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SECTION 02640

VALVES, HYDRANTS AND APPURTENANCES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Section covers the requirements for furnishing all labor, materials, tools, equipment, appurtenances and services necessary for the complete and satisfactory construction of all valves, hydrants, appurtenances, and services shown on the Drawings and as specified herein.

B. All work, materials and incidentals shall meet the requirements of Part IV of the Albemarle County Service Authority's (ACSA's) General Water and Sewer Specifications and to the applicable requirements of other Sections and as modified herein.

1.02 SHOP DRAWINGS

A. The Contractor shall submit to the Engineer, as specified in Section 01300, a list of materials to be furnished, including all manufacturer's data, drawings, weight of each item, list of recommended spare parts, descriptive literature for each item, the names of the suppliers, and the date of delivery of materials on the job site.

B. Contractor shall submit Operation and Maintenance Manuals required for the materials and equipment furnished herein with Section 01300.

C. Submit certifications from manufacturers indicating compliance with specified standards.

PART 2 - MATERIALS

2.01 GENERAL

A. All valves and appurtenances shall be of the size shown on the drawings and as far as possible all items of the same manufacturer type shall be from one manufacturer.

B. All valves and appurtenances shall have the name of the maker, flow directional arrows, and working pressure for which they are designed cast in raised letters upon the exterior of the unit.

C. All painted surfaces in contact with potable water shall be in accordance with NSF Standard 61.

D. The Contractor shall furnish suitable restrained: spool pieces, fittings, blind flanges, plugs or appurtenances as required for connection to all valves, during testing such that the valve can be operated to be open during the test.

E. All valves shall open left (counter-clockwise).

2.02 GATE VALVES

A. Gate valves 2" and smaller shall be double disc. Gate valves 2 ½" and above shall be resilient seat type.

B. The resilient seated type shall be non-rising stem, fully encapsulated wedge in accordance with ANSI/AWWA C509-01 or current revision.

C. Resilient seat gate valves shall be iron body, bronze mounted, non-rising stem with O-ring seals meeting the requirements of AWWA C509-01. The wedge shall be of cast or ductile iron completely encapsulated with rubber. Valve ends shall be mechanical joint for underground service. Accessories (bolts, glands, and gaskets) shall be supplied by the valve manufacturer. Valves shall open counter-clockwise. Valves shall be factory tested in accordance with AWWA C509-01 and upon request the manufacturer shall furnish certified copies of test reports.

D. Gate valves shall be one make and shall open by a two (2) inch square operating nut. The operating nut shall be no greater than three (3) feet below finished ground. Operating nuts placed greater than five (5) feet below finished ground shall be equipped with approved operating nut extensions to meet the minimum depth requirement. Gate valves installed in access vaults, pumping stations, etc., shall be equipped with handwheels.

E. Gate valves 4" to 12" shall have a minimum working pressure of 250 psi and a test pressure of 400 psi. Gate valves greater than or equal to twelve (12) inches on high pressure systems (greater than 100 psi) shall be provided with gear case and a by-pass. Gate valves shall have one "O" ring above and one "O" ring below the stem thrust collar. The thrust collar shall be lubricated with oil to ensure positive operation in opening and closing.

F. Resilient seated valves shall be U.S. Pipe Metroseal 250, American Flow Control Series 2500, Kennedy Valve Ken Seal II, Mueller Series 2360, American AVK Series 45 or approved equal.

2.03 CHECK VALVES

A. Check valves shall be designed for 250 psi working pressures and 350 psi test pressures for sizes up to twelve (12) inches. Check valves from fourteen (14) inches to twenty-four (24) inches shall have an opening suitable for cleaning without disconnecting from the pipe. They shall have a cast iron body with bronze mountings, discs, arms, and seat rings. Check valves shall conform to the most current revision of the ANSI/AWWA C-508 Standard with CL 125 flanged connections. Check valves shall be APCO CVS-6000/6000A or approved equal with lever and weight closure device.

2.04 VALVE BOXES

A. Each valve on underground piping shall be provided with a screw-type, adjustable, cast iron, heavy-duty traffic-rated valve box. They shall have a round shaft (5 1/4 inch inside diameter), a flared base, and a coat of bituminous paint applied to both surfaces. Also, the head shall be cast iron, round, and have the word "Water" cast on it.

B. Valve boxes shall be adjusted flush with the finish grade. If the street surfaces are renewed or replaced by the developer, owner or his representative after the water system has been approved and accepted by the ACSA, but while such streets are still the obligation of the developer or owner, the valve boxes therein shall be readjusted to the proper finished grade at the developer's or owner's expense. If changes are made in grade at valve boxes by parties other than the developer, owner or his representative after initial construction approval, the cost of this adjustment shall be borne by the party responsible for the construction adjustments. In remote areas, valve boxes shall extend six (6) inches above finished grade and have a witness post securely placed next to the box.

C. Valve boxes shall be Bingham & Taylor: I5B18W or 15B20WCL35 with GRE5LWRD lid, Capital Foundry cast iron screw type Part No. 562ST;standard cover with 1-1/2” lip, East Jordan Iron Works: 8550 Series, two piece screw type with 6800 valve box drop lids, or approved equal.

D. The witness post shall consist of a five (5) foot long 2-inch galvanized pipe, capped on either end and painted blue.

2.05 FIRE HYDRANTS

A. Hydrants shall be manufactured in accordance with the most current revision of ANSI/AWWA C502-05 and shall be approved by the National Board of Fire Underwriters. Hydrants shall have six-inch (6") barrel with 5.25-inch clear opening through the valve and shall be provided with a 4.5-inch pumper connection and two (2) 2.5-inch I.D. hose connections.

B. Fire hydrants shall be installed in such a manner as to provide the proper fire protection as approved by the County’s Fire Official to all structures and no hydrant shall be more than 500 feet from any other hydrant measured along the centerline of the public right-of-way, private road, or other applicable access route. Generally, fire hydrants shall be placed no closer than 40 feet to any major structure nor further away than 400 feet from all major structures.

C. Fire hydrants shall be installed in areas where weep holes are above the prevailing groundwater table. Design elevations and the location of drainage structures shall be used to ensure the weep holes of the hydrant are not subject to groundwater immersion. If, during the course of construction, groundwater is observed in the trench, the fire hydrant shall be moved to higher ground and the separation between fire hydrants will be adjusted accordingly. If fire hydrants cannot be placed above groundwater, the weep holes shall be plugged and the hydrant shall be pumped dry.

D. Hydrants shall be of the frost-proof and non-flooding type which will not flood in case the barrel or valve stem is damaged, with orifices for draining the hydrant when the valve is closed.

A safety flange shall be provided so that the barrel will not break if struck by a vehicle or other object, and the hydrant can be repaired without digging. Hydrants shall have a three foot, six inch (3'6") minimum bury and be designed for 150 psi working pressure and 300 psi hydrostatic pressure. All working parts shall be bronze to bronze. All hydrants shall open counterclockwise and be preceded in the line by a gate valve. The pumper connection shall face the roadway. Fire hydrants shall have a moisture-proof chamber around operating threads filled with USDA H-1 food grade oil or grease which shall lubricate the threads.

E. Hydrants shall be set plumb with the centerline of the pumper connection no less than eighteen (18) inches and no more than twenty-two (22) inches above grade. For new construction, the maximum number of allowable hydrant risers for each hydrant is one (1). Unless the hydrant location is specifically indicated otherwise, it shall be located so that the center is not less than two (2) nor more than ten (10) feet from the back of the curb of the adjacent street, with the pumper connection facing the street, unless otherwise directed by the Fire Official. The connecting pipe shall have the same depth of cover as the waterline and shall not include bends. The base and back of the hydrant, opposite the pipe connection, shall have a thrust block poured behind it as shown in Detail W-3 to prevent the hydrant from blowing off the line. If the character of the soil is such that in the opinion of the Authority the hydrant cannot be securely blocked, bridle rods and rod collars and/or a pipe type bracing shall be used. Bridle rods and rod collars shall not be less than three-quarter (3/4) inch stock and shall be protected by a coat of bituminous paint. Not less than seven (7) cubic feet of VDOT No. 57 or 68 stone shall be placed around the base of the hydrant to ensure drainage. The backfill around hydrants shall be thoroughly compacted to grade line. Hydrants and valves shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and the hydrant or valve shall be inspected in open and closed positions, to see that all parts are in working condition (See Part IV, Figure W-3). Black bags shall be tied securely over all fire hydrants as soon as they are installed. These bags shall not be removed until approved by the Authority. Each new fire hydrant shall be painted, if the ACSA determines the factory finish has been compromised.

F. The threads on the 4.5-inch pumper (steamer) connection and on the operating nut shall be National Standard threads. The threads on the hose connections shall be Albemarle County Service Authority standard thread (Charlottesville thread), 3-21/64" female, 3-9/32" male, eight threads per inch (Gauge 8-322) except for the Scottsville service area which are National Standard threads. All threads shall be thoroughly lubricated with a food grade lubricant. All of the male connections shall have caps. The cap nuts and the operating nut shall be 1-1/2" Pentagon and shall open counterclockwise.

G. Hydrants shall be M&H: Model 129 (Color - Safety Red), Kennedy: Guardian Model No. K-81A or K-81D (Color - Safety Red), Clow Medallion (Color - Safety Red), Mueller: Super Centurion 250 (Color - Mueller Red), American Darling: B-84-B-5 (Color - Safety Red); or approved equal. Hydrant paint shall be Devoe DP 58106 (Safety Red BAR-OX Alkyd Industrial Gloss Enamel) or approved equal. Hydrant paint for caps shall be Axon Products, Inc. Silver-White 1440 Alert or approved equal.

2.06 TAPPING SLEEVES AND VALVES

A. Tapping valves shall meet the same specifications as gate valves, except they shall have a full, unobstructed opening to receive a full-size shell cutter. It shall be a standard mechanical joint type on one and a flanged joint on the other end. Tapping valves shall be American Flow Control Series 2500, Kennedy Ken-Seal II resilient wedge gate valve, Mueller Series T-2360 resilient wedge gate valve, Clow or approved equal.

B. Tapping sleeves may be split sleeve with mechanical joint type end seals or stainless steel. They shall have the same working and test pressures as noted for gate valves. Tapping sleeves shall be Mueller Catalog No. H-615, Ford model FAST (stainless steel), Smith Blair Inc. model 663 (all stainless steel), Romac model SST or SST III (stainless steel), American Flow Control mechanical joint tapping sleeve, Clow, PowerSeal Pipeline Products Corp. Powersleeve Model 3490, or PowerMJ Model 3490MJ, Cascade Model CST-EX or approved equal.

2.07 WATER SERVICE PIPING

A. Copper pipe for service laterals shall be soft Type K Copper with standard water works flare or compression fittings. Copper piping shall be 1” or 2” and shall conform to ASTM B88, Type K. Fittings for solder-type joint shall conform to ANSI B16.18 or ASME/ANSI B16.22; fittings for compression type joint shall conform to ASME/ANSI B16.26, flared tube type. Piping shall be installed a minimum depth of 36” from the main line to a meter setting below finished grade.

2.07 SERVICE SADDLE

A. Service saddles shall be installed on for all service connections to 4-inch ductile iron pipe. The service saddle shall be equipped with ½” or 5/8” fluorocarbon coated heavy hex nuts and washers made from 18-8 type 304 stainless steel. The straps or band shall be stainless steel. Service saddles shall be Romac Style 202NS or 202BS with stainless steel straps, Ford Style Coated FS202 or 202BS with wide stainless steel band and 4 bolts, Smith-Blair Coated Model 317 or Model 325 with stainless steel straps, Hymax DR or BR 2S Series with stanless steel straps or approved equal.

2.08 METER BOXES

A. Meter boxes shall be installed in non-paved areas. The box and lid shall conform to the finished grade after installation. Meter boxes of appropriate size shall be installed around all meter yokes or coppersetters as indicated on the plans. Meter box locations shall be in non-paved areas except as approved by the Authority for the single application. Meter boxes shall be located and installed so as to prevent water, dirt or debris from entering or covering them. If changes in grade at the meter box are made before Final Acceptance is granted or during the 1-year warranty period after Final Acceptance, the Developer is responsible for resetting the meter box or vault to match the finished grade.. Coppersetters shall be installed no less than twelve (12) inches or more than sixteen (16) inches " from the top of the meter box.

B. All meter boxes shall have non-locking lids and will be used for water meters up to and including one (1) inch in size (See Detail W-5 for additional information). Lids shall be

provided with two (2) inch recessed hole tapped into the lid. Blind taps or plugs shall be provided to prevent debris from entering the box prior to use. The Contractor must ensure a clear two (2) inch opening where the hole is cast into the lid to accommodate a Touch Read sensor.

C. Plastic meter boxes are preferred and Contractor must obtain Engineer's approval for installation of cast iron box. Meter boxes shall be as follows:

1. Carson 2200 Series (plastic)
2. Old Castle FL30 (for paved areas): Lid – Water logo, 2-inch recess probe; Box FL30T 18" meter box (02006045); extension - 02001090.

2.09 CORPORATION STOPS

A. At the location indicated on the plans and where directed, corporation stops of sufficient size with eighth-bend couplings, if required, shall be furnished and installed approximately 45˚ below the top of the pipe in accordance with AWWA C800, current revision. All corporation stops shall have ball style valves and have a pressure rating of 300 psi.

B. A Mueller B-25000, A.Y. McDonald Model 4701B, or Ford FB600-4 corporation stop or approved equal shall be used.

2.10 METER YOKES AND COPPERSETTERS

A. All water meters shall be placed in a horizontal inlet and outlet copper meter yoke. The yoke shall have a multi-purpose connection on the customer side and the supply side. It shall also have a lock-winged ball valve on the supply side and a ball valve on the customer side. Coppersetters shall be installed no less than twelve (12) inches or more than sixteen (16) inches from the top of the meter box for meters one (1) inch or less.

B. Meter coppersetters shall be Ford Model No. VBB 72 (5/8"x3/4"), Ford Model No. VBB 74 (1"), McDonald Model No. 20-209 WWDD33, 20-412 WWDD44, Ford Model No. VBB77-12B-11-77, Mueller Model B-2423 (1-1/2",2"), McDonald Series 20, horizontal style (1",5/8"x3/4"), low bypass (1-1/2"or approved equal.

C. The ACSA will supply the new meters for the project for installation by the contractor.

2.11 MARKING TAPE

A. A three (3) inch wide minimum size blue colored non-metallic water marking tape shall be buried at a distance of approximately two (2) feet directly over all water mains to alert water construction and maintenance crews that a water pipe is below. The marking tape shall be continuous. Marking tape disturbed during the course of construction on existing waterlines shall be restored to its original condition and to the satisfaction of the project inspector. The marking tape shall be as manufactured by Allen Systems and be minimum 3" wide with "WATER" stamped in blue on the tape as manufactured by Allen Systems, Harris Industries, Inc., Damage Prevention Solutions, or approved equal.

2.12 CONDUCTIVE WIRE

A. Conductive wire disturbed during the course of construction shall be restored to its original condition and to the satisfaction of the ACSA's inspector. Conductive wire shall be 14-gauge insulated copper or larger. Conductive wire 14-gauge shall be placed on top of water main or as directed by the ACSA inspector.

2.13 1-INCH AIR RELEASE VALVE ASSEMBLY

A. Approved automatic air release valves shall be installed at the high points in the system. Each assembly shall consist of a corporation stop, riser pipe, ball valve, fittings, and a precast concrete manhole cone section (including frame and cover with the word "WATER" cast on it), or approved equal. The riser shall be Type K copper pipe. Fittings shall be brass or bronze. One (1") air release valve or approved equal shall be used on lines smaller than twelve (12) inches in diameter. One inch air release valves shall be ARI Valve: Model D-040, APCO Model 143C, CLA-VAL Model 361-CAV, Crispin Model UL10, Val-Matic Models 15A.3 and 22.3 or approved equal.

If the grade allows, a two (2) inch drain pipe shall be properly installed in the cone section of the manhole.

Air release valve assemblies shall not be connected directly to any storm drain or sanitary sewer system (See Part IV, Figure W-14 from the ACSA Standard Specifications).

2.14 CASING PIPE

A. The casing pipe shall be as indicated on the Drawings. The casing pipe shall be smooth-walled steel pipe, and shall have a minimum yield strength of 36,000 psi (ASTM A-570 Grade 36). Joints shall be fully welded around the circumference of the pipe with a complete penetration weld. It shall be the Contractor's responsibility to provide welds of sufficient strength to withstand all forces at the joints without distortion of the pipes during installation.

B. The minimum casing thickness shall be 3/8-inch for 20-inch diameter casing and less. The minimum casing thickness shall be 1/2-inch for 24-inch diameter casing and greater.

C. Coating - Casing pipes shall be coated inside and out with coal tar epoxy; Carboline, Bitumastic 300M; Tnemec 46H-413 Hi-Build; or equal. Minimum thickness and application shall be per the Manufacturer's specifications.

2.15 CASING END SEALS AND SPACERS

A. Casing end seals shall be installed properly sized for the casing pipe outer diameter. Casing end seals shall be Advance Product Systems, Inc. Model AC or approved equal.

B. Casing spacers shall be Advance Product Systems, Inc. Model SS1, S1, Cascade Model CCS-905, or BWM Company Model BWM-SS (8" and 12" width) or approved equal.

PART 3 - EXECUTION

3.01 EXISTING PIPING

A. Where new piping is to be connected to existing piping, the Contractor shall: drain or purge the existing piping; cut, remove, grind and prepare the existing piping in every respect in order that it is suitable for connecting to the new piping; disinfect the new and existing piping in accordance with paragraph 3.01.B; and connect to the existing pipe using an approved connection method.

B. Pipes to be connected shall be disinfected by spraying the inside of the new and existing pipe within three (3) feet of point of connection with a solution containing not less than 200 mg/l of chlorine immediately before connection is made. Prior to disinfection the new and existing pipe shall be thoroughly cleaned.

C. Where existing pipe is to be abandoned and removed, the Contractor shall not reuse the existing piping on this Project. Pipes that have been removed shall be removed from the Project site and disposed of by the Contractor at a permitted site.

3.02 BURIED VALVES INSTALLATION

A. Buried valves and boxes shall be installed in conformance to AWWA Standards C500 and C504, as applicable, except as specified herein. Valves shall be set with the operating nut vertically aligned in the center. Valves shall be set on a firm foundation and supported by tamping selected excavated material under and at the sides of the valve.

B. Valve boxes shall be installed vertically, centered over the operating nut, and the elevation of the top shall be adjusted to conform with the finished surface of roadway or other surface at the completion of the contract. Boxes shall be adequately supported during backfilling to maintain vertical alignment.

3.03 FIRE HYDRANTS

A. Hydrants shall be set plumb with the invert of the pumper connection eighteen (18) inches above grade. The maximum number of allowable hydrant risers for each hydrant is 2. Unless the hydrant location is specifically indicated otherwise, it shall be located so that the center is not less than two (2) nor more than ten (10) feet from the back of the curb of the adjacent street, with the pumper connection facing the street, unless otherwise directed by the fire official. The connecting pipe will have the same depth of cover as the distribution mains. The base and back of the hydrant, opposite the pipe connection, shall be firmly blocked against the vertical face of the trench with cast-in-place concrete to prevent the hydrant from blowing off the line. If the character of the soil is such that in the opinion of the Authority the hydrant cannot be securely blocked, bridle rods and rod collars and/or a pipe type bracing shall be used. Bridle rods and rod collars shall not be less than three-quarter (3/4) inch stock and shall be protected by a coat of bituminous paint. Not less than seven (7) cubic feet of broken stone shall be placed around

the base of the hydrant to ensure drainage. The backfill around hydrants shall be thoroughly compacted to grade line. Hydrants and valves shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and the hydrant or valve shall be inspected in open and closed positions, to see that all parts are in working condition (See Part VII, Figure W-4). Bags shall be tied securely over all fire hydrants as soon as they are installed. These bags shall not be removed until approved by the Authority.

B. Fire hydrants shall be installed in areas where weep holes are above the prevailing groundwater table. Design elevations and the location of drainage structures shall be used to ensure the weep holes of the hydrant are not subject to groundwater immersion. If, during the course of construction, groundwater is observed in the trench, the fire hydrant shall be moved to higher ground and the separation between fire hydrants will be adjusted accordingly. If fire hydrants cannot be placed above groundwater, the weep holes shall be plugged and the hydrant shall be pumped dry.

3.04 CONNECTION AT DISSIMILAR METALS

A. Wherever pipes of dissimilar metals join, there shall be provided an insulating union, coupling or flange connector for corrosion control. Connectors shall include an approved type dielectric separator. Connectors shall be the product of Dresser Corporation, F. H. Maloney Company, Universal Controls Corporation, or equal. Stainless steel nuts, bolts, and washers shall be used at all places at which such dielectric separators are used.

END OF SECTION

SECTION 02930

FINE GRADING AND SEEDING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section includes seeding as required for restoration and restabilization of disturbed areas, and seeding outside of disturbed areas as directed by the Engineer, including preparation of seed, fertilizer, lime, and mulch, in accordance with the Contract Documents.

1.02 SUBMITTALS

A. Submit certificates of compliance before delivery of materials for the following items:

1. Topsoil, seed, fertilizer, lime and mulch.

1.03 CONSTRUCTION CRITERIA

A. Unless otherwise indicated, provide sod on those disturbed areas which supported a previously established stand of turf on slopes 3:1 and steeper, and where directed by the Engineer. Provide seeding on all other disturbed and filled areas.

1.04 REGULATIONS

A. The Standard Specifications (Virginia Department of Highways and Transportation, Road and Bridge Specifications), dated January, 1994, and the Virginia Erosion and Sediment Control Handbook shall govern material and construction methods, unless otherwise specified.

B. Horticultural methods and standards as to size and quality shall conform to "USA Standard for Nursery Stock" of the American Association of Nurserymen, 1990 Edition.

C. Measurement and payment clauses contained in the referenced specifications will not apply on this project. Payment for all fine grading and seeding required as restoration or stabilization shall be paid for as incidental work of the appropriate pay item. Fine grading and seeding, as directed by the Engineer, outside the disturbed limits shall be paid for at a price per square yard to be negotiated with the Contractor at the time the work is directed.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. Topsoil shall consist of fertile, agricultural soil capable of sustaining vigorous plant growth. It shall contain not less than 1-1/2 percent organic matter as determined by MSHA standard method of testing and shall have a pH value between 6.0 and 7.6.

1. Topsoil shall be free of roots, rubbish and other objectionable materials such as Bermuda Grass, Johnson Grass, Canada Thistle, Quack Grass, Poison Ivy and any material harmful to plant growth. Topsoil shall provide sufficient pore space to permit adequate root penetration.

B. Topsoil shall meet the following analysis as determined by the standard hydrometer test. Sand, silt, and clay are as defined in AASHTO M146.

