



**COUNTY OF SPOTSYLVANIA, VIRGINIA  
INVITATION FOR BID (IFB) #17-14-EG  
LAKE ACRES WATER SYSTEM IMPROVEMENTS  
November 1, 2016**

**Name of Soliciting Public Body:**

County of Spotsylvania, Procurement Division  
P.O. Box 215  
8800 Courthouse Road, 2<sup>nd</sup> Floor Room 404  
Spotsylvania, VA 22553

A **non-mandatory** pre-bid meeting will be held **November 15, 2016 at 11:00 AM**, in the Marshall Center Conference Room located at 8800 Courthouse Road, Spotsylvania, VA 22553 (The Marshall Center), 2<sup>nd</sup> Floor Room 405.

Sealed Bids Will Be Received Until **December 13, 2016 at 2:00 PM** For Furnishing The Services Described Herein.

**Bids Shall Be Mailed Or Hand Delivered To:**

Spotsylvania County Procurement Division  
P.O. Box 215  
8800 Courthouse Road, 2<sup>nd</sup> Floor Room 404  
Spotsylvania, VA 22553

**All Inquiries For Information Should Be Directed To:**

Elaine Guinn, Procurement Officer I  
Phone: (540) 507-7599  
Fax: (540) 582-6304 – (Call to Confirm Receipt)  
Email: [eguinn@spotsylvania.va.us](mailto:eguinn@spotsylvania.va.us)

**All updates are posted on the Spotsylvania County web site at [www.spotsylvania.va.us/bids](http://www.spotsylvania.va.us/bids)  
It is the responsibility of the vendor to check back for updates.**

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## I. PURPOSE

The County of Spotsylvania, VA is seeking bids from qualified firms to provide for construction of the Lake Acres Water System Improvements Project in Spotsylvania County, VA. This project consists of furnishing and installing water lines and PRV vaults along Marathon Place and Ni River Drive for approximately 100 feet at each intersection. The successful bidder (Contractor) shall perform all construction activities and provide all construction management, necessary tools, equipment, materials, fuel, insurance, personnel, and supervision to complete the Project as described herein. The successful bidder (Contractor) shall fulfill the obligations of any Contract resulting from this IFB at the direction of Spotsylvania County and follow accordingly all federal, state and local regulations.

A non-mandatory pre-bid meeting will be held **November 15, 2016 at 11:00 AM**, in the in the Marshall Center Conference Room located at 8800 Courthouse Road, Spotsylvania, VA 22553 (The Marshall Center), 2<sup>nd</sup> Floor Room 405.

## II. BASIS OF AWARD

The award of a contract resulting from this Invitation for Bid shall be based on the following criteria submitted from the lowest responsive and responsible bidder:

**Price** - The bids will be evaluated and contract award will be made to the lowest responsive and responsible bidder according to Spotsylvania County Procurement Policy. Contract award will be based on the Total Lump Sum Bid Price, as stated on Attachment C, Bid Form. In case of arithmetic errors, the unit price will govern.

The County reserves the right to reject any and all bids in whole or in part and to waive any informality prior to making an award.

## III. INSTRUCTIONS TO BIDDERS

- A. This competitive sealed bidding procurement shall be conducted in accordance with the Spotsylvania County Procurement Policy. The Procurement Policy is available at [www.spotsylvania.va.us/policies](http://www.spotsylvania.va.us/policies)
- B. Bids may be withdrawn at any time before the bid opening. A Bidder wishing to withdraw the bid after bid opening may do so in accordance with Spotsylvania Procurement Policy Section 3-16.
- C. Bids must be made by utilizing, initialing and signing Attachment C, Bid Form. The Bid Form (all pages) of this IFB must be completed and returned for a bidder to be considered responsive. Specifications incorporated into this Invitation to Bid should be followed accordingly.

The Response Statement of the Bid Form must be completed in a sufficient manner to allow for a detailed comparison of the IFB Specification and the bidder's proposed construction work to ascertain adherence to the Specification. The bidder must explain in the Response Statement any deviations from the Specification.

- D. Questions concerning the operations and requirements of the Spotsylvania County Utilities Department as related to the required services, and questions related to this IFB and the contractor selection process should be directed to:

Elaine Guinn, Procurement Officer I  
Spotsylvania County Government  
Phone: (540) 507-7599  
Fax: (540) 582-6304  
E-Mail: [eguinn@spotsylvania.va.us](mailto:eguinn@spotsylvania.va.us)

Questions may be faxed or e-mailed to Spotsylvania County. Questions that are faxed to Spotsylvania County, the prospective bidders must call the Procurement Office to confirm receipt of fax. All responses to inquiries will be in writing and will be provided to all prospective Bidders who have registered with Spotsylvania County and expressed intent to bid. Questions from Bidders must be received by Spotsylvania County by **12 noon, on November 29, 2016** to ensure that the answers can be distributed and received by all registered bidders.

Bidders are responsible for familiarizing themselves with the specifications for the Lake Acres Water System Improvements project for Spotsylvania County.

- E. Late bids will not be considered and will be returned to the Bidder UNOPENED.
- F. All bids must be in a sealed envelope and clearly marked in the lower left hand corner:

Business/Contractor Name  
Sealed Bid, Spotsylvania County IFB #17-14-EG Lake Acres Water System Improvements  
Bid Opening: 2:00 PM, December 13, 2016  
DO NOT OPEN

- G. Bids will be accepted until **2:00 PM, December 13, 2016**. Mailed bids must be sent to:

Spotsylvania County Procurement Division  
P.O. Box 215  
8800 Courthouse Road, 2<sup>nd</sup> Floor Room 404  
Spotsylvania, VA 22553

Bids will be opened at the Spotsylvania County Procurement Division, 8800 Courthouse Road (the Marshall Center), 2<sup>nd</sup> Floor Room 404, Spotsylvania, VA 22553.

It is the Bidders sole responsibility to ensure that their bid received by the Spotsylvania County Division of Procurement at the above address and by the above stated time and date. **Please note that Federal Express and other overnight delivery services do not guarantee morning delivery to Spotsylvania, Virginia. Next day delivery usually arrives in mid-to-late afternoon. Also, please note that USPS deliveries require additional days from the post office to the Procurement Office.** If you will be using one of these services for delivery of your bid, please take this information into consideration. The time of receipt shall be determined by the time clock stamp in the Procurement Division, Room 404.

**Inclement Weather:** In the event that Spotsylvania County is closed during the scheduled times for a pre-bid (pre-proposal) conference or bid opening, the pre-bid conference or bid opening will occur on the next business day that Spotsylvania County is open at the appropriate times as stated in the IFB. No exceptions will be made in this situation. Please contact the procurement officer as stated in the IFB for information pertaining to this procurement.

- H. Specifications incorporated into this Invitation to Bid should be followed accordingly. Bids must be made by utilizing and signing the Bid Form. The bid form must include the total bid price, warranty details, exceptions to the specification (if any), to be considered responsive. The Bid Form (all pages) of this IFB shall be completed and returned for a bidder to be considered responsive.
- I. All warranties shall commence from the date of Spotsylvania County's acceptance of the completed work. The contractor warrants that, unless otherwise specified, all materials and equipment incorporated in the work under the contract shall be new, first class condition, and in accordance with the contract documents. The contractor further warrants that all workmanship shall be of the highest quality and in accordance with contract documents and shall be performed by persons qualified at their respective trades. Work not conforming to these warranties shall be considered defective. This warranty of materials and workmanship separate and independent from and in addition to any of the contractor's other guarantees or obligations in this contract.

The minimum warranty period for the construction and related accessories shall be at least one year and shall start from the date of Spotsylvania County's acceptance of the completed work.

- J. **BID BOND:** All bids shall be accompanied by a Bid Bond from a surety company selected by the Bidder, which is legally authorized to do business in Virginia in the amount of five percent (5%) of the amount of the bid if the bid price is in an amount of or over \$100,000. If the bid price is less than \$100,000 the County may ask for a bid bond after the opening of the IFB and performance and payment bonds before work commences. In lieu of a Bid Bond, a Bidder may furnish a certified check or cash escrow in the face amount required for the bond. Such bid guarantee shall be submitted with the understanding of the following: It shall guarantee that the Bidder will not withdraw his bid during the period of 150 days following the opening of bids; if his bid is accepted, he will enter into a formal Contract with Spotsylvania County in accordance with the County Agreement or Purchase Order included as a part of the Contract Documents; and the Standard Performance Bond and the Standard Labor and Material Payment Bond shall be given. And further, in the event of the withdrawal of the said bid within said period, or failure to enter into said Contract and give said Bonds within ten (10) days after he has received Notice of Award, the Bidder shall be liable to the

Spotsylvania County Board of Supervisors for the lesser of (i) the difference between the Bid for which the Bond was written and the next low Bid, or (ii) the face amount of the Bid Bond. This amount represents the damage to the Spotsylvania County Board of Supervisors on account of the default of the Bidder in any particular hereof.

K. As a guideline, Spotsylvania County anticipates the following timetable for selection of a Contractor.

<u>Date</u>	<u>Activity/Event</u>
November 1, 2016	Invitation for Bid Issued
November 15, 2016	Non-mandatory pre-bid meeting 11:00 AM
November 29 2016	Deadline for Questions is 12:00 noon
December 13, 2016	Bids Due by 2:00 p.m. Deadline
February - March 2017	Award Contract

L. Bid price will include freight to the specified delivery location in Spotsylvania County, Virginia, and associated insurance. It shall be the responsibility of the contractor to make all arrangements for delivery, unloading, receiving and storing materials. The County will not assume any responsibility for receiving these shipments. Contractor shall check with owner and make necessary arrangements for security and storage.

M. Failure to manually sign the bid shall disqualify it. The person signing bid shall show title or authority to bind his firm in a Contract.

N. Any quantities indicated in this IFB are for informational purposes only and are not guaranteed to be purchased.

O. The prices quoted on the Bid Form shall be firm for 150 days. Prices shall be submitted in the unit of measurement specified on the Bid Form. No separate line item charges shall be permitted for either bidding or invoicing purposes on the items appearing on the Bid Form, which would include but are not limited to equipment rental, detention, demurrage, drop ship charges, local freight, or any other extraneous charges. Insertion of delivery costs, disclaimers, or limitations of liability, and the like which are not expressly allowed in this IFB will be cause for rejection of the bid.

P. The total of all Bid unit prices will be the sum of the products of the quantity of each item and the corresponding unit price.

Q. Payment for the work included in this section will be in accordance with the unit prices set forth in the bid for the quantity of worked performed.

- R. To perform public work in the Commonwealth of Virginia, the successful Bidder (Contractor) and any Subcontractor working for the Contractor shall hold or obtain such Contractor's and Business License as required by state law and local ordinances. Bidders are required to be licensed Contractors in the Commonwealth of Virginia in compliance with Title 54.1 of the Virginia Code. The bidder shall show evidence of compliance with these licensing requirements as a condition of the Bid being considered. The Bidder's Virginia Contractor's License Number shall be listed on the Bid Form of this Invitation for Bid.
- S. The successful Bidder (Contractor) shall have been engaged in sewer replacement construction and work for a length of time sufficient to establish his competence for providing the required management, work, and expertise. A list of 3 References for which the Contractor has provided similar work over the last 5 years similar in Scope to that which is described herein shall be provided with the Bid Package. Spotsylvania County cannot be listed as a reference.
- T. Any vendor transacting business with Spotsylvania County may be asked to provide proof of registration with the State Corporation Commission (SCC), as required by Sections 13.1 or Title 50 of the Code of Virginia.

#### **IV. SCOPE OF WORK**

Bids will be received for the purchase of construction services and materials to construct the Lake Acres Water System Improvements project in Spotsylvania County, VA. This project consists of furnishing and installing water lines and PRV vaults along Marathon Place and Ni River Drive for approximately 100 feet at each intersection. The water system improvements construction project is described in the specifications titled "Spotsylvania County Specifications for Lake Acres Water System Improvements", dated May, 2016, to include Construction Drawings titled "Spotsylvania County Utilities Water System Improvement Project Lake Acres" dated May 9, 2016 which are found in Attachments A and B of the Invitation for Bid (IFB). All bid documents are available on the County's website: [www.spotsylvania.va.us/bids](http://www.spotsylvania.va.us/bids).

Hard copies of the Construction Drawings titled "Spotsylvania County Utilities Water System Improvement Project Lake Acres" dated May 9, 2016, are available for \$30.00 per set (plus shipping) from: Sullivan, Donahoe and Ingalls, 10720 Columbia Drive, Fredericksburg, VA 22408, Phone 540-898-5878, Monday through Thursday from 8:00 a.m. to 4:30 p.m. and Friday from 8:00 a.m. to 12 p.m.

The Lake Acres Water System Improvements work shall be completed by the Contractor within 90 calendar days as measured from the date of the Notice to Proceed. The date which is 60 calendar days past the Notice to Proceed shall be the Contract Substantial Completion Date.

#### **V. CONTRACT PERFORMANCE**

- A. Performance, Payment Bonds

Upon the award of a public construction Contract resulting from this IFB which exceeds \$100,000 awarded to the successful Bidder(s) (Contractor(s)), the Contractor shall furnish to Spotsylvania County Performance and Payment bonds. If a contract is under \$100,000 the County may request the

bonds in accordance with the Spotsylvania County Procurement Policy. The following bonds shall be furnished to Spotsylvania County:

1. A Performance Bond in the penal sum of 100 percent of the dollar value of the contract conditioned upon the faithful performance of the Contract in strict conformity with the Plans, Specifications, and Terms and Conditions of the Contract. Said bond for the faithful performance of the Contract shall remain in existence for the duration of the Contract performance time period until final acceptance of the project by Spotsylvania County.
2. Payment Bond in the sum of the Contract amount. Such bond shall be for the protection of Claimants who have and fulfill contracts to supply labor or materials to the Contractor to whom the Contract resulting from this IFB was awarded or to any Subcontractors, in the prosecution of the Work provided for in such Contract, and shall be conditioned upon the prompt payment for all such material furnished or labor supplied or performed in the prosecution of the Work. Labor or materials shall include public utility services and reasonable rentals of equipment, but only for periods when the equipment rented is actually used at the Work Site.
3. Each of the above bonds shall be executed by one or more surety companies, selected by the Contractor, which are legally authorized to do business in Virginia. Bonds shall be payable to Spotsylvania County. The Contractor shall present the Performance Bond and Payment Bond to the Spotsylvania County Procurement Division within 15 days after receipt of a fully executed Contract and prior to any Site Work. The Performance Bond shall remain in existence for the duration of the Contract performance time period, and the Payment Bond shall remain in existence for one year after final acceptance of the Work by Spotsylvania County. In lieu of payment or Performance Bonds, the Contractors may furnish a certified check or cash escrow in the face amount required for each of the bonds and which will be held for the statutory period as applicable for each bond.

B. Delivery and Installation Address

The construction work shall be performed at the site location described in the Scope of Work indicated in Section IV.

C. Notice to Proceed

A written "Notice to Proceed" shall be issued by Spotsylvania County to the Contractor fixing the date on which the Contract time will commence to run and on which the Contractor shall be authorized to begin the Work.

D. Pre-Maintenance and Repair Meeting

Before construction services have started, a representative of the Contractor shall confer with representatives of the Spotsylvania County Utilities Department and shall provide such planning, measurements, schedules etc., as are required to ensure that the planned construction activities meet

the requirements of the County. At this meeting, Limits of Authority, changes, and General Procedures shall be explained.

E. Period of Contract Performance and Completion Date

The Lake Acres Water System Improvements project construction shall be completed by the Contractor within 90 calendar days as measured from the date of the Notice to Proceed. The date which is 60 calendar days past the Notice to Proceed shall be the Contract Substantial Completion Date.

The Contractor, in submitting his bid, acknowledges that he has taken into consideration normal weather conditions. Normal weather does not mean statistically average weather, but rather means a range of weather patterns which might be anticipated based on weather data for the past ten (10) years, (i.e., conditions which are not extremely unusual). Normal weather conditions shall be determined from the public historical records available, including the U. S. Department of Commerce, Local Climatological Data Sheets, National Oceanic and Atmospheric Administration/Environmental Data and Information services, National Climatic Center and National Weather Service. The data sheets to be used shall be those for the locality closest to the site of the work.

F. Liquidated Damages

Should the contractor fail to complete the work and/or installation or any part thereof, in the time specified in the Contract Documents, the contractor shall reimburse Spotsylvania County for the additional expense and damage for each calendar day that substantial and final completion has not been achieved. The amount of such additional expense and damage incurred by reason of failure to achieve substantial completion is the per diem rate of \$250. The amount of such additional expense and damage incurred by reason of failure to achieve final completion is the per diem rate of \$500. Such liquidated damages are in addition to any other ascertainable damage allowable by law, which Spotsylvania County sustains for the contractor's breach of the contract. Spotsylvania County shall have the right to deduct liquidated damages or other such damages from any amount due, or that may become due the contractor, or the amount of such damages shall be due and collectable from the contractor or his surety. It is understood and agreed by the Contractor that any liquidated damages payable in accordance with this Agreement are not a penalty and that such sums are reasonable under the circumstances existing as of the date of execution and delivery of this Agreement. The Contractor further acknowledges and agrees that liquidated damages may be owed even though no default has occurred or been declared.

G. Work Site Damages:

Any damage to existing utilities, equipment or finished surfaces resulting from the performance of this contract shall be repaired to Spotsylvania County's satisfaction at the contractor's expense.

## H. Permits

The Contractor shall be responsible for obtaining all permits as indicated in the Technical Specifications detailed in the IFB, and Construction Drawings of this IFB.

The Contractor must provide all contractors licensing information as detailed in Section V, Paragraph I below.

## I. Contractor and Sub-Contractor Licenses

Spotsylvania County requires a general contractor to provide copies of all its construction and business licenses to the County Code Compliance Department.

Upon award of a contract, and prior to work, the successful bidder (contractor) shall be responsible for providing the County's Code Compliance Department with the names of all contractors and sub-contractors involved with the project and copies of their Virginia Contractor's Licenses, Virginia Tradesman Certificates and Spotsylvania County Business Licenses, where applicable.

In addition, the contractor shall complete a sub-contractor roster. This must be returned to the County Business License Office prior to final inspection of the completed work.

## J. Inspection

a. All material and workmanship shall be subject to inspection, examination, and test by the owner and its project inspector at any and all times during construction. The project inspector shall have authority to reject defective material and workmanship and require its correction. Rejected workmanship shall be satisfactorily corrected and rejected material shall be satisfactorily replaced with proper material without charge therefore, and the contractor shall promptly segregate and remove the rejected material from the premises. If the contractor fails to proceed at once with replacement of rejected material and/or the correction of defective workmanship, the owner may, by contract or otherwise, replace such material and/or correct such workmanship and charge the cost to the contractor, or may terminate the right of the contractor to proceed, the contractor and surety being liable for any damages.

b. Job-site inspections, tests conducted on site or tests of materials gathered on site, which the contract requires to be performed by independent testing entities, shall be contracted and paid for by the owner. Examples of such tests are the testing of cast in-place concrete, foundation materials, soil compaction, pile installations, caisson bearings, and steel framing connections. Although conducted by independent testing entities, the County will not contract and pay for tests or certifications of materials, manufactured products, or assemblies which the contract, codes, standards, etc. require to be tested and/or certified for compliance with industry standards such as Underwriters Laboratories, Factory Mutual, or ASTM. If there are any fees to be paid for such tests and certifications, they will be paid by the contractor. The contractor shall also pay for all inspections, tests, and certifications which the contract specifically requires him to perform or pay, together with any inspections and tests which he chooses to perform for his own quality control purposes. The contractor shall

promptly furnish, without additional charge, all reasonable facilities, labor, and materials necessary and convenient for making such tests. Except as provided in (c) below, whenever such examination and testing finds defective materials, equipment, or workmanship, the contractor shall reimburse the owner for the cost of re-examination and retesting.

c. Should it be considered necessary or advisable by the County at any time before final acceptance of the entire work to make an examination of any part of the work already completed, by removing or tearing out portions of the work, the contractor shall on request promptly furnish all necessary facilities, labor and material to expose the work to be tested to the extent required. If such work is found to be defective in any respect, due to the fault of the contractor or his subcontractors, he shall defray all the expenses of uncovering the work, of examination and testing, and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the actual cost of the contractor's labor and material necessarily involved in uncovering the work, the cost of examination and testing, and contractor's cost of material and labor necessary for replacement shall be paid to the contractor and he shall, in addition, if completion of the work has been delayed thereby, be granted a suitable extension of time.

d. The contractor project inspector will recommend to the County that the work be suspended when in his judgment the drawings and specifications are not being followed. Any such suspension shall be continued only until the matter in question is resolved to the satisfaction of the owner. The cost of any such work stoppage shall be borne by the contractor unless it is later determined that no fault existed in the contractor's work.

e. The Contractor's Project Inspector has no authority to and shall not:

- (1) Authorize deviations from the contract documents;
- (2) Enter into the area of responsibility of the contractor's superintendent;
- (3) Issue directions relative to any aspect of construction means, methods, techniques, sequences or procedures, or in regard to safety precautions and programs in connection with the work;
- (4) Authorize or suggest that the owner occupy the project, in whole or in part;
- (5) Issue a certificate for payment.

#### K. Contractor's Title to Materials

No materials or supplies for the work shall be purchased by the contractor or by any subcontractor subject to any security interest, installment or sales contract or any other agreement or lien by which an interest is retained by the seller or is given to a secured party. The contractor warrants that he has clear title to all materials and supplies which he uses in the work or for which he accepts payment in whole or in part.

## VI. TERMS AND CONDITIONS

### A. Acceptance, Invoicing and Payment

Spotsylvania County will make payment to the Contractor, Net 30 days or in accordance with discount terms, if offered, after receipt of an acceptable invoice for services or goods rendered resulting from this IFB.

Pursuant to Virginia Code § 2.2-4354, (1950, as amended), the CONTRACTOR covenants and agrees to:

1. Within seven (7) days after receipt of any amounts paid to the CONTRACTOR under the Agreement, (i) pay any subcontractor for its proportionate share of the total payment received from the COUNTY attributable to the work under the Contract performed by such subcontractor, or (ii) notify the COUNTY and the subcontractor, in writing, of its intention to withhold all or part of the subcontractor's payment and the reason therefore;
2. Provide its federal employer identification number or social security number, as applicable, before any payment is made to the CONTRACTOR under the Agreement;
3. Pay interest at the legal rate or such other rate as may be agreed to in writing by the subcontractor and the CONTRACTOR on all amounts owed by the CONTRACTOR that remain unpaid after seven (7) days following receipt by the CONTRACTOR of payment from the COUNTY for work performed by the subcontractor under the Agreement; and
4. Include in its contracts with any and all subcontractors the requirements of 1, 2, and 3 above.

### B. Attorney's Fees

In the event of any action brought by either party against the other to enforce any of the obligations hereunder or arising out of any dispute concerning the terms and conditions hereby created, each party shall pay their own attorney's fees, costs and expenses, except in a case of default by the Contractor, the Contractor shall be responsible for any resulting additional purchase and administrative costs including, but not limited to fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs.

### C. Audit

Contractor shall keep and require each of its Subcontractor, if any, to keep, at no additional cost to County, full and detailed accounts of costs chargeable to County, during the project, and for five (5) years following completion. County shall be afforded full access to accounts, records, and supporting documents for review, audit, copy (such copies will be the property of County), and verification of costs. Audit access to Contractor's records in lump sum or unit price areas when applicable shall be sufficient to satisfy County that all quantities meet the payments to its subcontractor and suppliers, Contractor shall remit promptly to County the amount of any adjustment resulting from audit.

D. Availability of Funds

It is understood and agreed between the parties herein that the County shall be bound hereunder only to the extent of the funds available or which may hereafter become available for the purpose of this agreement.

E. Binding Effect

The terms, provisions, covenants and conditions contained in any resulting contract shall apply to, inure to the benefit of, and be binding upon the parties hereto and upon their respective heirs, legal representatives, successors, and permitted assigns except as otherwise expressly provided.

F. Compliance of Law

The Contractor providing materials and services to the County under any contract resulting from this IFB represents and warrants to the County that it is:

1. Conforming to the provisions of the Civil Rights Act of 1964, as amended, the Virginia Fair Employment Contracting Act of 1975, as amended, and the Virginia Human Rights Act, as amended, where applicable.
2. Not employing illegal alien workers or otherwise violating the provisions of the Immigration Reform and Control Act of 1986; and Virginia Code § 2.2-4311.1.
3. Complying with federal, state and local laws and regulation applicable to the performance of the services procured; and
4. In full compliance with the Virginia Conflict of Interest Act.

G. Contract Award

Spotsylvania County reserves the right to accept or reject any and/or all bids, and to waive informalities. Spotsylvania County reserves the right to award any contract resulting from this IFB to the lowest priced responsive and responsible bidder, resulting in a contract that is most advantageous and in the best interest of Spotsylvania County. Spotsylvania County shall be the sole judge of the bids and the resulting contract that best serves the public interest, and Spotsylvania County's decision shall be final.

Negotiation with the Lowest Bidder: Unless all bids are cancelled or rejected, the County reserves the right granted by Virginia Code § 2.2-4318 to negotiate with the lowest responsive, responsible bidder to obtain a contract price within the funds available to the agency whenever such low bid exceeds the agency's available funds. For the purpose of determining when such negotiations may take place, the term "available funds" shall mean those funds which were budgeted by the agency for this contract prior to the issuance of the written Invitation for Bids. Negotiations with the low bidder may include both modifications of the bid price and the Scope of Work/Specifications to be performed. The agency shall initiate such negotiations by notice to the lowest responsive, responsible bidder that its bid exceeds the available funds and that the agency wishes to negotiate a lower contract price. The times, places, and manner of negotiating shall be agreed to by the agency and the lowest responsive, responsible bidder.