	Min. Percent	Max. Present
Sand -	30%	50%
Silt -	30%	50%
Clay -	5%	20%
Humus -	3%	5%

C. Topsoil shall be used where indicated.

D. Materials available on site which meet the specified requirements may be utilized with the permission of the Engineer.

2.02 TURF SEED

A. Grass seed shall be Mix No. 1 in accordance with Table 1.66a of the Virginia Erosion and Sediment Control Handbook. The exact mixture ratio may vary according to the discretion of the Contractor. No seed or seed additives shall be supplied by anyone other than the Contractor. Seed which has become wet, moldy or otherwise damaged prior to seeding will not be acceptable.

2.03 FERTILIZER

A. Fertilizer shall be uniform in composition, free flowing and delivered to the site fully labeled according to applicable state fertilizer laws and shall bear the name trade name or trademark and warranty of the producer.

B. The Contractor may submit soil samples to an approved soils testing laboratory for fertilizing recommendations. Recommendations shall be submitted to and approved by the Engineer before implementation.

C. Otherwise, fertilize at the following rates:

1. Temporary Turf Seeding:

a. Supply 10-10-10 fertilizer, or the equivalent, at the rate of 600 pounds per acre or 14 pounds per 1,000 square feet.

2. Permanent Turf Seeding:

a. Supply 600 pounds of 10-10-10 fertilizer per acre with limestone. Immediately prior to seeding supply 400 pounds of 38-0-0 ureaform.

2.04 LIME

A. Lime shall be ground limestone containing at least 50 percent total oxides (calcium oxide plus magnesium oxide). Limestone shall be ground to a fineness that at least 50 percent will pass through a 100 mesh sieve and 98 percent will pass through a 20 mesh sieve.

B. Supply 70 pounds per 1,000 square feet (1-1/2 tons per acre) on sandy and silty soils or 100 pounds per 1,000 square feet (2.3 tons per acre) on clay or clay loam soils.

2.05 MULCH

A. Mulch for protection of permanent seeding shall conform to the following requirements:

1. Clean, weed free, unrotted straw (not less than 48 hours after mowing) shall be applied at a rate of not less than 70 pounds per 1,000 square feet (1 1/2 tons per acre) and shall be anchored with: mulch anchoring tool (flat slopes), mulch nettings, cut back and emulsified asphalt (five gallons per 1,000 square feet), Curasal (5 gallons per 1,000 square feet) Tera Tack II (20 gallons per 1,000 square feet), or Petroset (manufacturer's recommendations). On slopes 8 feet or more high, the rate of liquid binders shall be increased by 60%.

2. Mulch nettings, jute or excelsior blanket.

B. Mulch utilized as temporary protection and stabilization shall conform to the above materials requirements. Rate of application shall be as directed by the Engineer. Stone mulch will be permitted at the option of the Engineer.

C. Use either straw or cellulose wood fiber for landscaping.

PART 3 - EXECUTION

3.01 PERMANENT SEEDING

A. Harrow, disc, or otherwise loosen subsoil to a depth of four inches. Spread topsoil evenly over prepared subsoil to the following depths:

1. Slopes 3:1 or steeper, two inches after compaction.

2. Slopes flatter than 3:1, four inches after compaction.

B. Remove objectionable material such as stones, 1-1/2 inches or larger, clods, brush, roots, and trash from the top four inches of soil.

C. Apply lime and fertilizer at the rates specified in "PRODUCTS", and thoroughly mix into the top six inches. Scarify the area and rake until the surface is leveled to provide a maximum of two inches in variation, and the soil is friable and of uniform fine texture.

D. Immediately prior to seeding apply additional fertilizer at the rates specified in "PRODUCTS", and work into the top two inches of the soil.

E. Perform harrowing, discing, scarifying, and raking on the contour of slopes steeper than 3:1.

F. Moisten seedbed during periods of high temperatures and when directed by the Engineer.

G. Apply seed mixture uniformly with mechanical power driven seeders, mechanical cyclone hand seeders or hydroseeding equipment. (Slurry for hydroseeder may contain seed and fertilizer only).

H. Culipack or roll one inch into soil in floodplain areas. Rake, roll or drag the seedbed in all other areas, if hydroseeder or cyclone seeder is used.

I. Apply mulch, immediately after seeding, at the rates specified in "PRODUCTS".

J. Anchor mulch as specified.

3.02 TEMPORARY SEEDING

A. Loosen top two inches of seedbed.

B. Apply lime and fertilizer at the rates specified in "PRODUCTS".

C. Moisten seedbed during period of high temperature and when directed by the Engineer.

D. Apply seed mixture uniformly with mechanical power drawn seeders, mechanical cyclone hand seeders or hydroseeding equipment. (Slurry for hydroseeder may contain seed and fertilizer only).

E. Cultipack or roll seed one inch into soil in floodplain areas. Rake, or drag seedbed in all other areas, if hydroseeder or cyclone seeder is used.

F. Apply mulch, immediately after seeding, at the rates specified in "PRODUCTS".
G. Anchor mulch as specified.

3.03 MULCH ONLY

A. Perform grading as required. Place and anchor mulch only at the rates specified in "materials" where indicated and where directed by the Engineer.

3.04 TIME RESTRICTIONS

A. When permanent seeding is specified or directed, and seeding is not allowed because of time restrictions specified in "PRODUCTS", utilize one or more of the following methods to prevent erosion and sedimentation until such time as permanent seeding is allowed:

1. Place and anchor straw mulch or wood chips.

2. Apply temporary seeding.

3. Prepare soil as for permanent seeding and then mulch as specified; overseed during next seasonal seeding period.

4. Provide other erosion control measures acceptable to the Engineer and the sediment control inspector.

5. Remove straw or wood chips used as temporary mulch or work into subsoil to a minimum depth of six inches prior to initiation of permanent seeding application.

3.05 MAINTENANCE OF SEEDED AREAS

A. Maintain seeded areas until receipt of final acceptance.

B. Water seeded areas as necessary to maintain adequate moisture in the upper four inches of soil and keep mowed to a height of two to three inches; do not remove more than 1/3 of the grass leaf during initial mowing. Contractor will not be required to mow seeded areas.

C. Inspect seeded areas for failures and necessary repairs.

D. Provide replacements during the specified planting seasons.

E. If turf grass stand is inadequate as determined by the Engineer, overseed and fertilize using half of the rates originally applied.

F. If turf grass stand is over 60 percent damaged during a period of one year after final acceptance, as determined by the Engineer, reestablish following original seeding requirements.

END OF SECTION

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SECTION 03410

PRECAST CONCRETE STRUCTURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall provide all labor, materials, tools and equipment necessary for the furnishing and installing of all precast concrete units as shown on the drawings and herein specified.

B. Precast concrete work shall be supplied by a firm with a minimum of three years of continuous operations and which has performed at least three representative jobs, three years or older, comparable to precast work to be provided for this project.

1.02 RELATED WORK DESCRIBED ELSEWHERE

A. Section 02200 - Earthwork, Excavation, Trenching and Backfilling.

1.03 QUALITY ASSURANCE

A. All work related to Precast Concrete Structures shall conform to the requirements and provisions of the latest editions of the following publications:

1. American Concrete Institute (ACI)

   a. ACI 301-96 - “Specification for Structural Concrete”.
   b. ACI 318-95 - “Building Code Requirements for Structural Concrete and Commentary”

B. ASTM

1. ASTN C478-97 – “Standard Specification for Precast Reinforced Concrete Manhole Sections”.

2. ASTM C857-87 (1994) - “Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures”.

3. ASTM - C858-83 (1990) - “Specification for Underground Precast Concrete Utility Structures”

4. ASTM C890-91 - “Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water or Wastewater Structures”

5. ASTM C923-94 - "Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals."

1.04 DESIGN REQUIREMENTS

A. Structural design for precast units shall be prepared by a registered Professional Engineer licensed in the Commonwealth of Virginia for the precast concrete manufacturer.

B. Distribution of earth loading and live load shall be in accordance with ASTM C857-87, or ASTM C890-91. Design vertical live load shall be AASHTO HS20 – 44 and shall not be less than 300 lbs/sq. ft.

C. The precast units shall be designed for flotation with the water level at the ground surface. The units shall also be designed to resist all stresses encountered during casting, handling, transportation and erection.

D. Concrete design shall be in accordance with ACI 318-95. All design and testing shall be under the supervision of a registered Professional Engineer.

1.05 SUBMITTALS

A. Shop drawings and design calculations shall be submitted for approval. The calculations shall be prepared for the units which are being submitted for approval. Calculations not prepared for this project shall be rejected. The drawings shall be fully dimensioned and shall show all opening reinforcing steel details, joint details, lifting and erection inserts. Fabrication shall not commence until the Engineer has approved the layout, design and dimensions of the drawings.

B. Calculations shall be certified to meet all contract drawings and specification requirements and to meet the standards herein specified.

1.06 FABRICATION

A. The precast units shall be factory cast. Job site casting will not be permitted. Concrete in the precast elements shall be continuously placed to prevent formation of seams. The finished units shall be free of voids, cracks and have beveled corners and edges. All inserts shall be securely attached or embedded in their proper location.

B. Concrete strength of all precast units at 28 days shall be 5,000 psi minimum. It shall be the precast unit manufacturer's responsibility to insure that the specified strength is maintained throughout production of the units. Mix designs shall be those previously used by the manufacturer which have proven satisfactory for

casting units similar to those specified and producing the required strength. All precast concrete shall be air entrained. Concrete shall not contain water soluble chloride ions.

C. Precast concrete units shall be manufactured in accordance with the applicable requirements of ASTM C858-83 (1990), "Underground Precast Concrete Utility Structures", or ASTM C478-97, "Precast Reinforced Concrete Manhole Sections", and as modified herein.

D. Wall sleeves for piping, sump, steps, access hatch and other inserts as shown on the drawings, and specified, shall be cast into the structure at the place of manufacture.

1.07 INSPECTION AND CERTIFICATION

A. Certification requirements shall be in accordance with ASTM C858-83 (1990). Copies of all certificates shall be available to the Engineer upon request.

B. The Engineer shall be allowed into the casting plant at any time to inspect the fabrication of units for this project.

PART 2 - PRODUCTS

2.01 GENERAL

A. Materials shall be in accordance with ASTM C858-83 (1990), or ASTM C478-97 with Type I cement.

B. Joint sealing material shall be preformed, flexible joint sealing compound in accordance with ASTM C923-94.

2.02 APPURTENANCS

A. A modular sealing system shall be provided at all pipe penetrations into structures. Modular seals shall be Link-Seal or equal.

B. Manhole steps shall be steel encapsulated in corrosion resistant rubber and shall be in accordance with OSGA standards and ASTM C-478-80 or current revision.

PART 3 - EXECUTION

3.01 PRODUCT HANDLING

A. Precast sections shall be transported and handled with proper equipment to protect the elements from damage. Sections shall be handled by means of lifting inserts

embedded in the concrete. Damaged sections that cannot be satisfactorily repaired shall be replaced by new sections at no additional cost to the Owner.

3.02 INSTALLATION

A. Precast units shall be provided as shown on the drawings. Precast concrete sections shall be set so as to be vertical and with sections in true alignment with a 1/4 inch maximum tolerance to be allowed. The Contractor shall install the precast sections with joint sealing compound in a manner that will result in a watertight joint. Backfilling shall be done in a careful manner, bringing the fill up evenly on all sides.

END OF SECTION

SECTION 13000

GENERAL INSTRUMENTATION AND CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section includes general work requirements for all instrumentation and control work including Divisions 13 and 16. The following summary of work is given as a synopsis of work that is described in other specification sections and shown on the Contract Drawings. Work not mentioned in this summary is not intended to exclude work from the Contract required to provide a fully functional and communicating SCADA system at each site. The Contractor shall include the work required for the completion of the project in order to provide a fully functional and operational SCADA system at each site as described in the complete set of Contract Documents and applicable addenda.

B. The Contractor shall be responsible for providing fully functional systems at site without the operational logical and graphical programming. The system provided by the Contractor shall be configured and installed to transmit and receive local field I/O points and transmit and receive data between site and the existing master SCADA terminal. The Contractor shall be responsible to test and demonstrate the functionality of the expanded SCADA system at site prior to the completion of the Operational Programming. Operational Programming will be provided separately by the ACSA's designated Programming Engineer.

C. Item descriptions and functions provided are for new devices and equipment to be provided in this contract unless otherwise noted. If no remark is made, the CSI shall assume the work item requires a new device to be provided and installed for this contract. Installation shall include all required mounting brackets, fittings, hardware, conduit and wire for power supply and signals.

D. The CSI shall be responsible for providing new devices for new signals, including the necessary field investigation to determine how to interface with applicable existing instrument signals and control circuits in order to obtain required functions from these points. The Contractor shall provide the necessary field investigation, contact blocks, terminals, relays, etc. to complete the interface to existing equipment and electrical circuits. The interface shall be clearly documented for new and existing points in the submittals.

E. Functions described as existing have equipment in service at the site and should be assumed to be functional to obtain signals for connection to new RTU's. The CSI shall assume new conduit and wire to connect these existing devices to the new SCADA system.

F. Functions that are listed as future do not have equipment installed and will not be addressed on this project, but the RTU I/O capacity, relays and terminals and other necessary equipment shall be included for these future functions.

G. Unless otherwise noted, RTUs shall be provided with minimum of 20% spare I/O for each I/O type used in addition to the future points.

1.02 DEFINITIONS

A. ACSA: Albemarle County Service Authority

B. CCS – Central Control System

C. CSI: Control System Integrator

D. HMI: Human Machine Interface

E. I/O: Input/Output

F. OIT: Operator Interface Terminal

G. RTU: Remote Terminal Unit

H. SCADA: Supervisory Control and Data Acquisition

1.03 GENERAL REQUIREMENTS

A. The Contractor shall maintain overall responsibility for the project. References to other subcontractors are intended to provide a general concept of work assignments. The Contractor shall be responsible to coordinate work between all trades and subcontractor to ensure the completion of the project.

B. The Contractor shall coordinate and obtain all drawings, specifications, wiring diagrams and other information as required to properly install and connect all new equipment for a properly functional system.

C. Associated excavating and backfilling work shall be performed in accordance with accepted practices and codes and in accordance with ACSA's standards of construction.

D. Prior to commencing work at any facility, the CSI shall perform a Field Pre-Test to verify existing facility conditions and functions of existing equipment as applicable. The Contractor shall document any discrepancies or non-operational equipment found where the work is to be performed to avoid potential liability problems and conflicts. Unless otherwise noted on pre-testing reports, it shall be assumed that all existing equipment is functional and operating as required.

E. The Contractor shall repair or replace any components or equipment damaged as a result of work performed under this contract to prior conditional acceptance. The Contractor shall be responsible for repairs to damaged or inoperable equipment within the scope of work performed for anything not documented prior to starting the work.

1.04 QUALITY ASSURANCE/QUALITY CONTROL

A. Reference

Materials and installation shall be in accordance with the latest revisions of the following applicable codes, standards, specifications, except where more stringent requirements have been specified:

1. ANSI – American National Standards Institute
2. ASTM – American Society for Testing and Materials
3. ETL – ETL Testing Laboratory (Intertek Testing Services)
4. FM – Factory Mutual
5. NEC – National Electric Code
6. NEMA – National Electrical Manufacturers Association
7. FFPA – National Fire Protection Association
8. UL – Underwriter's Laboratory

B. Uniformity

1. Unless otherwise specified, equipment or material of the same type or class used for the same purpose shall be the product of a single manufacturer.

C. Design

1. Provide only new, unused, current production equipment and materials unless specifically indicated otherwise. Equipment and materials shall be delivered to the site in new, unused condition in original packaging. Store and protect equipment against damage, theft, dirt, moisture and extreme temperatures.

D. Installation

1. All work shall be installed in a neat, workmanlike and professional manner; align, level and adjust for satisfactory operation. Install and

orient devices such that parts are easily accessible for inspection, operation, maintenance, calibration, and repair.

1.05 SUMMARY OF WORK

A. Pressure Reducing Valve Vault includes but not limited to the following:

1. RTU (Blind panel with internal swing-out sub-door) with PLC; I/O; Flow Converter and Wireless Cellular Network Adapter with panel mounted antenna;
2. Suction and Discharge pressure and monitoring to PLC;
3. PRV Site flow measurement (main line) and monitoring to PLC;
4. PRV Site flow measurement (bypass line) and monitoring to PLC;
5. Bypass line Control Valve 1 status monitoring and control to/from PLC;
6. Bypass line Control Valve 2 status monitoring and control to/from PLC;
7. Vault hatch security switch and monitoring to PLC;
8. Vault flooded monitoring to PLC;
9. Redundant 24 V-DC Power Supplies and monitoring to PLC;
10. Smart UPS with status and monitoring to PLC;
11. Conduit and wire as required for interface wiring;
12. Outdoor electrical enclosures including RTU which houses site PLC;
13. Electrical power service, distribution panel as load center and associated material and devices;
14. Terminations and integration of proposed components.

1.06 SUBMITTALS

A. Shop drawings include, but are not necessarily limited to, complete terminal identification diagrams and schedules, complete point-to-point interconnection diagrams, complete single line and elementary wiring diagrams, for all power, signal and control systems as well as scaled panel layout fabrication drawings. Device, terminal point and wire identification on all shop drawings shall be identical to related device, terminal point and wire identifications on equipment panels, and absolutely no deviation from this requirement will be permitted.

B. Submittals shall be submitted in accordance with provision set forth in Division 1, GENERAL REQUIREMENTS and the following:

1. Submittals shall be provided in bound, 3-ring binders with table of contents and section dividers.

2. Drawings shall be provided on 11”x17” printed pages.

C. Panel shop drawings shall contain the following:

1. Elevation drawing of the enclosure front, inside panel and other surfaces with equipment mounted or wiring devices. Drawings shall be drawn with all objects shown to the same scale and shall show arrangement, equipment labels, clearances and outside dimensions.

2. Elevation sections (right and left sides minimum, others as required).

3. Mounting details of all principal equipment.

4. All panel and accessory drawings shall be drawn to a readable scale with printed text not less than 1/8”. Drawing submittals shall be provided on 11”x17” “Ledger” size paper and on USB with CAD files in both native AutoCAD format and in PDF format.

5. Drawings shall include a complete Bill of Materials indicating the Device Reference Number, Description, Manufacturer and Model Number, Quantity, Panel, and other Pertinent Remarks. A separate list shall be provided for each separate manufacturer listing local distributors and points of contact for warranty and/or technical support for the different devices.

6. A complete wiring diagram showing all electrical apparatus, both within the equipment and connections to external equipment, shall be submitted. All wires shall be shown continuous from end to end and identified by numbers. A wire connected to one side of a contact, such as pushbuttons, relays or selector switches shall change its identifying number when leaving the opposite side of such contact. Any and all wires passing from panel to panel across the panel joints, which must be disassembled for shipping, must have matched terminal blocks at these joints. The terminal blocks shall be identified with the respective wire numbers. All wires entering and/or leaving the equipment shall be brought to the terminal blocks and identified.

7. Information showing compliance with contract requirements such as manufacturer’s name, model or catalog numbers, catalog information, technical data sheets, pictures, nameplate data and test reports as required.

8. All catalog information submitted shall be legible with model numbers including specific features and options clearly marked or crossed out (if not provided) in red ink on the catalog information. If information is not crossed out, it will be assumed that the function or feature is included. Submittal shall be rejected if this requirement is not met.

9. Spare parts list shall include replacement parts recommended by the equipment manufacturer, quantity of parts, current source and price of each part.

D. In addition to the above, provide the following for PLCs and OITs: electronic copy for all PLC and OIT configuration programs for each location. These files shall be the actual configurations used for the Factory Acceptance Test and the Field Demonstration Tests.

E. Provide submittal of Cellular Communication Test Results

1. Provide written results showing the cellular communication testing analysis using cellular modems communicating to the ACSA facility.

2. Test results shall indicate the signal strength for each site and shall clearly indicate any problematic communication results. The Contractor shall be responsible for resolving such problematic results that originates from site.

F. Pre-Construction Site Inspection Report

1. Provide written report of completion of site inspection and testing of equipment as applicable. Report shall detail discrepancies found during testing. Include details about broken or inoperative equipment; missing devices; cracked or broken pavement; and other issues found at station that the Contractor should advise the Owner of prior to commencement of construction activities.

2. Reports for site without found discrepancies shall indicate no discrepancies found.

3. Report should indicate if equipment was not able to be tested and for what reason it was not.

G. Other general requirements

1. All PDF documents shall be word-searchable to facilitate review during construction and enable ease of maintenance during service. This requirement extends to all data sheets. The only exception to this requirement is for any scanned page that has wet signature as required.

1.07 PROJECT CONDITIONS

A. Actual conditions of the existing site may vary from those depicted on the referenced documentation. The CSI shall provide knowledgeable and responsible representative who will be assigned to the project for the mandatory pre-bid site visits.

B. The Contractor and the CSI of Record shall field verify reference documentation and data prior to use in the detailed design of equipment.

C. Field verification of information and data provided by the Owner is the responsibility of the Contractor and his CSI of Record. The Owner will provide coordination of access, but all tests, observations, examinations, recording of data, equipment, supplies; materials and associated labor needed by the Contractor in order to field verify Owner-furnished data must be provided by the Contractor at the Contractor's expense.

1.08 CONTRACT DRAWINGS

A. Approximate Locations

1. The locations of equipment shown on the Contract Drawings are approximate only. The Contractor shall coordinate final locations of equipment and conduit with actual dimension of equipment provided and other trades to avoid conflicts. No additional compensation will be made for relocations, reconnections or additional work required as a result of failure to coordinate with other trades.

2. Where the Engineer determines that the Contractor has installed equipment that is not "conveniently accessible" for operation and maintenance, equipment shall be removed and reinstalled as directed by the Engineer at the Contractor's expense.

3. "Conveniently accessible" is defined as operable without the use of ladders, without climbing over or crawling under obstacles such as equipment, structures, piping and ductwork. Indicating devices shall be installed so that the readout is unobstructed. Panels shall be fabricated and mounted so the centerlines of displays are 5 feet 6 inches above finished floor.

B. Diagrammatic Drawings

1. The circuit diagrams shown are diagrammatic and functional only and are not intended to show exact circuit or wiring layouts, number of fittings or other installation details. The Contractor shall furnish all labor and materials necessary to install and place in satisfactory operation a fully complete functional system.

2. The motor starter circuit diagrams shown are not intended to show all the requirements and features of the motor starter. The Contractor shall

furnish motor starter equipment and features in compliance with Division 16 Specifications.

3. The number of conductors shown is the anticipated minimum required. Contractor shall install as many conductors as required for the complete and satisfactory operation of all systems.

4. Contractor shall be responsible to field verify existing control circuits and provide wiring interface to meet the intended operation of the device. Contractor shall mark-up schematic drawings to reflect actual field connections and termination points.

1.09 OPERATIONS AND MAINTENANCE MANUALS

A. Manuals (hardcopy and electronic) shall be submitted in accordance with the provisions set forth in Division 1, GENERAL REQUIREMENTS and Division 13, SPECIAL CONSTRUCTION .

B. Operation manuals shall describe in detail step by step how to operate the related equipment. Information shall also be sufficient of details to enable a qualified technician to perform normal first line maintenance, troubleshooting, and repair

1.10 RECORD DRAWINGS

A. Record drawings shall include all changes to the original Contract Documents, including addenda issued during bidding and change orders or other field changes issued during construction to reflect actual construction.

B. Record drawings shall be provided to ACSA in the form of 3 hard copies and 1 electronic copy in PDF format.

1.11 PROTECTED WORK

A. Dry Locations

1. Dry locations are areas not normally subject to dampness or wetness. An area designated as dry may temporarily be subjected to dampness or wetness, as in the case of a building under construction.

2. All equipment and enclosures installed in Dry Locations shall be NEMA Type 12 unless otherwise noted.

B. Wet Locations

1. Where installed outdoors or areas designated as Wet Locations, all work shall meet the requirements of the NEC for Wet Locations.

2. All equipment and enclosures installed in Wet Locations shall be NEMA Type 4X 316 Stainless Steel, unless otherwise noted.

3. Areas not specifically labeled as a Wet or Dry location shall be assumed to be a Wet Location unless otherwise directed by the Engineer.

1.12 SPECIAL WARRANTY

A. All work and materials, including hardware, electronics, instrumentation, RTU, network equipment, communications equipment, software, and programming, shall be warranted by the Contractor for parts and labor for one year from the date of conditional acceptance. Replacement parts shall be provided directly by the manufacturer or through an authorized distributor in original packaging.

B. The CSI shall provide troubleshooting assistance for failures and system problems experienced during the warrantee period. At the Owner's request, the CSI shall provide personnel on-site within 24-hours for troubleshooting and repair of warranted failures at no additional cost.

C. Telephone-based technical support for the SCADA System equipment shall be available 365 days/year, 24 hours/day, with 24-hour turnaround for parts and supplies.

D. Warranty periods for all work and materials shall begin on a site-by-site basis. The warranty period for a completed and accepted location shall begin when the station has been granted conditional acceptance. Conditional Acceptance shall be granted when the Site Acceptance Test for the specific site has been completed and discrepancies identified have been resolved to the Owner's satisfaction.

PART 2 - PRODUCTS

2.01 GENERAL

2.02 SYSTEM IDENTIFICATION

A. Nameplates

1. Nameplates for equipment, enclosures and back panels shall be engraved three-layer laminated plastic, 1/8-inch thick, black letters on white background. Lettering shall be uppercase.

2. 3/16-inch letters for identifying individual equipment, operators, lights and loads.

3. 3/8-inch letters for identifying grouped equipment and loads

4. 1/2-inch letters for large sized enclosures

B. Labels – Equipment in Enclosures

1. Labels shall be self-debossing, 0.0002-inch thick aluminum foil type.

2. Labels shall be typewritten or machine impressed.

3. Labels shall be secured using permanent pressure-sensitive adhesive; use high temperature adhesive for labels on heat producing devices.

4. Label letter size shall be all upper case, minimum 0.1-inch high.

5. Embossed adhesive strip labels from hand-held dispenser devices are not permitted.

6. Labels shall be as manufactured by Seton, Brady, EMED Company, Inc.

C. Enclosure Identification

1. Refer to section entitled Control Panels and Stations.

D. Wire and Cable Markers

1. Markers shall be machine printed; non-smudging, heat-shrunk sleeve type wire markers with black print on white background.

2. Power branch or feeder circuits shall be as numbered on the shop drawings.

3. Control circuits shall match as indicated on schematic and interconnection diagrams on shop drawings.

4. Terminate wires such that markers are easily read without twisting or moving wires to see marking. Wire marking should be oriented left-to-right or bottom-to-top.

5. Markers shall be as manufactured by Brady, Thomas & Betts, or approved equal.

E. Instrument Tags

1. Instrumentation tags shall be 1-1/2” diameter, 3/8” thick solid brass stamped with the instrument tag number.

2. Instrument tags shall be secured to the instrument with stainless-steel wire.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Nameplates and Labels

1. Install nameplate and label parallel to equipment lines.

2. On NEMA 1, 2, 5, 12, and 12K equipment, secure plastic laminate and nameplate to equipment front using stainless steel screws. Adhesive mounting is not acceptable.

3. On NEMA 3, 3R, 4 and 4X equipment, secure plastic laminate and nameplate to equipment front using permanent pressure-sensitive adhesive.

4. Labels Inside of Enclosures - Center beneath respective components, clearly visible and readily associated with the equipment which they are intended to identify.

5. Control panel enclosures shall not have any labels on the outside of the panel with company logos, names or other identifying markings.

B. Wire Markers

1. All wiring except primary service conductors and motor power conductors shall be labeled with a unique identifier at each end of the conductor. Wires shall also be labeled at each junction box, panelboard gutter, pullbox, and load connection.

END OF SECTION

SECTION 13300

SCADA SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. The CSI shall provide a comprehensive project approach and implementation schedule in accordance with Section 01315 showing sequencing of events with interdependencies of work and facilities clearly noted. Approach and project schedule shall indicate sequence of construction for work that must be completed in specific order, scheduled durations and dependencies on other events, testing and inspections and submittal review periods. Schedule shall be coordinated with other subcontractor's work. Allow a minimum of 2 weeks for review periods and 2 weeks advanced notice and coordinating on-site activities with the ACSA and/or their designated Engineer unless otherwise noted.

B. Provide a SCADA Remote Terminal Unit (RTU) at PRV vault as shown on Contract Drawings. RTU shall include PLCs; input/output (I/O); communication modules; power supply; cellular wireless network adapter; enclosure; accessories; and instrumentation as shown on the contract drawings.

C. The RTU and Cellular Wireless Network Adapters shall be provided from similar (like) equipment to provide continuity in training, programming and minimizing required spares. The Contractor shall provide and coordinate all required adapters, equipment, configurations and services as required to provide wireless Ethernet communication from field site RTU to the existing CCS.

D. Provide conduit and wiring and interface terminations to connect new instrumentation to the RTU and verify communications to the CCS.

E. Provide communication hardware, software and configuration programming for the wireless Ethernet network, PLC and OIT at each site.

1.02 RELATED SECTIONS

A. DIVISION 13 – Special Construction

B. DIVISION 16 - Electrical

1.03 REFERENCES

A. NEC – National Electrical Code

B. UL – Underwriter Laboratories

C. NEMA – National Electrical Manufacturers Association\

D. ISA – International Society of Automation

1.04 SCADA SYSTEM REQUIREMENTS

A. The intent of this section is to provide equipment and installation standards for a PLC-based SCADA RTU at site. The site will utilize software, RTU and networking equipment to integrate into the existing SCADA system

B. The CSI will be responsible for providing, installing, configuration and testing of the site SCADA system components including the RTU, networking equipment and instrumentation capable of communicating between field sites and to the CCS.

C. Once installation and configuration is complete, the ACSA's designated Programming Engineer will be responsible for programming the operational control logic in the PLCs and the graphics in the HMI/OITs. Operational programming is limited to the site-specific logic and graphics programming for the PLCs, OITs and HMIs. This programming will be done as an addition to the basic configuration files provided by the CSI.

D. Operational functions and programming detailed in this section are for informational purposes only to provide a comprehensive picture of the nature and extent of the site SCADA systems and the types and quantities of data to be transmitted between sites.

E. The SCADA systems at the PRV vault shall be provided to acquire inlet and outlet pressures, flows, intrusion and other alarm and status conditions. The SCADA system will provide remote control start/stop of devices as applicable and to remotely write and display automatic control set points. Additionally, the SCADA RTU will be interfaced with existing circuits and equipment to perform control and monitoring functions.

F. The SCADA system shall relay pressure, level, flow and alarm signals for PRV vault to the CCS. These signals will be used for control of local equipment based on programmable set points compared to remote data inputs. The CSI shall demonstrate network communications between new sites and CCS.

G. Provide enclosures for the RTU panels per DIVISION 13 and 16. Equip the enclosure with a panel light, ventilation fans, convenient receptacle, UPS and other equipment as shown on Contract Drawings. Provide an anti-condensation space heater where the panel is mounted in an exterior location. Enclosures exposed to direct sun shall be equipped with sun shields.

H. Arrange panel components logically for easy accessibility and maintenance.

I. Communication of RTUs to the SCADA central location and to other RTUs shall be via Wireless (Cellular) Ethernet Network Adapters. Network adapters shall be suitable for application as designed.

J. Provide sufficient communication and configuration ports for the following purposes, as required to provide the specified functionality:

1. USB communications port configured for connection to a laptop computer or other programming tool.

2. Ethernet port quantity as shown and required on Contract Drawings.

K. Configure and connect field devices to the I/O points at each site as described in Section 13318 – Input/Output Point List and as shown on drawings. Where I/O points are not used, label as spare and wire to terminal blocks and configured future usable I/O. All similar sites shall follow the same basic format where possible.

1.05 CRITERIA

A. Electrical Systems shall be in accordance with the required and advisory portions of:

1. NFPA 70, National Electrical Code

1.06 COMPLIANCE VERIFICATION

A. Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection.

1.07 SUBMITTALS

A. Provide a complete submittal package for review and approval prior to ordering materials, fabrication, or installation. The following items shall be submitted to the Owner for approval.

B. Provide the following information, plans, layouts and/or schematic drawings. schedules and any other drawings and documents necessary to construct the project:

1. Project approach and schedule indicating detailed sequence of work, duration and interdependencies.

2. Cellular communication survey showing site locations, and signal strengths. Survey should indicate tested antenna mounting location and height and recommendations for providing external or elevated antenna mountings.

3. Control wiring schematics and connection drawing for existing equipment and the interface for new control equipment to existing equipment.

4. Testing plans and procedures for the different required tests. Submit test

plans for approval, including pre-construction site inspection; cellular communication, factory acceptance, and site acceptance testing.

C. Submit a Pre-Construction Site Inspection report detailing all discrepancies identified during the inspection. The report must include name of site, date, time, list of discrepancies and certified by the Contractor's and ACSAs inspecting personnel.

D. Submit a Factory Acceptance Test report to the ACSA, showing factory test results verifying all systems conform to specification. As a minimum, the factory test report shall include the following: description of equipment tested, description of test, test data, analysis of data, and recommendations. ACSA may witness Factory Testing. Notify ACSA of testing schedules 20 calendar days in advance scheduled test date. Notify ACSA 10 days in advance of changes to scheduled date.

E. Submit a Site Acceptance Test report to ACSA for approval, showing field test results verifying all systems conform to specification. As a minimum, the field test report shall include the following: description of equipment tested, description of test, test data, analysis of data, and recommendations.

F. CLOSEOUT SUBMITTALS - The following items shall be submitted to the Owner for approval prior to Final Completion:

1. Certified Test Reports

2. O&M Manuals

3. As-built Drawings

1.08 QUALIFICATIONS

A. The CSI shall maintain the same personnel assigned to the project as possible. If new assignments are required, new personnel assigned to the project shall meet minimum qualifications and the CSI shall submit a detailed resume of new personnel for approval by the Engineer. The CSI shall maintain assignment of key personnel throughout the project as approved unless a change is requested by ACSA.

B. Key personnel assigned to the project requiring continuity of assignment shall include:

1. Project Manager

2. PLC and HMI Programmers

3. Field Superintendent

4. Instrumentation Technicians

PART 2 - PRODUCTS

2.01 REMOTE TERMINAL UNIT (RTU)

A. The SCADA System Remote Terminal Unit (RTU) shall be a PLC-based device. Control panels shall be built with sufficient open space for future expansion considerations and must allow space for future installation of at least 3 additional 16 point discrete output modules with space for relays, fuses and terminals for each point.

B. The ACSA currently operates multiple sites and stations with existing Allen-Bradley Compact Logix processors. PLCs used for the SCADA system shall be compatible with communications and programming to the ACSA's existing processors. Products proposed as equivalents shall be demonstrated as compatible with existing systems and software packages for approval. PLC Manufacturer and types shall be:

1. Allen-Bradley, Compact Logix (1769-L27ERM-QBFC1B)

2. No substitute will be allowed

C. Product Description: The RTU shall be an intelligent, modular unit, capable of both data acquisition and local data processing. It shall be capable of monitoring and controlling local equipment in a stand-alone mode, as well as being an intelligent node in a distributed system. It shall be suitable for installation in outdoor environments. Programs shall be capable of being downloaded directly to the unit using a USB or Ethernet interface. System shall be designed with adequate programming and interface ports for both serial and Ethernet connections.

D. The RTU shall be a package type programmable controller for smaller control applications with Discrete and Analog I/O. The controller shall be provided with expansion I/O capacity as required to provide the following at a minimum:

1. 0.75 MB (min.) user memory
2. Built in Power Supply
3. 1 USB and 2 Ethernet/IP Port
4. 24 VDC Discrete Inputs (Qty. as required plus spares)
5. 24 VDC Discrete Relay Outputs (Qty. as required plus spares)
6. 4-20 mA Analog Inputs (Qty. as required plus spares)
7. 4-20 mA Analog Outputs (Qty. as required plus spares)
8. Expansion modules provided where required to provide sufficient quantity of used and spare I/O count.

E. The operator interface (OIT) shall be TFT LCD color touch screen display with a NEMA 4X suitable for corrosive atmospheres. The OIT shall be compatible with

the supplied PLC Controller and configured to use tag database typical to PLC and OIT. OIT shall be provided with the following features at a minimum:

1. Operator Interface Size: 7” for PRV
2. (1) Ethernet/IP port for communication to the supplied PLC Controller
3. (1) USB Port
4. CPU: 1.0 GHz
5. RAM: 512 MB
6. Input Power: 24 VDC
7. The OIT shall be Allen Bradley, Panel View Plus 7 Standard.
8. No substitutions allowed.

2.02 CELLULAR WIRELESS NETWORK ADAPTER

A. Provide cellular wireless network components at each site, including network adapter, antenna, antenna mast, antenna cable, system grounding, lightning protection (for outdoor antennas), and physical connections, for a complete operating system.

1. Provide a 4G LTE wireless network adapter for each RTU. Adapter shall be procured and configured with a static IP address and Dynamic Mobile Network Routing by the carrier within the ACSA’s private IP address range. Cellular network adapters will not be accessible to devices outside of the ACSA private network. Coordinate IP addresses with ACSA and cellular provider during construction.

2. The Wireless Network Adapters shall be:

   a. AirLink RV50X as manufactured by Sierra Wireless

   b. Or Approved Equal.

3. Provide antenna appropriate to the site and to FCC specifications for ERP.

   a. Internal Antenna (base bid):

      1) Weather proof, wideband rugged surface mount antenna with a direct N Female.

      2) 3dBi gain

      3) Lightning arrestor: bulk-head style, Polyphasor or equal.

      4) Dimensions: ø1.75" x 4.1" Height

      5) Construction: ASA Plastic

      6) RM/RMM Stud Mount.

7) Internal Antenna shall be:

a) PCTEL, High Efficiency Low Profile Antenna (BMLPV-MBLTE-HP)

b) Or approved equal

b. External Antenna (if required following required communications survey):

1) Cellular Omni directional antenna with 5db gain. Antenna shall be cut at the factory for the assigned frequencies.

2) Antenna mast: Polyester powder-coated steel or anodized aluminum, with 2-3/8" diameter tenon, rated for 80MPH wind, Valmont or equal. Provide weather head on top of tenon.

3) Antenna cable: ½" foam-filled 50-ohm heliax, Times Microwave Systems w/ ¼" superflex jumper cable inside panel.

4) Antenna cable grounding kit: Andrew or equal.

5) Crimp-style lug: Andrew or equal.

6) Cold shrink weatherproof tubing: Andrew or equal.

7) Antenna down conductor: #6 AWG bare tinned solid copper, Microflect or equal.

8) Lightning arrestor: bulk-head style, Polyphasor or equal

9) Hardware: Stainless steel.

10) External Antenna shall be:

a) Digital Antenna, Low Profile Antenna (295-PW)

b) Or approved equal

B. Coordinate cellular service and data plans with ACSA. Cellular service shall be procured by the ACSA and SIM cards shall be provided to the contractor for installation into the cellular network adapter.

2.03 ETHERNET SWITCHES

A. RTU Ethernet Switches shall be:

1. DIN Rail Mounted
2. 24 VDC Powered
3. Minimum (5) RJ-45 10/100BaseTX Auto Sensing Ports.
4. Manufacturer – N-Tron or equal

PART 3 - EXECUTION

3.01 GENERAL

A. RTU Installation Requirements

1. Provide enclosures per Section 16000.

2. Construct enclosures in a neat and workman-like manner. Cut wireways square and deburr the cut edges. Mount wireways securely, running parallel to enclosure sides. Route wires neatly and exit at right angles to wireways.

3. Install all wires in plastic wireways, except (1) wiring between mating blocks in adjacent sections, (3) wiring from components on a swing-out panel to components on the fixed structure, and (4) wiring to panel-mounted components. Wiring from components on a swing-out panel to other components on fixed panels shall be tied into bundles with nylon spiral wrap and shall be secured to panels at both sides of the hinge loop so that conductors are not strained at the terminals. Run signal and low voltage wiring separately from power wiring. Run 120V control wiring separate from power wiring.

4. Tie together wiring to control devices on the front panels at short intervals with nylon wire ties and secure to the inside face of the panel using adhesive mounts.

5. Designate each signal, control, alarm, and indicating circuit conductor connected to a given electrical point by a single unique number, which shall be shown on all shop drawings. Mark three numbers on all conductors at every terminal using numbered white plastic-coated wire markers, or permanently marked heat-shrink plastic.

6. Seal and weatherproof antenna connections and openings.

7. If required to obtain acceptable cellular signal strength, provide a mast and install an outdoor antenna. Adjust antenna orientation for optimum radio performance.

8. Unless required for existing conduits, all conduit penetrations to RTU enclosures shall be bottom entry only. Contractor shall provide and install pull boxes, junction boxes and fittings as required to meet bottom entry and electrical code installation requirements.

B. Control Wiring: All wiring within panels shall be made in horizontal and vertical runs, and groups of wires to and from common points shall be made in PVC wire ducts and adequately supported. Analog and discrete signal wiring shall be in separate conduits or wire ducts, or if required to be in the same duct they shall be separated with vertical dividers.

1. Control Wiring:

a. Type MTW or THHN color coded stranded copper.

b. Provide wire color coded in accordance with established scheme.

c. Rated for 600 Volts, 105 degrees C.

d. Sized for current to be carried, but not less than No. 16 AWG. Twisted Shielded Pair (TSP) wire size minimum is 18 AWG.

e. Special Signal Circuits: Manufacturer's standard cables or recommend cables.

f. Wire Identification:

1) Wire IDs shall be numbered and tagged at each end of termination.

2) Tags shall be legible with machine-printed markings and numbers. Numbers shall be arranged and sized for easy identification without removing wire from terminal strip. Each wire shall be marked with unique numbers, identical on both ends.

3) Tags shall be on heat-shrinkable black printing on white polyolefin that will not smudge or fade when printed. Adhesive or taped on tags are not acceptable. Handwritten markings will not be allowed.

4) Wires carrying voltages from external sources shall be yellow wires or use yellow wire markers that are conspicuously marked as powered by external sources.

C. Network Adapter Installation Requirements

1. Install the network adapter in the same enclosure as the RTU.

2. Mount antennas on top of RTU enclosure with weather-tight mounting hardware.

3. If external mast mounted antennas are required:

a. Mount the antennas with an appropriate mounting base for the antenna mast. Orient the antenna for vertical polarization, and mount the antenna below the top of the mast.

b. Run antenna cables from network adapter to antenna continuously with no splices. Seal antenna connections with cold shrink weatherproofing tubing. Secure antenna cable with stainless steel wire ties at three-foot intervals along the antenna mast. Secure antenna cable at three-foot intervals along building walls, using Unistrut bases bolted to the wall.

c. Run the antenna grounding down conductor from the top of the antenna mast to a ground rod at the base of the mast. Cadweld the down conductor to the ground rod.

d. Attach ground lead to antenna with a crimp-style lug.

e. Install antenna cable grounding kit within six inches of the cable connection to the antenna. Install grounding kit at the entrance to the building (or to the RTU enclosure, if the enclosure is outdoors). Cadweld grounding kit leads to the grounding system down conductor.

f. Mount lightning arrestor at the bottom of the RTU enclosure. Provide a #6 AWG stranded copper drain wire with green insulated jacket, and attach to the arrestor with a crimp-on lug.

3.02 TESTING REQUIREMENTS

A. Pre-Construction Site Inspection

1. Prior to starting any construction activities at a site, the Contractor shall conduct a Pre-Construction Site Inspection. The inspection shall document equipment that will be modified or accessed through the SCADA project and also any obvious defects or broken equipment such broken light fixtures, windows, cracked pavement, etc. The intent of this inspection is to document the condition of existing facilities prior to the Contractor's access to limit claims or liabilities of damage.

2. Inspection shall include operating process equipment in HAND and AUTO modes (by ACSA Operator) if applicable, verifying readouts and signals on existing instrumentation, actuation of valves, switches and breakers.

3. Provide written inspection results detailing discrepancies or no discrepancies as applicable. All discrepancies shall be noted to and reviewed by ACSA during the inspection.

B. Factory Acceptance Testing (FAT)

1. The CSI shall develop a testing procedure and record documentation for the FAT and provide personnel to coordinate and perform the testing.

2. Verify proper operation of each RTU's components, configuration programming, and network communications. Correct all problems discovered during factory testing before proceeding with field installation of any RTU's.

3. Perform complete FAT pre-test and submit certified results showing successful completion of the test procedure and resolved problems prior to scheduling witnessed FAT. The witnessed FAT shall be completed without significant errors or discrepancies found during the test. Determination of significant errors or discrepancies and the test may be canceled at any point and declared a failure at the discretion of the ACSA or their Engineer.

4. FAT shall include the complete setup of each RTU including communications hardware, PLCs, OITs, etc. The test shall demonstrate successfully transmit two-way data between existing servers, PLCs and OITs. Data transmission to a test application on the existing server will be coordinated by the Contractor with the Engineer prior to the FAT. The ACSA will provide interface to the existing server during the FAT.

5. The CSI shall develop a test application for each of the PLCs and OITs to communicate and display data transferred between the HMIs, PLCs and OITs. Demonstration shall show transition of data from all PLC input points to OITs and HMI display screens and activation of PLC output points from the OITs and HMI display screens.

6. Demonstrate functions of input and output points for all PLC RTUs.

7. Perform inspection of RTU components, wiring and devices to verify compliance with as-built drawings and documentation.

8. Provide certification documentation for each site that cellular communication reliability is at least 99.5%. Provide documentation of installed system's signal-to-noise ratio and fade margin for each site.