## H. Contract Changes

No verbal agreement or conversation with any officer, agent or employee of Spotsylvania County either before or after execution of the contract resulting from this Invitation for Bid (IFB), IFB Addendum or follow-on negotiations, shall effect or modify any of the terms or obligations contained in the contract. No alterations to the terms and conditions of the contract shall be valid or binding upon Spotsylvania County unless made in writing and where Board approval is not required, by the county Administrator or his designee.

Contract Extension: This contract may be extended during the term of the existing contract for services allowed to complete any work undertaken but not completed during the original term of the contract.

## I. Contract Documents

The contract entered into by Spotsylvania County and the Contractor shall consist of this Invitation For Bid, the Specification, any Addendum issued, the signed Bid Forms submitted by the Contractor, Spotsylvania County's Standard Form Agreement, Purchase Order and any approved change orders issued, all of which shall be referred to collectively as the Contract Documents. Additional documents which the parties agree to include as contract documents may be set forth in the final contract.

## J. Cooperative Procurement

1. This procurement is being conducted on behalf of Spotsylvania County, Virginia and other public bodies in accordance with the provisions of §2.2-4304 of the Virginia Public Procurement Act.
2. If approved by the Contractor, the contract resulting from this procurement may be used by other public bodies to purchase at contract prices and in accordance with the contract terms. The Contractor shall deal directly with any public body it approves to use the contract. Failure to extend a contract to another public body will have no effect on consideration of Contractor's bid/proposal.
3. With the approval of the Contractor, any public body using the resultant contract has the option of executing a separate contract with the Contractor to add terms and conditions required by statute, ordinances, or regulations, or to remove terms and conditions which conflict with its governing statutes, ordinances, or regulations.
4. The County of Spotsylvania, its officials and staff are not responsible for placement of orders, invoicing, payments, contractual disputes, or any other transactions between the Contractor and any other public bodies, and in no event shall the County, its officials or staff be responsible for any costs, damages or injury resulting to any party from use of a Spotsylvania County contract. If, when preparing such a contract, the additional terms and conditions of a public body seeking to purchase pursuant to cooperative procurement are

unacceptable to the Contractor, the Contractor may withdraw its consent to extension of the contract to that particular public body.

5. Spotsylvania County assumes no responsibility for any notification of the availability of the contract for use by other public bodies, but the Contractor may carry out such notification.

K. Definitions:

1. Contractor:  
The successful bidder who enters into a contract with Spotsylvania County to provide the goods or services as specified herein.
2. County/Owner:  
Wherever the word "County or Owner" appears, it shall be understood to mean the Spotsylvania County Government.
3. Bidder:  
One who submits a competitively priced offer in response to an Invitation for Bids (IFB).
4. Informality:  
A minor defect of variation in a bid or proposal from the exact requirements of the Invitation to Bid, or the Request for Proposal, which does not affect the price, quality, quantity or delivery schedule for the goods, services or construction being procured.

L. 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 any site at which the performance of work is done in connection with this contract awarded to the 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.

M. Ethics in Public Contracting

The Contractor hereby certifies that it has familiarized itself with Article 6 of Title 2.2 of the Virginia Public Procurement Act, Section 2.2-4367 through 2.2-4377, Virginia Code Annotated, and that all amounts

received by it, pursuant to a Contract resulting from this IFB, are proper and in accordance herewith. By submitting a response to this solicitation, bidder certifies that their bid is made without collusion or fraud 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 any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged.

N. Examination of Records

The Contractor agrees that Spotsylvania County or any duly authorized representative shall have access to and the right to examine any and copy any directly pertinent books, documents, papers and records of the Contractor involving transactions related to any Contract resulting from this IFB. The period of access provided in this paragraph for records, books, documents, and papers and software which may be related to any arbitration, litigation, or the settlement of claims arising out of the performance of any subsequent contract or any subsequent Contracts with vendors shall continue until disposition of any appeals, arbitration, litigation, or claims. Contractors agrees to keep all records in accordance with the state and local retention laws including but not limited to Virginia Code § 55-525.27.

O. Faith-Based Organizations

Pursuant to Section 2.2-4343.1 of the Code of Virginia of 1950, in all invitations to bid, requests for proposals, contracts, and purchase orders, the COUNTY does not discriminate against faith-based organizations.

“Faith-based Organization” means a religious organization that is or applies to be a contractor to provide goods or services for programs funded by the block grant provided pursuant to the Personal Responsibility and Work Opportunity Reconciliation Act of 1996, P.L. 104-193.

If CONTRACTOR is a faith-based organization, then Contractor shall give to each individual who applies for or receives goods, services, or disbursements provided pursuant to this Agreement the following notice:

NOTICE

Pursuant to Section 2.2-4343.1 of the Code of Virginia of 1950, as an applicant for or recipient of goods, services, or disbursements provided pursuant to a contract between the COUNTY and a faith-based organization, you are hereby notified as follows:

Neither the COUNTY’S selection of a charitable or faith-based provider of services nor the expenditure of funds under this contract is an endorsement of the provider’s charitable or religious character, practices, or expression. No provider of services may discriminate against you on the basis of religion, a religious belief, or your refusal to actively participate in a religious practice. If you object to a particular provider because of its religious character, you may request assignment to a different provider. If you believe that your rights have been violated, please discuss the complaint with your provider or notify the COUNTY Administrator.

P. Federal-Aid Provisions

When the U. S. government pays all or any portion of the cost of a project, the Contractor shall observe all federal laws, rules, and regulations made pursuant to such laws. The work shall be subject to inspection by the appropriate federal agency. Such inspection shall in no sense make the federal government a party of the contract and will in no way interfere with the rights of either party. Contractor shall require all subcontractors to observe all federal laws, rules, and regulations made pursuant to such laws. Reporting requirements that is part of the regulation shall be followed in accordance with the federal law, rules and/or regulation made pursuant to such laws. A Duns number will be provided by the Contractor and registration with the Central Contractor Registration (CCR) shall be followed according to the federal aid provisions.

Q. Force Majeure

In any contract resulting from this IFB, neither party shall be liable hereunder by reason of any failure or delay in the performance of its obligations hereunder (except for the payment of money) on account of strikes, industry wide material shortages, riots, insurrection, fires, flood, storm, explosions, earthquakes, pandemic flu, acts of God, war, governmental action, and labor conditions. In the case of an industry wide material shortage the Contractors shall provide to the County within 24 hours of Contractor's determination that there exists an industry wide material shortage, the following: 1) a written description of the specific material alleged to be in short supply; 2) a written list of all manufacturers, wholesalers, suppliers and/or retailers from which Contractor has attempted to obtain, and/or contracted to obtain, said material; 3) a written description detailing all actions taken by Contractor to obtain said materials; 4) a written statement, signed by an authorized representative of Contractor, that Contractor has used due diligence to secure said materials in the most expeditious manner; 5) a written time frame in which Contractor anticipates that it will obtain said materials and; 6) the County, or its authorized representative, concurs that there is an industry wide shortage of the specific material so identified by contractor.

R. Freedom of Information

All information submitted to the County in response to this IFB will constitute public information and pursuant to the Virginia Freedom of Information Act will be available to the public for inspection upon request. Pursuant to Virginia Code § 2.2-4342 and County Procurement Policy § 3-27, a Bidder may request an exception to disclosure for trade secrets or proprietary information as such is defined under Virginia Code § 59.1-336, part of the Uniform Trade Secrets Act. In order to claim this exemption, a Bidder must: (1) Submit a request in writing referencing their desire to invoke the protections of Virginia Code § 2.2-4342; (2) Specifically identify which data or materials they wish to have protected; and (3) Articulate the rationale for why protection is necessary for the particular data or materials, to the satisfaction of the County. Failure to meet these requirements will result in the data or materials being open for inspection in response to a valid inquiry under the Virginia Freedom of Information Act and serve to waive any right of the Bidder to assert a claim against the County for disclosure of trade secrets or proprietary information.

S. Governing Law

In any contract resulting from this IFB, the parties agree that this agreement is governed by and shall be interpreted in accordance with the Spotsylvania County Procurement Policy and the laws of the

Commonwealth of Virginia, including the Spotsylvania County Procurement Policy, and that proper venue, in the event of litigation concerning this matter, shall be in the Circuit Court of Spotsylvania County, Virginia. The parties agree that any litigation involving this Agreement shall be brought only in such court.

#### T. Grant Funds Provision

When a project is funded in part or all by grant funds, the Contractor shall observe all rules and regulations according to the grant fund award documentation. Contractor has the responsibility to comply with all grant fund reporting requirements and any or all award documentation terms and conditions.

#### U. Headings

Headings in the IFB and any resulting contract are informational only and the substance of each numbered or lettered provision shall prevail in the event of any ambiguity or inconsistency between a heading and its content.

#### V. IFB and Bid Clarification

Spotsylvania County reserves the right to request clarification of information submitted and to request additional information of one or more bidders. Each bidder shall examine the IFB and shall judge all matters relating to the adequacy and accuracy of such IFB. Any inquiries, suggestions or requests concerning interpretation, clarification or additional information pertaining to the IFB shall be submitted in writing to the Spotsylvania County Procurement contact listed on the first page of this IFB. Spotsylvania County shall not be responsible for oral interpretations given by an employee, representative, agent, or others. The issuance of a written IFB Addendum issued by the Spotsylvania County Procurement Division is the only official method whereby interpretation, clarification, or additional information can be issued.

#### W. Insurance

During the performance of any contract resulting from this IFB, the Contractor shall have and keep current insurance whichever is greater in scope or amount as follows:

- (1) Worker's Compensation Insurance in compliance with all states in which the Contractor does business, including coverage B Employer's Liability in not less than the following amounts:
  - a. i Bodily Injury by accident, \$100,000 for each accident;
  - b. ii Bodily Injury by disease, \$500,000 policy limit;
  - c. iii Bodily Injury by disease, \$100,000 for each employee;
- (2) General Liability Insurance in amount not less than \$1,000,000 for any occurrence involving bodily injury, and not less than \$1,000,000 for any occurrence involving property damage. This coverage shall include contractual liability, broad form property damage, independent contractors, and personal injury;

- (3) Automobile Liability Insurance in an amount not less than \$500,000 combined single limit bodily injury and property damage. This coverage shall include liability for the use of hired and non-owned vehicle.

The General Liability and Automobile Liability insurance policies specified herein shall name Spotsylvania County as additional insured with regard to work performed under any contract resulting from this IFB. The Contractor shall provide Spotsylvania County with copies of certificates of insurance coverage and proof of payment of all premiums. These certificates shall have provisions for notifying Spotsylvania County if there is any change in liability insurance.

The insurance required shall have been issued by a company rated “A” as reported in the current edition of Best’s Key Rating Guide, published by Alfred M. Best Company, Inc.

X. Interpretation

Words of any gender used in a resulting contract shall be held and construed to include any other gender, And words in the singular number shall be held to include the plural, and vice versa, unless the context otherwise requires.

Y. Non-Collusion

The party submitting the foregoing IFB hereby certifies that such IFB is genuine and not collusive or sham; that said bidder has not colluded, conspired, connived or agreed, directly in indirectly, with any bidder or person, to put in a sham bid or to refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person to fix the bid price or affiant or of any bidder, or to fix any overhead, profit or cost element of said IFB price, or of that of any other bidder, or to secure any advantage against the County or any person interested in the proposed contract; and that all statements in said IFB are true.

Z. Non-Discrimination

Any contract resulting from this IFB and every contract, sub-contract, or purchase order there under shall include the following provisions according to 2.2-4311 Code of Virginia:

During the performance of a contract, the Contractor agrees as follows:

- i. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, or national origin, except where religion, sex or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicant for employment, notices setting forth non-discrimination clause.
- ii. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such contractor is an equal opportunity employer.

- iii. Notices, advertisements, and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirement.

#### AA. Partial Invalidity

In the event any one or more of the provisions of a contract resulting from this IFB are found by a court of competent jurisdiction to be invalid or unenforceable, the remaining provisions of the contract shall remain in full force and effect.

#### BB. Release and Ownership of Information

Spotsylvania County shall make a good faith effort to identify and make available to the Contractor all non-confidential technical and administrative data in Spotsylvania County's possession which Spotsylvania County may lawfully release including, but not limited to contract specifications, drawings, correspondence, and other information specified and required by the Contractor and relating to its work under this Contract. Spotsylvania County reserves its rights of ownership to all material given to the Contractor by Spotsylvania County and to all background information, documents, and computer software and documentation developed by the Contractor in performing any Contract resulting from this IFB.

No reports, information or data given to or prepared by the Contractor under the resulting Contract shall be made available to any individual or organization by the Contractor without the prior written approval of Spotsylvania County, which approval Spotsylvania County shall be under no obligation to grant.

As may be allowed by law, any information, ideas, or concepts that the County receives during the procurement process from any bidder's IFB response, any discussion or interview with the bidder or as a result of any portion of the procurement process for the services described in this Invitation for Bid shall become the property of Spotsylvania County. Spotsylvania County may use this information for any purpose without compensation to the bidder from whom the information was received.

#### CC. Rights and Responsibilities of Contractor

The Contractor shall indemnify, defend and hold harmless the County and its representatives from any and all claims, suits and actions for injury or damage sustained by any person or property from any act or omission by Contractor and/or its Contractors or employees, or anyone else for who Contractor is or may be responsible. This section shall survive the termination this agreement.

The Contractor in any contract resulting from this IFB shall pay all royalties and license fees necessary for performance of the contract. The Contractor shall defend all suits or claims for infringement of any patent rights or any other proprietary rights arising from or related to performance of the resulting contract and shall save Spotsylvania County harmless from any and all loss, including reasonable attorneys' fees, on account thereof.

#### DD. Subcontractor and Assignments

The Contractor shall not sublet or assign or transfer any interest in this Contract or any portion thereof without the prior written consent of Spotsylvania County of which Spotsylvania County shall be under no obligation to grant. In seeking consent for any subcontract or assignment, the Contractor shall furnish all information required by Spotsylvania County to permit Spotsylvania County to ascertain the qualifications of the proposed Subcontractor to perform the work, and the Contractor shall submit a copy of the subcontract to Spotsylvania County for approval. The subcontractor shall incorporate by reference all provisions and conditions of the contract resulting from this solicitation.

Spotsylvania County's approval of a Subcontractor shall not relieve the Contractor of any of its responsibilities, duties or liabilities hereunder. The Contractor shall continue to be responsible to Spotsylvania County for performance of the Subcontractor and the Subcontractor, for all purposes, shall be deemed to be an agent or employee of the Contractor. Nothing in the Contract resulting from this RFP or any subcontract shall create any contractual relationship between any Subcontractor and Spotsylvania County.

#### EE. Tax Exemption

The County of Spotsylvania as a public body politic and corporate of the Commonwealth of Virginia, is exempt from any Federal excise tax and Virginia sales and use tax for purchases made by the County.

#### FF. Termination

Spotsylvania County shall have the right to terminate at Spotsylvania County's convenience, with or without cause, any contract resulting from this IFB by specifying the date of termination in a written notice. In this event, the Contractor shall be entitled to just and equitable compensation for any authorized satisfactory work done or any items/materials accepted by Spotsylvania County.

#### GG. Testing and Inspection

Spotsylvania County reserves the right to conduct any test/inspection it may deem advisable to assure goods and services conform to the specifications prior to award.

#### HH. Transportation and Packaging

By submitting their bid, all bidders certify and warrant that the price offered for FOB destination includes only the actual freight rate costs at the lowest and best rate and is based upon the actual weight of the goods to be shipped.



**ATTACHMENT A**

***TECHNICAL SPECIFICATIONS***

For

Invitation For Bid (IFB#17-14-EG)

**LAKE ACRES WATER SYSTEM IMPROVEMENTS**

May, 2016

SECTION 01100 – SUMMARY

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Section, Spotsylvania County Department of Utilities Project Manual for the Lake Acres Water System Improvements, the Virginia Work Protection Manual, and Virginia Department of Transportation "Road and Bridge Specifications", apply to this Section.

2. SUMMARY

- A. This Section includes the following:
  - 1. Work covered by the Contract Documents.
  - 2. Type of the Contract.

3. WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Water System Improvement Project – Lake Acres
  - 1. Project Location: Along Gordon rd at the intersection of Marathon Place and Ni River Drive
- B. Owner: Spotsylvania County Department of Utilities, 600 Hudgins Road, Fredericksburg, Virginia 22408
- C. Engineer: Sullivan, Donahoe & Ingalls, PC
- D. The Work consists of the following:
  - 1. The Work includes installation of water lines and PRV vaults along Marathon Place and Ni River Drive for approximately 100' at each intersection.

4. TYPE OF CONTRACT

- A. Project will be constructed under a single prime contract.

END OF SECTION 01100

SECTION 01106 – CONSTRUCTION SCHEDULING, COORDINATION AND SEQUENCING

PART 1 – GENERAL

1. GENERAL REQUIREMENTS

- A. Construction work under this contract shall have the least amount of interferences with the operations of existing facilities. 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 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, drawings showing details of all temporary connections or facilities as required.
- E. 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 price bid of the Proposal.

2. 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. 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.

3. FACILITY SHUTDOWNS

- A. Temporary shutdown periods shall not extend more than 8 hours.
- B. Scheduled shut downs shall be mutually agreed upon by the Owner and the Contractor, with the Engineer's approval.

- C. Contractor shall 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 with 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 shut downs the Contractor shall be responsible for all damages and costs thereof due to negligence.

#### 4. 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 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 judgment of the Owner 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.
2. The Contractor shall arrange that each subcontractor determines the location, size and arrangement of all chases and openings and shall establish clearances in concealed spaces required for the proper installation of its work and shall see that such are provided.

#### 5. PERMITS

##### A. Virginia Department of Transportation

1. The Contractor will be responsible for obtaining and paying for the Virginia Department of Transportation Land Use Permit.

##### B. Erosion and Sediment Control Permit

1. The Contractor will be responsible for obtaining the Spotsylvania County Erosion and Sediment Control Permit. The County will be responsible to pay for the Permit.

##### C. Virginia Department of Conservation and Recreation (DCR) - Stormwater Management Program General Permit for Construction Activity

1. The Contractor is required to apply for and obtain a Stormwater Management Program General Permit for Construction Activity from the DCR. The contractor will be required to pay the permit fee, submit the permit application and sign the appropriate certification. The contractor is

required to prepare and maintain a Stormwater Pollution Prevention Plan (SWPPP) as required by the permit.

END OF SECTION 01106

SECTION 01130 – MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1. 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 as CONTINGENCY (UNIT PRICE) ITEMS in the proposal 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 material 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 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 CONDITIONS, Article 10 - Cost of the Work, Allowances, Unit Price Work and Article 15 - Payments and Completion.

## 2. 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.

### 3. 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 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 Lump Sum Bid.

### 4. ITEM OF WORK

- A. Items A – 1                      6-inch Dia. Pressure Class 350 DIP Waterline
1. Payment for furnishing and installing 6-inch diameter, Pressure Class 350 DIP Waterline shall be made at the respective unit price bid per linear foot for the lengths of pipe actually installed, complete in place.
  2. Measurement of lengths will be made horizontally, along the centerline of the pipe. No deductions will be made in the measured length for fittings and 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 Pressure Class 350 DIP Waterline including, but not limited to, traffic control, pavement removal, excavation including rock if required, laying of the pipe, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable material, replacement of sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt and concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre- construction conditions, and other incidental items required for the proper operation of the waterline.
- B. Items A – 2                      6-inch Gate Valve and Box
1. Payment for furnishing and installing each 6-inch gate valve and box shall be made at the unit price bid per for each respective gate valve and box actually installed, complete in place.

2.No measurement shall be made for this item.

3.The unit price bid per each gate valve and box shall include all labor, materials, tools, equipment and services for furnishing and installing each gate valve and box including, but not limited to; traffic control, pavement removal, excavation including rock if required, laying of the pipe, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable material, replacement of sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt and concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline.

C. Items A – 3                      6-inch Tapping Valve and Box

1.Payment for furnishing and installing each 6-inch gate valve and box shall be made at the unit price bid per for each respective gate valve and box actually installed, complete in place.

2.No measurement shall be made for this item.

3.The unit price bid per each gate valve and box shall include all labor, materials, tools, equipment and services for furnishing and installing each gate valve and box including, but not limited to; traffic control, pavement removal, excavation including rock if required, laying of the pipe, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable material, replacement of sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt and concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline.

D. Item A – 4                      6-inch Ductile Iron 90 Degree Bend

1.Payment for furnishing and installing bend shall be made at the unit price bid per for each respective bend actually installed, complete in place.

2.No measurement shall be made for this item.

3.The unit price bid per each bend shall include all labor, materials, tools, equipment and services for furnishing and installing bends including, but not

limited to; traffic control, pavement removal, excavation including rock if required, laying of the pipe, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable material, replacement of sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt and concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline.

- E. Item A – 5                      6-inch Ductile Iron 45 Degree Bend
1. Payment for furnishing and installing bend shall be made at the unit price bid per for each respective bend actually installed, complete in place.
  2. No measurement shall be made for this item.
  3. The unit price bid per each bend shall include all labor, materials, tools, equipment and services for furnishing and installing bends including, but not limited to; traffic control, pavement removal, excavation including rock if required, laying of the pipe, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable material, replacement of sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt and concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline.
- F. Items A – 6                      6-inch Ductile Iron 22-1/2" inch Degree Bend
1. Payment for furnishing and installing bend shall be made at the unit price bid per for each respective bend actually installed, complete in place.
  2. No measurement shall be made for this item.
  3. The unit price bid per each bend shall include all labor, materials, tools, equipment and services for furnishing and installing bends including, but not limited to; traffic control, pavement removal, excavation including rock if required, laying of the pipe, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable material, replacement of sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt and

concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline.

- G. Item A – 7                      16" x 6" Ductile Iron Tapping Tee
1. Payment for furnishing and installing each 16" x 6" Tapping Tee shall be made at the unit price bid per each 16" x 6" Tee, complete in place.
  2. No measurement shall be made for this item.
  3. The unit price bid shall include all labor, materials, tools, equipment and services for furnishing and installing the 16" x 6" Tapping Tee including, but not limited to; traffic control, pavement removal, excavation including rock if required, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable material, replacement of sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt and concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline.
- H. Item A – 8                      Asphalt Patches
1. Payment for completing an open cut asphalt patch, including installing the 16-inch Tapping Sleeve and 6-inch Dia. Pressure Class 350 DIP water line pipe and the restoration of the asphalt, made shall be made at the square yard unit price bid, complete in place actually installed, complete in place.
  2. Area measurement shall be made for this item in the field with a representative of the County present.
  3. The unit price bid for completing an open cut asphalt crossing, including installing the 16-inch tapping sleeve and 6-inch Dia. Pressure Class 350 DIP water line pipe and the restoration of the asphalt, shall include all labor, materials, tools, equipment and services for furnishing and restoring the asphalt including, but not limited to, sawcut, traffic control, pavement removal, excavation including rock if required, laying of the pipe, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable material, replacement of asphalt, and including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and

other incidental items required for the proper operation of the waterline and the roadway.

I. Item A – 9 Concrete Ditch Repair

1. Payment for completing an open cut concrete Ditch crossing, including installing the 6-inch Dia. Pressure Class 350 DIP water line pipe and the restoration of the ditch, made shall be made at the square yard unit price bid, actually installed, complete in place.
2. Area measurement shall be made for this item in the field with a representative of the County present.
3. The unit price bid for completing an open cut concrete ditch crossing, including installing the 6-inch Dia. Pressure Class 350 DIP water line pipe and the restoration of the driveway, shall include all labor, materials, tools, equipment and services for furnishing and restoring the concrete driveway including, but not limited to, sawcut, traffic control, pavement removal, excavation including rock if required, laying of the pipe, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable material, replacement of concrete driveways, and including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline and the driveway.

J. Item A – 10 Silt Fence

1. Payment for silt fence shall be made at the unit price bid per each linear foot of silt fence actually installed, complete in place.
2. Measurement shall be made for each linear foot of silt fence actually installed.
3. The unit price bid shall include all labor, materials, tools, equipment and services for completing the installation and removal of the silt fence including, but not limited to, traffic control, excavation including rock if required, trench support, dewatering, cleanup, removal and disposal of all unsuitable material, replacement of sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt and concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the silt fence.
4. Fifty (50%) percent of the unit price will be made upon installation and fifty (50%) of the unit price shall be made upon removal.

- K. Item A – 11 Mobilization
1. Payment for mobilization shall be made at the lump sum bid for the mobilization, upon completion.
  2. No measurement shall be made for this item.
  3. Lump sum cost for mobilization shall include such items as bonds, insurance, stakeout, equipment and labor mobilization, field office, progress photographs, project sign, permits, shop drawings, Contractor's test pits, and other incidental items including the safe relocation and protection of personal property located within the water line easement required prior to commencement of construction. Mobilization shall not exceed 5.0% of the total price bid. Application for maximum 50% payment of mobilization may be made on the first "Request for Payment".
- L. Item A – 12 Traffic Control
1. Payment for traffic control shall be made at the lump sum bid for traffic control.
  2. No measurements shall be made for this item.
  3. The unit price bid for traffic control shall include all labor, materials, tools, equipment and services for installing, removing, and re-installing traffic control including, but not limited to, cleanup, removal and disposal of all unsuitable material, restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper function and maintenance of the traffic control.
- M. Items A-13 Topsoil, Permanent Seeding, Fertilizing, and Mulching
1. Payment for furnishing and installing topsoil, seeding, fertilizing, and mulch shall be made at the unit price bid per square yard of topsoil, permanent seeding, fertilizing, and mulch installed, complete in place.
  2. No measurement will be made. Payment is based on the square yards of topsoil, permanent seeding, fertilizing, and mulch within the permanent utility easement and temporary construction easement; the length of pipe shall be multiplied by the combined widths of temporary and permanent sanitary sewer easements to obtain the area of topsoil permanent seeding, fertilizing, and mulch installed, complete in place.