C. Communications Testing

1. Communications testing is intended to verify adequate signal strength at installed antenna height. Communications testing shall be performed simulating final installed conditions and vegetation in full foliage. Communications testing shall be completed before final installation of antennas and cable.

2. Perform communications testing at each site using an actual cellular modem that will be installed in an RTU', but does not necessarily (although strongly preferred) need to be the same cell modem that will be installed at the respective test site. CSI shall provide and coordinate all required devices for use during the communications test.

3. Survey shall measure communications signal strengths at all facilities with an external antenna located inside the facility building or simulated enclosure and outside the building at the recommended installed height. Test shall last 30 minutes with sample signal readings every 5 minutes recorded.

4. If the average signal strength is less than -90dB at the recommended installed height repeat test at 5ft. and if necessary 10ft. elevations above the recommended antenna height.

D. Site Acceptance Testing (SAT)

1. The CSI shall develop a testing procedure and record documentation for the SAT and provide personnel to coordinate and perform the testing.

2. The first phase of the SAT shall verify effective network communications of the RTU at its respective field site to the CCS. The first phase is intended to simply verify that cellular communications and network connectivity is acceptable.

3. The Second phase of the SAT will use programming applications developed by the ACSA's Programming Engineer added to the configuration and communications routines proven in the FAT. The SAT shall be a collaborative effort between the ACSA, CSI and the Programming Engineer to validate the complete installed, configured and programmed SCADA system for each site.

4. Demonstrate proper operation of each RTU's components, configuration, and communications. Simulate all input conditions at each site and verify that data is detected by the HMIs and other RTUs in the system.

5. The CSI shall actuate field devices as practical or simulate signals at furthest point possible from the RTU input. ACSA operators shall be available to operate equipment and test status feedback as required.

6. All field input and output points shall be tested to the local RTU and OIT. Communications from the RTU to the CCS shall also be verified on a point-by-point basis.

7. Network connection and data transmition between the local RTU and other on-line RTUs shall be demonstrated to the Engineers satisfaction. It is not intended to test cellular transmission between each site for every

signal but rather verify the network connectivity and ability to transmit data between sites.

8. Cooperate with ACSA in troubleshooting cellular network communications problems, if required, to determine cause of communications problems.

3.03 PROGRAMMING REQUIREMENTS

A. The programming required from the CSI shall be limited to the initial configurations and communications routines. The CSI shall be responsible to demonstrate the successful configuration and capability to transmit and receive data by the system to include PLC and I/O modules; OITs; network wired and wireless connections; cellular network adapters and the SCADA servers.

B. The ACSA's designated Programming Engineer shall be responsible for completing operational logical and graphical interface programming for specific SCADA functions.

3.04 SPARE PARTS

NOT USED

END OF SECTION

SECTION 13318

INPUT/OUTPUT POINT LIST

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the input/output (I/O) point list for the PRV.

B. The requirements of Section 13000 – SPECIAL CONSTRUCTION and Section 16000 - ELECTRICAL shall apply to all work specified under this section.

PART 2 - PRODUCTS

2.01 GENERAL

A. The I/O point list contains the information necessary to configure the I/O interface hardware and to indicate range conversion or signal functions associated with the each site's PLC.

B. POINT NAME is an alphanumeric character string. For the point F-123, the following apply:

1. The letters (F) are the functional identification. In the example, the "F" represents flow. Refer to the instrumentation identification schedule in this section for function identification representation.

2. The three digit number (123) identifies the loop number and/or field device.

C. DESCRIPTION is an alphanumeric character string up to twenty-four positions in length. FUTURE indicates future points for which prewired I/O hardware shall be provided. SPARE indicates spare points for which prewired I/O hardware shall be provided. All future and spare I/O points shall be wired to the terminal block, with corresponding interposing relays for spare discrete outputs, and fusing for spare I/O to be the same as specified for active points.

D. SIGNAL TYPE is one of the following:

1. AI designates an analog input.

2. DI designates a digital input.

3. AO designates an analog output.

4. DO designates a momentary, maintained or latched digital output.

E. DATA FIELD 1 and DATA FIELD 2 describe the function or signal characteristics. These are further defined under each signal type.

2.02 PLC ANALOG INPUT

A. DATA FIELD 1 is the electrical input signal range and units.

B. DATA FIELD 2 is the process parameter range and engineering unit.

2.03 PLC DIGITAL INPUT

A. DATA FIELD 1 is the condition that exists when a field contact is closed.

B. DATA FIELD 2 is the condition that exists when a field contact is open.

2.04 PLC ANALOG OUTPUT

A. DATA FIELD 1 is the electrical output signal and units.

B. DATA FIELD 2 is the range of the controlled variable and engineering units.

2.05 PLC DIGITAL OUTPUT

A. Control digital outputs can be momentary, maintained or latched.

B. DATA FIELD 1 is the contact closed function.

C. DATA FIELD 2 is the contact open function.

PART 3 - EXECUTION

3.01 POINT DATA FIELDS

A. I/O point data fields shall be subject to review and modification by the Engineer during the shop drawing review phase. All changes directed by the Engineer shall be incorporated completely into the entire system at no increase in Contract price subject to the following limitations:

1. The total number of modifications shall be limited to 20% of the total number of I/O points.

2. All changes to each unique I/O point shall count as one modification. For example, modifying the description, range, and engineering units on an analog input shall count as one modification.

3. Analog input alarm limit definition shall not be counted as a modification.

3.03 PLC INPUT /OUTPUT POINT LIST

The Input / Output List reflects the PRV I/O requirements. Actual I/O and memory point assignments shall be coordinated with the Owner prior to fabrication. Points with a ** are internal, PLC-generated points. Points designated as future are reserved for the intended installation of future equipment. All future points shall be wired, configured and tested similar to points where the equipment is being installed as a part of this project.

Description	Type	Data 1	Data 2	Remarks
Control Power On	DI	Normal	Fault	Control Power On Relay
Vault Intrusion Hatch 1	DI	Normal	Intrusion	Magnetic Switch
Vault Intrusion Hatch 2	DI	Normal	Intrusion	Magnetic Switch
Vault Flooded	DI	Normal	Flooded	Float Switch
UPS Alarm	DI	Normal	Alarm	From UPS
UPS On Battery	DI	Normal	Alarm	From UPS
UPS Battery Charging	DI	Normal	Battery Charge	From UPS
2” Control Valve 1 Opened	DI	Open	--------	Valve Stem Switch
2” Control Valve 1 Closed	DI	Closed	--------	Valve Stem Switch
2” Control Valve 2 Opened	DI	Open	--------	Valve Stem Switch
2” Control Valve 2 Closed	DI	Closed	--------	Valve Stem Switch
2” Control Valve 1 Close	DO	Close	--------	Control Solenoid
2” Control Valve 2 Close	DO	Close	--------	Control Solenoid
Inlet Pressure	AI	4-20mA	0-100 PSI min.	Analog Value
Outlet Pressure	AI	4-20mA	0-100 PSI min.	Analog Value
PRV Vault Main Flow	AI	4-20mA	0-XXXX GPM	Analog Value
PRV Vault Bypass Flow	AI	4-20mA	0-XXX GPM	Analog Value

END OF SECTION

SECTION 13320

CONTROL PANELS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section includes requirements for new control panels, control stations and modifications to existing control panels as shown on the Contract Drawings, specified herein, and otherwise indicated or referenced.

B. Equipment furnished under this Contract shall be installed in an industrial type environment and powered from an electrical source that may include harmonic distortion, surges, sags, and other electrical noise under normal operating conditions. The Contractor shall verify that all equipment furnished shall function correctly in an environment where electrical noises of the types referenced are common during normal operations. If the equipment is found to be unable to operate in this environment, the Contractor shall furnish additional and/or replacement equipment, surge protection, power line conditioners, UPS, or other equipment required to correct this problem at no additional cost to the Owner.

C. This Section includes power line surge protectors as shown on the Contract Drawings, specified herein, and otherwise required for appropriate equipment, including, but not limited to control panels, instrument cabinets, instruments, processors, and other equipment susceptible to damage from power surges in the electrical supply.

1.02 QUALITY ASSURANCE/QUALITY CONTROL

A. Reference

Materials and installation shall be in accordance with the latest revisions of the following codes, standards, specifications, except where more stringent requirements have been specified herein:

1. NEC – National Electric Code

2. NEMA – National Electric Manufacturers Association

3. UL – Underwriters Laboratories, Inc.

1.03 SUBMITTALS

A. Submittals shall be submitted in accordance with the provisions set forth in the General Conditions, and Specification Section 13000, GENERAL INSTRUMENTATION AND CONTROLS.

B. Submittals for equipment and materials shall be clearly marked or noted with specific features, standard options, and wiring diagrams to indicate compliance with Contract Documents. Terminal board wiring diagrams including terminal numbers and conductor color codes shall be indicated.

C. Where deviations to Contract Documents are proposed, submit a list of deviations. Provide a detailed description and explanation for each deviation.

D. Shop drawings shall present complete and accurate information relative to all working dimensions, equipment weights, assembly, and section views, and all necessary details pertaining to coordinating the Work of the Contract. Shop drawings shall contain information such as special tools and other items of information that are required to demonstrate detailed compliance with the Contract Documents.

E. Submit shop drawings which shall include the following:

1. Submittals shall contain the NEMA type designation and manufacturer data describing the enclosures and showing its compliance with specifications and associated standards.

2. Control panel assembly drawings detailing panel cut-out locations and sizes, back panel and device layout and locations.

3. Provide electrical point to point wiring diagrams showing detailed internal wiring and wiring to field devices. Device tag numbers shall be indicated where shown on the Contract Drawings. Terminal blocks and wiring numbers shall be identified on the wiring diagrams.

4. Bill of Materials for all equipment and accessories.

5. Manufacturer’s catalog information for all components and accessories.

6. Manufacturer’s standard wiring diagrams including all available terminal connections for each component.

7. Spare Parts List (including specified spare parts to be furnished by the Contractor and manufacturer’s recommended spare parts list for each type of unit).

8. Project specific installation instructions and mounting details for each component. Materials of construction for supports, brackets, and mounting hardware shall be provided with details for each type of equipment including mounting racks.

9. A list of nameplate titles shall be submitted.

10. Identify spare control panel space for future equipment.

F. Submit Operation and Maintenance Manuals for control panel equipment and components.

PART 2 - PRODUCTS

2.01 GENERAL

A. Control panels shall include display panels, relay panels, annunciator panels, termination boards, or any other assembly of electrical components shop assembled in enclosures.

B. The control panels and associated controls and instrumentation equipment shall be furnished as a coordinated assembly requiring field connections of the power and control circuits for a complete and operating installation as specified and shown on the Contract Drawings.

C. Electrical equipment and controls shall be provided as required to perform the control function as shown on the Contract Drawings and specified herein. Controls shall include motor starters, control power transformers, circuit breakers, power disconnecting devices and hardware, control relays, timing relays, intrinsically safe relays, and miscellaneous controls as required, or as specified. Electrical equipment and controls shall be provided in accordance with the specifications contained herein and in Divisions 13 and 16.

D. The control panel enclosure, components, and controls shall be UL Listed and Labeled. Control panels as a complete assembly shall conform to the requirements of and be certified by the governing UL standards.

2.02 ENCLOSURES

A. Enclosure Construction

1. General

a. Unless specifically noted otherwise, dimensions of enclosures shown on the Contract Drawings are minimum required dimensions. Contractor shall size each enclosure and back panel as required to house the electrical equipment shown or specified. Each enclosure shall be sized such that a minimum of 20% spare open space is provided on the interior subpanel and/or swing-out panel for mounting of future equipment. Spare space shall be located in one clear and open, contiguous area of the subpanel.

b. Control panels shall include an equipment support system for mounting internal wiring and control components, and for the proper support of long case instruments. This system shall ensure that equipment is adequately supported by the main structural

frame members. Fixed support members shall not be attached to front panels or removable access panels.

c. Steel enclosures shall be constructed of a minimum of 14 gauge steel and shall be constructed in accordance with NEMA requirements. Seams shall be continuously welded and ground smooth, with no holes or knockouts. Exterior hardware, including mounting hardware shall be stainless steel unless otherwise noted.

d. Panel cutouts shall be provided for mounting components as arranged on the Contract Drawings and shall include cutouts and cover plates, and shall be capable of being removed for the addition of future components. Components shall be door mounted unless otherwise noted. Control panels requiring rear access shall have the components mounted on side opposite the door.

e. Enclosures shall be as manufactured by Hoffman or an approved equal.

2. NEMA 12 Steel Enclosures

a. NEMA 12 enclosures shall be dust-tight, drip-tight suitable for protecting enclosed equipment and components from fibers, flyings, lint, dust and dirt. NEMA 12 enclosures shall provide a degree of protection against light splashing, seepage, dripping and external condensation of non-corrosive liquids.

3. NEMA 4X Stainless Steel Enclosures

a. NEMA 4X enclosures shall be water-tight and dust-tight suitable for outdoor installations. NEMA 4X enclosures shall protect enclosed equipment against splashing water, seepage of water, falling or hose-directed water, severe external condensation, and shall be corrosion resistant.

b. Enclosures shall be constructed of 14 gauge Type 304 stainless steel. Trim shall be Type 304 stainless steel. Exterior shall be unpainted.

B. Enclosure Doors

1. Enclosures shall be provided with front access single or double overlapping doors as required for the enclosure size. Door(s) shall be provided with heavy duty ¼-turn, three-point spring-roller latches operated by a key locking handle. Latch rods shall have rollers to facilitate door closing. Provide a minimum of two keys for each lock. Locks shall be keyed the same. Door assemblies for NEMA 4X stainless steel enclosures shall be constructed to maintain the NEMA rating of the

enclosure using the three-point latching assembly without the use of external door clips or hasps.

2. Door(s) shall be mounted with continuous piano hinges. Contractor shall coordinate door swing (right hand or left hand) for each control panel to avoid interference with other equipment mounted adjacent to the control panels.

3. A rolled lip around minimum three sides of door shall be provided to prevent dirt and liquid from dropping into the panel when door is open.

4. Door(s) shall be fitted with a neoprene gasket applied with oil resistant adhesive and held in place with stainless steel retaining strips.

5. Enclosures mounted outdoors shall be provided with stainless steel door stops to hold the door(s) in the open position. The open position shall be field adjustable.

C. Interior Subpanels

1. Interior subpanels for component mounting shall be provided and assembled for each enclosure. Interior subpanels shall be constructed of 14 gauge steel finished in white enamel paint. Subpanels shall be provided with intermediate stiffeners where required to maintain surface flatness and panel rigidity. Fasteners, screws, and equipment mounting racks shall be stainless steel.

D. Enclosure Finish

1. NEMA 12 enclosures: Sheet metal components shall be thoroughly cleaned, bonderized and finished with a prime coat and two topcoats of a two-component, catalyzed, polyurethane enamel. Texture semi-gloss finish shall be applied to provide a non-glare and abrasion resistant surface. Enclosures shall be provided with gray finish exterior and with a white enamel interior unless otherwise specified.

2. NEMA 4X stainless steel control panel enclosures housing electronic equipment mounted outside shall be finished with a white exterior coating as described above. Other NEMA 4X enclosures shall not be finished.

E. Enclosure Accessories

1. Print Pocket

a. A large print pocket shall be provided on interior face of the enclosure door(s). Where this cannot be accommodated due to windows and other control devices mounted on the door, the print pockets shall be mounted on the interior side of the control panels.

2.03 EQUIPMENT MOUNTING CABINET

A. The Contractor shall furnish and install where indicated and as detailed on the drawings equipment mounting cabinets, to house the electrical equipment. The equipment cabinet assemblies shall consist of a free standing pad mounted type unit of the overall size indicated with front two door dual access. All cabinets shall be of NEMA type 12 modified to meet NEMA 3R construction, complete with interior panel mounted on channel welded horizontally to interior body sides at top, bottom, and center. Doors shall be over lapping type (no center post) with oil resistant gasket attached with oil resistant adhesive and held in place with steel retaining strips. Doors shall be complete with grounding stud, plastic print pocket, and three point latch operated by stainless steel padlocking handle and door stop kit at top of each door. Latch rods shall have rollers for easier closing. Door stop hardware shall be installed on each door.

B. Enclosures shall have heavy duty continuous hinges with stainless steel hinge pins, stainless steel drip shields over doors and weep holes in bottom.

C. Enclosure interior finish shall be zinc rich powder electrostatically applied followed by a polyester powder, white color inside and a custom polyester powder outside color to be ACSA County standard color. Interior and panels shall be standard white enamel.

D. Enclosures shall be shipped on a pallet wrapped in heavy gauge plastic, corners protected with cardboard to protect from damage.

E. The cabinets shall be manufactured by Hoffman Engineering Company or equal.

F. The Contractor shall submit shop drawings of cabinets, with equipment layout drawn to scale.

2.04 RELAYS

A. General Purpose Control Relays (CR)

1. Relays shall be designed for continuous operation and shall be by one manufacturer wherever possible.

2. Number and arrangement of contacts shall be as shown on the Contract Drawings. Contacts shall be rated for a minimum of 10A continuous at connected voltage unless otherwise shown or specified.

3. Relay coils shall be rated for continuous operation on 120VAC or 24VDC as required unless otherwise shown or specified. Provide blade type relays and sockets for 120VAC coils and pin type relays and sockets for 24VDC coils. Relays shall have LED to indicate when coil is energized.

4. Socket Bases for plug-in type relays shall be DIN rail mounted, single tier design, provided with relay retainer clip and captive screw terminal connections.

5. Provide relays with sufficient number of poles for functions shown on contract drawings up to 4PDT. If additional poles are required, provide parallel relays for additional contacts.

6. Analog switching relays shall be provided with bifurcated palladium alloy contacts.

7. Relays shall be as manufactured by:

   a. Magnecraft 78x Series

   b. Idec – RH Series

   c. Or approved equal

8. Provide additional 5 spare relays with sockets for each type of relay used in project.

B. Time Delay Relays (TR)

1. Time delay relays shall be the solid state plug-in type with calibrated dial head or dip switch adjustment with encapsulated coil and snap action switch assembly with number of poles as indicated on the Contract Drawings.

2. Provide “On-Delay”, “Off-Delay, or “On-Off Delay” dual head type as indicated; timing range intervals as shown or specified.

3. Relays shall be as manufactured by:

   a. Allen-Bradley

   b. Magnecraft

   c. Idec

   d. Or approved equal

4. Provide additional 5 spare time delay relays with sockets for each type of relay used in project.

2.05 PILOT DEVICES

A. General

1. Pilot devices shall include indicating pilot lights, pushbuttons, and selector switches

2. Devices shall be corrosion resistant, watertight/oiltight heavy duty industrial type construction with die cast operator bodies and shall be by one manufacturer wherever possible.

3. Devices shall be 30.5 millimeter in diameter.

4. Contact Blocks

   a. Blocks shall be molded of an amorphous transparent polyamide material with high impact resistance and resistant to carbon tracking

   b. Contacts shall be double break silver type rated for minimum of 2.4A continuous at connected voltage.

   c. Contact blocks shall have finger-safe covered terminals.

5. Manufacturers

   a. Devices shall maintain NEMA rating of enclosure that they are mounted on. Provide as manufactured by:

      1 Square D

      2 Allen Bradley

      3 Or approved equal

B. Indicating Pilot Lights

1. Lights shall be LED bulb, full voltage type of voltages as indicated.

2. Lights shall be provided with plastic lens with lens color as shown or specified.

3. Lights shall be Push-to-test type

C. Pushbuttons

1. Pushbuttons shall be either momentary, maintained, push-pull, or other operational types as shown or specified.

2. Pushbuttons shall be provided with lockout feature as shown or specified.

3. Pushbuttons shall be provided with a red operator for stop or terminate operating functions and black operators for all other functions.

4. Pushbuttons shall be provided with a maintained position, “mushroom head” operator for emergency stop pushbuttons.

5. Provide contact blocks for configurations as shown on contract drawings.

D. Selector Switches

1. Switches shall be spring return, maintained, or other operational types as shown or specified.

2. Switches shall be provided with lockout feature as shown or specified.

3. Switches shall be provided with “gloved hand” operators.

4. Provide contact blocks for configurations as shown on contract drawings.

E. Provide additional 5 spare pilot devices for each type used in project.

2.06 POWER SUPPLIES AND UPS

A. 24VDC Power supplies shall be sized to meet power requirements as shown on contract drawings plus an additional 50% capacity.

B. Power supplies shall be tied in redundant pairs with manufacturer’s redundancy module as shown on contract drawings.

C. Provide a smart UPS with relay contact status card and continuously supplied output as shown, and an intelligent battery management system indicating battery status and diagnostics.

D. Provide status contacts, associated with the power supplies and UPS as shown on the contract drawings, indicating operating conditions. All status contacts shall be individually wired to PLC I/O for monitoring.

E. Provide circuit protection on inputs and outputs of all power supplies and UPS as shown on the contract drawings. Fuses shall be sized in accordance with manufacture’s recommendations.

F. The UPS shall power the connected load for a period of 20 minutes at a minimum.

G. Power Supplies and UPS shall be as manufactured by:

1. Phoenix Contact, QUINT Series

2. Or approved equal

H. Provide additional 2 spare power supplies for each type used in project.

2.07 FUSE BLOCKS

A. Fuse blocks shall be flip open, disconnecting type.

B. Fuse holders shall have LED indication for blown fuses.

C. Fuse blocks shall be DIN rail mounted in control panels.

D. Fuse blocks shall be as Buchanan, Phoenix Contact, or approved equal.

E. Provide all fuse blocks with fuse cartridges as required for connected load.

2.08 SIGNAL BOOSTER/ISOLATOR

A. The signal booster shall accept a 4-20 mADC signal input and provide the equivalent 4-20 mADC output. The signal boosters are used per manufacturer's recommendations when the loading of instruments is beyond the maximum ohms permitted for transmitting a signal. The signal booster input impedance shall be 50 ohm maximum.

B. The signal booster output shall be capable of driving a 1650 ohm minimum load on a 4-20 mADC basis, and shall operate on 120VAC input power. Accuracy shall be minimum of 0.10% of range in ambient temperature range of 0 to 50 degrees C. Units shall be provided with field adjustment capability for input signal offset and span. The signal booster shall be AGM Model 4000 series, or equal.

2.09 SIGNAL MULTIPLIER

A. Signal multiplier shall have an isolated input, 2 outputs, and power supply. The device shall have the following features:

1. DIN Rail Mounted

2. Green Power LED indicating supply voltage is present.

3. Accept #14-#24 AWG solid or stranded wire.

4. Requires 18-30VDC power supply.

5. (1) 4-20mA input signal.

6. (2) 4-20mA output signals.

B. Signal multiplier shall be Phoenix Contact MCR Signal Multiplier, or approved equal.

2.10 ELECTRICAL SYSTEMS

A. Power Distribution

1. Control panels shall include provisions for distributing power to all three phase and single phase equipment as shown on the Contract Drawings. Control panels shall include a main circuit breaker which shall disconnect power to the entire system. Incoming terminals shall be oversized to accommodate wiring and cable sizes as shown on the Contract Drawings.

2. Motor control panels which include motor controllers, motor starters, variable frequency drives, solid state reduced voltage starters, etc, shall have flange mounted disconnects mounted on the enclosure. "Through Door" type disconnecting handles are not acceptable.

3. Branch circuit breakers shall be provided on control power circuits and each individual circuit distributed from the panel. Circuit breakers shall be grouped on a single subpanel or DIN rail. Place subpanel so that there is a clear view of and access to the breakers when the door is open. Use branch circuit breakers rated at no more than twice the load.

4. Provide control power transformers and power supplies as required to obtain an operable system. Control power transformers shall be provided with suitable fusing on the primary and secondary side of the transformers. Control power transformers shall be sized as required to power equipment as shown on the Contract Drawings.

5. Place no more than 20 devices on any single circuit. Do not exceed 12A on any branch circuit

6. Where multiple units provide parallel operations, do not group devices on the same branch circuit.

B. Circuit Protective Devices

1. Circuit Breakers

a. Circuit Breakers shall be of the thermal magnetic air type, and shall be as specified in the Division 16. Circuit breakers shall be appropriately sized to protect the equipment served per the requirements of the NEC.

b. Thermal magnetic air circuit breakers shall be provided for branch circuit disconnect service and short circuit protection of motor control and auxiliary circuits.

c. Main circuit breakers for motor control panels which include motor controllers, motor starters, variable frequency drives, solid state reduced voltage starters, etc, shall be rated a minimum of 35kAIC.

2. Fuses

a. Provide fuses as required and specified for protecting individual control circuits and systems. Fuse ratings shall be sized to protect the equipment served per the requirements of the National Electric Code.

3. Surge Protection

a. Each control panel shall be provided with an Innovative Technologies #HS-DIN-120 or approved equal transient voltage surge arrester on the incoming 120VAC power supply.

b. Control and Instrumentation circuits which enter/exit the building or structure shall be furnished with Phoenix Digital TERMITRAB or approved equal surge protective devices.

c. All 4-20mA analog PLC input circuits shall be furnished with Phoenix Digital TERMITRAB or approved equal surge protective devices.

C. Terminal Blocks

1. Terminal blocks shall be feed-through, single level, and suitable for DIN rail mounting. Terminal blocks shall be fabricated complete with marking strip, covers, end plates, partitions, and screw type pressure connectors.

2. Terminal blocks shall be UL listed, rated for 600VAC, 35A unless otherwise noted. Terminal blocks shall not be less than nominal 1/4" width.

3. Not less than 25 percent spare terminals shall be provided.

4. Terminal blocks for external connections shall be suitable for #12 AWG wire.

5. Terminal blocks for low voltage instrumentation circuits shall be rated for 300VAC, 10A.

6. Separate terminals shall be used for AC and DC voltages. These terminals shall be labeled AC and DC and shall be provided with two distinct colors. Separate wireways shall be installed for AC and DC voltages. AC and DC wiring shall be kept separate at all times.

7. Fuse terminal blocks shall be provided with LED blown fuse indicators and shall be capable of being disconnected without special tools.

8. Ground terminals shall be green or green/yellow.

9. Terminal blocks shall be located in the bottom of the panel, except where otherwise shown or noted. Terminal blocks shall be located near the doors or access panels of the enclosures to facilitate field wiring connections. Minimum spacing between terminal blocks shall be 5 inches and a minimum of 4 inches all around. Duplicate terminals shall be used to limit the number of wires at one terminal to two.

10. Terminals shall be labeled to agree with identification shown on supplier's submittal drawings. A terminal shall be provided for each conductor of external circuits, plus one ground for each shielded cable. Wires shall be numbered using wire markers. Wire numbers shall agree with terminal numbers, submittals, and remote equipment wiring designations.

11. Terminal blocks shall be as manufactured by:

    a. Phoenix Contact

    b. Weidmuller

    c. Or approved equal

D. Internal Wiring

1. Internal control, instrument and component device wiring shall be type MTW or as normally furnished by the manufacturer. Internal control panel wiring shall be minimum of #14 AWG for power, #16 AWG for discrete wires, #18 AWG for analog wires.

2. Interconnecting wiring and wiring to terminals for external connection shall be stranded type THHN/THWN and shall be not less than #16 AWG copper, insulated for not less than 600 volts, with a moisture and heat resistant material and flame-retardant nonmetallic covering.

3. Wiring, except where noted, shall terminate on panel terminal blocks. Wiring shall be from terminal to terminal with no splices. Wiring from external devices shall terminate at the panel's field termination terminal blocks.

4. All wiring shall be run in plastic finger type wire duct. Ducts shall be provided and sized with consideration to allow field wires to be run in the ducts plus an additional 25% spare capacity.

5. Instrumentation circuits shall be shielded. All instrumentation signal wire (4-20mA) shall be separated with barriers in wire ducts.

6. Wiring shall be grouped or cabled and firmly supported to the panel. Not less than 8” of clearance shall be provided between the terminal strips and the base of vertical panels for conduit and wiring space. Plastic wireway,

Panduit or equal, shall be used to route wire within the panel. Wireways shall be provided with removable covers. Wireway shall be run in continuous length with snap on covers. AC and DC wiring shall be run in separate plastic wireways.

7. Tie-wraps used for bundling wire shall be cinched carefully to eliminate grooving the insulation. Wires bundles between the back panel and enclosure door shall be spiral wrapped.

8. Each control loop or system shall be individually fused, and fuses and circuit breakers shall be clearly labeled and located for easy maintenance.

9. Color code wiring as follows:

a.	Line and Load Circuits (ac or dc power)	Black
b.	Neutral/Grounded Conductors	White
c.	AC Control Circuits	Red
d.	DC Control Circuits (+)	Blue
e.	DC Control Circuits (-)	Blue/Black
f.	Interlock Control Circuits on the panel energized from external source.	Yellow
g.	Equipment Grounding Conductors	Green

E. Circuit Identification

1. Devices mounted on or within the enclosures shall be permanently identified with engraved labels. The device and terminal identifications shall agree with those shown on the Contract Drawings.

F. Controls and Instrumentation

1. Panel mounted control relays, pushbuttons, indicating lights, selector switches, and instruments and components shall be as specified and shall maintain the NEMA/UL Type rating of the enclosure.

2. Device, Junction, Pull Boxes and other conduit system accessories shall be as specified in the Division 16.

G. Grounding

1. Enclosures shall be provided with two grounding lugs located on opposite sides of the enclosure for connection to external grounding system.

2. Provide a ground bus in each cabinet or panel for the shield and signal grounding circuits.

3. Swing-out panels shall be grounded and provided with flexible grounding braids that allow the swing-out panels to be opened.

2.11 CONTROL PANEL IDENTIFICATION

A. Control panels and enclosures shall be provided with nameplates on the exterior of each enclosure as shown on the contract drawings. Nameplates shall be mounted directly above equipment.

B. In addition, for selector switches and/or pushbuttons, a factory installed legend plate shall be provided to indicate the function each station performs, such as "ON" or "OFF."

C. Nameplates shall be engraved 1/4” high (1/2” high for enclosure titles) black capital letters on a 1/8" thick plastic white tag with black letters mechanically attached to enclosure. Lettering shall be in capitals except as shown. Nameplate text shall be as shown or scheduled on the Contract Drawings.

D. Legend plates shall be metal with black lettering mechanically attached to control panel.

E. Interior mounted components and equipment shall be provided with nameplates. Nameplates shall be located adjacent to, but not on, the given device and visibility shall not be obstructed by wire bundles or other equipment. Nameplates shall include device identification number as well as descriptive name.

F. Enclosures shall be provided with instruction plaques indicating any warnings or special instructions required by the component manufacturers. Warning plaques shall be red with white lettering.

G. Control panels that contain wiring fed from multiple external power sources shall be provided with a nameplate on the front of the enclosure indicating:

“WARNING -
THIS PANEL IS FED BY
MULTIPLE POWER SOURCES”

H. Nameplates shall be permanently secured to enclosures and back panels.

2.12 MISCELLANEOUS ITEMS

A. Wiring Diagrams

1. A glossy embossed elementary wiring diagram shall be provided, permanently attached to the inside door of each control panel. The wiring diagram shall include all shop drawing and field changes and revisions performed during construction.

B. Surge Suppressors

1. Surge suppressors shall be provided on all DC operated relay coils to minimize the high transient voltages generated when the circuit to the operating coil is opened.

C. Spare Parts

1. Each control panel shall be provided with spare parts as indicated in individual component sections.

PART 3 - EXECUTION

3.01 FABRICATION

A. General

1. Fabricate control panels, install instruments and components plumb, and wire in the factory. Test wiring and check plumbing prior to shipment.

2. Use panel fabrication techniques that allow for removal and maintenance of all equipment after installation.

3. Cut, punch, or drill cutouts for panel mounted instruments and smoothly finish with rounded edges.

4. Place knockouts for the wiring of freestanding panels either at top or bottom of the panel. Cover holes for future devices with a plastic plate.

B. Wiring

1. Panel wiring shall be installed by the panel manufacturer and shall be brought out to identified terminal blocks. Inter-wiring between panel sections shall be from terminal blocks to terminal blocks. Terminal blocks for panel wiring shall be correlated with those for the electrical equipment by the panel manufacturer.

C. Component Location

1. Equipment shown or specified to be furnished with the panels shall be mounted by the panel manufacturer. Panel mounted controls shall be located such that they are easily accessible. Panel mounted controls and components shall be mounted a minimum of 30" above grade or finished floor and a maximum of 72" above finished floor. The panels shall be furnished as completely assembled units, requiring only field connections of power and control wiring.

3.02 INSTALLATION

A. General

1. Contractor shall verify placement of panel prior to fabrication and any and all shipping splits shall be provided.

2. Panels shall be grounded and all equipment and circuits included in the panels, as shown or required to be grounded, shall be connected to the grounding conductors.

3. The panels shall be installed as shown and directed. The final control panel locations shall be coordinated by the Contractor to avoid interference with standard operation and maintenance practices of the adjacent equipment. Wiring and conduits shall enter the panels as shown or specified.

4. Wall mounted control panels butting to masonry walls shall be provided with closure strips to seal the opening between the panel and the masonry.

5. Enclosures up to 48” in height shall be wall mount and enclosures larger than 48” shall be floor mount.

6. All panels shall be mounted level and plumb.

7. Control panels shall be mounted such that:

   a. Top of wall mounted panels shall not be higher than 6’-0”.

   b. No pilot devices shall be higher than 5’-6”.

   c. No operator interface device (i.e., operator interface panel, pump controllers, etc) is higher than 5’-0” to the centerline of the device.

3.03 QUALITY CONTROL

A. Testing and Demonstration

1. Control panels shall be assembled and tested at the fabricator’s facility prior to shipment to the job site to verify that all system components function properly and perform as specified.

2. Control panels shall be tested for proper operation and operational sequencing after installation at the job site. Testing shall be witnessed by the Engineer and/or Owner unless indicated otherwise. The Contractor shall submit written notice of the test 14 days prior to the test date and shall submit information on testing procedures.

3. Proper operation of control panels shall be demonstrated to the Engineer and/or Owner. Testing and demonstration shall be performed by a qualified service representative of the control panel fabricator or manufacturer.

4. Any and all equipment required for the testing of the control panels shall be provided by the Contract at no cost to the owner.

END OF SECTION

SECTION 13420

INSTRUMENTATION

PART 1 - GENERAL

1.01 SUMMARY

A. This section describes the requirements for furnishing, installing, and placing into operation field-mounted and panel-mounted instrumentation.

1. Related sections include:

a. DIVISION 16
b. DIVISION 13

1.02 REERENCES

A. Work covered by this Section shall comply with all relevant portions of the following regulations and standards:

1. API - American Petroleum Institute

2. ASTM - American Society for Testing and Materials

3. ISA - Instrument Society of America

4. ISO - International Standards Organization

5. NEMA - National Electrical Manufacturers Association

6. UL - Underwriters Laboratories, Inc.

7. NEC - National Electric Code

8. IEEE - Institute of Electrical and Electronic Engineers

1.03 SUBMITTALS

A. Include the following information in the submittal for each instrument specified in the section.

1. Tag number and description.

2. Data sheets and catalog literature. Provide data sheets as shown in ISA-S20-1981. For instruments not included in S20, submit data sheets using a format similar to those shown.

3. Mounting details, including all dimensions, installation methods, elevations and sections.

4. Range, size, weight, outline and dimension drawings, materials of construction, enclosure classification.

5. Description of any integral instrument controls.

6. Methods and materials required for installation. Include power and signal connection details with complete wiring diagrams.

7. List of recommended spare parts.

8. List of optional accessories.

B. Provide separate 3-ring binder for original manufacturer's calibration certificates. Binder shall include separate tabs for each facility with certificates for all analog instruments provided for a facility included in the referenced tab.

C. Include the following information in the final operations and maintenance manuals for each instrument specified in the section.

1. Operation and maintenance manuals for each instrument.

2. Specific arrangement and dimension drawings for the installation of each instrument. Include locations of each instrument or device.

3. Installation certifications.

4. Copy of manufacturer's calibration certification for each instrument.

5. Calibration/Data sheets.

6. Tag data to be included on instrument tag.

D. Exceptions to the specifications or drawings shall be clearly defined by the supplier. Failure to clearly indicate exceptions shall be basis for rejection of the submittal.

E. Submittals shall be reviewed with respect to their conformance with the Contract Documents. Unless provided for reference or clarification of unspecified items, submittals which do not address specific Specification items will not be acceptable. Address items in each specification or note specifically which items are omitted.

1.04 SYSTEM DESCRIPTION

A. All instrumentation supplied shall be of the most current and proven design. Specifications and drawings call attention to certain features but do not purport to cover all details entering into the design of the instrumentation equipment. The equipment provided shall be compatible with the functions required for the pump station controls.

B. All necessary fuses and cables required for instrumentation equipment shall be provided with the equipment.

C. Provide instruments that operate on 24V dc power, except where specifically noted. Provide instruments which return automatically to accurate measurement upon restoration of power after a power failure.

D. Provide and install transmitter power supplies in local panels or enclosures as required.

E. Provide two wire instrument transmitters which produce isolated 4-20 mA dc analog signals. Follow ISA-S50.1-1982. All analog transmitter and controller outputs shall be capable of driving into at least 1200 ohms unless otherwise specified.

F. Provide alarm and status points with an isolated contact. Unless otherwise noted, the contact will be closed when the normal, non-alarm condition to be sensed is true.

G. Provide instruments that are constructed so that they are impervious to damage by dust, moisture, fungus and airborne contaminants.

H. Provide instruments complete with mounting hardware, floor stands, wall brackets, or instrument racks.

I. Local indicators shall provide direct readings utilizing the same range, scale and units as that reported via the station control system. Instruments selected shall have ranges and indications appropriate to the process.

1.05 QUALITY ASSURANCE

A. Provide only new, standard, first-grade materials throughout, conforming to standards established by Underwriters Laboratories (UL), Inc. and National Electrical Manufacturers Association (NEMA) and so marked or labeled.

B. Provide material and equipment in accordance with applicable codes and standards, except as modified by the specifications.

C. Use single source manufacturer for each instrument type. Use the same manufacturer for different instrument types whenever possible.

D. Coordinate instrumentation to assure proper interface and system integration. Provide signal equipment, to include, but not to be limited to, transducers, signal

converters and power supplies. Coordinate the various subcontractors, equipment suppliers, and manufacturers.

E. Provide manufactures certificate of calibration for all analog instrument devices. Original certificates shall be provided to Owner in separate binder with copies included in O&M manuals.

1.06 DELIVERY, STORAGE AND HANDLING

A. Have each manufacturer or supplier package instrumentation to protect against shipping damage, dust, moisture, and atmospheric contaminants. Include a shipping label which contains the following information:

1. Tag number and description.

2. Instructions for unloading, transporting, storing and handling at the site.

B. Receive instrumentation at the site. Inspect instrumentation for damage in shipment. Return all damaged instrumentation to the manufacturer for replacement at no cost to the County.

C. Do not store instrumentation out-of-doors. Provide dry, permanent storage facilities and pay storage cost.

PART 2 - PRODUCTS

2.01 FLOAT SWITCHES

A. High water alarm float switches shall be provide as shown on the drawings and shall be a hermetically sealed, mercury-free float switch.

B. Float switches shall be suitable for wiring in intrinsically safe circuits for Class I, Group D, Division 1 Hazardous Locations.

C. The sensor shall have the following characteristics at a minimum:

1. Teflon Coated 316 stainless steel.
2. Flexible cord with 3 conductors, size No. 14 AWG.
3. Normally Open switches, closing on rising water level.
4. Temperature range or 32-221 degrees F

D. Activation height of float switches shall be coordinated with the owner at installation.

E. Float switches shall be manufactured by:

1. Anchor Scientific

2. Conery
3. Or approved equal

2.02 PRESSURE TRANSMITTERS

A. Pressure transmitters shall be provided as indicated on the drawings to provide station suction and discharge pressure. Pressure transmitters shall be installed in as detailed on the drawings and shall have the following characteristics:

1. Range: 0-600 PSI max with analog output calibrated for 0 – 100 PSI, subject to field adjustment for final calibrated range.
2. Accuracy: +/- 0.5%
3. Process Operating Temperature: -20°C to +70°C.
4. Integrated LCD Display
5. Signal Interface:
    a. 4 to 20 mA dc output with digital signal, unless otherwise noted below.
    b. Nominal Maximum Loop Resistance with External 24V DC Power Supply, as shown on drawings.

B. Pressure transmitters shall be manufactured by:

1. Rosemount
2. Endress & Hauser
3. Or approved equal

2.03 PRESSURE GAUGES

A. Pressure gauges shall be provided as indicated on the drawings for local reading of system pressure. Pressure gauges installed in PRV vaults shall be angled so that they can be read from outside of the vault.

B. Pressure gauges shall meet the following requirements

1. Case Style: Solid front with full blow-out back, liquid filled.
2. Case Material: Fiberglass reinforced plastic.
3. Dial Size: 4-1/2”
4. 316L SS Bourdon Tube
5. 1/2” NPT Process Connection
6. Accuracy: 0.5% Full Scale
7. Range: 0-200 psi

C. Pressure gauges shall be installed with ¼-turn isolating ball valves.

2.04 DOOR / HATCH SWITCHES

A. Switches shall be rugged sealed units rated for use in industrial environments. Switches shall be manufactured of aluminum housing and shall be provided with a stainless steel armored cable.

B. Provide required mounting hardware and fasteners of stainless steel. Provide NEMA 3R PVC junction box with concentric cord grip fitting for termination of armored cable.

C. Provide switches with DPDT contacts.

D. Installation shall be wired to provide an energized input when doors/hatches are in the fully-closed position and de-energize otherwise.

E. Switches shall be installed as indicated on the drawings.

F. Switch shall be by UTC Fire & Security 2507 series, or equal.

2.05 FLOW METERS - MAGNETIC

A. Flow meters shall utilize the characterized field principle of electromagnetic induction based on Faraday's Law to produces a DC signal directly proportional to the liquid flow rate.
B. Measurement Type: Volumetric Flow Rate.
C. Service: Rated for location and application as shown on the drawings
D. Flow meters shall have the following characteristics:

1. Accuracy: +/-1% of span or better.
2. Stability: +/- 0.1% of flow rate across 6 months, minimum.
3. Response Time: Max 330 ms
4. Linearity: +/-0.3% of calibrated range or less
5. Repeatability: Minimum of +/- 0.2% calibrated range
6. Flow Sensor:
    a. Operating Temperature: 5°F to 140°F
    b. Body: Stainless steel
    c. Grounding rings: quantity 2.
    d. Provided with manufacturer cable to interface with transmitter, length to-suit.
7. Flow Transmitter
    a. Power supply: 24VDC
    b. Operating Temperature: -40°F to 176°F

c. LCD display with backlight and buttons.

d. Accessories for remote panel-mount.

e. Signal output: 4-20mADC, linearly proportional to measured flow.

E. Calibration: provide NIST Traceable calibration certificate

F. Warranty: 3 years from date of shipment

G. Flow meters shall be manufactured by:

1. Rosemount

2. Endress & Hauser

3. Or approved equal

2.06 FLOW METERS – METERING VIA VALVE'S PRESSURES AND POSITION

A. Flow meters shall assimilate data from valve-mounted upstream and downstream pressure transmitters and valve position transmitter to calculate liquid flow through such valve.

B. Flow meter complete package includes all instruments and flow calculator-transmitters as required to be outfitted to indicated valve as shown on the drawings.

C. Service: Rated for location and application as shown on the drawings

D. Flow meters shall have the following characteristics:

1. No upstream or downstream pipe run length is required.

2. Field pressure transmitters

a. Ambient Temperature: -13°F to 170°F

b. Pressure range: 0 to 200PSI (if differential pressure transmitter is used, size range to-suit)

c. Quantity as required

d. Output 4-20mADC, accuracy +/- 0.5% of span.

3. Field position transmitter:

a. Ambient Temperature: -13°F to 170°F

b. With LED lights for diagnostic

c. Output 4-20mADC, accuracy +/- 100 micrometer.

4. Flow Calculator and Transmitter

a. Power supply: 24VDC

b. Ambient Temperature: 14°F to 150°F

c. LCD display with backlight and buttons.

d. Accessories for remote panel-mount.

e. Signal output: 4-20mADC, linearly proportional to measured flow.

E. Calibration: provide NIST Traceable calibration certificate
F. Warranty: 3 years from date of shipment
G. Flow meter package shall be manufactured by Cla-Val model XP2F, or approved equal.

2.07 INSTRUMENT NAMEPLATES

A. Each instrument shall be provided with 316 stainless steel tag attached to the instrument with 16 gauge 316 stainless steel wire or stainless steel screws. Letters shall be 3/16" high, fully impressed so that all characters are completely formed, crisp and deep. Instrument tag number shall be as shown in instrument index for each site. The following information shall be included on the tag:

1. Tag number and description.

2. Manufacturer and serial number.

3. Complete model that indicates all options for the provided instrument. A simple model series is unacceptable.

B. An instrument nameplate schedule shall be submitted to the Engineer for approval prior to performing any engraving.

2.08 SPARE PARTS – NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the Drawings and the site for placement and connections of instrumentation. Investigate the space in the buildings or facilities through which the equipment must pass to reach its final location. Make provisions to move the instrumentation into place. The Contractor shall coordinate with the equipment supplier to resolve any clearance or connection problems before the equipment is received on site.

B. Secure and utilize instrument mounting details from the manufacturer or supplier for installation purposes.

3.02 INSTALLATION

A. Provide labor, materials, tools, equipment, supplies and services and auxiliary devices including, but not limited to, bracket and mounting hardware to install the instrumentation.

B. Provide fused electrical disconnects locally at all instruments requiring 120 VAC.

C. Unless specifically shown, do not mount direct reading or electrical transmitters

on process piping. Mount on instrument racks or stands or in enclosures mounted on walls.