3. The unit price bid for each square yard of topsoil, permanent seeding, fertilizing, and mulch shall include all labor, materials, tools, equipment, and services for furnishing and installing topsoil, seeding, fertilizing, and mulch including, but not limited to; handling and placing of topsoil, fine grading, handling and placing of permanent seed, temporary seeding as required to stabilize disturbed areas, handling and placing of mulch and wetland seeding, handling and placing of fertilizer and lime, watering, testing and any other incidental items required for proper growth in the seeded area.

N. Item A – 14      6' – 0" Dia. Pre-cast Concrete PRV Manhole with Watertight Frame and Cover

1. Payment for furnishing and installing 6'-0" Dia. Pre-cast concrete manhole with watertight frame and cover shall be made at the unit bid per manhole, complete in place.

2. No measurement shall be made for this item.

3. The unit price bid per manhole shall include all labor, materials, tools, equipment and services for furnishing and installing 6' -0" diameter Pre-cast concrete manhole including, but not limited to; unclassified excavation, pavement removal, excavation including rock if required, removal of trench support, dewatering, handling and placing of manhole sections, watertight frame and cover, outside coating, flexible pipe connections, steps, making connections, temporary blocking, stone bedding, testing, cleanup, removal and disposal of all unsuitable or excess material, seeding and mulching, backfill and surface materials, including the replacement of gravel, asphalt, and concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for proper operation of the manhole.

O. Item A – 15      6' x 8' Pre-cast Concrete PRV Vault with 48" x 48" BILCO Hatch

1. Payment for furnishing and installing 6' x 8' Pre-cast concrete PRV Vault with 48" x48" BILCO Hatch shall be made at the unit bid per vault, complete in place.

2. No measurement shall be made for this item.

3. The unit price bid per manhole shall include all labor, materials, tools, equipment and services for furnishing and installing 6' x 8' Pre-cast concrete Vault including, but not limited to; unclassified excavation, pavement removal, excavation including rock if required, removal of trench support, dewatering, handling and placing of vault sections, 48" x 48" BILCO hatch, outside coating, flexible pipe connections, steps, making connections, temporary blocking, stone

bedding, testing, cleanup, removal and disposal of all unsuitable or excess material, seeding and mulching, backfill and surface materials, including the replacement of gravel, asphalt, and concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for proper operation of the manhole.

P. Item A – 16 Install 6” CLA-Val Model #90-01

1. Payment for installing county supplied 6” Cla-Val PRV valve in the Concrete Manhole and Vault shall be made at the unit bid per valve, complete in place.

2. No Measurement shall be made for this item

3. The unit price bid per PRV valve shall include all labor, materials, tools, equipment and services for installing each PRV valve and connections including, but not limited to; traffic control, pavement removal, excavation including rock if required, laying of the pipe, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable material, replacement of sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt and concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline.

Q. Contingency Items A-17 Over-Excavation of Unsuitable Subgrade/ Porous Fill

1. Payment for over-excavating and disposal of unsuitable material below the trench subgrade and furnishing and backfilling with 12 inches of VDOT No. 57 stone wrapped in geotextile (obtained offsite) will be made at the unit price bid per cubic yard. Measurement shall be made for compacted material, in-place where ordered in writing by the Engineer or County.

2. Measurement will be made in the field and witnessed by the Engineer; unwitnessed measurements will not be compensated.

3. The unit price bid per cubic yard shall include all labor, materials, tools, equipment and services for furnishing and placing select borrow material including, but not limited to, disposal of unsuitable material, transportation, trench support, placing of select material, compaction, dewatering, and any other incidental item required for proper function and maintenance of the water line.

4. Payment will not be made for select borrow material placed beyond the limits directed by the Engineer or County.

R. Contingency Items A-18 Allowance for Testing & Lab Testing Services

1. Payment for Testing and Lab Testing Services shall be made up to the \$10,000 allowance for Testing and Lab Testing actually performed where ordered in writing by the Engineer or County.
  2. No measurement shall be made for this item.
  3. The allowance for testing and lab testing performed shall include all labor, materials, tools, equipment and services for performing lab testing including, but not limited to; testing, cleanup, removal and disposal of all unsuitable material, restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper function and maintenance of the waterline.
- S. Contingency Items A-19 Allowance for Inspection Services
1. Payment for Inspection Services shall be made up to the \$5000 allowance for inspection services actually performed where ordered in writing by the Engineer or County.
  2. No measurement shall be made for this item.
  3. The allowance for Inspection Services shall include all labor, materials, tools, equipment and services for performing inspection required for the proper function and maintenance of the waterline.

#### 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 90% 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. Items of material or equipment to which partial payment applies includes and is limited to the following:
  - i. 6-inch Dia. Pressure Class 350 DIP Waterline
  - ii. 6-inch D.I. Valves & Fittings

END OF SECTION 01130

SECTION 01152 -Applications for Payment

PART 1 – GENERAL

1. THE REQUIREMENT

- A. Submit Applications for Payment in accordance with the requirements established by the Contract Documents.

2. FORMAT AND DATA REQUIRED

- A. Applications shall include the following:
  - 1.Application and Certification for Progress Payment form.
  - 2.Except as modified herein, measurement and payment shall be in accordance with the GENERAL CONDITIONS, Article 10 -Cost of the Work, Allowances, Unit Price Work and Article 15 -Payments and Completion.
  - 3.Invoices for stored materials.

3. PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

A. Application Form

- 1.Fill in required information on the "Application and Certification for Progress Payment" form.
- 2.Execute certification with signature of a responsible officer of CONTRACTOR. An original signature should appear on each copy submitted.
- 3.Attach to the Application, for payment of materials stored on or off site, original paid invoices.
- 4.Other Withholding from Progress Payment
  - a. If it is determined that additional monies should be withheld from the amount otherwise due CONTRACTOR, a "Other Withholding from Progress Payment" form will be completed with an explanation of the amount and reasons for such Other Withholding, and will be attached to each copy of the Application. Some items which, might be included in the Other Withholding amount are, but not limited to: engineering fees for review of substitutions; excessive shop drawing review; overtime required by CONTRACTOR's work in excess of eight hours per day; costs incurred due to CONTRACTOR caused damage to private or public property; etc.

4. SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. Provide any substantiating data, as requested by Owner.

- B. Since the operation and maintenance information to be supplied will be reviewed initially and then resubmitted, payment for individual items of equipment shall be limited to 75 percent of the invoiced equipment value until the preliminary draft operation and maintenance data is submitted and receives a "Furnish as Corrected" annotation by DESIGN ENGINEER.
  - C. As a prerequisite for monthly progress payments, exhibit the updated record drawings for review.
5. SUBMITTAL PROCEDURES
- A. Submit, to Owner, Applications for Payment at the times stipulated in the Agreement.
  - B. Submit six copies of each Application.
  - C. When Application is determined to be properly completed and correct, four copies of the certificate for payment will be retained OWNER, one to DESIGN ENGINEER, and one copy will be returned to CONTRACTOR.

- END OF SECTION -

SECTION 01153 - CHANGE ORDER AND FIELD ORDER PROCEDURES

PART 1 – GENERAL

1. REQUIREMENTS

- A. Promptly implement change order procedures as follows:
  - 1. Provide full written data required to evaluate changes.
  - 2. Maintain detailed records of Work done on a time-and-material/force account basis.
  - 3. Provide full documentation on request.
- B. Designate in writing the member of CONTRACTOR's organization:
  - 1. Who is authorized to accept changes in the Work.
  - 2. Who is responsible for informing others in the CONTRACTOR's employ of the authorization of changes in the Work.
- C. OWNER will designate in writing the person who is authorized to execute Change Orders and Work Directive Changes.
- D. Forms for Change Orders, Work Directive Changes and Field Orders are included in the County's standard documents or from the Engineer.

2. RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01152 - Applications for Payment

3. PRELIMINARY PROCEDURES

- A. OWNER may initiate changes by submitting a Request for Proposal (RFP) to the CONTRACTOR in accordance with paragraph 10.01.B of the General Conditions as amended by the Supplementary Conditions. Request will include:
  - 1. A detailed description of the change, products, and location of the change in the Project;
  - 2. Supplementary or revised Drawings and Specifications;
  - 3. The projected time span for making the change, and a specific statement as to whether overtime work is, or is not, authorized;
  - 4. Such request is for information only, and is not an instruction to execute the changes, or to stop work in progress.
- B. CONTRACTOR may initiate a request to make a change by submitting a written notice (in a form acceptable to the OWNER) containing:
  - 1. Description of the proposed changes;

2. Statement of the reason for making the changes;
3. Statement of the effect on the Contract Price and the Contract Time;
4. Statement of the effect on the work of separate Contractors;
5. Documentation supporting any change in Contract Price or Contract Time.

4. WORK CHANGE DIRECTIVE

- A. In lieu of a Request for Proposal (RFP), OWNER may issue a Work Change Directive (WCD) for the CONTRACTOR to proceed with a change for subsequent inclusion in a Change Order.
- B. A WCD will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change, and will designate the method of determining any change in the Contract Price and any change in Contract Time.
- C. OWNER will sign and date the WCD as authorization for the CONTRACTOR to proceed with the changes.
- D. CONTRACTOR may sign and date the WCD to indicate agreement with the terms therein.

5. DOCUMENTATION OF PROPOSALS AND CLAIMS

- A. CONTRACTOR shall support each quotation for a lump-sum proposal, and for each unit price that has not previously been established, with sufficient substantiating data to allow evaluation of the quotation, in accordance with the General Conditions.
- B. On request, CONTRACTOR shall provide additional data to support time and cost computations including, but not limited to, the following:
  1. Labor required
  2. Equipment required
  3. Products required
    - a. Recommended source of purchase and unit cost
    - b. Quantities required
  4. Taxes, insurance, and bonds
  5. Credit for Work deleted from Contract, similarly documented

6. Overhead and profit

7. Justification for any change in Contract Time

- C. Support each claim for additional costs, and for Work done on a time-and-material/force account basis, with documentation in accordance with the General Conditions, plus additional information as follows:
1. Name of the OWNER's authorized agent who ordered the Work, and date of the order.
  2. Dates and times Work was performed, and by whom.
  3. Time record, summary of hours worked, and hourly rates paid.
  4. Receipts and invoices for:
    - a. Equipment used, listing dates, and times of use
    - b. Products used, listing of quantities
    - c. Subcontracts

6. PREPARATION OF CHANGE ORDERS AND FIELD ORDERS

- A. OWNER will prepare each Change Order and Field Order with technical requirements provided by the DESIGN ENGINEER.
- B. Forms: See County's standard documents for forms.
- C. Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.
- D. Change Order will provide an accounting of the adjustment in the Contract Price and in the Contract Time.
- E. Field Order will describe interpretations or clarifications of Contract Documents, order minor changes in the Work, and/or document trade-off agreements.
- F. Field Order Work will be accomplished without change in the Contract Price, Contract Time, and/or claims for other costs.
- G. If in agreement, the CONTRACTOR shall sign and return Field Orders for execution by the next working day at which time they will become binding on the CONTRACTOR.

7. CORRELATION WITH CONTRACTOR'S SUBMITTALS

- A. Revise Schedule of Values and Application for Payment forms to record each change as a separate item of Work and to record the adjusted Contract Price.

- B. Revise the Construction Schedule monthly to reflect each change in Contract Time.  
Revise sub-schedules to show changes for other items of Work affected by the changes.
  
- C. Upon completion of Work under a Change Order, enter pertinent changes in Record Documents.

- END OF SECTION -

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

2. SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
- C. The contractor shall comply with the Spotsylvania County Building Codes as well as the requirements of all permits obtained by the owner or contractor.
- D. The contractor shall give all necessary notices, obtain all permits (except as otherwise noted herein) and pay all governmental taxes, fees, and other costs in connection with the work, file all necessary plans, prepare all documents, and obtain all necessary approvals of all government departments having jurisdiction, obtain all required Certificates of Inspection and Approval for the work and deliver same to the engineer, except as otherwise notes.

3. DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer.
- C. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

#### 4. COMPLIANCE

- A. All materials furnished and all work installed shall comply with the requirements of all governmental departments having jurisdiction.
- B. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.
- C. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements.
- D. The contractor shall arrange for inspection and approval by the appropriate City Inspectors and shall pay all costs of these services.

#### 5. SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Description of test and inspection.
  - 3. Identification of applicable standards.
  - 4. Identification of test and inspection methods.
  - 5. Number of tests and inspections required.
  - 6. Time schedule or time span for tests and inspections.
  - 7. Entity responsible for performing tests and inspections.
  - 8. Requirements for obtaining samples.
  - 9. Unique characteristics of each quality-control service.
- C. Reports: Prepare and submit certified written reports that include the following:
  - 1. Date of issue.
  - 2. Project title and number.

3. Name, address, and telephone number of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making tests and inspections.
  6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  11. Name and signature of laboratory inspector.
  12. Recommendations on retesting and re-inspecting.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
6. QUALITY ASSURANCE
- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
  - B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
  - C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
  - D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
  - E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
  - F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations.

Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
    - A. Provide test specimens representative of proposed products and construction.
    - B. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - C. Provide sizes and configurations of test assemblies, mockups, and laboratory
    - D. mockups to adequately demonstrate capability of products to comply with performance requirements.
    - E. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    - F. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - G. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
  2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer, through Construction Manager, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

## 7. QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
    - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  - B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
    - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
      - A. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
    - 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
    - 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
    - 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
    - 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
  - C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section "Submittal Procedures."
  - D. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
  - E. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
    - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
8. TEST AND INSPECTION LOG
- A. Prepare a record of tests and inspections. Include the following:
    - 1. Date test or inspection was conducted.
    - 2. Description of the Work tested or inspected.
    - 3. Date test or inspection results were transmitted to Engineer.

4. Identification of testing agency or special inspector conducting test or inspection.
  - B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.
9. REPAIR AND PROTECTION
- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
    1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
  - B. Protect construction exposed by or for quality-control service activities.
  - C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.
10. Materials and Workmanship
- A. All materials and equipment required for the work shall be new, unless otherwise specified, and of the best quality and especially adapted to the services required.
  - B. The contractor shall furnish a superintendent who shall be constantly in charge of the installation of the waterline, together with all skilled workmen and labor required to unload, transfer, erect, connect up, adjust, start, operate, and test each system.
  - C. The contractor shall locate and install all equipment which must be serviced, operated, or maintained in fully accessible positions. Such equipment shall include, but not be limited to, valves, unions, cleanouts, drain points, pressure gages, and controls. Minor deviations from the drawings may be made to allow for better accessibility, but changes of significant magnitude or changes involving extra cost shall not be made without approval of the engineer.

-END OF SECTION 01400-

SECTION 01410 – TESTING AND LABORATORY TESTING SERVICES

PART 1 – GENERAL

1. PERFORMANCE REQUIREMENTS

- A. CONTRACTOR shall provide testing and laboratory testing services to facilitate execution of required services specified in the Work.
  - 1. An allowance has been established in the Bid Proposal and is for payment of the CONTRACTOR's independent laboratory, professional engineering, technicians and laboratory services approved by the ENGINEER and OWNER and provided for soils engineering and concrete inspection costs as identified in Section 02200, Section 02500 and Section 03300. The payment will be applied to the direct cost for professional inspections, soils and concrete testing and laboratory services as described in the allowance summary in Specification Section 01130 and as authorized and directed by the ENGINEER.
  - 2. The CONTRACTOR shall pay for the services on a bi-weekly or monthly basis as required and shall submit documentation or payment with each monthly application for payment along with reports and documentation required. Payment to the CONTRACTOR will include a five percent markup for overhead and profit which will be added to the total amount paid to the independent laboratory, professional engineering and laboratory services performed.
  - 3. Payment for all other testing and laboratory services required in the Work shall have been included under those items requiring testing, professional engineering, technicians or laboratory services as identified in the Specifications.
- B. Employment of Laboratory shall, in no way, relieve CONTRACTOR of obligations to perform work.
- C. Concrete and soils testing services will be performed by an independent laboratory furnished by the CONTRACTOR as part of the Laboratory and Testing Services Allowance, with the exception of retests performed as the result of defective work, which shall be borne by the CONTRACTOR.
- D. Related Requirements in Other Parts of the Contract Documents:
  - 1. Inspections and testing require by laws, ordinances, rules, regulations, orders or approvals of public authorities, Conditions of Contract.
- E. CONTRACTOR shall provide the services of an independent testing and laboratory that is satisfactory to the Owner and the Engineer. The independent testing and laboratory shall as a minimum be validated by the US Army Corps of Engineers to USACE ER 1110-1-8100 and Er 1110-1-261 to perform all soils and concrete inspections, testing and laboratory work as identified in Section 0220,02500 and Section 03300. The laboratory shall provide professional engineering services and technical services as required for compliance with the specified performance objectives identified in the specified sections. The ENGINEER shall direct such additional test and inspections as required or

necessary in the performance of the work. The cost for testing identified for Section 02200 and 03300 shall be deducted from the allowance provided in the Bid.

- F. The CONTRACTOR shall be responsible to obtain and pay for all other testing and laboratory services as required by the other Sections. The cost for those testing and laboratory services identified under other sections shall have been included in the sections. The cost for testing or laboratory services required by the CONTRACTOR for the CONTRACTOR's construction requirements shall be paid for by the CONTRACTOR.

## 2. REFERENCES

- A. American Society for Testing and Materials (ASTM):
1. E329-90 – Standard Practice for use in the evaluation of testing and inspection agencies as used in construction.
- B. American Society for Nondestructive Testing Inc.:
1. SNT-TC-1A – Recommended Practice No. 1996
  2. CP-189 – Standard for Qualification and Certification of Nondestructive Testing Personnel

## 3. QUALIFICATION OF LABORATORY

- A. Meet basic requirements of ASTM E329, SNT-TC-1A, and CP-189
- B. Authorized to operate in the state in which the Project is located.
- C. Validated by the US Army Corps of Engineers to USACE ER 1110-1-8100 and ER 1110-1-261 to perform all soils and concrete inspections, testing and laboratory work as identified in Section 02200 and Section 03300.
- D. Testing Equipment:
1. Calibrated at reasonable intervals by devices of accuracy traceable to either:
    - a. National Bureau of Standards
    - b. Accepted values of natural physical constants
    - c. ASTM

## 4. LABORATORY DUTIES

- A. Cooperate with ENGINEER, DESIGN ENGINEER and CONTRACTOR; provide qualified personnel to perform work after due Notice to Proceed.
- B. Perform specified inspections, secure samples, and test materials.
1. Comply with specified standards.
  2. Ascertain compliance of materials with Contract Documents.
- C. Promptly notify ENGINEER, DESIGN ENGINEER and CONTRACTOR of observed irregularities or deficiencies of Work, equipment and material.
- D. Promptly submit written report of each test and inspection; one copy each to ENGINEER, DESIGN ENGINEER and OWNER, material supplier, and CONTRACTOR, and one copy to record document file. Each report shall include following:
1. Date Issued
  2. Project title and number
  3. Testing laboratory name, address, and telephone number
  4. Name and signature of laboratory inspector
  5. Date and time of sampling or inspection

6. Record to temperature and weather conditions if test performed in field
  7. Date of test
  8. Identification of products and Specification section
  9. Location of sample or test in Project
  10. Type of inspection or test
  11. Results of tests and compliance with Contract Documents
  12. Interpretation of test results. When requested by ENGINEER or DESIGN ENGINEER
- E. Perform additional tests as required by ENGINEER, DESIGN ENGINEER and CONTRACTOR.
5. LIMITATIONS OF AUTHORITY OF TESTING LABORATORY
- A. Laboratory is not authorized to:
1. Release, revoke, alter or enlarge on requirements of Contract Documents.
  2. Approve or accept any portion of Work
  3. Perform duties of CONTRACTOR
6. CONTRACTOR'S RESPONSIBILITIES
- A. Cooperated with laboratory personnel and provide access to Work
- B. Provide to laboratory preliminary design mix proposed to be used for concrete and other material mixes which require control by testing laboratory.
- C. Furnish copies of product test reports
- D. Furnish incidental labor and facilities.
1. Provide access to Work to be tested.
  2. Obtain and handle samples at Project site or at source of product to be tested.
  3. Facilitate inspections and tests.
  4. Store and cure test samples.
- E. Notify laboratory, ENGINEER and DESIGN ENGINEER sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
1. When tests or inspections cannot be performed after such notice, reimburse OWNER for laboratory personnel and travel expenses incurred due to CONTRACTOR's negligence.
- F. Make arrangements with laboratory and pay for additional samples and tests required for CONTRACTOR's convenience.
- G. Employ and pay for services of testing laboratory to perform additional inspections, sampling, and testing required when initial tests indicated Work does not comply with Contract Documents.

END OF SECTION

Section 01500 – Temporary Facilities and Controls

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

2. SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

3. DEFINITIONS

- A. Permanent Enclosure: As determined by Engineer, permanent or temporary roofing is complete, insulated, and weather tight; exterior walls are insulated and weather tight; and all openings are closed with permanent construction or substantial temporary closures.

4. USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost. Including, but not limited to Owner, Engineer, Test agencies, and authorities having jurisdiction.

PART 2 – PRODUCTS

1. TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finished, temperature controls, and foundations adequate for normal loading.
- B. Common – Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly. Furnish and equip offices as follows:
  - 1. Furniture required for Project –site documents including file cabinets, plan tables, plan racks, and bookcases.
  - 2. Conference room of sufficient size to accommodate meetings of 6 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4- foot square tack board.
  - 3. Drinking water and private toilet.

PART 3 – EXECUTION

1. INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

2. TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
  - B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
  - C. Water service: Install water service and distribution piping in sizes and pressures adequate for construction.
  - D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities for type, number, location, operation, and maintenance of fixtures and facilities.
  - E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
  - F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required to minimize energy consumption.
  - G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
  - H. Telephone Service: Provide temporary telephone service in common-use facilities for use by call construction personnel.
    1. At each telephone, post a list of important telephone numbers.
      - a. Police and fire departments
      - b. Ambulance service
      - c. Contractor's home office
      - d. Engineer's office
      - e. Owner's office
      - f. Principal subcontractors' field and home offices
3. SECURITY AND PROTECTION FACILITIES INSTALLATION
    - A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterways, and subsoil contamination or pollution or other undesirable effects.
  4. OPERATION, TERMINATION, AND REMOVAL
    - A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
    - B. Maintenance: Maintain facilities in good operating condition until removal.
    - C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction

that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

END OF SECTION 01500

SECTION 01570 – TRAFFIC CONTROL

PART 1 – GENERAL

1. SCOPE
  - A. General Conditions, Supplementary General Conditions and other sections in Division 1 of these specifications govern all work hereunder.
  - B. Furnish labor, materials, and equipment necessary to maintaining a safe flow of traffic at all times during construction on or adjacent to public rights-of-way.
2. RELATED REQUIREMENTS AND WORK SPECIFIED ELSEWHERE
  - A. Virginia Department of Transportation (VDOT), “Road and Bridge Specifications”
  - B. VDOT Permit for installation of water lines for “Lake Acres PRV”
  - C. Virginia Department of Transportation (VDOT), “ Virginia Work Area Protection Manual”
3. REFERENCE STANDARDS
  - A. Traffic control procedures and equipment shall conform to the standards and regulations of the Virginia Department of Transportation (VDOT), “Road and Bridge Specifications”, latest edition. Section numbers designated herein refer to sections in these Road and Bridge Specifications unless specified otherwise.

PART 2 – PRODUCTS TYPE OF CONTRACT

1. BARRICADES AND WARNING SIGNS
  - A. All warning signs, cones, barricades, flags, lights and other traffic control devices shall conform to the requirements of the “Manual of Uniform Traffic Control Devices for Streets and Highways.”
  - B. All orange construction signs shall be fabricated using encapsulated lens type reflective sheeting in accordance with Section 701.02(e) 2.
  - C. Traffic cones shall be fluorescent red-orange, minimum 28” in height.

PART 3 – EXECUTION

1. MAINTENANCE DURING CONSTRUCTION
  - A. The Contractor shall maintain and protect traffic at all times during construction, Section 104.04, and VDOT permit.
  - B. Except as noted in 3.1 C. below, the Contractor shall maintain two-way traffic at all times and shall not block or stop traffic without the approval of the Virginia Department of Transportation (VDOT).
  - C. When approved in advance by VDOT, the Contractor shall provide the necessary flagmen to direct one-way traffic.
  - D. The Contractor shall erect, move, maintain and be responsible for the security of the traffic control devices as required during the project.
  - E. The Contractor shall comply with all requirements of the local police department, fire department, and rescue squad for access and passage through construction zones by those agencies.

2. PUBLIC CONVENIENCE AND SAFETY

- A. The Contractor shall at all times conduct the work as to insure the least possible obstruction to traffic. The safety and convenience of the general public and residents along the adjacent roads and streets and the protection of persons and property shall be provided for by the Contractor.

END OF SECTION 01570

SECTION 01710 – CLEANING UP

PART 1 – GENERAL

1. GENERAL

- A. During the construction duration, the work and the adjacent areas affected thereby shall be kept cleaned up and all rubbish, surplus materials, and unneeded construction equipment shall be removed and all damage repaired so that the public and property owners will be inconvenienced as little as possible.
- B. Where material or debris has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes, structures, work done under this contract, or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the work. Ditches, channels, drains, pipes, structures and work, etc., shall, upon completion of the work, be left in a clean and neat condition.
- C. On or before the completion of the work, the Contractor shall, unless otherwise directed and permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organic matter in, under and around privies, houses and other buildings used by him; shall remove all rubbish from grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operation in a neat and satisfactory condition.
- D. The Contractor shall thoroughly clean all materials and equipment installed by him and his subcontractors, and on completion of the work shall deliver it undamaged and in fresh and new-appearing condition.
- E. The Contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment or employees to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary street, alley, walk, and landscaping work. Suitable materials, equipment and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable as work progresses and shall not be left until the end of the Contract Period.