D. Install the instrumentation and auxiliary devices so that they are accessible for maintenance. Provide space between instruments and other equipment and piping for ease of removal and servicing. Generally, install instrumentation to be accessible from floor level or grade.

E. Follow additional installation specification as specified in the individual instrument sections.

F. Provide unions, couplings, shut off valves and adapters for process piping to field instrumentation interface, as shown on instrument mounting detail drawings.

G. Minimize process interruptions during installation, removal, or replacement of instruments and devices. Any operating interruptions shall be at the convenience of operations personnel.

3.03 FIELD QUALITY CONTROL

A. Provide instrument manufacturer's services for installation assistance, field calibration, startup and training. Provide manufacturers certificate for each instrument at each site stating that installation is in accordance with manufacturers recommended practice.

B. Provide site training describing maintenance, calibration, troubleshooting, repair and replacement for each instrument. The site training shall be provided by a technician employed directly by the instrument manufacturer. Contractor personnel shall not provide this training. Two training sessions shall be provided for each instrument type on non-consecutive days. Each session shall accommodate up to six instrumentation technicians. Include the instructor's travel, meals, lodging and expenses for site training. For factory training, include, travel, meals, lodging and expenses for four students unless otherwise specified.

C. Remove the shipping stickers, paint splatters, dirt, grease and other contaminants to restore the instrumentation to a clean and like new condition prior to final acceptance.

3.04 DEMONSTRATION

A. Prepare instrumentation installation certification and calibration certification sheets for each instrument. Use these sheets for documenting installation, testing and calibration.

B. For each installation certification sheet, include the following information:

1. Project name.
2. Tag number and description.
3. Manufacturer.

4. Complete model and serial number.
5. Date, time and person who performed mechanical installation verification.
6. Date, time and person who performed electrical installation verification including wiring terminations.
7. Space for comments.
8. Space for sign off and date.

C. For each calibration certification sheet, include the following information.

1. Project name.
2. Tag number and description.
3. Manufacturer.
4. Model and serial number.
5. Date, time and person who performed calibration.
6. Calibration data to include:
   a. Input, output, and error at 0 percent, and 100 percent of span for analog instruments.
   b. Switch setting, contact action, and deadband, if applicable, for discrete elements.
7. Space for comments.
8. Space for sign off and date.

D. Conduct a performance test for each instrument. Furnish special tools, calibration equipment and labor to perform the tests. Demonstrate that the instrument performs as specified. Test analog devices at 0, 25, 50, 75, and 100 percent of scale and record actual vs. expected instrument response.

E. For each analog instrument performance test, prepare a performance test sheet and include the following information:

1. Project name.
2. Tag number and description.
3. Manufacturer.
4. Model and serial number.
5. Date, time and person who performed test.
6. Test date to include output and error at each test point.

END OF SECTION

SECTION 16000

ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide AC power as required. See contract drawings for details. Provide dedicated power circuits to new SCADA RTU panels and ancillary equipment as required.

B. Provide all labor, materials, equipment and services for installation of a complete operating system including all equipment, conduits conductors, etc.

1.02 RELATED SECTIONS

A. Division 13 Specifications

1.03 SYSTEM REQUIREMENTS

A. The electrical system shall be designed after a thorough site investigation and meetings with the ACSA's staff. Arrange components logically for easy maintenance.

1.04 CRITERIA

A. Electrical Systems shall be in accordance with the required and advisory portions of:

1. NFPA 70, National Electric Code

2. NECA 1, Standard Practices for Good Workmanship in Electrical Contracting

3. NETA, Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

4. UL Underwriters Laboratory

1.05 COMPLIANCE VERIFICATION

A. Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection

1.06 SUBMITTALS

A. Submit shop drawings and manufacturer's product data, in accordance with provisions of Division 16000 – ELECTRICAL SYSTEMS. Manufacturer's data shall include specifications, installation instructions and general recommendations for each type of raceway required. Include data substantiating that proposed materials comply with specified requirements for each type of raceway.

PART 2 – PRODUCTS

2.01 ELECTRICAL POWER – SERVICE AND DISTRIBUTION

A. Provide power to the new SCADA RTU panel by installing a new circuit breaker in the circuit breaker distribution panel or load center. Circuit breakers shall be per UL 489 and shall be intended by their manufacturer, as indicated in by the manufacturer's product cross-reference, to be compatible with the existing breaker panels.

B. Provide new 120/240 volt, 100 ampere, single phase, 3 wire electrical service at the following sites

1. Camelot PRV - Coordinate with Rappahannock Electric Cooperative
2. Fontana PRV - Coordinate with Dominion Virginia Power
3. Forest Lakes North PRV - Coordinate with Dominion Virginia Power
4. Ivy/Flordon PRV - Coordinate with Dominion Virginia Power
5. Woodlands PRV - Coordinate with Dominion Virginia Power

2.02 ELECTRICAL ENCLOSURES

A. Provide junction boxes and enclosures as indicated in Section 13000. All enclosures shall be, NEMA 4X Stainless Steel unless otherwise noted on drawings.

B. Enclosure shall have the following features:

1. Smooth continuously welded seams.
2. Heavy gauge continuous piano hinge.
3. Oil resistant door gasket.
4. External mounting tabs on the top and bottom of enclosure
5. Finish and construction shall be manufacturer's standard.

6. Enclosures housing electrical controls and/or terminal blocks shall be provided with a document pocket mounted on the interior of door.

7. Subpanel constructed of 14 gauge steel, minimum, with white enamel paint finish, intermediate stiffeners and stainless steel hardware.

C. Enclosure shall be as manufactured by Hoffman Engineering or approved equal.

2.03 CONDUCTORS AND CABLES

A. Insulated Single Conductor Cables

1. Secondary wiring within buildings shall be soft drawn copper 98% conductivity with 600 volt insulation, and shall be manufactured in accordance with requirements of the NEC, UL, ASA, NEMA, and ICEA.

2. Wire and cable shall be delivered to job site in full coils or reels, each bearing a tag containing UL approval stamp, name of manufacturer, trade name, code, type of wire, and month and year of manufacture.

3. Conductor insulation shall be NEC type "THHN/THWN" for field wires and type MTW for control panel wires. Wire insulation shall be adequately color coded for identification, unless otherwise indicated. Conductor size shall be as defined by standard American Wire Gauge (AWG) numbers or circular mils where indicated. Panel control wiring shall be MTW type.

4. All control, signal and power conductors shall be stranded.

5. Minimum size for power and lighting circuits shall be #12. Minimum size for 120 VAC and 24 VDC control circuits shall be #16. All wires shall meet the minimum size rating for connected load and distances per code requirements.

B. Bare Single Conductor Cables

1. Bare copper ground wire shall be soft drawn copper 98% conductivity and shall conform to ASTM B-3 and Federal Standard QQ-W-343.

2. All bare conductors #2 and smaller shall be solid. Conductors #1 and larger shall be stranded and shall conform to ASTM B-8.

C. Termination and Splicing Fittings

1. No splices will be permitted in new installed wires for control, signals or

power, unless specifically approved by the Engineer.

2. If splices are approved by the Engineer, materials shall be as follows:

   a. Fittings for termination or splicing stranded wire shall be solderless and designed for stranded wire set screw pressure fittings or indent compression type fittings. Thomas and Betts, Brundy, Square D, or equivalent.

   b. Splices (junctions which occur below grade (including those in NEMA 4 junction boxes)) shall be 3M "Scotch-cast" insulated.

   c. Splices in branch circuit and control wiring #10 and smaller shall be made with insulated spring connectors, Ideal "Wirenuts" or equivalent.

D. Pulling Compound

1. Pulling compound shall be UL approved, "Y-ER-EASE", or equivalent. Soap, grease or any substance other than specified shall not be permitted.

2. Wire pulls shall not exceed manufacturers recommended maximum tensile.

E. Wire Labels

1. Wires shall be labeled with durable thermal printed heat-shrink labels unless otherwise specified.

2. Wire labels shall be white with black capitalized alpha-numeric characters.

PART 3 – EXECUTION

3.01 GENERAL

A. Exposed low voltage circuits shall be run in galvanized metallic raceways. Metallic cable assemblies, type MI cable, type AC cable and type MC cable are not acceptable.

B. Unless otherwise noted, use Schedule 80 PVC conduit in all vaults, direct buried and wet locations and galvanized steel conduit in all other locations. Support conduit per NEC.

C. All wiring shall use stranded copper conductors with insulations suitable for dry and wet locations. Power wiring insulation shall be rated for 600V. Instrumentation cable shall be twisted pair overall foil shielded with drain wire and insulation shall be rated for 300V or 600V. Shield shall be grounded at one end only, at the control panel.

D. Instrumentation and 24 Volt DC signal wiring shall be segregated from 120 Volt AC power wiring.

E. Identify each wire with a numbered label corresponding to the wire numbers appearing on the as-built wiring diagrams. Provide labels at each end.

F. Design circuits and components to be loaded to no more than 80% of rated ampacity.

G. Coordinate power requirements of all equipment. Provide branch circuits and final connections for all equipment.

H. Test the installation per the recommendations of NETA ATS.

3.02 RACEWAYS, CONDUCTORS AND CABLES

A. All wire shall be installed in raceways as indicated above or on drawings.

B. Grounding, neutral, and phase conductors shall be pigtailed for connection to receptacles so that any receptacle may be disconnected without interrupting connections to other receptacles on same multi-wire branch circuit.

C. Do not install wire in raceways until after concrete work or plastering is completed. Raceways, in which moisture has collected, must be swabbed out before pulling in wire.

D. Openings for raceways penetrating poured concrete floors or masonry walls shall be core-drilled. Openings shall be sealed watertight with grout and finished to match existing finish.

E. Wiring exposed to temperatures higher than 30 degrees Celsius shall have insulation properly rated for temperatures it must withstand (i.e., wiring in lighting fixtures or electric heating equipment, unless provided by fixture or equipment manufacturer shall be type XHHW).

F. Green colored insulated equipment grounding "Green Wire" conductors shall be provided for all feeders and branch circuits. "Green Wire" grounding and neutral wires shall be color coded throughout entire length. Provide "Green Wire" grounding conductor, in addition to grounding provided by raceway system enclosing branch circuit or circuits. Size of "Green Wire" grounding conductor shall conform to NEC requirements. Ground conductor shall interconnect grounding terminal of each receptacle, lighting fixture or equipment enclosure containing circuit and grounding bus or terminal at point of origin of respective circuit. "Green Wire" grounding conductor shall be run with each respective feeder and branch circuit conductor group and with each multi-wire branch circuit

conductor group. At each receptacle location, connect "Green Wire" system to receptacle enclosure using separate pigtail.

G. Branch circuits shall be provided only as single or combined wiring groups, as follows:

1. One section of raceway shall not enclose more than one branch circuit or multi-wire branch circuit, unless otherwise indicated.

2. Where more than one branch circuit or multi-wire branch circuit share common enclosure (i.e., pull box or junction box or wiring trough). Wiring comprising each branch circuit and multi-wire branch circuit shall be secured as group by "ties" or other grouping devices at intervals not to exceed 3 inches, where accessible.

3. Where branch circuits and multi-wire branch circuits are routed in wireway, increase wiring size, as required, to comply with derating requirements of NEC.

H. Wiring size shall be minimum #12 for 20 ampere, 120 volt or 277 volt lighting or receptacle branch circuit with maximum total length of 60 feet and 150 feet, respectively. Where circuit total lengths exceed those limits (measured horizontally and vertically along path from Panelboard to load), wiring size shall be increased as follows:

Wire Size	120V to Ground Max Total Length	277V to Ground Max Total Length
#12	60'	150'
#10	100'	250'
#8	over 100'	over 250'

1. Where wire size is specifically indicated and voltage drop is in accordance with NEC, length restrictions noted above do not apply (i.e., motor branch circuits).

2. Where wire size is increased only to accommodate length relationships noted above, taps (i.e., pigtails to devices) up to 10' long may be made with #12 at utilization points.

3.03 WIRE IDENTIFICATION

A. Each wire shall be labeled and numbered with a plastic heat-shrink label around the wires at each termination of the wires at relays, terminal boards and other devices.

B. Wire numbers shall correspond to wire numbers on the wiring and schematic

diagrams.

END OF SECTION

SECTION 16130

RACEWAYS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Requirements of Section 16000 - ELECTRICAL SYSTEMS - apply to work specified under this section.

B. Requirements of this section of specification apply to and form part of individual electrical sections of the specification.

1.02 SCOPE

A. Work includes labor, materials, equipment and services for installation of complete raceway system.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Refer to Section 16000 – ELECTRICAL SYSTEMS

B. Division 13 Specifications

1.04 SUBMITTALS

A. Submit shop drawings and manufacturer's product data, in accordance with provisions of Section 16000 - ELECTRICAL SYSTEMS. Manufacturer's data shall include specifications, installation instructions and general recommendations for each type of raceway required. Include data substantiating that proposed materials comply with specified requirements for each type of raceway.

PART 2 - PRODUCTS

2.01 GENERAL

A. Raceways shall be UL listed and bear the UL label, unless otherwise indicated.

2.02 RIGID METAL CONDUIT (RMC) RACEWAY

A. RMC raceway shall also be known as galvanized rigid steel raceway (GRS). RMC raceway shall be steel, zinc coated for corrosion protection and shall comply UL 6, Federal Specification WWC-581 and ANSI Specification C80.1. Threads shall be protected from corrosion as soon as possible after they are cut by plated or painted finish.

B. Polyvinylchloride (PVC) coated RMC raceway shall be steel, hot-dipped galvanized inside and out prior to application of protective coating. PVC coated RMC shall comply with UL 6, Federal Specification WWC-581E, ANSI Specification C80.1 and shall bear the UL listing mark #E-65583. Exterior coating shall be applied with nominal thickness of 40 mils to raceway, which has been treated with primer before coating is applied. Urethane coating shall be applied to interior of raceway to nominal thickness of 2 mils. The exterior and interior coatings shall be continuous, except for threads, and shall be made in accordance with NEMA Standards Publication RN1.

2.03 LIQUID TIGHT/FLEXIBLE METAL CONDUIT (LT/FMC) RACEWAY

A. LT/FMC raceway for feeder and branch circuits of general wiring systems shall be constructed of galvanized steel core with thermoplastic jacket and integral copper ground wire, and shall comply with UL 360 and Federal Specification WWC-566, Type 1. Liquid tight jacket shall conform to NEMA RN1. Provide Anamet Type U.A., or equivalent.

2.04 ELECTRICAL METAL CONDUIT (EMT) RACEWAY

A. EMT raceway shall be steel, zinc coated on outside and zinc or enamel coated on inside, with compression fittings. EMT raceway shall comply with UL 797, Federal Specification WWC-563 and ANSI Specification C80.3.

2.05 COUPLINGS AND FITTINGS FOR STEEL RACEWAYS

A. Couplings shall be steel finished with coatings inside and outside of zinc or cadmium.

B. Couplings for RMC, except where encased in concrete or in hazardous locations, shall be threaded (solid or split). Where encased in concrete or within masonry, couplings for RMC raceway shall be solid (not split in half or down one side) threaded steel fittings only. In hazardous locations, couplings for RMC raceway shall be solid (not split in half or down one side) threaded steel fittings only.

C. Provide type "A" insulating bushings by OZ/Gedney, or equivalent, on RMC raceway terminations.

D. Box connectors for LT/FMC raceway shall comply with Federal Specification WF 406B and shall be liquid tight with insulated throat as manufactured by Sepco, or equivalent. Provide straight or 90 degree connectors suitable for use in its intended application.

E. Fittings shall be compatible with raceway and box accommodated. Fittings for RMC shall be threaded and shall conform to Federal Specification W-C-408. Fittings for LT/FMC shall meet Federal Specification W-F-406, Type I, Class 3, style as required.

F. Expansion fittings for use with RMC raceway shall be type AX or EX by OZ/Gedney, or equivalent. Expansion/deflection fittings for use with RMC shall be type DX by OZ/Gedney, or equivalent. Type of fitting shall be properly chosen for type of movement anticipated.

2.06 CONDUIT OUTLET BODIES FOR STEEL RACEWAYS

A. Conduit outlet bodies shall conform to UL 514, Federal Specification W-C-586b and ANSI Specifications C80.4 and C33.84.

B. Conduit outlet bodies shall be hot-dipped zinc galvanized iron alloy where used with RMC, galvanized steel raceway.

C. Conduit outlet bodies for RMC conduit systems shall be provided complete with threaded hubs, neoprene gaskets and cast covers.

2.07 POLYVINYLCHLORIDE RIGID NONMETALLIC CONDUIT (PVC) RACEWAY

A. All PVC raceways shall be heavy wall polyvinylchloride type 80 conforming to NEMA TC-2 and Federal Specification WC-1094. PVC raceway shall be suitable for concrete encased or direct burial underground applications. PVC raceway shall have reduced emissions of smoke and HCL under fire conditions.

B. PVC raceway for power circuits shall be suitable for use with 90 degree C. conductors.

2.08 COUPLINGS AND FITTINGS FOR PVC RACEWAYS

A. Couplings and fittings for PVC raceway shall conform to NEMA TC-3.

B. Couplings and fittings for PVC raceway encased in concrete, or within masonry shall provide watertight connections and shall be suitable for encasement in concrete.

2.09 WIREWAY

A. Wireway raceway shall be complete with covers and associated assemblies, (including: adapters, elbows, three-way junction, four-way junction, and telescopic hangers to accommodate installation of wiring using "Lay-in" methods.

B. Oil-tight, dust-tight, watertight wireway raceway (NEMA 4X) shall conform to UL 870, and shall be molded of glass reinforced polyester resins. Resin system shall include flame retardant to obtain flammability rating which meets UL 94V-O. Wireway by Stahlin division of Robroy Industries, or equivalent.

C. Oil-tight, dust-tight wireway (NEMA 12) shall conform to UL 870, and shall not be less than 14-gauge steel, except that end flanges shall not be less than 10-gauge steel. Wireway shall be constructed without knockouts, and shall be provided with

corrosion-resistant phosphatizing primer and ANSI-49 grey epoxy finish. Wireway shall be gasketed and provided with quick release cover latches. Square D "JIC", or equivalent.

2.10 ELBOWS AND OFFSETS

A. Preformed elbows and offsets shall conform to same standards as respective raceway.

2.11 MISCELLANEOUS

A. Cable Supports shall be OZ/Gedney type "S", or equivalent.

B. Wall entrance seals shall consist of hot-dipped galvanized sealing gland assembly capable of providing seal around conduit to withstand 50-foot head of water without leakage. Shell of seal shall have at least two cast collars at right angle to sleeve that is embedded in concrete. Entrance seals shall be OZ/Gedney suitable for use with new or existing construction as applicable.

C. Conduit seals shall be as manufactured by Crouse-Hinds, Appleton, or equivalent.

PART 3 - EXECUTION

3.01 GENERAL

A. Install wiring in raceways, unless otherwise indicated.

B. Provide labeling in accordance with Section 16000 - ELECTRICAL SYSTEMS

3.02 RACEWAY METHODS

A. The Contractor shall use the types of conduit for raceways in locations as follows:

1. EMT conduit with compression fittings inside buildings.

2. Galvanized Rigid Steel conduit outside of buildings and above grade.

3. Schedule 80 PVC conduit in vaults and buried locations. Schedule 80 PVC conduit shall transition to RGS after 90 degrees up elbow such that PVC conduit is not exposed.

B. LT/FMC raceway shall be used:

1. In short lengths not to exceed three (3) feet for connection to motor terminal boxes, dry type transformers, engine generators, and vibrating equipment. Where such equipment is exposed to weather in damp or wet locations, LT/FMC raceway shall be employed.

2. In lengths, as required by NEC, between outlet boxes and recessed lighting fixtures.

C. Concealed raceway run below finish grade shall be Schedule 80 PVC.

D. RMC raceways turning from slab to enter and turning from below waterproofing membrane of slab on grade to enter building shall be provided with polyvinylchloride coated RMC elbows.

3.03 INSTALLATION REQUIREMENTS

A. ~~R~~Raceways and associated fittings shall not be used as grounding means, all raceways shall contain ground wire bonded to boxes.

B. Provide cable supports in conduit raceway risers, as required, by NEC or as indicated.

C. Raceway sizes shall be in accordance with NEC, except as follows:

1. Minimum 3/4", except that 1/2" may be used for control and signal wiring between outlet boxes and recessed lighting fixtures and as indicated.

2. Where indicated.

D. Raceways shall be installed exposed, except where indicated.

E. Raceway shall be installed with no interference with other trades. Raceways shall be supported at interval, as required, by NEC but not greater than 10 feet. Raceway supports shall be in accordance with the following:

1. Exposed raceways shall be run parallel on wall or ceiling, and shall follow contours of surface to which they are attached. Support raceways employing PVC coated steel two-hole pipe clamps securely fastened to surface to which raceway is attached.

2. Suspended raceways shall be supported by hangers used only for raceway support. Hanger rods shall not penetrate air ducts or equipment of other trades. Raceways shall not be supported from ducts, pipes or hangers provided under other divisions for support of pipes, ducts, or suspended ceilings.

3. Parts and hardware used for support of equipment, conduits, and fittings shall be galvanized steel for dry locations and galvanized PVC coated steel for exterior, damp or wet locations.

F. No raceway shall pass through beams. Raceway passing from heated to unheated spaces, conditioned spaces to unconditioned spaces, exterior spaces, refrigerated

spaces, cold section plenums of air conditioning units, shall be suitably sealed by means of "Duxseal" or sealing fittings to prevent accumulation of condensation.

G. Cap raceways immediately after installation to prevent entrance of debris and moisture.

H. Raceways turning from slab to enter partition shall be totally concealed.

I. Raceways installed indoors at grade level shall be galvanized rigid steel.

J. Galvanized rigid steel raceways installed below grade level shall be PVC coated.

K. Provide No. 14 AWG zinc-coated steel or 1/8" polypropylene pull cord having not less than 200 pound test strength in empty raceways 2" diameter or less. Provide 3/16" 3-strand polypropylene pull cord having not less than 800 pound test strength in empty raceways greater than 2" diameter. Provide minimum of 2 feet of slack pull cord at each end of raceway.

L. Provide expansion fittings or expansion/deflection fittings in each raceway crossing building expansion joint or as required by installation to accommodate expansion, contraction or deflection of raceway.

M. After installation of PVC coated raceways touch-up exposed bare metal with manufacturer's approved touch-up compound.

END OF SECTION

SECTION 16960

ELECTRICAL FIELD ACCEPTANCE TESTS

PART 1 - GENERAL

1.01 SCOPE

A. After the electrical installation is complete, it shall be thoroughly tested by the Contractor to demonstrate that the entire system is in proper working order and in accordance with the Drawings and Specifications:

1. Tests are in addition to individual tests at the Manufacturer's plant and may not substitute for same.

2. Tests are also intended to provide, ensure, or determine the following:

a. Provide initial acceptance tests and recorded data that can be used as a benchmark for future routine maintenance and trouble shooting by plant operating forces.
b. Ensure a successful start-up with a minimum of last minute interruptions and problems.
c. Determine the suitability of the equipment and systems for energization and placing into operating service.
d. Provide assurance that each system component is not only installed satisfactorily but performs, and will continue to perform, its function in the system with reasonable reliability throughout the life of the plant.