END OF SECTION 01710

SECTION 02300 – EARTH WORK

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

2. SUMMARY

- A. This Section includes the following:
  - 1. Preparing subgrades for slabs-on-grade walks pavements lawns and grasses and exterior plants.
  - 2. Excavating and backfilling for buildings and structures.
  - 3. Drainage course for slabs-on-grade.
  - 4. Sub-base course for concrete walks pavements.
  - 5. Sub-base and base course for asphalt paving.
  - 6. Subsurface drainage backfill for walls and trenches.
  - 7. Excavating and backfilling for utility trenches.
  - 8. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.

3. DEFINITIONS

- A. Backfill: Soil material or controlled low strength material used to fill an excavation.
  - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
  - 2. Final Backfill: Backfill placed over initial backfill to fill trench.
- B. Base Course: Course placed between the sub-base course and hot-mix asphalt paving.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
  - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
  - 2. Bulk Excavation: Excavation more than 10 feet (3 m) in width and more than 30 feet (9 m) in length.
  - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

- G. Fill: Soil materials used to raise existing grades.
- H. Rock: Rock material in beds, ledges, un-stratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. Yd. (0.76 cu. m) for bulk excavation or ¼ cu. yd. (0.57 cu. m) for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted: Caterpillar Model No. 215C LC. Rated not less than 115HP flywheel power and 32,000-pound drawbar pull equipped with a short stick and a 42-inch wide, short tip radius rock bucket rated at 0.81 cubic yard (heaped) capacity.
- I. Structures: Building, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- J. Sub-base Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below sub-base, drainage fill, or topsoil materials.
- L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

#### 4. SUBMITTALS

- A. Product Data: for the following:
  - 1. Each type of plastic warning tape.
  - 2. Geotextile.
  - 3. Controlled low strength material, including design mixture.
  - 4. Geofoam.
- B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
  - 1. Classification according to ASTM D 2487 of each on-site soil material proposed for fill and backfill.

#### 5. QUALITY ASSURANCE

- A. Standard Specification and Details: Reference in this Section to Standard Specifications or Standard Details shall mean the following, and are hereby made part of this specification:
  - 1. Virginia Department of Transportation “Road and Bridge Specifications” Latest Edition, and “Road and Bridge Standards” Latest Edition with the latest incorporated revisions.
  - 2. Virginia Department of Transportation, “Road and Bridge Specifications” Latest Edition, and “Road Standards Volumes I and II” Latest edition, with the latest incorporated revisions.
  - 3. “Virginia Erosion and Sediment Control Handbook” Latest Edition, with the latest incorporated revisions.

- B. Codes and Standards: 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:
1. M6 - Fine Aggregate for Portland Cement Concrete
  2. M43 – Standard Sizes of Coarse Aggregate for Highway Construction
  3. M145 – Classification of Soils and Soil –Aggregate Mixtures
  4. T89 – Determining the Liquid Limit of Soils
  5. T90 – Determining the Plastic Limit of Soils
  6. T119 – Slump of Portland Cement Concrete
  7. TISO – Moisture-Density Relations of Soils Using a 10-lb. Ram and 18” Drop
  - 8.T191 - Density of Soils In-Place by the Sand-Cone Method
  - 9.T206 – Penetration Test and Split-Barrel Sampling of Soils
  10. T238 – Density of Soils and Soil-Aggregate in Place by Nuclear Methods
  11. T239 Moisture Content of Soil-Aggregate in Place by Nuclear Methods
  12. T265 – Laboratory Determination of Moisture Contents of Solids.

All work shall comply with Occupational Safety and Health Regulations for Construction of the Code of Federal Regulations.

- C. Supervision and Field Compaction Testing:
1. Supervision and testing shall be done in accordance with the following. The contractor shall select a soils and concrete testing firm that the contractor will subcontract with to perform the required testing and inspection services as defined in the Project Manual. Field and Laboratory Testing of concrete and soils shall be from the allowance in the Bid Proposal for Laboratory and testing Services when so directed by the owner or engineer. Invoices for the testing firm shall be submitted directly to the owner for approval and the Owner will forward the approved invoice to the Contractor for Payment and inclusion into the next partial payment request. Cost 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 approved testing and inspection firm and the Owner’s inspector. The Contractor shall provide 48 hours notice to the Engineer and Owner, and no controlled fills shall be constructed unless the Engineer or Owner is on site. The Contractor shall allow safe access for the Engineer and Owner 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 or Owner, and approved testing and inspection firm.
  3. Field compaction tests of the density and moisture content of fill will be performed by a qualified testing consultant, paid for by the Contractor. Upon

completion of each layer of fill in a designated area, the Contractor shall be required to allow time for the testing consultant to perform the tests. When the tests indicate that the density or moisture of any layer of fill or portion thereof is below the specified dry density or outside the specified moisture range, the particular layer or portion shall be reworked by rolling or by scarifying, wetting or drying, and rerolling as required until the required dry density and moisture content have been obtained.

4. Where sheepfoot rollers are used, the soil may be disturbed to a depth of several inches. Density test will be taken in the compacted material below the disturbed surface. In this case the Contractor shall be required to use his equipment (such as a bulldozer blade) to cut out a smooth surfaced spot at any point requested by the Engineer on which to perform the test.

D. Laboratory Testing: All material to be used in the work shall be tested by a certified 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 to any material in the work. Any change in the source or material shall require the Contractor to retest and resubmit for approval.

## 6. JOB CONDITIONS

### A. Subsurface Investigations:

1. No subsurface soil borings have been performed for this project.
2. The Contractor shall determine to its satisfaction the ground water conditions and the character and type of soil, decomposed rock, rock and other material to be encountered in the work to be done under this Contract.
3. The Bidder may make its own investigation and tests, at the time acceptable to the Owner. Bidder should contact Ronnie Baker, at 540-507-7300, to coordinate dates and times.
4. As a condition of submitting bid, the Bidder acknowledges that the Owner has not provided any subsurface soil data and further acknowledges that a claim for changed conditions will not be allowed as a consideration for additional compensation.

### 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, and shall notify the Engineer of any impact to the work. The Contractor shall test pit existing utilities which impact construction. These test pits shall be performed two weeks in advance of excavation.
2. Should uncharted piping or other utilities be encountered during excavation, the Contractor shall cooperate with the Engineer and 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 County, 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. Where existing utilities interface with placement of the work, the Contractor shall relocate utilities as a part of the work, as directed by the Engineer.

## PART 2 – PRODUCTS

### 1. SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM, or a combination of these groups; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
  1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
  2. Soil that is too wet to permit proper compaction as determined by inspector or not appropriate for the use intended as defined in these specifications.
- D. Sub-base material: Naturally or artificially graded mixture of natural or crushed gravel, Crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1 ½ inch (37.5mm) sieve and not more than 12 percent passing a No. 200 (0.075mm) sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, Crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1 ½ inch (37.5mm) sieve and not more than 12 percent passing a No. 200 (0.075mm) sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, Crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1 ½ inch (37.5mm) sieve and not more than 12 percent passing a No. 200 (0.075mm) sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, Crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1 inch (25-mm) sieve and not more than 12 percent passing a No. 200 (0.075mm) sieve.
- H. Drainage Course: Narrowly graded mixture of washed crushed stone, or un-crushed gravel; ASTM D 448; coarse-aggregate grading size 67; with 100 percent passing a 1 inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.

- I. Filter Material: Narrowly graded mixture of washed crushed stone, or un-crushed gravel; ASTM D 448; coarse-aggregate grading size 67; with 100 percent passing a 1 inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.
  - J. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.
  - K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.
2. ACCESSORIES
- A. Detectable warning tape: Acid and alkali-resistant polyethylene film warning tape manufactured for making and identifying underground utilities, a minimum of 6 inches (150mm) wide and 4 mils (0.1mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750mm) deep, tape shall be Catalog No. 2 WAT as manufactured by Seton Name Plate Corporation or approved equal; colored as follows:
    - 1. Red: Electric
    - 2. Yellow: Gas, oil, steam, and dangerous materials
    - 3. Orange: Telephone and other communications
    - 4. Blue: Water systems
    - 5. Green: Sewer systems.
  - B. Provide Tracing Wire for all pressure mains, water and wastewater, regardless of material. Wire shall be #10, stranded, type THHN, thermoplastic insulated and nylon jacketed. Wire shall be color coded blue for water and green for sewer.
  - C. Wire Connectors
    - 1. One Connector, set screw pressure type for use with No. 10 stranded wire size. Holub Industries MA-2, Ideal Industries Model 30-222, or equal.
    - 2. Two connector, C-Tap for two way splicing tracer wire, for use with No. 10 stranded wire size. T & B #54705 or equal.
    - 3. Three connector, split bolts, three wire type for splicing of tracer wire, for use with No. 10 stranded wire size. ILSCO Catalog #SEL-2S or equal.
  - D. Test Station Box: Plastic box for corrosion protection. Plastic shaft a minimum of 3" long with cast iron lid and collar. Collar shall be a minimum of 2" deep. Lid shall be bolted to collar with brass bolts. Lid shall be imprinted with the wording "TEST". Lid shall be color coded blue for water and green for sewer.
  - E. Electric Tape: Vinyl Electric tape
  - F. Electrical Coating: Scotchkote 3M electrical coating Part No. 054007
  - G. Wire Nut: Non-conductive for No. 10 stranded wire size. Test wire Execution
3. PREPARATION
- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
  - B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions and deleterious materials from ground surface is specified in Division 2 Section "Site Clearing".

- C. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section "Site Clearing" , during earthwork operations.
- D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

4. DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area. ‘
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
- C. The Contractor shall provide and continuously operate and maintain all temporary dewatering, drainage and pumping systems required to satisfactorily perform all work under the Contract.
- D. Water shall be controlled to such an extent as may be necessary to keep excavations free from water during construction and to maintain a minimum of 12 inches below the bottom of pipes and structures. The Contractor will not necessarily be permitted to use any particular type of dewatering system it selects. The Contractor shall be entirely responsible for the design and adequacy of the dewatering system.
- E. 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.
- F. 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.
- G. The method of water disposal shall be in compliance with erosion and sediment control regulations and all other regulatory agencies.
- H. Methods of drawing 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 system shall be the responsibility of the Contractor.
- I. Should the Contractor’s dewatering operations affect any existing private water supply well used as a possible water source, the Contractor shall, at no additional cost to the County, take whatever steps are necessary to provide uninterrupted water service, including the installation of temporary water lines or the installation of permanent wells with treatment systems, if required. Bottled water shall be provided immediately to residents whose private wells are damaged during construction.

5. EXPLOSIVES

- A. Explosives: Do not use explosives.

6. EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
  - 1.If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- 7. EXCAVATION FOR STRUCTURES
  - A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
- 8. EXCAVATION FOR WALKS AND PAVEMENTS
  - A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.
- 9. EXCAVATION FOR UTILITY TRENCHES
  - A. Excavate trenches to indicated gradients, lines, depths and elevations in accordance with County standards.
  - B. Excavate trenches to uniform widths to provide the following clearance on each side of the pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300mm) higher than top of pipe or conduit, unless otherwise indicated.
    - 1.Clearance: 12 inches (300mm) each side of pipe or conduit.
  - C. Trench Bottom: Excavate trenches 4 inches (100mm) deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
    - 1.Excavate trenches 6 inches (150mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
    - 2.Excavate trenches 2 inches deeper if pipe is 16 inches or greater.
- 10. SUBGRADE INSPECTION
  - A. Notify Engineer when excavations have reached required subgrade.
  - B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
  - C. Proof-roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
    - 1.Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction.
    - 2.Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed at no additional expense to County.
  - D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.
- 11. STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water.
  - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
  - 2. Stabilize soil stockpiles with temporary seeping as required.
- B. Dispose of excess soil material and waste material.

#### 12. BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
  - 1. Construction below finish grade including, where applicable, sub drainage, damp proofing, waterproofing and perimeter insulation.
  - 2. Surveying locations of underground utilities for Record Documents.
  - 3. Testing and inspecting underground utilities.
  - 4. Removing concrete formwork.
  - 5. Removing trash and debris.
  - 6. Removing temporary shoring and bracing, and sheeting.
  - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

#### 13. UTILITY TRENCH BACKFILL

- A. After the installation of the pipe has been field inspected, the trenches shall be backfilled per County standards. Place backfill on subgrades free of mud, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and joints, fittings, and bodies of conduits. Pipe shall have minimum bedding per County standards.
- C. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch (25mm) in any dimension, to height of 12 inches (300mm) over the utility pipe or conduit. The initial backfill shall be compacted by hand or pneumatic tamping methods.
  - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
  - 2. After the initial backfill has been placed, the remainder of the backfill may be done by hand or with mechanical equipment in lifts no greater than 8".
- D. Backfill voids with satisfactory soil while installing and removing shoring and bracing. Where, in opinion of the Engineer, damage is liable to result from withdrawal of shoring, it shall be left in place.
- E. Place and compact final backfill of satisfactory soil to final subgrade elevation. Where settlement occurs, the trench shall be refilled and compacted to conform to the surface of the ground.
- F. Install warning tape directly above utilities, 12 inches (300mm) below finished grade, except 6 inches (150mm) below subgrade under pavements and slabs.

#### 14. SOIL FILL

- A. Plow, scarify, bench or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
  - 1. Under grass and planted areas, use satisfactory soil material.
  - 2. Under walks and pavements, use satisfactory soil material.
  - 3. Under steps and ramps, use engineered fill.
  - 4. Under building slabs, use engineered fill.
  - 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

#### 15. SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
  - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
  - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

#### 16. COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches (200mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
  - 1. Under structures, building slabs, steps, pavements, and road shoulders, compact each layer of backfill or fill soil material at 95 percent.
  - 2. Under walkways, scarify and recompact top 6 inches (150mm) below subgrade and compact each layer of backfill or fill soil material at 92 percent.
  - 3. Under lawn or unpaved areas, compact each layer of backfill or fill soil material at 85 percent.
  - 4. For utility trenches, under existing roadways and pavement and within VDOT right of way, Trenches shall be compacted in accordance with the requirements specified or, if more stringent, the requirements of VDOT.

#### 17. GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
  - 1. Provide a smooth transition between adjacent existing grades and new grades.
  - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
  - 1. Lawn or Unpaved areas: Plus or minus 1 inch (25mm)
  - 2. Walks: Plus or minus 1 inch (25mm)
  - 3. Pavements: Plus or minus ½ inch (13mm)
- C. Grading inside Building Lines: Finish subgrade to a tolerance of ½ inch (13mm) when tested with a 10-foot (3m) straightedge.

#### 18. FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent geotechnical engineering testing agency to perform field quality- control testing per Earthwork 2300-1 SC.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: at footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Engineer.
- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.
- E. When testing agency reports that subgrades, fills or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

#### 19. PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted settled or where they lose compaction due to subsequent construction operations or weather conditions.
  - 1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact and reconstruct surfacing.
  - 1. Restore appearance, quality and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

#### 20. DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 02300

SECTION 02510 – WATER DISTRIBUTION

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections and Spotsylvania County Water and Sewer Standards and Specifications, apply to this Section.

2. SUMMARY

- A. This Section includes water- distribution piping and related components outside the building for water service, fire service mains, and combined water service and fire service mains.
- B. Utility furnished products include water meters that will be furnished to the site, ready for installation.
- C. Construction as shown on the plans or stated herein shall be performed in accordance with current and applicable requirements as established by the County of Spotsylvania and the Virginia Department of Health or any other agencies having jurisdiction. Where conflicts arise between the construction documents and previously mentioned requirements, the more restrictive shall apply. If such requirements require a change in the work as stated herein or shown on the plans, the Contractor shall stop work and notify the County immediately for further direction.

3. DEFINITIONS

- A. DI: Ductile Iron
- B. PVC: Polyvinyl chloride plastic
- C. AWWA: American Water Works Association
- D. ASTM: American Society for Testing Materials
- E. ANSI: American National Standards Institute
- F. VDOT: Virginia Department of Transportation

4. SUBMITTALS

- A. Product Data: For each type of product indicated
- B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
- C. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
- D. Field quality control test reports.
- E. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation and maintenance manuals.

5. QUALITY ASSURANCE

- A. Regulatory Requirements:

1. Comply with requirements of County of Spotsylvania and the Virginia Department of Health or any other agencies having jurisdiction. Include tapping of water mains and backflow prevention.
  - B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
  - C. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  - D. Comply with FMG’s “Approval Guide” or UL’s “Fire Protection Equipment Directory” for fire service main products.
  - E. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire service main piping for fire suppression.
  - F. NSF Compliance:
    1. Comply with NSF 14 for plastic potable water service piping.
    2. Comply with NSF 61 for materials for water service piping and specialties for domestic water.
6. DELIVERY, STORAGE, AND HANDLING
- A. Preparation for transport: Prepare valves, including fire hydrants, according to the following:
    1. Ensure that valves are dry and internally protected against rust and corrosion.
    2. Protect valves against damage to threaded ends and flange faces.
    3. Set valves in the best position for handling. Set valves closed to prevent rattling.
  - B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
    1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
    2. Protect from weather. Store indoors and maintain temperatures higher than ambient dew point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
  - C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use hand wheels or stems as lifting or rigging points.
  - D. Deliver piping with factory applied end caps. Maintain end caps through shipping, storage and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
  - E. Protect flanges, fittings and specialties from moisture and dirt.
  - F. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.
7. PROJECT CONDITIONS
- A. Interruption of Existing Water Distribution Service: DO not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions:
    1. Contractor shall maintain water service to existing houses and notify houses of interruption of service for periods longer than one (1) hour.

8. COORDINATION

- A. Coordinate connection to water main with County of Spotsylvania.

PART 2 – PRODUCTS

1. COPPER TUBE AND FITTINGS

- A. Soft Copper Tube: ASTM B 88, Type K, Water tube, annealed temper.  
1. Copper, Solder Joint Fittings: ASME B 16.18, Cast copper alloy or ASME B 16.22, wrought copper, solder joint pressure type.

2. DUCTILE IRON PIPE AND FITTINGS

- A. Mechanical Joint, Ductile Iron Pipe: AWWA C 151 and AWWA C 150, minimum pressure Class 350, with mechanical joint bell and plain spigot end unless grooved or flanged ends are indicated.  
1. Mechanical Joint, Ductile Iron Fitting: AWWA C 110, pressure Class 250, ductile or AWWA C 153, ductile iron compact pattern.  
2. Glands, Gaskets, and Bolts: AWWA C 111, ductile, rubber gaskets, and steel bolts.  
3. Cement mortar lining with bituminous seal coat for ductile iron pipe and fittings or for cast iron fittings shall meet requirements of AWWA C 104.  
a. Cement mortar lining shall be standard thickness.  
4. Exterior, bituminous coating for ductile iron pipe and fittings and cast iron fittings shall meet requirements of AWWA C 106 or AWWA C 151 as applicable.
- B. Push on Joint, Ductile Iron pipe: AWWA C 151 and AWWA C 150, minimum pressure Class 350, with push on joint bell and plain spigot end unless grooved or flanged ends are indicated.  
1. Push on Joint, Ductile Iron Fittings: AWWA C 110, pressure Class 250, ductile or AWWA C 153, ductile iron compact pattern.  
2. Gaskets: AWWA C 111, rubber.  
3. Cement mortar lining with bituminous seal coat for ductile iron pipe and fittings or for cast iron fittings shall meet requirements of AWWA C 104.  
a. Cement mortar lining shall be standard thickness.  
4. Exterior, bituminous coating for ductile iron pipe and fittings and cast iron fittings shall meet requirements of AWWA C 106 or AWWA C 151 as applicable.

3. PIPING SPECIALTIES

- A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to ends compatible with, piping to be joined.
- B. Tubular Sleeve Pipe Couplings:  
1. Description: Metal, bolted, sleeve type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.  
a. Standard: AWWA C 219  
b. Center Sleeve Material: Manufacturer's standard

- c. Gasket Material: Natural or synthetic rubber
  - d. Pressure rating: 200psig (1380 kPa) minimum
  - e. Metal Component Finish: Corrosion resistant coating or material
- C. Split Sleeve Pipe Couplings:
- 1. Description: Metal, bolted, split sleeve type, reducing or transition coupling with sealing pad and closures plates, O-ring gaskets, and bolt fasteners.
    - a. Standard: AWWA C 219
    - b. Sleeve Material: Manufacturer's standard
    - c. Sleeve Dimensions: Of thickness and width required to provide pressure rating
    - d. Gasket Material: O-ring made of EPDM rubber, unless otherwise indicated
    - e. Pressure Rating: 200 psig (1380 kPa) minimum
    - f. Metal Component Finish: Corrosion resistant coating or material
- D. Flexible Connectors:
- 1. Nonferrous Metal Piping: Bronze hose covered with bronze wire braid; with copper tube, pressure type, solder joint ends or bronze flanged ends brazed to hose.
  - 2. Ferrous Metal Piping: Stainless steel hose covered with stainless steel wire braid; with ASME B 1.20.1, threaded steel pipe nipples or ASME B 16.5. steel flanges welded to hose.
- E. Dielectric Fittings: Combination of copper alloy and ferrous; threaded, solder, or plain end types; and matching piping system materials.
- 1. Dielectric Unions: Factory fabricated union assembly, designed for 250 psig (1725 kPa) minimum working pressure at 180 deg F (82 deg C). Include insulating material that isolates dissimilar metals and ends with inside threads according to ASME B 1.20.1.
  - 2. Dielectric Couplings: Factory fabricated companion flange assembly, for 150 or 300psig (1035 or 2070 kPa) minimum working pressure to suit system pressures.
  - 3. Dielectric Flange Insulation Kits: Field assembled companion flange assembly, full face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
    - a. Provide separate companion flanges and steel bolts and nuts for 150 or 300 psig (1035 or 2070 kPa) minimum working pressure to suit system pressures.
  - 4. Dielectric Couplings: Galvanized steel couplings with inert and noncorrosive thermoplastic lining, with threaded ends and 300 psig (2070 kPa) minimum working pressure at 225 deg F (107 deg C).
  - 5. Dielectric Nipples: Electroplated steel nipples with inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved end types, and 300psig (2070 kPa) minimum working pressure at 225 deg F (107 deg C).

#### 4. GATE VALVES

##### A. AWWA, Cast Iron Gate Valves:

1. Nonrising Stem, Resilient Seated Gate Valves: Valves shall meet Spotsylvania County Sewer and Water Standards and Specification.

a. Description: Gray or ductile iron body and bonnet; with bronze or gray or ductile iron gate, resilient seats, bronze stem, and stem nut.

1) Standard: AWWA C 509

2) Minimum Pressure Rating: 200ps, working and 400ps, test pressure

3) Interior Coating: Complying with AWWA C 550

#### 5. GATE VALVE ACCESSORIES AND SPECIALTIES

##### A. Tapping Sleeve Assemblies:

1. Description: Sleeve and valve compatible with drilling machine.

a. Standard: MSS SP 60

b. Tapping Sleeve: Ductile iron, two piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size pipe being tapped and with recessed flange for branch valve.

c. Valve: AWWA, cast iron, nonrising stem, resilient gate valve with one raised face flange mating tapping sleeve flange.

B. Valve Boxes: Comply with AWWA M 44 for cast iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER", and bottom section with base that fits over valve and with a barrel approximately 5 inches (125 mm) in diameter.

1. Operating Wrenches: Steel, tee handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

#### 6. CORPORATION VALVES

A. Corporation stop with corporation cock thread inlet Ford F 600 or equal compression type.

B. Service Saddle Assemblies: Comply with AWWA C 800. Include saddle and valve compatible with tapping machine.

1. All saddle castings must be ductile iron and meet the requirements of ASTM A 536-80, protected with corrosion resistant paint or epoxy coating.

2. All saddles must have a minimum of two (2) 1 ½" wide (including bolts) stainless steel straps type 304 (18-8) where welds are passivated for resistance to corrosion. Exception: Ford FS 202 which has two (2) bolts and a single strap with a minimum width of 3 ¼".

3. Gaskets must be made of virgin NBR compound.

4. Service saddles are required on all taps made onto PVC pipe other than C-900 6" and larger and all taps made on ductile iron pressure class 350 pipe smaller than 6". The maximum direct tap on 6" and 8" pressure class 350 ductile iron is 1" and 1.25" for 112".

#### 7. WATER METERS

- A. Water meters will be furnished by utility company.
- 8. WATER METER BOXES
  - A. See design standards and details for meter box requirements.
- 9. METER YOKES
  - A. Description: Meter yokes shall be 5/8" x 3/4" Ford 5020 or Mueller 502 or approved equal. Expanders shall be Ford RC 23 or approved equal with epoxy coating.
- 10. FIRE HYDRANTS
  - A. Dry Barrel Fire hydrants:
    - 1. Description: Freestanding, with one NPS 5 -1/4 (DN 115) and two NPS 2 -1/2 (DN 65) outlets, 5 1/4 inch (133mm) main valve, drain valve, and NPS 6 (DN 150) mechanical joint inlet. Hydrant shall have cast iron body, compression type valve opening against pressure and closing with pressure. Comply with AWWA Fire Hydrant Specification C-502 and the following:
      - a. Type: Compression Dry Standpipe: Valve shall open against and close with the pressure. The design shall be such that all internal operating parts can be removed through the standpipe and main valve rod extended without excavating.
      - b. Size: Internal valve diameter shall be a minimum 5 1/2".
      - c. Inlet Size and Type: 6" mechanical joint end with accessories.
      - d. Hose Nozzles: Each hydrant shall be equipped with two 2 1/2" ID hose nozzles with National Standard threads, one quarter turn bayonet lock, or threaded in with )-ring seal and suitable locking arrangement.
      - e. Steamer Nozzle: Each hydrant shall be equipped with one 5 1/4" Steamer Nozzle having National Standards Threads, one quarter turn bayonet lock, or threaded in with )-ring seal and suitable locking arrangement.
      - f. Direction of Open: Left, counter clockwise. Standpipe ground line Safety Construction: The standpipe sections shall be Direction of Open: Left, counter clockwise.
      - g. Size and Shape of Operating Nut and Cap Nuts: to be 1 1/2" point to flat pentagon. Each hydrant shall be equipped with a weather cap.
      - h. Seal Plate: The hydrant shall be so constructed that a moisture proof lubricant chamber is provided which encloses the operating threads, Thereby automatically lubricating the threads each time the hydrant is operated. The lubricant chamber shall be enclosed with at least three O-rings. The two lower O-rings will serve as pressure seals; the third O-ring will serve as a combined dirt and moisture seal to prevent foreign matter from entering the lubricant chamber. The hydrant shall be equipped with either an anti-friction washer or bronze bushing to reduce operating torque. The bonnet will be secured to the hydrant using bolts and nuts.
      - i. Base ground line safety construction: The standpipe section shall be connected at the ground line by a two part, bolted safety flange or

breakable lugs. The main valve road sections shall be connected at the ground line by a frangible coupling. The standpipe and ground line safety construction shall be such that the hydrant nozzles can be rotated to any desired position without disassembling and removing the top operating components and the top section of the standpipe. The minimum inside diameter of the barrel shall be 6”.

- j. Main Valve, Stem Assembly: The main valve road assembly shall be so constructed to allow removal of all operating parts through the barrel regardless of depth of bury, using a removal wrench which does not extend below the ground line of the hydrant. The main valve seat ring shall be bronze and its assembly into the hydrant shall involve bronze to bronze thread engagement, and the valve assembly pressure seals shall be obtained without the employment of torque compressed gaskets. The design of the main valve rod shall be such that the operating threads at the top of the rod and the valve assembly threads at the bottom of the stem are isolated from contact with the water in the standpipe or in the hydrant inlet shoe.
  - k. Drain Valve: The operation of the drain mechanism shall be correlated with the operation of the main valve and shall involve a momentary flushing of the drain ports each time the hydrant is opened. The drain ports shall be fully closed when the hydrant valve is more than 2 ½ turns open and the drainage channel in the bronze valve seat ring shall connect to two or more outlet drain ports. No springs may be employed in the hydrant valve or drain valve mechanism. The drain valve will be protected with at least ½ yard #57 stone protected with fiber cloth.
  - l. Depth of Bury: Normally hydrants shall be suitable for installation in trenches 4 ½’ deep. Required parts and materials to adjust fire hydrants to different depth of bury shall be provided by the manufacturer to meet actual field conditions as required.
  - m. Painting Instruction: Two prime coats and one Rustolum Safety Red #7564 finish coat shall be used, unless otherwise specified. Exposed area of fire hydrant shall receive one field coat of Rustolum Safety Red #7564 after installation. The wetted surface of the hydrant shoe shall be epoxy coated to prevent corrosion of the waterway. Coat of reflective 3M Scotchlite 7210 Silver paint is required around the bonnet.
  - n. Pressure Rating: Test pressure 300 psi, working pressure 150 psi.
- B. If the standard hydrant provided by a manufacturer does not fully comply with these specifications, but compliance can be attained by providing optional features, then each hydrant must be permanently marked to indicate the option or options that have been provided. The method of marking hydrants to indicate that options are included must be approved by the inspector.

## 11. FLUSHING HYDRANTS

A. Post Type Flushing Hydrants:

1. Description: Non-freeze and drainable, of length required for shutoff valve installation below frost line.
  - a. Pressure Rating: 150psig (1035kPa) minimum
  - b. Outlet: One, with horizontal discharge
  - c. Hose Thread: NPS 2 ½ (DN 65), with NFPA 1963 external hose thread for use by local fire department, and with cast iron cap with brass chain
  - d. Barrel: Cast iron or steel pipe with breakaway feature
  - e. Valve: Bronze body with bronze ball or plunger closure, and automatic draining
  - f. Security: Locking device for padlock
  - g. Exterior Finish: Red alkyd gloss enamel paint, unless otherwise indicated
  - h. Inlet: NPS 2 (DN 50) minimum
  - i. Operating Wrench: One for each unit

PART 3 EXECUTION

1. EARTHWORK

- A. Refer to Division 2 Section “Earthwork” for excavating, trenching, and backfilling.

2. PIPING APPLICATIONS

- A. General: Use pipe, fittings and joining methods for piping systems according to the following applications.
- B. Transition couplings and special fittings with pressure rating at least equal to piping pressure rating may be used, unless otherwise indicated.
- C. Do not use flanges or unions for underground piping.
- D. Flanges, unions, grooved end pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- E. Underground water service piping NPS ¾” to NPS 1” shall be the following:
  1. Soft copper tube, ASTM B 88, Type K
- F. Underground water service piping NPS 1 ½” to NPS 2” shall be the following:
  1. Hard copper tube, ASTM B 88, Type K
- G. Water Meter Box Water Service Piping NPS ¾” to NPS 2” shall be same as underground water service piping.

3. VALVE APPLICATIONS

- A. General Application: Use mechanical joint end valve for NPS 3 (DN 80) and larger underground installation. Use threaded or flanged end valves for installation in vaults. Use UL/FMG, nonrising stem valve for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 (DN 50) and smaller installation.

4. PIPING INSTALLATION

- A. Water Main Connection: Tap water main according to requirements of Spotsylvania County Standards and of size and in location indicated.

- B. Comply with NFPA 24 for fire service main piping materials and installation.
- C. Install ductile iron, water service piping according to AWWA C600 and AWWA M41.
- D. Bury piping with depth of cover over top at least 42 inches.
- E. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained joint piping, thrust bocks, anchors, tie rods and clamps, and other supports.
- F. Tracing Wire:
  - 1. Tracing wire shall be accessible for test hook up at all fire hydrants, and test stations. The tracing wire must be continuous and completely insulated from ground. The tracing wire will be attached to the top of the pipe using duct tape at an interval no greater than 16' feet. Tracing wire within test stations and hydrants shall be stripped ¾" from the end and capped with a wire nut to minimize electrical ground contact. Test stations shall be installed within 2 feet of all fire hydrants and at intervals no greater than 1000 feet. All connections at the main line must be electrically sound and physically secure with screw connections or clamps. All connections must be taped with electrical tape and sealed with an electrical coating sealant. Tracing wire for waterlines shall be color coded blue.
  - 2. Place underground warning tape directly above all water mains, 12" below finished grade. Tape shall be polyethylene tape with a metallic core, 2" in width, with the continuous printed message "Caution – Waterline Buried Below". Tape shall be catalog No. 2 WAT as manufactured by Seton Name Plate Corp. or approved equal.

#### 5. JOINT CONSTRUCTION

- A. Make pipe joints according to the following:
  - 1. Copper Tubing, Pressure sealed joints: Use proprietary crimping tool and procedure recommended by copper, pressure seal fitting manufacturer.
  - 2. Ductile Iron Piping, Gasket Joints for Water Service Piping: AWWA C 600 and AWWA M 41.
  - 3. Ductile Iron Piping, Gasketed Joints for Fire Main Piping: UL 194.
  - 4. PVC Piping Gasketed Joints: Use joining materials according to AWWA C 900. Construct Joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.

#### 6. ANCHORAGE INSTALLATION

- A. Anchorage, General: Install water distribution piping with restrained joints. Anchorages and restrained joint types that may be used include the following:
  - 1. Locking Mechanical joints
  - 2. Set screw mechanical retainer glands
- B. Install anchorages for tees, plugs and caps, bends, crosses, valves and hydrants, per Spotsylvania County Standards.

- C. Thrust Protection as shown on plans in the standard details shall consist of pipe joints, fittings and appurtenances specially designed for thrust restraint. All restraint devices must be U.L. listed and F.M. approved.
    - 1. Mechanical joint restraint shall be incorporated in the design of the follower gland and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Flexibility and minimal deflection of the joint shall be maintained after burial. Glands shall be manufactured of ductile iron conforming to ASTM A 536-80. Twist off nuts shall be used to ensure proper actuating of the restraining devices.
    - 2. Restraining devices shall be of ductile iron, heat treated to minimum hardness of 370 BHN. There shall be no dissimilar metals allowed. Dimensions of the gland shall be such that it can be used with all AWWA approved standardized mechanical joint bell and tee head bolts conforming to ANSI/AWWA A 21.11 and ANSI/AWWA C 153.53/A 21.53 of the latest revision. The mechanical joints within the length of required restrained joint pipe shall be restrained with a clamping ring and an additional ring designed to fit behind the bell end of the ductile iron pipe. The rings shall be connected with T-head bolts and rods. Rods must be protected from corrosion either by rod material or coating.
  - D. Apply full coat of asphalt or other acceptable corrosion resistant material to surfaces of installed ferrous anchorage devices.
7. VALVE INSTALLATION
- A. AWWA Gate Valves: Comply with AWWA C 600 and AWWA M 44 and Spotsylvania County Standards. Install each underground valve with stem pointing up and with valve box.
    - 1. General: Valves, fittings and hydrants shall be set and jointed to the piping system as specified for cleaning, laying and joining pipe.
    - 2. Valves and Valve Boxes: Cast iron valve boxes shall be firmly supported centered and plumb over the operating unit of valve. Box cover shall be set flush with the surface of finished pavement or at such other level as may be directed by the Inspector. Valve rod extension with guide shall be required to maintain a maximum distance of 2' -4' from operating nut to top of box. All valves shall be properly restrained.
  - B. AWWA Valves Other Than Gate Valves: Comply with AWWA C 600 and AWWA M 44 and Spotsylvania County Standards.
  - C. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.
8. WATER METER BOX INSTALLATION
- A. Install water meter boxes in paved areas flush with surface in accordance with Spotsylvania County Standards.
9. FIRE HYDRANT INSTALLATION

- A. Genera: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position, in accordance with Spotsylvania County Standards.
  - 1. Connection to main: Each hydrant shall be restrained and connected to the main with a minimum 6" diameter branch, controlled by an independent 6" gate or resilient seat gate valve. All hydrant valves shall be restrained to the hydrant tee on the main line.
  - 2. Setting of Hydrants: When hydrants are set, a drainage pit two feet in diameter and two feet below the bowl of the hydrant shall be excavated. The pit shall be filled with coarse gravel or #57 clean stone to a level of 6" above the weep hole. No hydrant drainage pit shall be connected to a sewer. The bowls of all hydrants shall be well braced against unexcavated earth with suitable concrete blocking, and when directed shall be restrained to the pipe with approved harnessing. All hydrants shall be thoroughly cleaned of dirt or foreign matter before setting.

#### 10. CONNECTIONS

- A. Drawings indicate general arrangement of piping, fitting and specialties.
- B. Connect water distribution piping to existing water main.

#### 11. FIELD QUALITY CONTROL

- A. Pressure Test: Each section of the piping system, including all water services, shall be subject to a pressure test of 150 psi or 1 ½ times working pressure, whichever is greater. Use only potable water. Test shall be conducted in accordance with Spotsylvania County Standards.
- B. Disinfection Test: Prior to being placed in service, the pipe line and appurtenances shall be disinfected in general accordance with ANSI/AWWA C 651. Latest edition; AWWA Standard for Disinfecting Water Mains and supplemental procedures as set forth by Spotsylvania County requirements.
- C. Bacteriological Test: After final flushing and before the water main is placed in service, samples shall be collected and tested for bacteriological quality per Spotsylvania County requirements.

#### 12. IDENTIFICATION

- A. Install continuous underground detectable warning tape during backfilling of trench for underground water distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Division 2 Section "Earthwork".

#### 13. CLEANING

- A. Clean and disinfect water distribution piping as follows:
  - 1. Purge new water distribution piping system and parts of existing systems that have been altered, extended, or repaired before use.
  - 2. Use purging and disinfecting procedure generally in accordance with ANSI/AWWA C 651, AWWA Standard for disinfecting Water Mains and Spotsylvania County Standards.
  - 3. Upon the completion of the installation of the water system and prior to the County acceptance, all restoration shall be complete. The work area shall be

restored to its original condition and pavement replaced to the satisfaction of VDOT and/or the County. All trash and debris shall be removed and properly disposed of. Areas not otherwise stabilized shall be seeded and mulched and a good stand of grass established.

END OF SECTION 02510

SECTION 02741 HOT MIX ASPHALT PAVING

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and supplementary conditions and Division 1 Specification Sections and Virginia Department of Transportation “Road and Bridge Specifications,” apply to this Section.

2. SUMMARY

- A. This Section includes the following:
  - 1. Hot mix asphalt paving
  - 2. Hot mix asphalt patching
  - 3. Hot mix asphalt paving overlay
  - 4. Asphalt surface treatments
  - 5. Pavement marking paint
  - 6. Cold milling of existing hot mix asphalt pavement
- B. Related Sections include the following:
  - 1. Division 2 Section “Earthwork” for aggregate subbase and base courses and for aggregate pavement shoulders.

3. DEFINITIONS

- A. Hot Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definition of terms.
- B. VDOT: Virginia Department of Transportation.

4. SYSTEM DESCRIPTION

- A. Provide hot mix asphalt paving according to materials, workmanship, and other applicable requirements of standard specifications of state or local DOT.
  - 1. Standard Specification: Virginia Department of Transportation (VDOT) “Road and Bridge Specifications”.

5. SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
- B. Job Mix Designs: Certification, by authorities having jurisdictions, of approval of each job mix proposed for the work.
- C. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international graphics symbol, spaces dedicated to people with disabilities.
- D. Material Test Reports: For each paving material.
- E. Material Certificates: For each paving material, signed by manufacturers.

6. QUALITY ASSURANCE

- A. Manufacturers Qualifications: A qualified manufacturer.
  - 1. Manufacturer shall be a paving mix manufacturer registered with and approved by authorities having jurisdiction or VDOT.

- B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated, as documented according to ASTM E 548.
  - C. Regulatory Requirements: Comply with “Road and Bridge Specifications” of VDOT for asphalt paving work.
7. DELIVERY, STORAGE, AND HANDLING
- A. Deliver pavement marking materials to Project site in original packages with seals unbroken and bearing manufacturer’s labels containing brand name and type of material, date of manufacture, and directions for storage.
  - B. Store pavement marking materials in clean dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.
8. PROJECT CONDITIONS
- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:
    - 1. Prime and Tack Coats: Minimum surface temperature of 60 deg F (15.5 deg C).
    - 2. Slurry Coat: Comply with weather limitations of ASTM D 3910.
    - 3. Asphalt Base Course: Minimum surface temperature of 40 deg F (4 deg C) and rising at time of placement.
  - B. Pavement Marking Paint” Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F (4 deg C) for oil based materials, 50 deg F (10 deg C) for water based materials, and not exceeding 95 deg F (35 deg C).

## PART 2 – PRODUCTS

1. AGGREGATES
- A. General: Use materials and gradations in accordance with Virginia Department of Transportation “Road and Bridge Specifications”.
2. ASPHALT MATERIALS
- A. Asphalt Concrete: Asphalt concrete mixtures shall conform to the requirements of Virginia Department of Transportation “Road and Bridges Specifications”.
  - B. Prime Coat: Asphalt emulsion prime complying with Virginia Department of transportation “Road and Bridge Specifications” requirements.
  - C. Tack Coat: Asphalt tack coat complying with Virginia Department of transportation “Road and Bridge Specifications”.
  - D. Water: Potable.
3. AUXILIARY MATERIALS
- A. Paving Geotextile: AASHTO M 288, nonwoven polypropylene; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.
  - B. Pavement Marking: Marking shall be thermoplastic material in accordance with Virginia Department of transportation “Road and Bridge Specifications” .
    - 1. Color: As indicated.
  - C. Glass Beads: AASHTO M 247, Type 1.

D. Wheel Stops: Precast, air entrained concrete, 2500psi (17.2MPa) minimum compressive strength, 4 ½ inches (115 mm) high by 9 inches (225 mm) wide by 72 inches (1800 mm) long. Provide chamfered comers and drainage slots on underside and holes for anchoring to substrate.

1. Dowels: Galvanized steel, ¾” (19 mm) diameter, 10 inch (254 mm) minimum length.

E. Wheel Stops Solid, integrally colored, 96 percent recycled HDPE or commingled postconsumer and postindustrial recycled plastic; UV stabilized; 4 inches high by 6 inches wide by 72 inches long. Provide chamfered comers and drainage slots on underside and holes for anchoring to substrate.

1. Dowels: Dowels: Galvanized steel, ¾” (19 mm) diameter, 10 inch (254 mm) minimum length.

#### 4. MIXES

A. Hot Mix Asphalt Dense, hot laid, hot mix asphalt plant mixes in accordance with Virginia Department of Transportation “Road and Bridge Specifications” designed according to procedures in AI MS 2, “Mix Design Methods for Asphalt Concrete and Other Hot Mix Types”.

### PART 3 – EXECUTION

#### 1. EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.
- B. Proof roll subbase using heavy, pneumatic tired rollers to locate areas that are unstable or that require further compaction.
- C. Contractor shall retain Geo Technical Engineer to verify the density and compaction of subgrade and base. Any material not meeting specifications shall be removed at no expense to Owner.

#### 2. COLD MILLING

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
  - 1. Mill to a depth shown on plans.
  - 2. Mill to a uniform finished surface free of gouges, grooves, and ridges.
  - 3. Control rate of milling to prevent tearing of existing asphalt course.
  - 4. Repair or replace curbs, manholes, and other construction damaged during cold milling.
  - 5. Excavate and trim unbound aggregate base course, if encountered, and keep material separate from milled hot mix asphalt.
  - 6. Keep milled pavement surface free of lose material and dust.

#### 3. PATCHING

- A. Hot Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extend 12 inches (300 mm) into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound aggregate base course to form new subgrade.
- B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot mix asphalt paving at a rate of 0.05 to 0.15 gal./sq.yd. (0.2 to 0.7 L/sq.m).
  - 1.Allow tack coat to cure undisturbed before applying hot mix asphalt paving.
  - 2.Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- C. Patching: Partially fill excavated pavements with hot mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot mix surface layer finished flush with adjacent surfaces.

#### 4. REPAIRS

- A. Leveling Course: Install and compact leveling course consisting of hot mix asphalt surface course to level sags and fill depressions deeper than 1 inch (25 mm) in existing pavements.
  - 1.Install leveling wedges in compacted lifts not exceeding 3 inches (75 mm) thick.

#### 5. SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving in accordance with Virginia Department of Transportation “Road and Bridge Specifications”.
  - 1.Sweep loose granular particles from surface of unbound aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.
- B. Herbicide Treatment: Apply herbicide according to manufacturer’s recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted aggregate base before applying paving materials.
  - 1.Mix herbicide with prime coat if formulated by manufacturer for that purpose.
- C. Prime Coat: Apply uniformly over surface of compacted unbound aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd. (0.7 to 2.3 L/sq. m). Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure for 72 hours minimum.
  - 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
  - 2.Protect primed substrate from damage until ready to receive paving.
- D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. Yd. (0.2 to 0.7 L/sq. m).
  - 1.Allow tack coat to cure undisturbed before applying hot mix asphalt paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

6. PAVING GEOTEXTILE INSTALLATION

- A. Apply asphalt binder to existing pavement surfaces at a rate of 0.20 to 0.30 gal./sq. yd. (0.8 to 1.2 L/sq. m).
- B. Place paving geotextile promptly according to manufacturer's written instructions. Broom or roll geotextile smooth and free of wrinkles and folds. Overlap longitudinal joints 4 inches (100 mm) and transverse joints 6 inches (150 mm).

7. HOT MIX ASPHALT PLACING

- A. Machine place hot mix asphalt on prepared surface, spread uniformly, and strike off. Please asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
  1. Place hot mix asphalt base course in number of lifts and thickness indicated.
  2. Place hot mix asphalt surface course in single lift.
  3. Spread mix at minimum temperature of 250 deg F (121 deg C).
  4. Begin applying mix along centerline of crown for crowned sections and on high side of one way slopes, unless otherwise indicated.
  5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt paving mat.
- B. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.
  1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

8. JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot mix asphalt course.
  1. Clean contact surfaces and apply tack coat to joints.
  2. Offset longitudinal joints, in successive courses, a minimum of 6 inches (150 mm).
  3. Offset transverse joints, in successive courses, a minimum of 24 inches (600 mm).
  4. Construct transverse joints as described in AI MS 22, "Construction of Hot Mix Asphalt Pavements).
  5. Compact joints as soon as hot mix asphalt will bear roller weight without excessive displacement.

6. Compact asphalt at joints to a density within 2 percent of specified course density.

#### 9. COMPACTION

- A. General: Begin compaction as soon as placed hot mix paving will bear roller weight without excessive displacement. Compact hot mix paving with hot, hand tampers or vibratory plate compactors in areas inaccessible to rollers.
  - 1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct lay down and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot mix asphalt is still hot enough to achieve specified density. Continue rolling until hot mix asphalt course has been uniformly compacted to the following density:
  - 1. Average Density: 96 percent of reference laboratory density according to AASHTO T 245, but not less than 94 percent nor greater than 100 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot, compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect Barricades to protect paving from traffic until mixture has cooled enough not to become marked.

#### 10. INSTALLATION TOLERANCES

- A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:
  - 1. Base Course: Plus or minus ¼ inch
  - 2. Surface Course: Plus ¼ inch (6 mm), no minus.
- B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10 foot (3 m) straightedge applied transversely or longitudinally to paved areas:
  - 1. Base Course: ¼ inch (6 mm).
  - 2. Surface Course: 1/8 inch (3 mm).
  - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is ¼ inch (6 mm).

#### 11. PAVEMENT MARKING

- A. Do not apply pavement marking paint until layout, colors, and placement have been verified with Engineer or Owner and VDOT.

- B. Allow paving to age for 30 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm).
- E. Apply thermoplastic metal with equipment to produce pavement markings of dimensions indicated with uniform straight edge.

#### 12. FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
  - 1. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from specified requirements.
- B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- C. Thickness: In place compacted thickness of hot mix asphalt courses will be determined according to Virginia Department of Transportation "Road and Bridge Specifications".
- D. Surface Smoothness: Finished surface of each hot mix asphalt course will be tested for compliance with smoothness tolerances.
- E. In Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to Virginia Department of Transportation "Road and Bridge Specifications".
- F. Remove and replace or install additional hot mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

#### 13. DISPOSAL

- A. Except for material indicated to be recycled, remove excavated material from Project site and legally dispose of them in an EPA approved landfill.
  - 1. Do not allow excavated materials to accumulate in site.

END OF SECTION 02741

SECTION 02920 – LAWNS AND GRASSES

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification Section, apply to this Section.

2. SUMMARY

- A. This Section includes the following:

- 1. Seeding.
- 2. Sodding.
- 3. Plugging
- 4. Sprigging.
- 5. Meadow grasses and wildflowers.
- 6. Lawn renovation.

- B. Related Sections include the following:

- 1. Division 2 Section “Site Clearing” for topsoil stripping and stockpiling.
- 2. Division 2 Section “Earthwork” for excavation, filling and backfilling, and rough grading.

3. DEFINITIONS

- A. Finish Grade: elevation of finished surface of planting soil.
- B. Manufactured Soil: Soil produced off site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

4. SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Certification of Grass Seed: From seed vendor for each grass seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
  - 1. Certification of each seed mixture for turfgrass sod, identifying source, including name and telephone number of supplier.
- C. Product Certificates: For soil amendments and fertilizers, signed by product manufacturer.
- D. Qualification Data: For landscape Installer.
- E. Material Test Reports: For existing surface soil and imported topsoil.
- F. Planting Schedule: Indicating anticipated planting dates for each type of planting.

- G. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of lawns and meadows during a calendar year. Submit before expiration of required maintenance periods.
5. QUALITY ASSURANCE
- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful lawn and meadow establishment.
    - 1. Installer’s Field Supervision: Require Installer to maintain an experienced full time supervisor on Project site when planting is in progress.
  - B. Soil Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
  - C. Topsoil Analysis: Finish soil analysis by a qualified soil testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant nutrient content topsoil.
    - 1. Report suitability of topsoil for lawn growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
  - D. Preinstallation Conference: Conduct conference at Project site.
6. DELIVERY, STORAGE, AND HANDLING
- A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.
  - B. Sod: Harvest, deliver, store and handle sod according to requirements in TPI’s “Specifications for Turfgrass Sod Materials” and “Specifications for Turfgrass Sod Transplanting and Installation” in its “Guideline Specifications to Turfgrass Sodding”.
7. SCHEDULING
- A. Planting Restriction: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
    - 1. Spring Planting: See Contract Drawings
    - 2. Fall Planting: See Contract Drawings
  - B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.
8. LAWN MAINTENANCE
- A. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
    - 1. Seeded Lawns: 60 days from date of Substantial Completion.
      - a. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established, continue maintenance during next planting season.
    - 2. Sodded Lawns: 30 Days from date of Substantial Completion.
  - B. Maintain and establish by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, grade, and replant bare or eroded and remulch to produce a uniformly smooth lawn.