B. The costs of all tests shall be the responsibility of the Contractor, including the expenses of retests because of defects and failure of equipment to meet Specifications:

1. Wiring and equipment which is defective, or which fails to meet Specifications, shall be replaced by the Contractor, unless specific approval for repair is given by the Engineer. The Contractor shall bear the costs for either action.

2. Also, the Contractor shall provide sufficient personnel to assist operating forces in any additional checks they may require for acceptance, start-up, run-in and placing the equipment and systems into continuous service.

C. Make necessary openings in circuits for testing instruments and place and connect all instruments, equipment, and devices, necessary for the tests. Upon completion of tests, remove instruments and instrument connections and restore all circuits to permanent condition.

D. Contractor shall notify the Engineer, in writing, at least seven calendar days before the test is to take place. The tests shall be conducted in the presence of the Owner/Engineer and shall not be started without his permission.

E. Contractor shall supply electric current necessary for the tests.

F. Contractor shall place and connect all instruments and equipment needed for the test, remove same and restore circuits when tests are complete.

G. All testing and checkout work shall be performed with fully qualified personnel skilled in the particular tests being conducted. This is essential for obtaining and properly evaluating data while the tests are in progress and for insuring that important facts and questionable data are reported.

H. The Contractor shall ensure that all testing and checkout work is conducted in a safe manner. Special safety precautions such as the following to be utilized where appropriate:

1. Locking and tagging procedures

2. Barricades.

3. De-energization and/or isolation of equipment prior to testing.

4. Review of procedures with the Owner's safety personnel.

5. Erection of warning signs.

6. Stationing of guards and watchmen.

7. Maintenance of voice communications.

8. Personnel orientation.

I. The sequence of all tests and checks shall be such that the equipment can be energized immediately after the completion of the applicable tests.

J. Tests are in addition to all other tests specified under other sections and shall be coordinated by the Contractor.

1.02 QUALITY ASSURANCE

A. Codes and Standards

1. All inspections and tests shall be in accordance with the following applicable codes and standards latest revisions except as provided otherwise herein.

a. All Standard, Special and Supplemental Conditions of the Contract

b. NEMA: National Electrical Manufacturer's Association
c. ASTM: American Society for Testing and Materials
d. IEEE: Institute of Electrical and Electronic Engineers
e. NETA: International Electrical Testing Association
f. ANSI: American National Standards Institute

1) ANSI C2: National Electrical Safety Code
2) ANSI Z244-1: American National Standards for Personnel Protection

g. State and Local Codes and Ordinances
h. ICEA: Insulated Cable Engineers Association
i. AEIC: Association of Edison Illuminating Companies
j. Occupational Safety and Health Administration

1) OSHA Part 1910; Subpart S, 1910.308
2) OSHA Part 1926; Subpart V, 1926.950 through 1926.960

k. National Fire Protection Association, Batterymarch Park, Quincy, MA 02169:

1) ANSI/NFPA 70B: Electrical Equipment Maintenance
2) NFPA 70E: Electrical Safety Requirements for Employer Workplaces
3) ANSI/NFPA 70: National Electric Code
4) ANSI/NFPA 78: Lightning Protection Code
5) ANSI/NFPA 101: Life Safety Code

2. All inspections and tests shall utilize the following references:

a. Project Design Specifications
b. Project Design Drawings
c. Project Short Circuit and Coordination Study
d. Manufacturer's instruction manuals applicable to each particular apparatus

B. Coordination:

1. Coordinate activities, and cooperate with others on project, to ensure that systems are energized when required, loads applied, and other requirements of Sections are carried out on timely, coordinated basis.

2. Other Sections of specifications require services of one or more manufacturer's representatives, to ensure that equipment supplied has been installed properly and adjusted to proper working order. Advise representative of all applicable tests in this Section, so that work will be coordinated, and tests combined where feasible.

3. It is important that equipment warranties or guarantees not be voided by the Contractor's testing and checkout work. The checks and tests will normally be supplemental to and compatible with the manufacturer's installation instruction leaflets and literature. Where deviations are apparent, the manufacturer's review shall be obtained prior to testing. Reasonable cooperation to be extended to permit witnessing by the manufacturer's representative if so requested. Where any questionable repairs, modifications, significant adjustments, tests or checks are to be made, the Contractor shall contact the Owner's Representative to determine if the work should be performed by or with the manufacturer's representative.

C. Conditions:

1. No testing of any kind shall be done without written approval or the presence of the Owner. The Contractor shall obtain from the manufacturer al data required to verify calibrations, to set and test equipment provided.
2. The Contractor shall notify, in writing, the Owner at least 72 hours prior to tests. The notice shall identify the test and the time that the test will be performed.
3. Tests shall be performed by an independent testing agency approved by the Owner. Each two-technician field test crew shall include at least one test technician who provides current certification as such by either NETA or NICET.

1.03 SUBMITTALS

A. General:

1. Contractor shall submit to the Engineer four copies of instrument calibration curves, plotted test results, and all measurements and data.

2. All inspections, tests, and calibrations to be reported in writing. The recorded data form shall have the signatures of the persons conducting the tests and authorized witnesses. The data shall be designed to serve as the test and inspection checklist for inspection requirements. The test and checkout data shall also include any data taken prior to the adjustments, repairs, drying out, or similar work prior to final testing and acceptance. "As-found" and "as-left" test data shall be recorded and reported in writing.

3. Copies of Test Data Reports shall be incorporated in each of the related Service Manuals. The Data Reports shall include those items of equipment contained in the Service Manual. Reports shall be separated by a divider labeled "Electrical Field Acceptance Tests". Reports shall contain data for all power conductors and controls including instrumentation conductors and devices for static and dynamic equipment in the Service Manual. In addition, Operating Tests of the equipment shall be included in this section of the Service Manual.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

A. Contractor shall provide all necessary test equipment, calibrated for these specific tests by a recognized, independent test laboratory. The calibration must have been performed no more than a year from acceptance test.

1. Test equipment shall include, but not be limited to, the following:

a. Three-phase wattmeter suitable for motors up to 200 hp.
b. Ammeters (0-600 A).
c. Voltmeters (0-600 V).
d. Megger (500 V) to be used for equipment 600 volts or less.
e. Megger (2,500 V) to be used for equipment above 600 volts.
f. Clamp-on ammeters (0-300 A).
g. Current transformers (as required).
h. Potential transformers (as required).
i. AC-DC volt-ohm millimeter.
j. All test equipment needed for high-voltage cable tests.
k. Turns ratio test set.

PART 3 - EXECUTION

3.01 INSULATION RESISTANCE TESTS

A. Cables

1. Insulation resistance tests shall be performed in accordance with NETA (International Electrical Testing Association, Inc.) Standard, Cable Insulation Resistance Test, between conductors and conductors to ground.

2. Each circuit tested shall have an insulation resistance between conductors and between each conductor and ground of not less than the following:

a. Cable 600 V and below shall have a minimum insulation resistance of 50 megohms.
b. In no case shall a phase conductor have an insulation resistance 40 percent less than the phase conductor with the highest insulation resistance.

B. Motors

1. An insulation resistance test shall be performed in accordance with NETA Standard, Motor Insulation Resistance Test.

3.02 GROUND RESISTANCE

A. The grounding system shall be tested for continuity of connection and for resistance to flow of current through ground connections:

B. The ground resistance of conduits, equipment cases, and supporting frames shall be near that for the system as a whole.

C. Measurement shall be made with a vibroground or ground megger, using the three point method (fall of potential).

3.03 CONDUCTOR CONNECTIONS

A. Make up no connections at service entrance, transformers, substations, motors, motor control centers, and switchgear permanently until correct phase rotation of all equipment is determined. Install and insulate these connections temporarily, if necessary, while determining proper rotation. Make permanent connections after proper rotation has been established and subsequent to completion of insulation resistance and dielectric tests.

3.04 INSTRUMENT TRANSFORMERS

A. Electrically tested for polarity and ratio

1. On each transformer winding, the manufacturer's polarity markings shall be verified.

2. The test data shall include the following:

   a. Manufacturer's stated ratio for each tap position.
   b. Test turns ratio results.
   c. Percent error per tap position.
   d. Manufacturer's indicated polarity.
   e. Test result polarity.

3. One each set of transformer windings, the turns ratio shall be determined for all no-loads taps, using the two voltmeter method for control transformers and the two ammeter method for current transformers.

B. Confirm test switch wiring and operation

1. A functional test shall be performed on the test switch of the current transformer to ensure that the secondary leads are shorted and that no open circuit conditions exist. A functional test shall also be performed on the control transformers to ensure that no short circuit exists across the secondary leads.
2. All control wiring shall be checked to ensure proper operation of the device being powered.

3.05 RELAYS

A. Standard testing and calibration Specifications:

1. To demonstrate that the relay will function as designed throughout the entire range of its operations, acceptance tests shall be performed in accordance with NETA Protective Relay Testing.

B. Test all relays in place, trip breakers by all relays:

1. To demonstrate that the relaying system will function as specified, acceptance tests shall be performed in accordance with NETA Relaying Systems Function.

C. Test lockout relays and associated test switch trip links and closing circuit contacts:

1. The lockout relays shall be functionally tested to ensure proper system operation. Associated equipment shall be checked for proper alignment and contact closure.

D. Test supervisory relays and all transducer outputs:

1. All relays shall be checked and calibrated using the built-in test switch and test plug.

2. Relays shall be checked and calibrated under service conditions against portable standards connected in series with the relay undergoing test. For some in-service testing the test plus shall be used to connect devices which shall measure the currents and voltage being applied to the relays.

3.06 OPERATING TESTS

A. Test all mechanical and electrical interlocks:

1. Mechanical interlocks shall be examined to ensure the interlock is free to operate and that bearing surfaces are free to perform their intended function.

2. Check for correct adjustment of primary disconnect mechanisms in plug-in units. Shall be mechanically interlocked with the door to ensure that the door is held closed with primary disconnect in the ON position.

3. Check for provisions for padlock mechanisms on disconnect operating mechanisms.

4. Check motor starters equipped with a defeater mechanism to ensure that they can be operated to release the door interlock with the disconnect device in the ON position.

5. Check all electrical interlocks for loose wiring, proper mechanical alignment and operation. Also inspect all contact surfaces to ensure they are clean and not pitted.

B. Circuit Breaker Operation:

1. Installation and inspection of 480V power circuit breakers shall be in accordance with NEMA Pub. No. SG-3:

a. Perform tests in accordance with NETA Section 8.6.1.2.

2. Molded case 600 volt circuit breakers of the time-delay instantaneous type are to be checked for possible damage during shipment or storage by:

a. Inspecting the breaker visually for physical damage.
b. Performing several mechanical ON-OFF operations.
c. Circuit continuity check on each pole with the circuit breaker in the closed position.
d. Three hundred (300) percent of breaker rated continuous current applied to each pole to determine that the circuit breaker will trip on an overload.
e. At least one test shall be made in the range of element of the trip device.

C. Test all remote control stations for operation:

1. A functional test shall be performed for all remote pushbutton stations and manual motor starters to ensure their proper operation.

2. Control stations tested under actual operating conditions shall perform their intended function.

D. Check insulation resistance of control power transformer (CPT):

1. An insulation resistance test shall be performed per NETA Transformer Insulation Resistance Test.

2. The reported test data shall be given in ohms.

E. Check motor operation:

1. The motor shall be run for at least four hours as close to full load as possible.

2. Motor alignment, wiring capacity, speed and operation shall be checked to verify compliance with Specifications.

F. Verify potential transformer (PT) circuits and test switches:

1. A functional test shall be performed on the test switch of the potential transformer to ensure that the proper voltage is on the secondary windings.

2. All control wiring shall be checked to ensure proper operation of the device being powered.

G. Contractor to demonstrate complete operation and functions of all equipment and devices not specifically included herein:

1. A functional test shall be performed on all equipment including all power wiring, motor starters, controls and control wiring to ensure that all equipment is operating properly, and that the system is operating as designed.

3.07 FINALLY

A. All defects found in new equipment shall be repaired at once and the tests reconducted at the Contractor's expense.

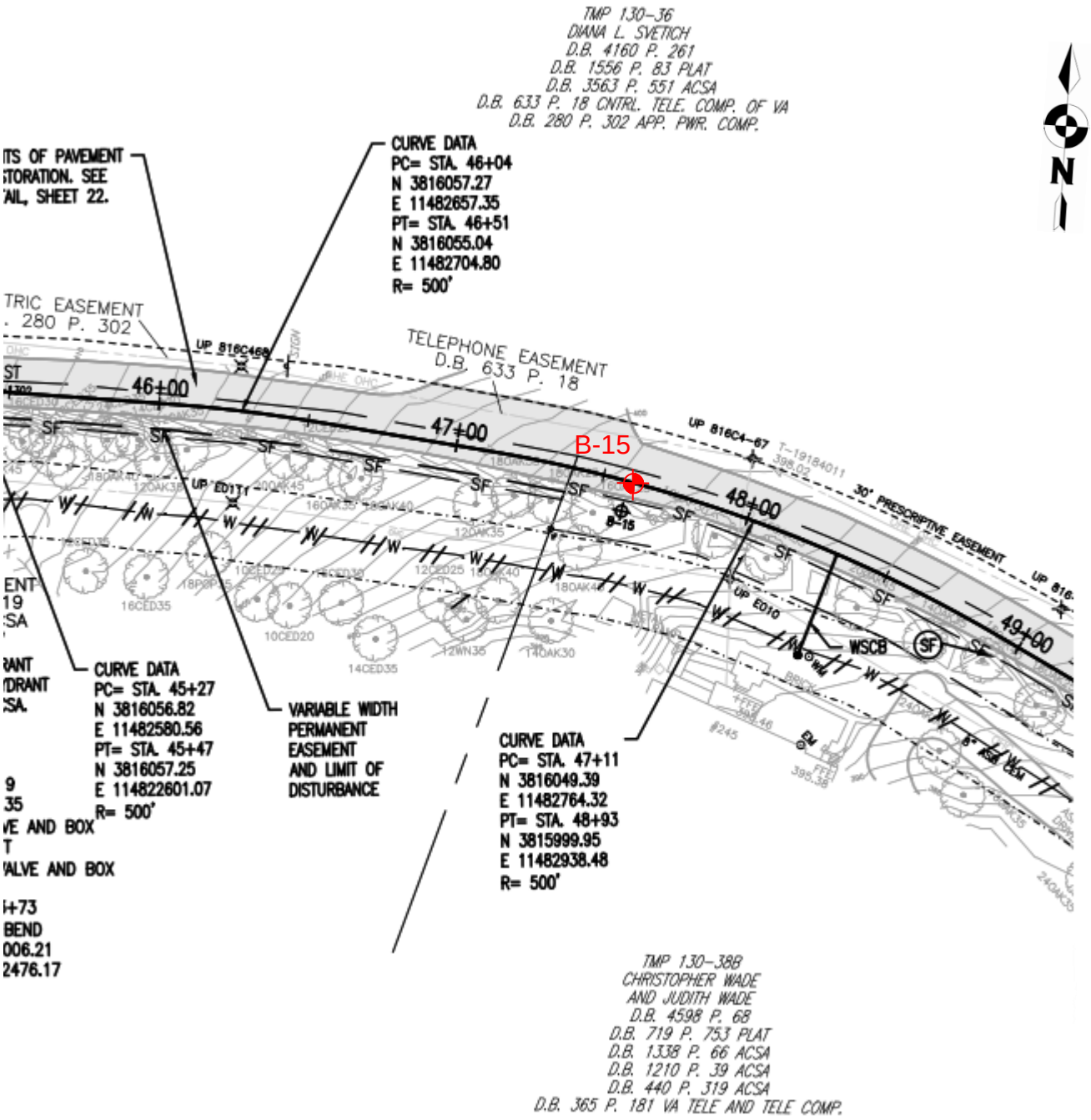
B. Results of the above tests shall show the equipment and wiring meets the requirements of this specification before final acceptance. Should any of the above tests indicate defects in materials or workmanship, the faulty installation shall be repaired or replaced at once, and the tests reconducted at the Contractor's expense.

C. All circuit breakers, etc., found defective shall be replaced.

END OF SECTION

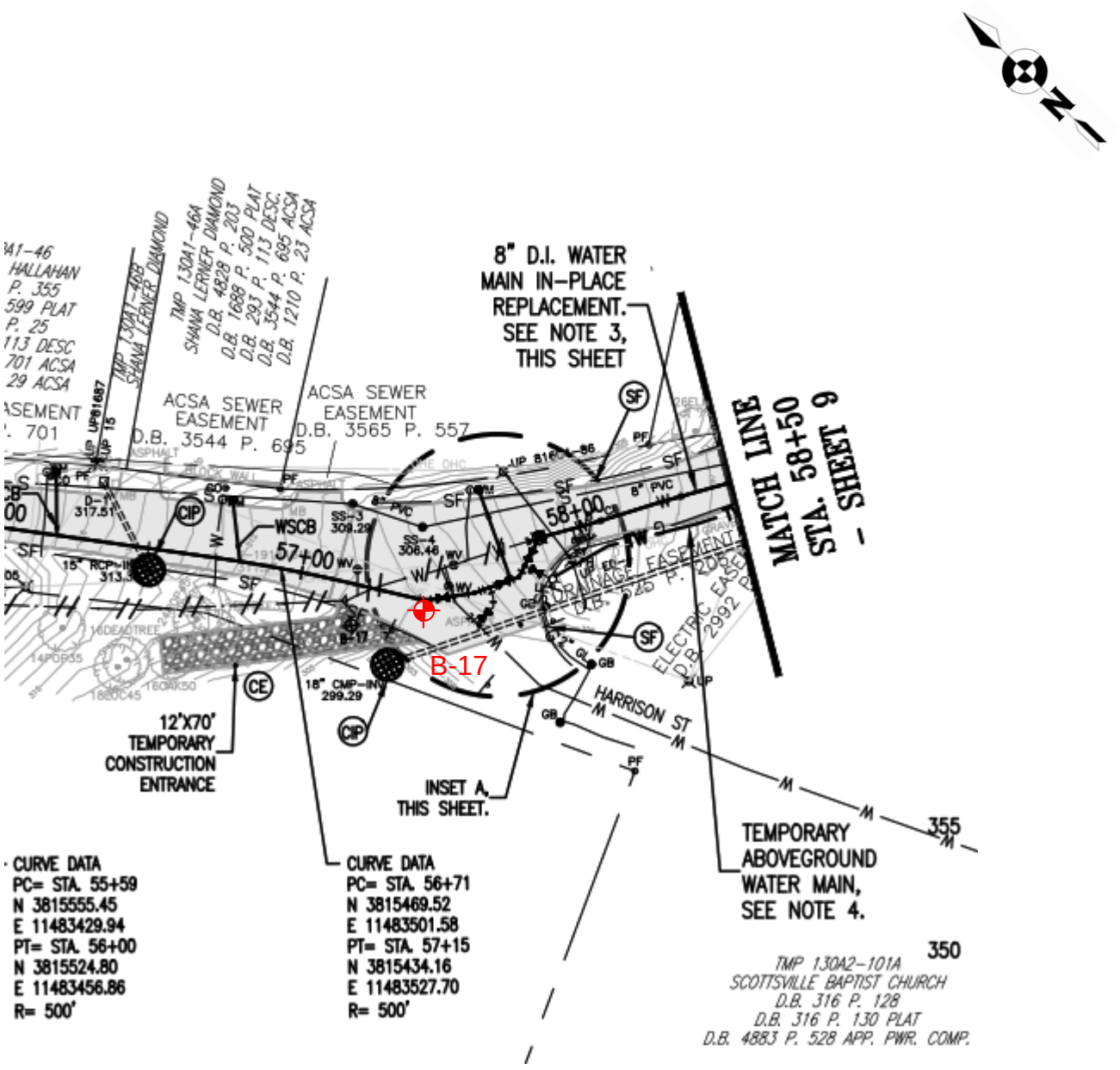
Appendix A

Geotechnical Data – Phase 4A



FROEHLING & ROBERTSON, INC.
Engineering Stability Since 1881
6185 Rockfish Gap Turnpike
Crozet, Virginia 22932-3330
T 434.823.5154 I F 434.823.4764

Boring Location Plan		
Client: Whitman, Requardt & Associates, LLP		
Project: Scottsville Phase 4 Water Main Replacement		
F&R Project No. 71A0036		
Date: April 2023	Scale: None	Drawing No.: 2D



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Boring Location Plan		
Client: Whitman, Requardt & Associates, LLP		
Project: Scottsville Phase 4 Water Main Replacement		
F&R Project No. 71A0036		
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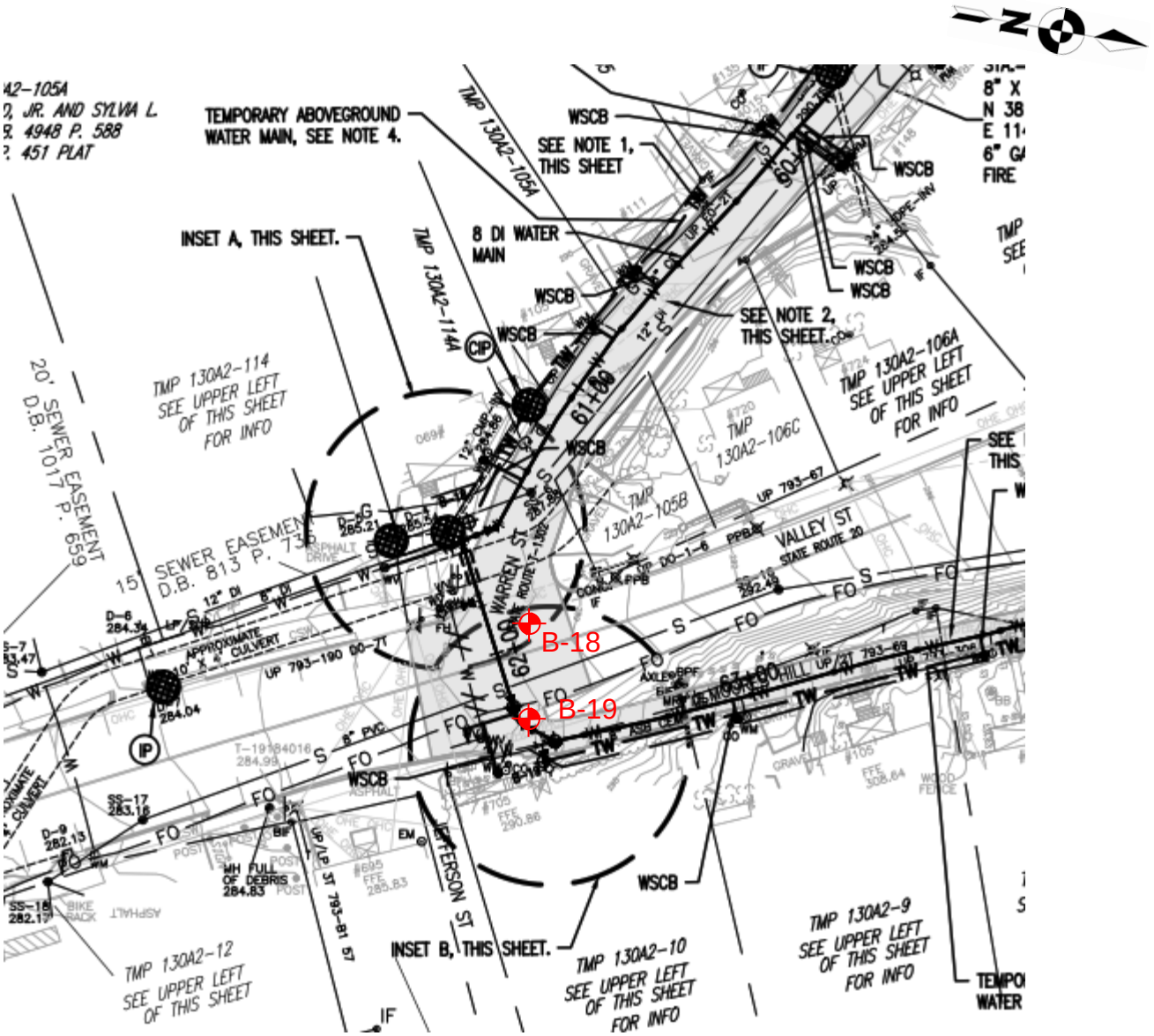