1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch. Anchor as required to prevent displacement.
  - C. Watering: Provide and maintain temporary piping, hoses, and lawn watering equipment to convey water from sources and to keep lawn uniformly moist to a depth of 4 inches (100 mm).
    1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
    2. Water lawn at a minimum rate of 1 inch (25 mm) per week.
  - D. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 40 percent of grass height. Remove no more than 40 percent of grass leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height.
    1. Mow Grass 1 to 2 inches (25 to 50 mm) high
  - E. Lawn Post fertilization: Apply fertilizer after initial mowing and when grass is dry
    1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. (0.45 kg/92.9 sq.m) to lawn area.
9. MEADOW MAINTENANCE
- A. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, but for not less than 40 days from date of Substantial Completion.
  - B. Maintain and establish meadow by water, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch.
  - C. Watering: Provide and maintain temporary piping, hoses, and lawn watering equipment to convey water from sources and to keep meadow uniformly moist.
    1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
    2. Water meadow at a minimum rate of ½ inch (13 mm) per week for 6 weeks after planting.

## PART 2 – PRODUCTS

1. SEED
  - A. Grass Seed: Fresh, clean, dry, new crop seed complying with AOSA’s “Journal of Seed Technology; Rules for Testing Seeds” for purity and germination tolerances.
  - B. Seed Species: State certified seed of grass species, as follows:
  - C. Seed Species: Seed of grass species as specified on contract drawings, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:
    1. Follow planting schedules as specified on approved drawings.

## 2. TOP SOIL

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth.
  - 1. Topsoil Source: Reuse surface soil stockpile on site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
    - a. Supplement with imported or manufactured topsoil from offsite sources when quantities are insufficient. Obtain topsoil displaced from naturally well drained construction or mining sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from bogs or marshes.

## 3. INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent and as follows:
  - 1. Class: Class 0, with a minimum 95 percent passing through No. 8 (2.36 mm) sieve and a minimum 55 percent passing through No. 60 (0.25 mm) sieve.
- B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum 99 percent passing through No. 6 (3.35 mm) sieve and a minimum 10 percent through No. 40 (0.425 mm) sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Aluminum Sulfate: Commercial grade, unadulterated.
- E. Perlite: Horticultural perlite, soil amendment grade.
- F. Agricultural Gypsum: Finely ground, containing a minimum of 90 percent calcium sulfate.
- G. Sand: Clean, washed, natural or manufactured, free of toxic materials.
- H. Diatomaceous Earth: Calcined, diatomaceous earth, 90 percent silica, with approximately 140 percent water adsorption capacity by weight.
- I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

## 4. ORGANIC SOIL AMENDMENTS

- A. Compost: Well composted, stable and weed free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through  $\frac{3}{4}$  inch (19 mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic plantings; as follows:
  - 1. Organic Matter Content: 50 to 60 percent of dry weight.
  - 2. Feedstock: Agricultural, food or industrial residuals; biosolids; yard trimmings; or source separated or compostable mixed solid waste.
- B. Peat: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with a pH range of 3.4 to 4.8.
- C. Peat: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed sedge peat and having a water absorbing capacity of 1100 to 2000 percent.

- D. Wood Derivatives: Decomposed, nitrogen treated sawdust, ground bark, or wood waste of uniform texture, free of chips, stones sticks, soil, or toxic materials.
    - 1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with at least 0.15 lb (2.4 kg) of ammonium nitrate or 0.25 lb (4kg) of ammonium sulfate per cubic foot (cubic meter) of loose sawdust or ground bark.
  - E. Manure: Well rooted, unleashed, stable or cattle manure containing not more than 25 [percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.
5. PLANTING ACCESSORIES
- A. Selective Herbicides: EPA registered and approved, of type recommended by manufacturer for application.
6. FERTILIZER
- A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.
  - B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
  - C. Commercial Fertilizer: Commercial grade complete fertilizer of neutral character, consisting of fast and slow release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
    - 1. Composition: 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
    - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil testing agency.
  - D. Slow Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water insoluble nitrogen, phosphorous, and potassium in the following composition:
    - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
    - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil testing agency.
7. MULCHES
- A. Straw Mulch: Provide air dry, clean, mildew and seed free, salt hay or threshed straw of wheat, rye, oats, or barley.
  - B. Peat Mulch: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with a pH range of 3.4 to 4.8.
  - C. Peat Mulch: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed sedge peat and having a water absorbing capacity of 1100 to 2000 percent.
  - D. Compost Mulch: Well composted, stable and weed free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1 inch

(25 mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
  2. Feedstock: Agricultural, food or industrial residuals; biosolids; yard trimmings; or source separated or compostable mixed solid waste.
  - E. Fiber Mulch: Biodegradable, dyed wood, cellulose fiber mulch; nontoxic; free of plant growth or germination inhibitors; with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
  - F. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber mulch manufacturer for slurry application; nontoxic and free of plant growth or germination inhibitors.
  - G. Asphalt Emulsion: ASTM C 977, Grade SS-1; nontoxic and free of plant growth or germination inhibitors.
8. EROSION CONTROL MATERIALS
- A. Erosion Control Blankets: Biodegradable wood excelsior, straw, or coconut fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long.
  - B. Erosion Control Fiber Mesh: Biodegradable twisted jute or spun coir mesh, a minimum of 0.92 lb/sq.yd. (0.5 kg/sq. m), with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long.

### PART 3 – EXECUTION

#### 1. EXAMINATION

- A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 2. PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
  1. Protect adjacent and adjoining areas from hydroseeding overspray.
- B. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil bearing water runoff or airborne dust to adjacent properties and walkways.

#### 3. LAWN PREPARATION

- A. Limit lawn subgrade preparation to areas to be planted.
- B. Newly graded Subgrades: Loosen subgrade to a minimum depth of 6 inches (150 mm). Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of item off the Owner's property.
  1. Apply fertilizer directly to subgrade before loosening.
  2. Thoroughly blend planting soil mix off site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.

- a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
      - b. Mix lime with dry soil before mixing fertilizer.
    3. Spread planting soil to a depth of 4 inches (100 mm) but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
      - a. Spread approximately one half the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 2 inches (50 mm) of subgrade. Spread remainder of planting soil mix.
      - b. Reduce elevation of planting soil to allow for soil thickness of sod.
  - C. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:
    1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
    2. Loosen surface soil to a depth of at least 6 inches (150 mm). Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches (100 mm) of soil. Till soil to a homogeneous mixture of fine texture.
      - a. Apply fertilizer directly to surface soil before loosening.
    3. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, trash, and other extraneous matter.
    4. Legally dispose of waste material, including grass, vegetation and turf, off Owner's property.
  - D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus ½ inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.
  - E. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
  - F. Restore areas if eroded or otherwise disturbed after finish grading and before planting.
4. SEEDING
- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
    1. Do not use wet seed that is moldy or otherwise damaged.
  - B. Sow seed at the rate specified on Contract Drawings.
  - C. Rake seed lightly into top 1/8 inch (3 mm) of topsoil, roll lightly, and water with fine spray.
  - D. Protect seeded areas with slopes exceeding 1:6 with erosion control fiber mesh and 1:4 with erosion control blankets installed and stapled according to manufacturer's written instructions.
  - E. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre (42 kg/92.9 sq. m) to form a continuous

blanket 1 ½ inches (38 mm) in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

- F. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak and scatter uniformly to a depth of 3/16 inches (4.8 mm) and roll to a smooth surface.

#### 5. HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

- 1. Mix slurry with nonasphaltic tackifier.

- 2. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry application at a minimum rate of 500 lb/acre (5.1 kg/92.9 sq. m) dry weight but not less than the rate required to obtain specified seed sowing rate. Apply slurry cover coat of fiber mulch at a rate of 1000 lb/acre (10.2 kg/92.9 sq. m).

#### 6. SODDING

- A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

- 1. Lay sod across angle of slopes exceeding 1:3.

- C. Saturate sod with fine spray within two hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1 ½ inches (38 mm) below sod.

#### 7. LAWN RENOVATION

- A. Renovate existing lawn.

- B. Renovate existing lawn damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

- 1. Reestablish lawn where settlement or washouts occur or where minor regrading is required.

- C. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury in soil.

- D. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil droppings, fuel spills, stone, gravel and other construction materials, and replace with new topsoil.

- E. Mow, dethatch, core aerate, and rake existing lawn.

- F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

- G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.
  - H. Till stripped, bare and compacted areas thoroughly to a soil depth of 6 inches (150 mm).
  - I. Apply soil amendments and initial fertilizers required for established new lawns and mix thoroughly into top 4 inches (100 mm) of existing soil. Provide new planting soil to fill low spots and meet finish grades.
  - J. Apply seed protect with straw as required for new lawns.
  - K. Water newly planted areas and keep moist until new lawn is established.
8. SATISFACTORY LAWNS
- A. Satisfactory Seeded Lawns: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches (125 by 125 mm).
  - B. Satisfactory Sodded Lawn: At end of maintenance period, a healthy, well rooted, even colored, viable lawn has been established, free of weeds, open joints, bare areas, and surface irregularities.
  - C. Reestablished lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.
9. MEADOW
- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 kg/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
    - 1. Do not use wet seed or seed that is moldy or otherwise damaged.
  - B. Sow seed at the rate of 6 oz./1000 sq.ft. (170g/92.9 sq. m).
  - C. Brush seed into top 1/16 inch (1.6 mm) of topsoil, roll lightly, and water with fine spray.
  - D. Protect seeded areas from hot, dry weather or drying winds by applying peat or compost mulch within 24 hours after completing seeding operations. Soak and scatter uniformly to a depth of 3/16 inch (4.8 mm) and roll to a smooth surface.
  - E. Water newly planted areas and keep moist until meadow is established.
10. CLEAN UP AND PROTECTION
- A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil into roads, walks, or other paved areas.
11. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after lawn is established.
12. Remove erosion control measures after grass establishment period.

END OF SECTION 02920

## SECTION 02950 – EROSION AND SEDIMENT CONTROL

### PART 1 – GENERAL

#### 1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications Sections, and Virginia Erosion and Sediment Control Handbook, 3<sup>rd</sup> Edition, including latest version, apply to this section.

#### 2. SUMMARY

- A. Project Description: The project consists of the installation of water lines and PRV vaults along Marathon Place and Ni River Drive for approximately 100' at each intersection.
- B. Existing Site Conditions: The site is gently sloping with a mix of wooded and cleared areas. The site is parallel to paved surfaces.
- C. Adjacent Property: There are residential properties adjacent to the project area but impact to these properties will be limited.
- D. Critical Areas: This project will not impact critical areas.

### PART 2 – PRODUCTS

#### 1. EROSION AND SEDIMENT CONTROL MEASURES

- A. All materials used in erosion control devices shall be in accordance with the Virginia Erosion and Sediment Control Handbook, latest edition.

### PART 3 – EXECUTION

#### 1. INSTALLATION SEDIMENT CONTROL MEASURES

- A. Unless otherwise noted, all erosion and sediment control practices shall be constructed according to the standards and specifications of the "Virginia Erosion and Sediment Control Handbook", 3<sup>rd</sup> Edition, including latest revisions and additions.

#### 2. MAINTENANCE

- A. In general all erosion and sediment control measures will be checked daily and after each significant rainfall event
- B. The Contractor shall inspect for deteriorated and damaged structured measures. Damaged structural measures shall be repaired or replaced. Temporary repair and protection from further drainage shall be completed by close of the work day.
- C. The Contractor shall install additional erosion and sediment control measures if the site inspectors reveal problems.

#### 3. REMOVAL SEDIMENT CONTROL DEVICES

- A. All temporary sediment control devices shall be removed after disturbed areas have been restored to original grades or constructed to finish grades as shown on Contract Drawings, and an acceptable vegetative cover has been established.

#### 4. LIABILITY

- A. The Contractor agrees to hold the Owner or any of its agents harmless from any and all liability or damage that may arise out of a violation of the Erosion and Sediment Control Ordinance and agrees to indemnify them against loss

END OF SECTION 02950

SECTION 311000 – SITE CLEARING

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to this Section.

2. SUMMARY

A. Section Includes:

- 1. Protecting existing vegetation to remain.
- 2. Removing existing vegetation.
- 3. Clearing and grubbing.
- 4. Stripping and stockpiling topsoil.
- 5. Removing above and below grade site improvements.
- 6. Disconnecting, capping or sealing, and abandoning site utilities in place.
- 7. Temporary erosion and sedimentation measures.

3. DEFINITIONS

- A. Subsoil: All soil beneath the top soil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically top soil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Top Soil: Top layer of the soil profile consisting of existing native surface topsoil or existing in place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of subsoil and weed, roots, toxic materials, or other nonsoil materials.
- D. Plant Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- E. Vegetation: Trees, shrubs, groundcovers, grass and other plants.

4. MATERIAL OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

5. INFORMATIONAL SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction. And site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
  - 1. Use sufficiently detailed photographs or videotape.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.
- 6. QUALITY ASSURANCE
  - A. Preinstallation Conference: Conduct conference at Project site. Minor adjustments in water line alignment may be required to minimize impacts to existing trees and landscaped areas.
- 7. PROJECT CONDITIONS
  - A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site clearing operations.
    - 1. Don not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
    - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
  - B. Utility Locator Service: Notify Miss Utility for area where Project is located before site clearing.
  - C. Do not commence site clearing operation until temporary erosion and sedimentation control measures are in place.
  - D. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

## PART 2 – MATERIALS

- 1. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Division 31 Section “Earth Moving”.

## PART 3 – EXECUTION

- 1. PREPARATION
  - A. Protect and maintain benchmarks and survey control points from disturbance during construction.
  - B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Minor adjustments in water line alignment may be required to minimize impacts to existing trees and landscaped areas.
  - C. Protect existing site improvements to remain from damage during construction.
    - 1. Restore damaged improvements to their original condition, as acceptable to Owner.
- 2. TEMPORARY EROSION AND SEDIMENTATION CONTROL
  - A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion and sedimentation control Drawings and requirements of the Virginia Erosion and Sediment Control handbook, latest edition.
  - B. Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.

- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- 3. TREE AND PLANT PROTECTION
  - A. General: Protect trees and plants remaining on site according to requirements in Division 1 Section “Temporary Tree and Plant Protection”.
  - B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Engineer.
- 4. EXISTING UTILITIES
  - A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.
    - 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
  - B. Locate, identify, disconnect, and seal or cap utilities to be removed or abandoned in place.
    - 1. Arrange with utility companies to shut off indicated utilities.
    - 2. Owner will arrange to shut off indicated utilities when requested by Contractor.
  - C. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
    - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
    - 2. Do not proceed with utility interruptions without Owner’s written permission.
- 5. CLEARING AND GRUBBING
  - A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
    - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
    - 2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches (450 mm) below exposed subgrade.
    - 3. Use only hand methods for grubbing within protection zones.
    - 4. Chip removed tree branches and dispose of offsite.
  - B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earth work is indicated.
    - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches (200 mm), and compact each layer to a density equal to adjacent original ground.
- 6. SITE IMPROVEMENTS
  - A. Remove existing above and below grade improvements as indicated and necessary to facilitate new construction.
  - B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full depth joints coincide with line of demolition, neatly saw cut along line of existing pavement to remain before removing adjacent existing pavement. Saw cut faces vertically.
  2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.
7. DISPOSAL OF SURPLUS AND WASTE MATERIALS
- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris; legally dispose of them off Owner's property.
  - B. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 312319 – DEWATERING

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this Section.

2. SUMMARY

- A. Section includes construction dewatering.
- B. Related Sections:
  - 1. Division 31 Section “Earth Moving” for excavating, backfilling, site grading, and for site utilities.
  - 2. Division 31 Section “Excavation Support and Protection” for shoring, bracing, and sheet piling of excavations.

3. PERFORMANCE REQUIREMENTS

- A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.
  - 1. Delegated Design: Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
  - 2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
  - 3. Prevent surface water from entering excavations by grading, dikes, or other means.
  - 4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
  - 5. Remove dewatering system when no longer required for construction.

4. ACTION SUBMITTALS

- A. Shop Drawings for Dewatering System: Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.
  - 1. Include layouts of piezometers and flow measuring devices for monitoring performance of dewatering system.
  - 2. Include a written plan for dewatering operations including control procedures to be adopted if dewatering problems arise.
- B. Delegated Design Submittal: For dewatering system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

5. INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified installer and professional engineer.
- B. Field quality control reports.
- C. Other informational submittals:
  - 1. Photographs: Show existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.

6. QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer that has specialized in dewatering work.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review methods and procedures related to dewatering including, but not limited to, the following:
    - a. Inspection and discussion of condition of site to be dewatered including coordination with temporary erosion control measures and temporary controls and protections.
    - b. Geotechnical report.
    - c. Proposed site clearing and excavations.
    - d. Existing utilities and subsurface conditions.
    - e. Coordination for interruption, shutoff, capping, and continuation of utility services.
    - f. Construction schedule. Verify availability of Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    - g. Testing and monitoring of dewatering system.

7. PROJECT CONDITIONS

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
  - 1. Notify Owner no fewer than two days in advance of proposed interruption of utility.
  - 2. Do not proceed with interruption of utility without Owner's written permission.
- B. Project Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.
  - 1. Make additional test borings and conduct other exploratory operations necessary for dewatering.
  - 2. The Geotechnical report is referenced elsewhere in the Project Manual.

- C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
  - 1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify architect if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

## PART 2 – EXECUTION

### 1. PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.
  - 1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
  - 2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C. Provide temporary grading to facilitate dewatering and control of surface water.
- D. Monitor dewatering systems continuously.
- E. Promptly repair damages to adjacent facilities caused by dewatering.
- F. Protect and maintain temporary erosion and sedimentation controls, which are specified in Division 31 Section “Site Clearing” during dewatering operations.

### 2. INSTALLATION

- A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface water controls.
  - 1. Space well points or wells at intervals required to provide sufficient dewatering.
  - 2. Use filters or other means to prevent pumping of fine sands or silts from the surface.
- B. Before excavating below ground water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

- C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
    - 1. Do not permit open sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
  - D. Reduce hydrostatic head in water bearing strata below subgrade elevations of foundations, drain, sewers, and other excavations.
    - 1. Maintain piezometric water level a minimum of 24 inches (600 mm) below surface of excavation.
  - E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow control devices as required by authorities having jurisdiction.
  - F. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.
    - 1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches (900 mm) below overlaying construction.
  - G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.
3. FIELD QUALITY CONTROL
- A. Observation Wells: Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers indicated; additional observation wells may be required by authorities having jurisdiction.
    - 1. Observe and record daily elevation of ground water and piezometric water levels in observation wells.
    - 2. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. In areas where observation wells are not functioning properly, suspend construction activities until reliable observations can be made. Add or remove water from observation well risers to demonstrate that observation wells are functioning properly.
  - B. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

END OF SECTION 312319

SECTION 321313 – CONCRETE PAVING

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

2. SUMMARY

- A. Section includes:
  - 1. Driveways
  - 2. Roadways
  - 3. Parking lots
  - 4. Curbs and gutters
  - 5. Walks

3. DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground blast furnace slag.

4. ACTION SUBMITTALS

- A. Product data: For each type of product indicated.
- B. Other Action Submittals:
  - 1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

5. INFORMATIONAL SUBMITTALS

- A. Qualifications Data: For qualified ready mix concrete manufacturer.
- B. Material Certificates: For the following, from manufacturer:
  - 1. Cementitious materials.
  - 2. Steel reinforcement and reinforcement accessories.
  - 3. Fiber reinforcement.
  - 4. Admixtures.
  - 5. Curing compounds.
  - 6. Applied finish materials.
  - 7. Bonding agent or epoxy adhesive.
  - 8. Joint fillers.
- C. Field quality control reports.

6. QUALITY ASSURANCE

- A. Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of stamped concrete paving systems.
- B. Ready Mix Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA’s “Certification of Ready Mixed Concrete Production Facilities” (Quality Control Manual – Section 3, “Plant Certification Checklist”).
- C. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
  1. Personnel conducting field test shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or equivalent certification program.
- D. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.
- E. ACI Publications: Comply with ACI 301 unless otherwise indicated.
- F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  1. Build mockups of full-thickness sections of concrete paving to demonstrate typical joints; surface finish, texture, and color; curing; and standard of workmanship.
  2. Build mockups of concrete paving in the location and of the size indicated or, if not indicated, build mockups where directed by Architect and not less than (96 inches (2400mm) by 96 inches (2400mm)). Include full size detectable warning.
  3. Approval mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 7. PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil –based materials, and not exceeding 95 deg F.

### PART 2 – PRODUCTS

#### 1. FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
  1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

#### 2. CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout Project:
  1. Portland Cement: ASTM C 150
    - a. Fly Ash: ASTM C 618

- b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
  - B. Water: Potable and complying with ASTM C 94/C 94M.
  - C. Air-entraining Admixture: ASTM C 260.
  - D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to obtain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
    - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
    - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
    - 3. Water-Reducing and Retarding admixture: ASTM C 494/C 494M, Type D
    - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F
    - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
    - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
  - E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading and resistant to lime and other alkalis.
3. CURING MATERIALS
- A. Absorptive Cover: AASHTO M 182, (Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz/sq.yd.(305 g/sq.m) dry or cotton mats).
  - B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
  - C. Water: Potable.
4. CONCRETE MIXTURES
- A. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M), for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
    - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trail batch method.
    - 2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.
  - B. Proportion mixtures to provide normal- weight concrete with the following properties:
    - 1. Compressive Strength (28 Days): 4000psi (27.6 MPa).
  - C. Limit water soluble, chloride-ion content in hardened concrete to (0.15) (0.30) percent by weight of cement.
  - D. Chemical Admixtures: Use admixtures according to manufacturer’s written instructions.
    - 1. Use (water-reducing admixture) (high-range, water-reducing admixture) (high-range, water-reducing and retarding admixture) (plasticizing and retarding admixture) in concrete as required for placement and workability.
    - 2. Use water-reducing and retarding admixture when required by high temperature, low humidity, or other adverse placement conditions.

- E. Cementitious materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 40 percent.
    - 1. Fly Ash or Pozzolan: 25 percent.
    - 2. Ground Granulated Blast- Furnace Slag: 50 percent.
    - 3. Combined Fly Ash or Pozzolan, and Ground Granulated Blast- Furnace Slag: 50 percent, with fly ash or pozzolan not exceeding 25 percent.
  - F. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu.yd. (0.60 kg/cu.m).
  - G. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.
5. CONCRETE MIXING
- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
    - 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1 -1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
  - B. Project Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum type batch machine mixer.
    - 1. For concrete batches of 1 cu. yd. (0.76 cu.m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
    - 2. For concrete batches larger than 1cu.yd. (0.76cu.m), increase mixing time by 15 seconds for each additional 1 cu.yd. (0.76cu.m).
    - 3. Provide batch ticket for each discharge and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

### Part 3 – EXECUTION

- 1. EXAMINATION
  - A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
  - B. Proof roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
    - 1. Completely proof roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph (5 km/h).
    - 2. Proof roll with a pneumatic tired and loaded, 10 wheel, tandem axle dump truck weighing not less than 15 tons (13.6 tonnes).

3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of  $\frac{1}{2}$  inch according to requirements in Division 31 Section “Earth Moving”.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
2. PREPARATION
  - A. Remove loose material from compacted subbase surface immediately before placing concrete.
3. EDGE FORMS AND SCREED CONSTRUCTION
  - A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
  - B. Clean forms after each use and coat with form release agent to ensure separation from concrete without damage.
4. STEEL REINFORCEMENT
  - A. General: Comply with CRSI’s “Manual of Standard Practice” for fabricating, placing, and supporting reinforcement.
  - B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond reducing materials.
  - C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
  - D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
  - E. Zinc Coated Reinforcement: Use galvanized steel wire ties to fasten zinc coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.
  - F. Epoxy Coated Reinforcement: Use epoxy coated steel wire ties to fasten epoxy coated reinforcement. Repair cut and damaged epoxy coating with epoxy repair coating according to ASTM D 3963/D 3963M.
  - G. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2 inch (50mm) overlap of adjacent mats.
5. JOINTS
  - A. General: Form construction, isolation, and contraction joints and tools edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
    1. When joining existing paving. Place transverse joints to align with previously placed joints unless otherwise indicated.
  - B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operation are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
  2. Provide tie bars at sides of paving strips where indicated.
  3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  4. Keyed Joints: Provide preformed keyway section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches (38mm) into concrete.
  5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Contraction Joints: Form weakened plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 3/8 inch (10mm) radius. Repeat grooving of construction joints after applying surface finishes. Eliminate grooving tool marks on concrete surfaces.
    - a. Tolerance: Ensure that grooved joints are within 3 inches (75mm) either way from centers of dowels.
  2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond rimmed blades. Cut 1/8 inch (3mm) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
    - a. Tolerance: Ensure that sawed joints are within 3 inches (75mm) either way from centers of dowels.
  3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one half of dowel length to prevent concrete bonding to one side of joint.
- D. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 3/8 inch (10mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate edging tool marks on concrete on concrete surfaces.
6. CONCRETE PLACEMENT
- A. Before placing concrete, inspect and complete formwork installation and items to be embedded or cast in.
  - B. Remove snow, ice, or frost from subbase before placing concrete. Do not place concrete on frozen surfaces.
  - C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

- D. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 (ACI 301M) by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
  - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating joint devices.
- H. Spread paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and joining.
- K. Slip Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
  - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip form paving machine during operations.
- L. Cold Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
  - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 Deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
  - 2. Do not use frozen materials or materials containing ice or snow.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- M. Hot Weather Placement: Comply with ACI 301 (ACI 301M) and as follows when hot weather conditions exist:
  - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Cover steel reinforcement with water soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

#### 7. FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
  1. Burlap Finish: Drag a seamless strip of damp burlap across float finished concrete perpendicular to line of traffic, to provide a uniform, gritty texture.
  2. Medium to Fine Textured Broom Finish: Draw a soft bristle broom across float finished concrete surface perpendicular to line of traffic to provide a uniform, fine line texture.
  3. Medium to Coarse Textured Broom Finish: Provide a coarse finish by striating float finished concrete surface 1/16 to 1/8 inch (1.6 to 3mm) deep with a stiff bristled broom, perpendicular to line of traffic.

#### 8. SPECIAL FINISHES

- A. Monolithic Exposed Aggregate Finish: Expose coarse aggregate in paving surface as follows:
  1. Immediately after float finishing, spray apply chemical surface retarder to paving according to manufacturer's written instructions.
  2. Cover paving surface with plastic sheeting, sealing laps with tape, and remove when ready to continue finishing operations.
  3. Without dislodging aggregate, remove mortar concealing the aggregate by lightly brushing surface with a stiff, nylon bristle broom. Do not expose more than one third of the average diameter of aggregate and not more than one half of the diameter of the smallest aggregate.
  4. Fine Spray surface with water and brush. Repeat cycle of water flushing and brushing until cement film is removed from aggregate surfaces to depth required.

#### 9. CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq.ft. x h (1 kg/sg. m x h) before and during finishing operations. Apply according to manufacturer's written

instructions after placing, screeding and bull floating or darbying concrete but before float finishing.

- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by curing compound as follows:
  - 1. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

#### 10. PAYING TOLERANCES

- A. Comply with tolerances in ACI 117 and as follows:
  - 1. Elevation:  $\frac{3}{4}$  inch (19mm).
  - 2. Thickness: Plus  $\frac{3}{8}$  inch (10mm), minus  $\frac{1}{4}$  inch (6 mm).
  - 3. Surface: Gap below 10 foot (3m) long, unlevelled straightedge not to exceed  $\frac{1}{2}$  inch (13mm).
  - 4. Alignment of Tie Bar End Relative to Line Perpendicular to paving Edge:  $\frac{1}{2}$  inch per 12 inches (13mm per 300mm) of tie bar.
  - 5. Lateral Alignment and Spacing of Dowels: 1 inch (25mm).
  - 6. Vertical alignment of Dowels:  $\frac{1}{4}$  inch (6mm).
  - 7. Alignment of Dowel Bar End Relative to Line Perpendicular to Paving Edge:  $\frac{1}{4}$  inch per 12 inches (6mm per 300MM) of dowel.
  - 8. Joint Spacing: 3 inches (75mm).
  - 9. Contraction Joint Depth: Plus  $\frac{1}{4}$  inch (6mm), no minus.
  - 10. Joint Width: Plus  $\frac{1}{8}$  inch (3mm), no minus.

#### 11. REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with Portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

SECTION 329300 – PLANTS

PART 1 – General

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this Section.

2. SUMMARY

A. Section Includes:

- 1.Plants.
- 2.Planting Soils.
- 3.Tree Stabilization
- 4.Landscaping edging.
- 5.Tree grates.

B. Related Sections:

- 1.Division 31 Section “Site Clearing” for protection of existing trees and plantings, topsoil stripping and stockpiling, and site clearing.
- 2.Division 32 Section “Turf and Grasses” for turf (lawn) and meadow planting, hydro-seeding, and erosion control materials.

3. UNIT PRICES

- A. Work of this Section is affected by unit prices specified by Division 1 Section “Unit Prices”.

- 1.Unit prices apply to authorized work covered by quantity allowances.
- 2.Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

4. DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than sizes indicated; wrapped with burlap, tied, rigidly supported, and drum laced with twine with root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than sizes indicated.
- D. Bare Root Stock: Plants with a well branched, fibrous root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.
- E. Container Grown Stock: Healthy, vigorous, well rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

- F. Duff layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
  - G. Fabric Bag Grown Stock: Healthy, vigorous, well rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.
  - H. Finish Grade: Elevation of finished surface of planting soil.
  - I. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
  - J. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regular, defoliant, or desiccant.
  - K. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and Slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
  - L. Planting Area: Areas to be planted.
  - M. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
  - N. Plant; Plants; Plant material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
  - O. Root Flare: Also called “Trunk Flare”. The area at the base of the plant’s stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
  - P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
  - Q. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
  - R. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
  - S. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
5. INFORMATIONAL SUBMITTALS
- A. Qualification Data: For qualified landscape installer. Include list of similar projects completed by installer demonstrating installer’s capabilities and experience. Include project names, address, and year completed, and include names and address of owners’ contact persons.

- B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
    - 1. Manufacturer's certified analysis of standard products.
    - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
  - C. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.
  - D. Warranty: Sample of special warranty
6. DELIVERY, STORAGE, AND HANDLING
- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.
  - B. Bulk Materials:
    - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
    - 2. Provide erosion control measures to prevent erosion or displacement of bulk materials, discharge of soil bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
    - 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.
  - C. Deliver bare root stock plants freshly dug. Immediately after digging up bare root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.
  - D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping and other handling and trying damage. Do not bend or bind tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
  - E. Handle planting stock by root ball.
  - F. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F (16 to 18 deg C) until planting.
  - G. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
    - 1. Heel in bare root stock. Soak roots that are in dry conditions in water for two hours. Reject dried out plants.
    - 2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
    - 3. Do not remove container grown stock from container before time of planting.

4. Water root systems of plants stored on site deeply and thoroughly with a fine mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

7. PROJECT CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Interruption of existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:
  - 1. Notify Owner n fewer than two days in advance or proposed interruption of each service or utility.
  - 2. Do not proceed with interruption of services or utilities without Owner's written permission.
- C. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
  - 1. Spring Planting: as shown on plans
  - 2. Fall Planting: as shown on plans
- D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.
- E. Coordination with Turf Areas (lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
  - 1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting.

8. WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
    - b. Structural failures including plantings falling or blowing over.
    - c. Faulty performance of tree stabilization.
    - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 2. Warranty Periods from Date of Planting Completion:
    - a. Trees, Shrubs Vines and Ornamental Grasses: 12 months
  - 3. Include the following remedial actions as a minimum:

- a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
- b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
- c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.
- d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

9. MAINTENANCE SERVICE

- A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 2 years from date of planting completion.

PART 2 – PRODUCTS

1. PLANT MATERIAL

- A. General: Furnish nursery grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well shaped, fully branched, healthy, vigorous stock densely foliated when in leaf and free of disease, pests, eggs larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk (“included Bark”); crossing trunks; cut off limbs more than ¾ inch (19mm) in diameter; or with stem girdling roots will be rejected.

2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

- C. Root Ball Depth: Furnish trees and shrubs with root balls measured from top of ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting. Remove top 1/3 of burlap.

2. TREE STABILIZATION MATERIALS

- A. Stakes and Guys:

1. Upright and Guy Stakes: Rough sawn, sound, new stake, free of knots, holes, cross grain, and other defects, 2 by 2 inch minimal (38 by 38 mm actual) by 18 inches, pointed at one end.

2. Guys to be ¼ inch poly rope or ¾ inch nylon strap per Spotsylvania County Design Standards manual.

### PART 3 – EXECUTION

#### 1. PLANTING AREA ESTABLISHMENT

- A. Loosen subgrade of planting areas to where top of root ball is 2 inches above finish grade.

#### 2. EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45 degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate at least 6 inches outside ball diameter for balled and burlapped stock.
2. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
3. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
4. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
5. Maintain supervision of excavations during working hours.
6. Keep excavations covered or otherwise protected when unattended by Installer's personnel.

- B. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

#### 3. TREE, SHRUB, AND VINE PLANTING

- A. Before planting, verify that root flare is visible at top of root ball according to NASI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 2 inches (50mm) above adjacent finish grades.
  1. Use planting soil for backfill.
  2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from top 1/3 of root ball, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use

planting stock if root ball is cracked or broken before or during planting operation.

3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets in each planting pit when pit is approximately one half filled; in amounts recommended in soil reports from soil testing laboratory. Place tablets beside the root ball about 1 inch (25mm) from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layers of soil.

#### 4. TREE, SHRUB, AND VINE PRUNNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.
- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; prune to retain natural character.
- D. Do not apply pruning paint to wounds.

#### 5. TREE STABILIZATION

- A. Install trunk stabilization as follows unless otherwise indicated:
  1. Upright Staking and Tying: Per Spotsylvania County Design.

#### 6. PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.
  1. Tree and Tree like Shrubs in Turf Areas: Apply organic mulch ring of 3 inch (75mm) average thickness.

#### 7. PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
- B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

#### 8. PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
  - B. Pre-Emergent Herbicides (Selective and Non Selective): Apply to tree, shrub, and ground cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.
  - C. Post Emergent Herbicides (Selective and Non Selective): Apply only as necessary to treat already germinated weeds and in accordance with manufacturer's written recommendations.
9. CLEANUP AND PROTECTION
- A. During planting keep adjacent paving and construction clean and work area in an orderly condition.
  - B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
  - C. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tis tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.
10. DISPOSAL
- A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's Property.

END OF SECTION 329300



## **ATTACHMENT B**

### **CONSTRUCTION DRAWINGS**

**For**

### **LAKE ACRES WATER SYSTEM IMPROVEMENTS**

**INVITATION FOR BID (IFB #17-14-EG)**

**May 9, 2016**

# SPOTSYLVANIA COUNTY UTILITIES WATER SYSTEM IMPROVEMENT PROJECT

## LAKE ACRES

CHANCELLOR MAGISTERIAL DISTRICT  
SPOTSYLVANIA COUNTY, VIRGINIA

### OWNER / APPLICANT

SPOTSYLVANIA COUNTY DEPARTMENT OF UTILITIES  
ATTN: RONNIE BAKER  
600 HUDGINS ROAD  
FREDERICKSBURG, VA 22408  
PHONE: (540) 507-7325  
FAX: (540) 898-3674

### RESPONSIBLE LAND DISTURBER

UNTIL FURTHER NOTICE, THE RESPONSIBLE LAND  
DISTURBER FOR THIS PROJECT IS:

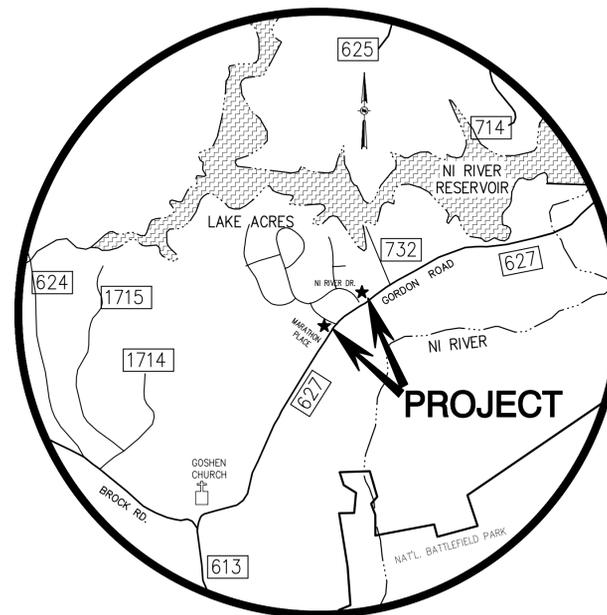
RICHARD H. FURNIVAL, P.E.  
# 24835, EXPIRES 2/28/2018  
PHONE: (540) 898-5878

THIS LAND DISTURBER DESIGNATED FOR PLAN REVIEW  
AND APPROVAL ONLY. OWNER OR CONTRACTOR SHALL  
DESIGNATE RESPONSIBLE LAND DISTURBER WHEN  
SECURING CONSTRUCTION PERMITS.

### ABBREVIATIONS

(NOT ALL ABBREVIATIONS ARE SHOWN ON PLANS)

BCOR	Building Corner	IPF	Iron Pipe Found
BH	Bore Hole	IPS	Iron Pipe Set
BL	Base Line	IRF	Iron Rod Found
BM	Benchmark	IRS	Iron Rod Set
CATV	Cable Television	L.P.	Low Point
CB	Catch Basin	L/S	Landscaping
CL	Centerline	LD	Loading Dock
CLDR	Centerline Drive	LP	Light Pole
CLF	Chain Link Fence	Lr	Length of Restrained Pipe
CLRD	Centerline Road	MB	Mailbox
CLSTR	Centerline Stream	MH	Manhole
CM	Concrete Monument	MON	Monument
CMP	Corrugated Metal Pipe	OHW	Overhead Wire
CO	Cleanout	PC	Point Of Curvature
CONC	Concrete Pad	PCD	Pedestal
COR	Corner	PKL	Parking Line
CP	Concrete Pipe	POC	Point On Curve
CPP	Corrugated Plastic Pipe	PPF	Pinched Pipe Found
DF	Drainfield	PPOLE	Power Pole
DI	Drop Inlet	PT	Point Of Tangency
DT	Centerline Of Ditch	PVMT	Pavement
EG	Edge Of Gravel	R/W	Right Of Way
ELP	Electric Light Pole	RCP	Reinforced Concrete Pipe
EP	Edge Of Pavement	ROW	Right Of Way
EPK	Edge Of Parking Lot	RR	Railroad
ET	Electrical Transformer	RW	Rock Wall
EW	Edge Of Woods	SAN LAT	Sanitary Sewer Lateral
EWT	Edge Of Water	SAN MH	Sanitary Manhole
FC	Face Of Curb	SMI	Sanitary Manhole
FENCE	Fence Line	SP	Sign Post
FF	Finish Floor	ST MH	Storm Manhole
FH	Fire Hydrant	STN	Station
FL	Flow Line	SW	Sidewalk
FLAG	Flag Pole	SWALE	Centerline Of Swale
FP	Fence Post	TB	Top Of Bank
FT	Fuel Tank	TBC	Top And Back Of Curb
GL	Gas Line	TC	Top Of Curb
GP	Gutter Pan	TOE	Top Of Slope
GR	Guard Rail	TP	Telephone Pedestal
GS	Ground Shot	TR	Tree
GV	Gate Valve	UGM	Underground Marker
GW	Guy Wire	UGMTEL	Underground Marker - Telephone
H/C	Handicapped	W MH	Water Manhole
HCOR	Handicapped	WL	Water Line
HCOR	House Corner	WLL	Wetland - Left Side
HH	Hand Hole (Verizon Box)	WLD	Wetland
HL	House Line	WLR	Wetland - Right Side
HW	Headwall	WM	Water Meter
HYD	Hydrant	WV	Water Valve



VICINITY MAP

1" = 2000'

## SULLIVAN, DONAHOE & INGALLS ENGINEERS, LAND PLANNERS AND SURVEYORS

P.O. BOX 614

FREDERICKSBURG, VIRGINIA 22404

PHONE 540-898-5878

### SHEET INDEX

SHT. NO.	TITLE
1	----- COVER SHEET
2	----- KEY SHEET
3	----- CONSTRUCTION NOTES & DETAILS
4	----- PRV SITES
5	----- EROSION & SEDIMENT CONTROL PLAN
6	----- E & S CONTROL PLAN NOTES AND DETAILS
7	----- TRAFFIC MANAGEMENT PLAN
8	----- TRAFFIC MANAGEMENT PLAN DETAILS
9	----- TRAFFIC MANAGEMENT PLAN DETAILS
10	----- TRAFFIC MANAGEMENT PLAN DETAILS

### PASS NOTE

DUE TO RECENT FINDINGS OF POSSIBLE ACID SULPHATE SOILS (PASS) WITHIN SPOTSYLVANIA COUNTY, IT IS RECOMMENDED THAT THE DEVELOPER, BUILDERS AND ENGINEERS BE AWARE THAT IF ACID SULFATE SOILS AS WELL, AS OTHER SOILS THAT PRODUCE A pH OF 4 OR LESS ARE PRESENT ON THE PROJECT SITE, EXTENSIVE TREATMENT TO BRING THE SOIL'S ACID/pH LEVEL TO AN ACCEPTABLE LEVEL TO SUSTAIN ANY FORM OF PLANT GROWTH MAY BE REQUIRED.

### CBPA NOTE

CBPA IS AN OVERLAY DISTRICT OF THE ENTIRE SPOTSYLVANIA COUNTY AND THE PROJECT DESCRIBED WITHIN THIS PLAN LIES WITHIN THE RMA FEATURES AND DOES NOT CONTAIN RPA FEATURES WITH THE CHESAPEAKE BAY PRESERVATION AREA OVERLAY DISTRICT.



DATE	REVISIONS
9-23-2015	VOOT SUBMITTAL
5-09-2016	REVISE PRV LOCATION

ENGINEERS, LAND PLANNERS & SURVEYORS  
P. O. BOX 614  
10720 COLUMBIA DRIVE  
FREDERICKSBURG, VIRGINIA 22404  
TELEPHONE 540-898-5878

**SDI**  
SULLIVAN  
DONAHOE &  
INGALLS

WATER SYSTEM IMPROVEMENT PROJECT  
CHANCELLOR MAGISTERIAL DISTRICT  
SPOTSYLVANIA COUNTY, VIRGINIA

COVER

DES.	RHF
DRAWN	SDI
APP	RHF
JOB NO.	12-SP-0172
DATE	9-11-13
SCALE	N/A

SHEET 1  
OF 10 SHEETS



DATE	REVISIONS
9-23-2015	VOT SUBMITTAL
5-09-2016	REVISE PRV LOCATION

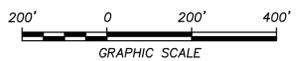
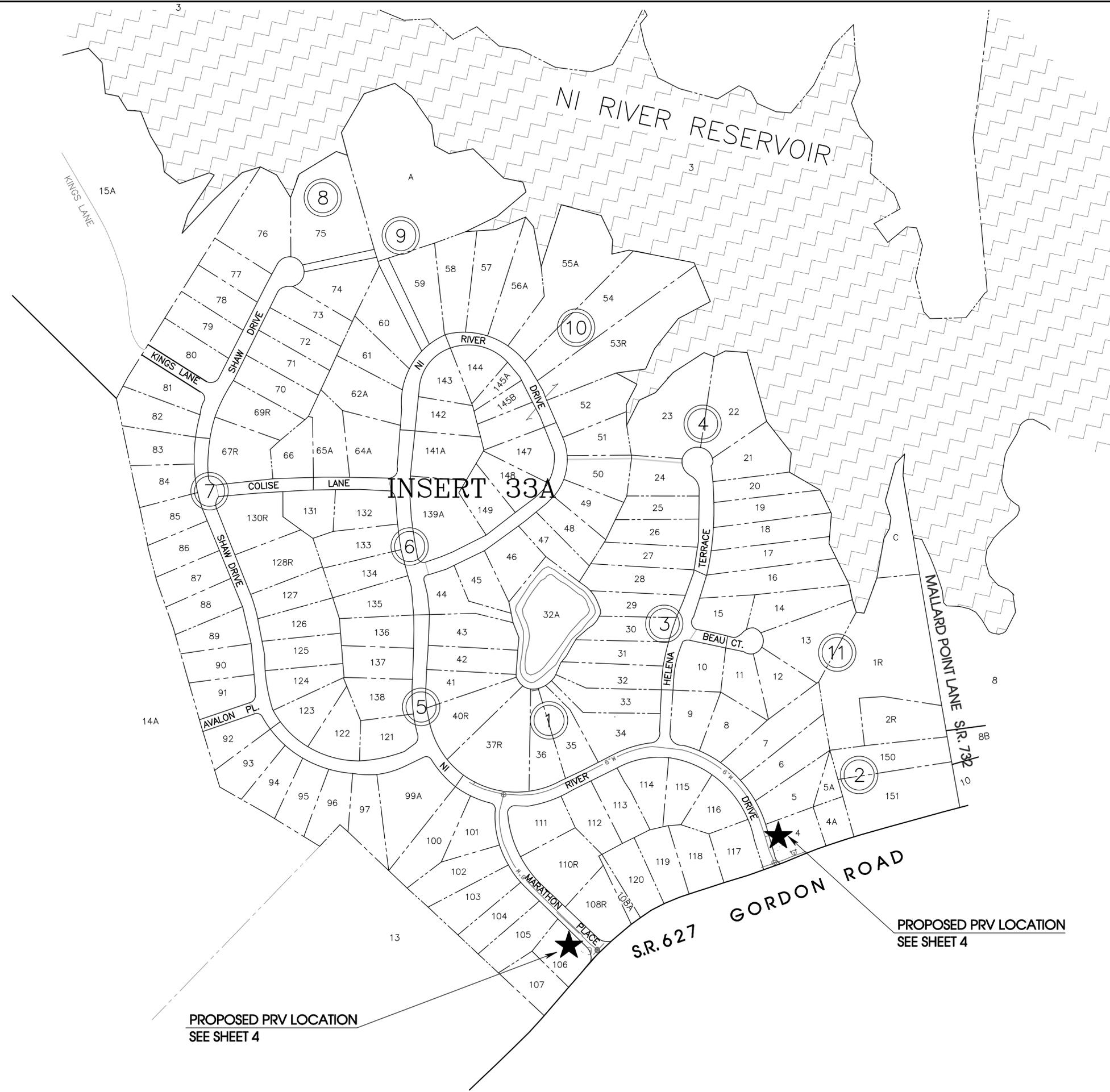
ENGINEERS, LAND PLANNERS & SURVEYORS  
 P. O. BOX 614  
 10720 COLUMBIA DRIVE  
 FREDERICKSBURG, VIRGINIA 22404  
 TELEPHONE 540-898-5878

**SDI**  
 SULLIVAN  
 DONAHOE &  
 INGALLS

**WATER SYSTEM IMPROVEMENT PROJECT**  
 CHANCELLOR MAGISTERIAL DISTRICT  
 SPOTSYLVANIA COUNTY, VIRGINIA

DES. RHF  
 DRAWN SDI  
 APP RHF  
 JOB NO. 12-SP-0172  
 DATE 9-11-13  
 SCALE 1" = 200'

SHEET **2**  
 OF **10** SHEETS



PROPOSED PRV LOCATION  
 SEE SHEET 4

PROPOSED PRV LOCATION  
 SEE SHEET 4

P: \Active Jobs\SP Lake Acres Waterline PRV Task #78 12-SP-0172\CADD\Utility Plans\LAKE ACRES PRVs.pro  
 JN:project info - SDI PROTOTYPE PROJECT (proj. info)  
 Last Plotted: Thu, May 12, 11:28:07, 2016