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6185 Rockfish Gap Turnpike
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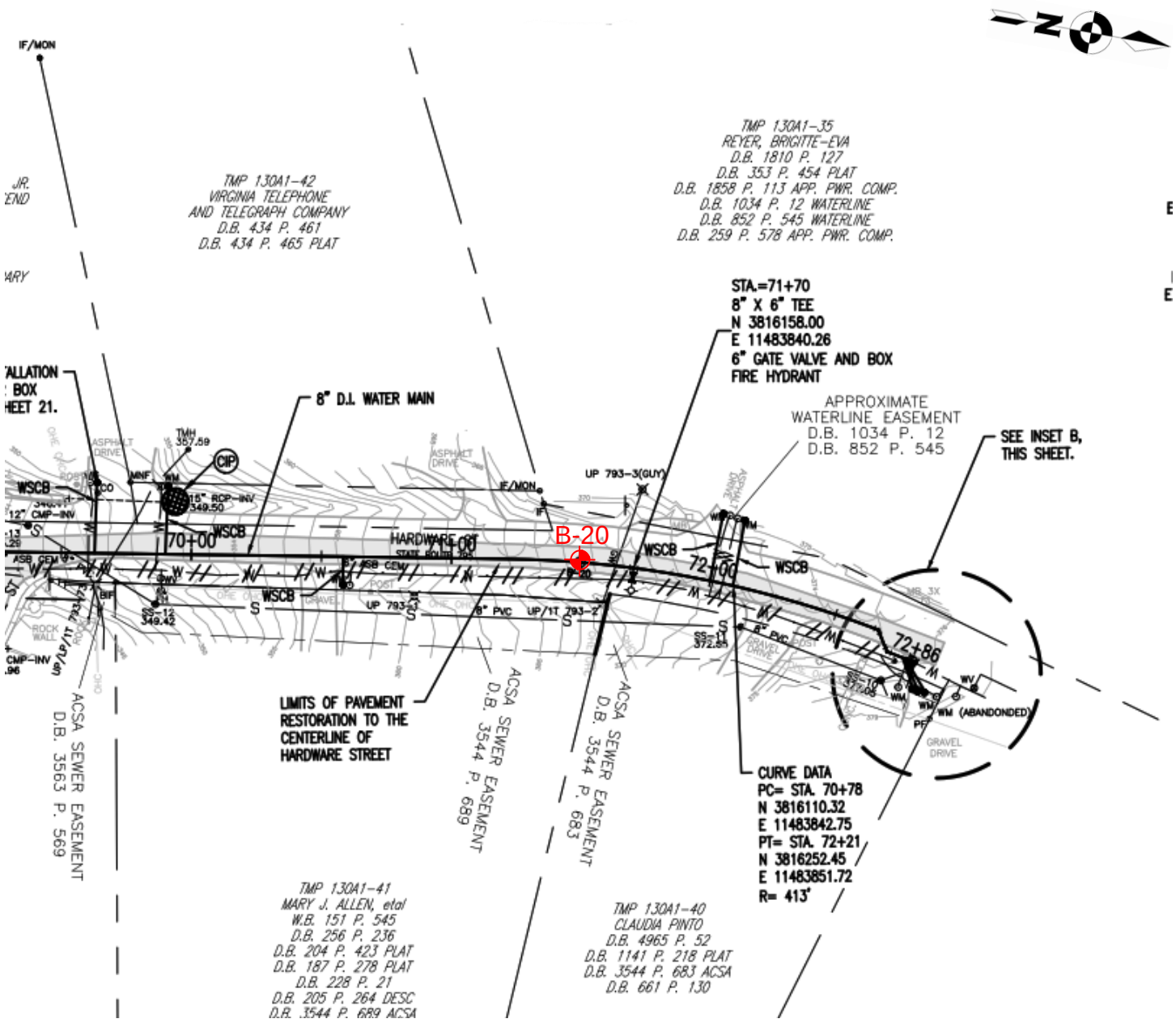
T 434.823.5154 I F 434.823.4764

Boring Location Plan		
Client: Whitman, Requardt & Associates, LLP		
Project: Scottsville Phase 4 Water Main Replacement		
F&R Project No. 71A0036		
Date: April 2023	Scale: None	Drawing No.: 2F



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6185 Rockfish Gap Turnpike
Crozet, Virginia 22932-3330
T 434.823.5154 I F 434.823.4764

Boring Location Plan		
Client: Whitman, Requardt & Associates, LLP		
Project: Scottsville Phase 4 Water Main Replacement		
F&R Project No. 71A0036		
Date: April 2023	Scale: None	Drawing No.: 2G

Froehling & Robertson, Inc.

BORING LOG

Boring: B-15 (1 of 1)

Project No: 71A0036
Client: Whitman, Requardt & Associates, LLP
Project: Scottsville Phase 4 Water Main Replacement
City/State: Albemarle County, Virginia

Elevation: 399 ±
Total Depth: 6.0'
Boring Location: See Boring Location Plan

Drilling Method: HSA
Hammer Type: Automatic
Date Drilled: 3/15/23
Driller: A. Wilhelm

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
398.5	0.5	6.2 Inches Asphalt Auger Probe to 6 Feet				Subsurface water not encountered during drilling or upon removal of the augers.
393.0	6.0	Boring Terminated at 6 Feet				

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

Froehling & Robertson, Inc.

BORING LOG

Boring: B-17 (1 of 1)

Project No: 71A0036
Client: Whitman, Requardt & Associates, LLP
Project: Scottsville Phase 4 Water Main Replacement
City/State: Albemarle County, Virginia

Elevation: 308 ±
Total Depth: 6.0'
Boring Location: See Boring Location Plan

Drilling Method: HSA
Hammer Type: Automatic
Date Drilled: 3/15/23
Driller: A. Wilhelm

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
		9 Inches Asphalt				
307.2	0.8	Auger Probe to 6 Feet				Subsurface water not encountered during drilling or upon removal of the augers.
302.0	6.0	Boring Terminated at 6 Feet				

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

Froehling & Robertson, Inc.

BORING LOG

Boring: B-18 (1 of 1)

Project No: 71A0036
Client: Whitman, Requardt & Associates, LLP
Project: Scottsville Phase 4 Water Main Replacement
City/State: Albemarle County, Virginia

Elevation: 288 ±
Total Depth: 15.0'
Boring Location: See Boring Location Plan

Drilling Method: HSA
Hammer Type: Automatic
Date Drilled: 4/4/23
Driller: A. Wilhelm

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
		8 Inches of Asphalt over 8 Inches of Aggregate Base				
286.6	1.4	Brown, Moist, Medium Dense to Dense, Silty SAND (SM), Trace Gravel, Micaceous **RESIDUUM**	8-12-16	1.5	28	
			14-19-21 -28	3.0	40	
283.0	5.0	Soft Weathered Rock becomes Light Brown, Moist, Very Dense, Silty SAND (SM), Trace Gravel, Micaceous **SOFT WEATHERED ROCK**	44-50/3	5.0 5.8	100+	
			50/5	7.0 7.4	100+	
279.0	9.0	Soft Weathered Rock becomes Brown and Gray, Very Moist, Very Dense, Silty SAND (SM), Little Gravel, Micaceous **SOFT WEATHERED ROCK**	50/4	9.0 9.3	100+	Cave-in depth recorded at 10.1 feet below existing ground surface upon removal of the augers.
277.0	11.0	Soft Weathered Rock becomes Gray, Moist, Very Dense, Silty SAND (SM), Little Gravel, Micaceous **SOFT WEATHERED ROCK**	50/5	11.0 11.4	100+	Subsurface water was measured at 12.1 feet below existing ground surface prior to removal of the augers.
			50/5	13.0 13.4	100+	
273.0	15.0	Boring Terminated at 15 Feet				

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

Froehling & Robertson, Inc.

BORING LOG

Boring: B-19 (1 of 1)

Project No: 71A0036
Client: Whitman, Requardt & Associates, LLP
Project: Scottsville Phase 4 Water Main Replacement
City/State: Albemarle County, Virginia

Elevation: 288 ±
Total Depth: 15.0'
Boring Location: See Boring Location Plan

Drilling Method: HSA
Hammer Type: Automatic
Date Drilled: 3/16/23
Driller: A. Wilhelm

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
287.3	0.7	2.5 Inches of Asphalt over 6 Inches of Aggregate Base				
		Brown, Moist, Medium Dense, Silty SAND (SM) **RESIDUUM**	5-11-19 -23	1.0	30	Subsurface water not encountered during drilling or upon removal of the augers.
285.0	3.0	Soft Weathered Rock becomes Brown, Moist, Very Dense, Silty SAND (SM) **SOFT WEATHERED ROCK**	12-28-50/4	3.0	100+	
				4.3		
			35-50/4	5.0	100+	
				5.8		
281.0	7.0	Soft Weathered Rock becomes Brown, Moist, Very Dense, Silty SAND (SM), Trace Gravel **SOFT WEATHERED ROCK**	20-31-50/3	7.0	100+	
				8.3		
279.0	9.0	Soft Weathered Rock becomes Light Brown, Moist, Very Dense, Silty GRAVEL (GM), Some Sand **SOFT WEATHERED ROCK**	50/5	9.0 9.4	100+	
277.0	11.0	Soft Weathered Rock beocmes Brown, Moist, Very Dense, Silty SAND (SM), Little Gravel **SOFT WEATHERED ROCK**	50/5	11.0 11.4	100+	Cave-in depth recorded at 12.8 feet below existing ground surface upon removal of the augers.
275.0	13.0	Soft Weathered Rock becomes Light Brown, Moist, Very Dense, Silty GRAVEL (GM), Some Sand **SOFT WEATHERED ROCK**	50/4	13.0 13.3	100+	
273.0	15.0	Boring Terminated at 15 Feet				

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

Froehling & Robertson, Inc.

BORING LOG

Boring: B-20 (1 of 1)

Project No: 71A0036
Client: Whitman, Requardt & Associates, LLP
Project: Scottsville Phase 4 Water Main Replacement
City/State: Albemarle County, Virginia

Elevation: 366 ±
Total Depth: 6.0'
Boring Location: See Boring Location Plan

Drilling Method: HSA
Hammer Type: Automatic
Date Drilled: 3/15/23
Driller: A. Wilhelm

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
365.6	0.4	4.9 Inches Asphalt Auger Probe to 6 feet				Subsurface water not encountered during drilling or upon removal of the augers.
360.0	6.0	Boring Terminated at 6 Feet				

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

Appendix B

VDOT Special Provisions for Surface Treatment

SP314-000100-00

VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
ASPHALT SURFACE TREATMENT

September 13, 2012; Reissued July 12, 2016

I. DESCRIPTION

This work shall consist of the application of a single or multiple course of asphalt surface treatment according to the Specifications and as specified herein.

II. DEFINITION OF TERMS

Seal Treatment is defined as one application of asphalt material and one application of cover aggregate.

Modified Single Seal is defined as two applications of asphalt material, one application of cover aggregate and one application of blot fine aggregate.

Modified Double Seal is defined as three applications of asphalt material, two applications of cover aggregate and one application of blot fine aggregate.

III. MATERIALS

The Contractor shall demonstrate the compatibility of the asphalt emulsion and cover aggregate (excluding the blot seal) prior to construction of the surface treatment. This testing shall be conducted according to VTM-65 in the presence of the Engineer for each asphalt and aggregate combination. In addition, the Contractor shall conduct the compatibility test at least once a week on stockpiled materials and any additional test, as deemed necessary by the Engineer. Compatibility test results shall be submitted to the Engineer. All material combinations shall pass the compatibility test unless waived in writing by the Engineer.

If during the life of this project excessive loss of cover aggregate occurs, the Engineer may suspend the work according to Section 108 of the Specifications until the cause of the loss of cover material is corrected.

(a) **Asphalt Materials** shall conform to Section 210 of the Specifications except as specified herein.

CRS-2 shall be a rapid setting cationic emulsified asphalt when tested according to ASHTO T59 Testing Emulsified Asphalt. CRS-2 shall meet the requirements of Type II coating ability.

CRS-2h shall conform to CRS-2 except that the penetration shall be 40 to 100.

RC-250 when permitted during the period of May 1 to October 1 shall meet the requirements of Type I coating ability. When permitted during the period of October 1 to May 1 Type II coating ability shall apply.

CRS-2M (Polymer Modified Cationic Emulsified Asphalt) shall meet the physical requirements of asphalt material per AASHTO M316 for CRS-2L or CRS-2P except as

modified herein. The minimum elastic recovery for CRS-2L, as tested according to AASHTO T301, shall be 50 percent.

The Contractor shall provide written certification of the test results.

(b) **Cover Material** — Coarse and Fine aggregate shall conform to Section 203 and 202 of the Specifications. Coarse aggregate shall be a minimum Grade B. Lightweight aggregate shall conform to Section 206 of the Specifications except as noted herein. For light weight aggregate when the material passing the No. 200 sieve by washing is dust of fracture, the percentage of deleterious material shall not exceed 1.7 percent. Crushed stone shall only be used on roads of Traffic Groups VI and above unless the surface treatment consists of modified single seal treatment or modified double seal treatment. Aggregates shall not be used within 24 hours of washing. Aggregate from more than one source shall not be furnished for a specified route or a group of sub-division routes unless permitted by the Engineer.

The following modifies the aggregate material as defined in Section 203 of the Specifications:

Designation	Modification
N	Non-polishing material only
L	Lightweight
G	Washed gravel only

Notes: Where 8N is specified, it shall meet the gradation requirements of No. 8P.
Where 8L is specified it shall meet the following gradation:

Sieve Size	Percent Passing
1/2	100
3/8	75-100
No. 4	10-40
No. 8	max. 5

Where 8G is specified, it shall meet the gradation requirements of No. 8P.

IV. PROCEDURES

Weather limitations for asphalt surface treatment work shall be according to Section 314 of the Specifications. The Contractor shall have a certified Surface Treatment Technician present during the surface treatment operation.

The Contractor shall use one steel wheel roller and one pneumatic-tire roller on modified single seal, modified double seal and seal treatments using CRS-2L asphalt material in a sequence approved by the Engineer. The Contractor is directed to the exceptions to these requirements found in IV.(c) of this special provision. These treatments shall be subjected to a minimum of one complete pass of each type of roller on either the cover aggregate or the blot seal coat.

(a) **Seal Treatment** shall conform to Section 312 of the Specifications. When seal treatment is specified, the Contractor shall protect the cover aggregate from traffic until the asphalt material has sufficiently cured to carry traffic without damage to the treatment.

The rate of application shall be according to VTM-66. The rate of application for the cover aggregate and asphalt emulsion shown in the contract are approximate and the actual rate shall be determined by the Contractor and approved by the Engineer.

After the roadway has been treated and cured, the Contractor shall lightly broom the surface to remove any excessive aggregate according to Section 312.04 of the Specifications and as directed by the Engineer. Brooming shall be performed in such a manner as not to damage the embedded aggregate material.

(b) **Modified Single Seal and Modified Double Seal Treatments**, when specified, shall be lightly broomed on the surface by the Contractor to remove any excessive aggregate according to Section 312.04 of the Specifications and as directed by the Engineer. Brooming shall be performed in such manner as not to damage the embedded aggregate material.

No traffic, including delivery trucks, shall be allowed on modified seal treatments until after the blot coat material has been placed and rolled.

1. **Modified Single Seal Treatment**

a. Approximately 0.17 gallons per square yard of asphalt material, of the type specified, shall be applied to the existing surface immediately followed by an application of approximately 15 pounds per square yard of aggregate size No. 8P. The aggregate shall be spread uniformly (one aggregate deep) over the treated surface.

The aggregate shall be rolled immediately at least once with a self-propelled roller of an approved design. When a continuous uninterrupted modified single seal treatment train method is employed, rolling of the initial aggregate course may be omitted.

b. Immediately after the seal coat has been rolled according to IV.(b)1.a., herein a blot seal coat consisting of approximately 0.15 gallons per square yard of asphalt material, of the type specified, shall be applied to the surface treated pavement followed by a uniform application of approximately 10 pounds per square yard of fine aggregate. The fine aggregate shall be Grading A, B or F natural or manufactured according to Section 202 or No. 9 aggregate according to Section 203 of the Specifications, except that the material shall have no more than 5 percent passing the No. 200 sieve by washed analysis. The Contractor is directed to the exceptions to these requirements found in IV.(c) of this special provision. An increase in the application rate for blotter material may be necessary when using natural sand and if the desired results are not achieved with this material, the Engineer may require the use of manufactured sand. Fine aggregate from more then one source shall not be used intermittently. The fine aggregate shall be applied by the use of a self-propelled aggregate spreader of approved design. The blot coat shall be rolled immediately at least once with a self-propelled roller of an approved design. At least 48 hours after the blot coat application, the roadway surface shall be lightly broomed as directed by the Engineer.

2. **Modified Double Seal Treatment**

a. Two applications of asphalt material and cover aggregate shall be applied according to Section IV.(b)1.a. herein, except that at least one complete pass shall be made with the roller after each aggregate application.

b. A blot coat shall be applied according to IV.(b)1.b. herein.

The application temperature for liquid asphalt material shall conform to Table III-1 of Section 310 of the Specifications, except that the minimum application temperature for CRS-2 and CRS-2L shall be 160 degrees F.

(c) **District-Specific Exceptions for Modified Single Seal and Modified Double Seal Treatments and Seal Treatment**

Bristol District — The blot coat for use in modified single seal and modified double seal shall be No. 9 aggregate conforming to Section 203 of the Specifications and applied at a rate of 12 pounds per square yard in lieu of sand. Two pneumatic-tire rollers shall be used on modified single seal, modified double seal and seal treatments using CRS-2L asphalt material.

Lynchburg, Salem, and Staunton Districts — The blot coat for use in modified single seal and modified double seal shall be No. 9 aggregate conforming to Section 203 of the Specifications and applied at a rate of 12 pounds per square yard in lieu of sand.

Hampton Roads District — The blot coat for use in modified single seal and modified double seal shall be manufactured sand only conforming to Section 202 of the Specifications.

Fredericksburg District (only Caroline, Spotsylvania, and Stafford Counties) — The blot coat for use in modified single seal and modified double seal shall be manufactured stone sand conforming to Section 202 of the Specifications.

(d) **Prime Coat**, when specified, shall be applied according to Section 311 of the Specifications. When cover material is specified, rolling shall be performed according to Section 312 of the Specifications.

The prime coat shall be permitted to cure prior to the next application of asphalt.

During the period between application of the prime coat and the seal coat, the primed surface shall be kept in repair. Holes, ravels, and areas deficient in primer shall be patched and repaired with asphalt-treated materials by penetration methods or other approved procedures.

(e) **Maintenance, Protection and Performance of the Work** — The Contractor shall be responsible for the maintenance and protection of the seal treatment on the roadway for a period of 48 hours after application.

The Contractor shall exercise control of the delivery and application of the surface treatment materials to prevent damage to the roadway surface. The speed of the delivery equipment and pilot truck shall be limited to a maximum 15 miles per hour. The maintenance and protection shall include, but not be limited to, the placement of signs; the use of flaggers and pilot trucks; and placement of additional asphalt and aggregate material. In the event a failure occurs prior to acceptance, the Contractor shall repair or replace the failed treatment as directed by the Engineer, at no additional cost to the Department.

V. EQUIPMENT

(a) **Asphalt Distributors and Aggregate Spreaders**

1. Distributors and spreaders shall be calibrated by the Contractor in the presence of the Engineer prior to placing surface treatment; to ensure an even and accurate spray, and aggregate distribution.

2. Asphalt distributors shall be equipped with proper spray nozzles including end nozzles for the application rate specified, to provide uniform coverage throughout the width of the application.

(b) **Rollers**

1. One steel wheel roller and one pneumatic-tire roller shall be used on modified single seal, modified double seal and seal treatment using CRS-2L asphalt material. The Contractor is directed to the exceptions to these requirements found in IV.(c) of this special provision. The steel wheel roller weight shall be between 6 and 8 tons for the tandem type and between 8 and 10 tons for the three-wheel type.

2. Two pneumatic-tire rollers shall be used on the conventional type seal treatment.

VI. MEASUREMENT AND PAYMENT

Liquid asphalt material for seal treatment will be measured and paid for according to Section 312 of the Specifications.

Aggregate for seal treatment will be measured and paid for in square yards on a plan quantity basis, which price bid shall include furnishing and applying aggregate, protection of the asphalt surface treatment and all incidentals necessary to complete the work. Authorized increases or decreases to the plan quantity will be adjusted according to Section 109 of the Specifications.

Modified single seal and **modified double seal** treatments will be measured and paid for in square yard on a plan quantity basis, which price bid shall include all cost for furnishing and applying liquid asphalt material and cover aggregate, protection of the asphalt surface treatment and all incidentals necessary to complete the work. Authorized increases and decreases to the plan quantities will be adjusted according to Section 109 of the Specifications.

Brooming shall be included in the price bid for other appropriate items.

Payment will be made under:

Pay Item	**Pay Unit**
Aggregate (type)	Square Yard
Modified Single Seal	Square Yard
Modified Double Seal	Square Yard