# CONSTRUCTION NOTES

## VDOT R/W NOTES

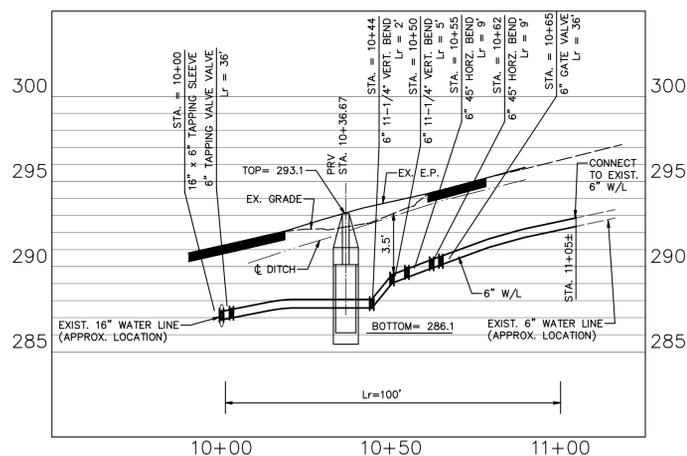
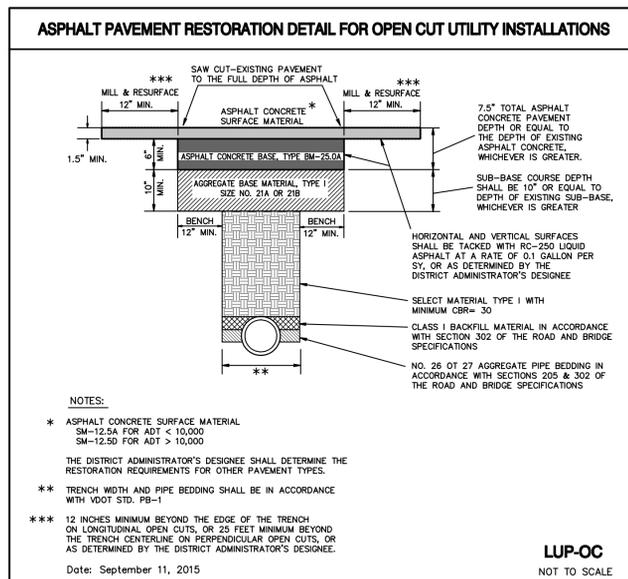
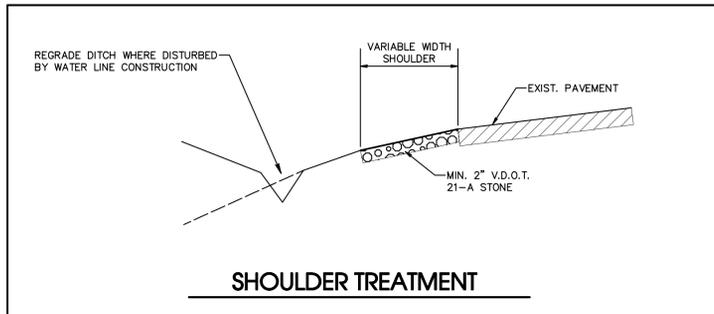
- SUBDIVISIONS ONLY - THESE REQUIREMENTS WERE PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF (SELECT ONE ( X ) IF APPLICABLE)
  - ( ) VDOT'S 2005 SUBDIVISION STREET REQUIREMENTS (SSR)
  - ( ) VDOT'S 2009 SECONDARY STREET ACCEPTANCE REQUIREMENTS (SSAR)
  - ( ) VDOT'S 2011 SECONDARY STREET ACCEPTANCE REQUIREMENTS (SSAR 2011)
- ALL WORK SHOWN HEREON SHALL BE IN STRICT ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) AND COUNTY ORDINANCES.
- IT IS THE INTENT OF THESE DRAWINGS TO SHOW ALL NECESSARY WORK. ANY ITEM OF WORK NOT SPECIFICALLY SHOWN, BUT NECESSARY TO ELIGIBILITY FOR ACCEPTANCE IS HEREBY IMPLIED.
- A VDOT PERMIT MUST BE OBTAINED PRIOR TO STARTING CONSTRUCTION WITHIN ANY STATE HIGHWAY RIGHTS-OF-WAY.
- THE CONTRACTOR/OWNER SHALL PERFORM CBR TESTING ON THE SUBGRADE IN ACCORDANCE WITH VDOT SPECIFICATIONS BY A CERTIFIED GEOTECHNICAL ENGINEER TO DETERMINE BASE AND PAVEMENT DESIGNS, AND THIS INFORMATION MUST BE FORWARDED TO VDOT AND REVIEWED PRIOR TO PLACEMENT OF AGGREGATE BASE.
- THE CONTRACTOR/OWNER MUST SPECIFY IN WRITING TO VDOT PRIOR TO CONSTRUCTION, THE TYPE OF SUBBASE, BASE AND SURFACE PAVEMENT TO BE UTILIZED ON EACH STREET FOR EACH TRAFFIC GROUP.
- THE CONTRACTOR SHALL NOTIFY VDOT 72 HOURS PRIOR TO PLACEMENT OF BASE MATERIALS AND PRIOR TO THE PLACEMENT OF ASPHALT MATERIAL TO ENSURE VDOT'S ABILITY TO PERFORM TESTING, SUCH AS PROOF-ROLLING, DEPTH CHECKS, COMPACTION, AND CONTAMINATION. OPTION: A CERTIFIED ANALYSIS FROM A PRIVATE ENGINEERING/TESTING FIRM MAY BE SUBMITTED WITHIN 7 WORKING DAYS OF THE REQUIRED TESTS. 72 HOURS NOTICE IS STILL REQUIRED PRIOR TO EACH ACTIVITY.
- ALL CULVERT PIPES SHALL BE OF A TYPE APPROVED BY VDOT AND THE LOCALITY.
- ALL ENTRANCE PIPES FOR DRIVEWAYS SHALL BE A MINIMUM OF 12" IN DIAMETER, AND 30' IN LENGTH (CONCRETE CULVERTS MAY BE 28' IN LENGTH), UNLESS OTHERWISE APPROVED BY VDOT. DRIVEWAY CULVERTS IN CUL-DE-SACS SHALL BE CONCRETE. SEE APPROVED ROAD PLANS FOR THE PROPER CULVERT SIZES.
- CONTRACTOR MUST VERIFY ALL DIMENSIONS AND ELEVATIONS IN THE FIELD BEFORE STARTING CONSTRUCTION AND NOTIFY THE DESIGN ENGINEER OF ANY DISCREPANCIES.
- THE CONTRACTOR SHALL ERECT STREET SIGNS AND TRAFFIC CONTROL SIGNS AS INDICATED ON THE SUBDIVISION CONSTRUCTION PLANS. THE SIGNS SHALL CONFORM TO VDOT AND COUNTY SPECIFICATIONS. ALL PROPOSED SIGNS ARE TO BE INSTALLED PER STP-1 OF THE 2008 ROAD AND BRIDGE STANDARDS.
- A MINIMUM 35' PAVEMENT FILLET RADIUS IS RECOMMENDED.
- THE CONTRACTOR SHALL DO SUCH OVERLOT GRADING AS NECESSARY TO PRECLUDE THE PONDING OF WATER ADJACENT TO THE ROADWAY.
- SLOPE EASEMENTS WILL BE REQUIRED AT ALL LOCATIONS WHERE THE TOP OF THE CUT OR THE TOE OF THE FILL EXCEEDS TO PROPOSED DEDICATION OF RIGHT-OF-WAY. SEE PLAT FOR EXACT LOCATION.
- IF RUNNING WATER IS PRESENT IN ANY OUTLET CHANNEL DURING CONSTRUCTION WHERE DITCH PROTECTION IS REQUIRED, THE BOTTOM OF THE CHANNEL SHALL BE LINED WITH RIP-RAP STONE WITH EC-1 PLACEMENT; FURTHER, EC-2 OR EC-3 MUST HAVE A MINIMUM WIDTH OF 4' IN FILL SECTIONS, AND 5' IN CUT SECTIONS.
- THE CONTRACTOR SHALL BE RESPONSIBLE TO SEE THAT ALL EROSION AND SEDIMENT CONTROL STANDARDS ARE MET, AND THE CONTRACTOR MUST SEED AND MULCH ALL DISTURBED AREAS ALONG WITH ALL GRADED AREAS WITHIN THE PROPOSED RIGHT-OF-WAY IN ACCORDANCE WITH VDOT STANDARDS AND SPECIFICATIONS.
- FINAL LOCATION OF MANHOLES, VALVES, FIRE HYDRANTS, AND OTHER APPURTENANCES SHALL NOT CONFLICT WITH OR CONSTRICT ROADWAY DRAINAGE. CONTRACTOR SHALL ADJUST MANHOLES AND/OR DITCH ALIGNMENT TO ENSURE PROPER ROADSIDE DRAINAGE, COMPATIBLE WITH EXISTING FIELD CONDITIONS.
- ALL WATER, SANITARY SEWER, AND STORM SEWER TRENCHES SHALL BE COMPACTED TO 95% DENSITY IN 6" LAYERS. COMPACTION TESTS MAY BE REQUIRED BY VDOT.
- VDOT WILL REQUIRE DENSITY TESTS FROM A CERTIFIED ENGINEERING FIRM FOR ALL CULVERT INSTALLATIONS WITH A DIAMETER OF 36" OR LARGER.
- VIDEO INSPECTION MAY BE REQUIRED ON ALL STORM SEWER SYSTEMS PRIOR TO FINAL CONSTRUCTION APPROVAL. A VDOT INSPECTOR MUST BE ON-SITE DURING THE VIDEO INSPECTION PROCESS.
- THE CONTRACTOR NEEDS TO CONTACT CENTRAL REGION OPERATIONS TRAFFIC SIGNALS AT (804) 524-6592 FOR A MARK OUT OF THE TRAFFIC SIGNAL EQUIPMENT A MINIMUM OF 72 HOURS PRIOR TO WORK BEGINNING WHEN WORKING WITHIN A 1,000 FEET OF A TRAFFIC SIGNAL.
- THE FINAL FOOTAGE AND LOCATION FOR VDOT STANDARD GUARDRAIL IS TO BE ESTABLISHED PRIOR TO THE COMPLETION OF FINE GRADING BY JOINT INSPECTION WITH THE CONTRACTOR, VDOT, AND THE OWNER'S REPRESENTATIVE.
- WHENEVER TYING IN TO AN EXISTING ROAD, VDOT'S WP-2 STANDARD WILL APPLY, WHICH INCLUDE MILLING AND OVERLAY OF THE ADJACENT TRAVEL LANE.
- PAVEMENT LEVELING COURSE MAY BE REQUIRED TO MEET THE INTENDED CROSS-SLOPE AND TYPICAL SECTION.
- ALL STORM STRUCTURES SHALL HAVE IS-1 INVERT SHAPING, AND SL-1'S (SAFETY LANDINGS) WILL BE REQUIRED IN ALL STRUCTURES WITH A DEPTH OVER 12'. ST-1'S (STEPS) ARE REQUIRED IN ANY STRUCTURE WITH A DEPTH OF 4' OR GREATER.
- ALL PAVEMENT STRIPING INCLUDING STOP BARS AND RIGHT-TURN ARROWS SHALL BE TYPE B, CLASS 1 THERMOPLASTIC PAINT TYPE, UNLESS INDICATED OTHERWISE.
- THE CONTRACTOR PERFORMING CONSTRUCTION ACTIVITIES UNDER THE AUSPICES OF A VDOT LAND USE PERMIT MUST HAVE AT LEAST ONE (1) EMPLOYEE ON-SITE WHO, AT A MINIMUM, IS VERIFIED BY VDOT IN BASIC WORK ZONE TRAFFIC CONTROL FOR ACTIVITIES INVOLVING THE INSTALLATION, MAINTENANCE AND REMOVAL OF WORK ZONE TRAFFIC CONTROL DEVICES. AN EMPLOYEE VERIFIED BY VDOT IN INTERMEDIATE WORK ZONE TRAFFIC CONTROL MUST BE ON-SITE TO PROVIDE SUPERVISION DURING WORKZONE ADJUSTMENTS OR CHANGES TO TRAFFIC CONTROL DUE TO FIELD CONDITIONS. THESE PERSONS MUST HAVE THEIR VERIFICATION CARD WITH THEM WHILE ON THE PROJECT SITE.

## GENERAL CONSTRUCTION NOTES

- CONTRACTOR SHALL BE RESPONSIBLE FOR STABILIZATION OF ALL DISTURBED ROADWAY SHOULDERS DURING CONSTRUCTION BY THE PLACEMENT OF 2" OF V.D.O.T. 21-A STONE BASE MATERIAL. CONTRACTOR SHALL STABILIZE ALL SLOPES AND DITCHES DISTURBED DURING CONSTRUCTION IN ACCORDANCE WITH VDOT REQUIREMENTS.
- NO SOILS REPORT PROVIDED.
- TOPOGRAPHIC INFORMATION BY SULLIVAN, DONAHOE & INGALLS.
- ADDITIONAL FIELD INFORMATION BY SULLIVAN, DONAHOE AND INGALLS.
- THE CONTRACTOR SHALL INCLUDE IN THE UNIT AND LUMP SUM PRICES FOR ALL WATER LINES AND APPURTENANCES ALL COSTS FOR PROVIDING AND INSTALLING EROSION AND SEDIMENT CONTROL MEASURES. ALL CONTROL BARRIERS SHALL BE PLACED PRIOR TO TRENCHING AND GRADING.
- CONTRACTOR SHALL SEED AND MULCH ALL DISTURBED AREAS.
- ALL EXISTING UNDERGROUND UTILITIES SHALL BE PHYSICALLY LOCATED BY THE CONTRACTOR OR HIS AGENT PRIOR TO THE BEGINNING OF CONSTRUCTION IN THE VICINITY OF THESE UTILITIES. THIS PLAN DOES NOT REPRESENT THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THOSE SHOWN ARE CORRECTLY LOCATED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT EACH UTILITY COMPANY. CALL MISS UTILITY (1-800-552-7001), DIG TEST PITS, AND TAKE WHATEVER STEPS ARE NECESSARY TO ACCURATELY LOCATE AND PROTECT ALL EXISTING UTILITIES. NO CONSTRUCTION SHALL PROCEED UNTIL THE ACCURATE LOCATIONS OF UTILITIES HAVE BEEN MADE, AND IT HAS BEEN DETERMINED BY THE CONTRACTOR THAT CONSTRUCTION CAN BE ACCOMPLISHED IN ACCORDANCE WITH THESE PLANS WITHOUT UTILITY CONFLICTS. IN THE EVENT THAT CONFLICTS EXIST, THE OWNER AND ENGINEER SHALL BE NOTIFIED IMMEDIATELY.
- EXISTING UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY EXACT LOCATIONS PRIOR TO CONSTRUCTION AND SHALL NOTIFY THE ENGINEER OF POTENTIAL CONFLICTS IMMEDIATELY.
- WHEN CROSSING AND/OR WORKING IN THE VICINITY OF EXISTING UTILITIES, IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO PROPERLY SUPPORT AND MAINTAIN THE OPERATIONS OF THOSE UTILITIES. EXTREME CARE MUST BE EXERCISED IN EXCAVATION AND BACKFILL OPERATIONS.
- IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATION AND ELEVATION OF EXISTING UTILITIES AT PROPOSED CROSSINGS, TIE-INS AND POSSIBLE AREAS OF CONFLICT.
- ANY DRIVEWAY (GRAVEL, CONCRETE, ASPHALT), CURBING, SIDEWALK, CULVERTS, LANDSCAPING OR ANY OTHER PHYSICAL IMPROVEMENT DAMAGED AS A RESULT OF PROVIDING PROPOSED IMPROVEMENTS SHALL BE REPLACED OR REPAIRED TO ITS ORIGINAL CONDITION AND TO THE SATISFACTION OF THE PROPERTY OWNER AND SPOTSYLVANIA COUNTY.
- NO BURNING SHALL BE PERMITTED ON THIS PROJECT PER SPOTSYLVANIA COUNTY.
- THE CONTRACTOR SHALL DISPOSE OF ALL DEBRIS, FOLIAGE, ETC. BY GRINDING, MULCHING OR OTHER METHOD APPROVED BY SPOTSYLVANIA COUNTY.
- ALL CONSTRUCTION SHALL CONFORM TO EXISTING STATE AND COUNTY BUILDING CODES.
- INSPECTION AND APPROVAL OF ALL WORK AND MATERIALS PERTAINING TO THIS PROJECT SHALL BE UNDER THE JURISDICTION OF SPOTSYLVANIA COUNTY, VIRGINIA.
- IN THE CASE OF DISCREPANCY BETWEEN SULLIVAN, DONAHOE & INGALLS SPECIFICATIONS AND SPOTSYLVANIA COUNTY SPECIFICATIONS THE MORE STRINGENT SPECIFICATION SHALL APPLY.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY UTILITIES DAMAGED DURING CONSTRUCTION AT DIRECTION OF COUNTY OR OWNER.
- ANY ITEM OF WORK NOT SPECIFICALLY SHOWN OR NOTED BUT NECESSARY FOR THE PROPER CONSTRUCTION, ACCEPTANCE AND APPROVAL OF THIS PROJECT IS HEREBY IMPLIED.
- TWO COMPLETE SETS OF AS-BUILT PLANS SHALL BE SUBMITTED TO THE DEPT. OF UTILITIES UPON COMPLETION OF THE WATER SYSTEM, AND PRIOR TO FINAL ACCEPTANCE. A COMPLETE SET OF AS-BUILT PLANS MUST BE DETERMINED BY ACTUAL FIELD SURVEY.

## WATER NOTES

- ALL WATER LINES AND CONSTRUCTION THEREOF SHALL COMPLY WITH THE STANDARDS AND SPECIFICATIONS OF SPOTSYLVANIA COUNTY, VIRGINIA AND THE SPOTSYLVANIA COUNTY DESIGN STANDARDS MANUAL, DATED DECEMBER 2000 OR LATEST EDITION.
- ALL WATER LINES SHALL BE DUCTILE IRON PIPE PRESSURE CLASS 350. DUCTILE IRON PIPE SHALL HAVE CEMENT MORTAR LINING AND SEAL COATING IN ACCORDANCE WITH ANSI A21.4 (AWWA C104). BITUMINOUS OUTSIDE COATING SHALL BE IN ACCORDANCE WITH ANSI/AWWA C104.
- PIPE FITTINGS SHALL CONFORM TO ANSI/AWWA C110/A21.10 FOR STANDARD SIZE FITTINGS OR ANSI/AWWA C153/A21.53 FOR COMPACT FITTINGS. ALL JOINTS C111/A21.11. FITTINGS SHALL BE CEMENT MORTAR LINED WITH A SEAL COAT IN ACCORDANCE WITH ANSI/AWWA C104/A21.4. ALL FITTINGS SHALL HAVE A MINIMUM PRESSURE RATING OF 250. Lr ON PROFILES INDICATES LENGTH OF RESTRAINED PIPE AT FITTING.
- THERE SHALL BE A 10' HORIZONTAL SEPARATION BETWEEN WATER LINES AND/OR SEWER LINES AND A VERTICAL SEPARATION OF 18" BETWEEN THE BOTTOM OF THE WATER MAIN AND THE TOP OF THE SEWER. THIS APPLIES TO BUILDING SEWER LATERALS ALSO.
- ALL WATER LINE AND LATERAL TRENCHES SHALL BE COMPACTED TO 95% DENSITY IN 6" LAYERS. COMPACTION TESTS MAY BE REQUIRED BY VDOT.
- NO EXISTING WATER MAIN TO BE TAMPERED WITH BY TAPPING, OPENING, OR CLOSING VALVES WITHOUT UTILITY CONSTRUCTION INSPECTOR PRESENT ON THE JOB SITE.
- NO NEW WATER LINES TO BE FILLED OR FLUSHED WITHOUT UTILITY INSPECTOR PRESENT.
- MINIMUM COVER FOR WATER LINES SHALL BE 42" FROM TOP OF PIPE TO FINISHED GRADE.



6" WATER LINE - MARATHON PLACE

SCALE: H: 1" = 25'  
V: 1" = 5'



DATE	REVISIONS
9-23-2015	VDOT SUBMITTAL
5-09-2016	REVISE PRIV LOCATION

ENGINEERS, LAND PLANNERS & SURVEYORS  
P. O. BOX 614  
10720 COLUMBIA DRIVE  
FREDERICKSBURG, VIRGINIA 22404  
TELEPHONE 540-898-5878

**SDI**  
SULLIVAN  
DONAHOE &  
INGALLS

**WATER SYSTEM IMPROVEMENT PROJECT**  
CHANCELLOR MAGISTERIAL DISTRICT  
SPOTSYLVANIA COUNTY, VIRGINIA  
**CONSTRUCTION NOTES AND DETAILS**

DES. RHF  
DRAWN SDI  
APP RHF  
JOB NO. 12-SP-0172  
DATE 9-11-13  
SCALE N/A

SHEET **3**  
OF **10** SHEETS





DATE	REVISIONS
9-23-2015	VOOT SUBMITTAL
5-09-2016	REVISE PRIV LOCATION

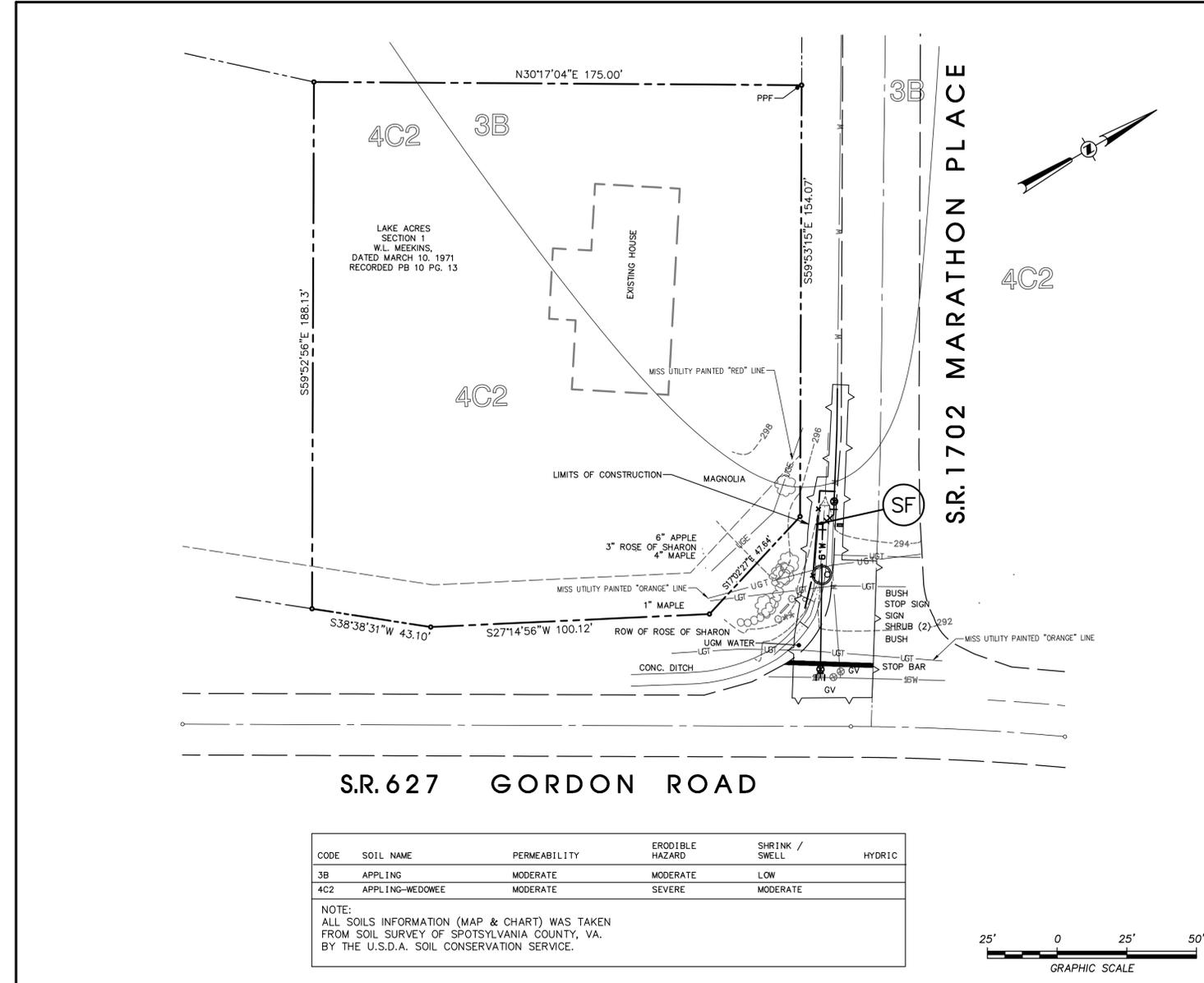
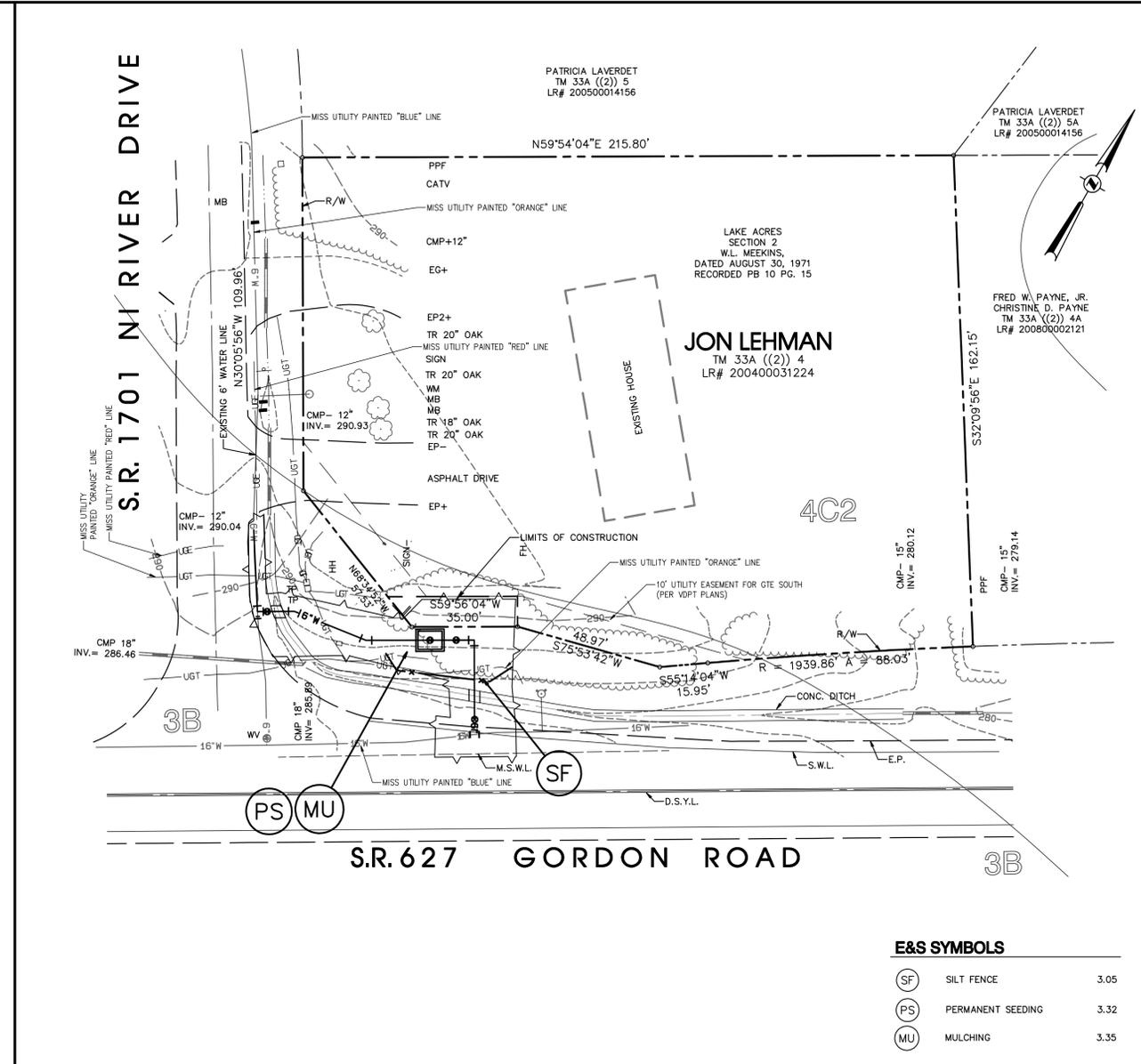
ENGINEERS, LAND PLANNERS & SURVEYORS  
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 TELEPHONE 540-898-5878

**SULLIVAN & DONAHOE**  
**INGALLS**

**WATER SYSTEM IMPROVEMENT PROJECT**  
 CHANCELLOR MAGISTERIAL DISTRICT  
 SPOTSYLVANIA COUNTY, VIRGINIA  
**EROSION AND SEDIMENT CONTROL PLAN**  
 NOTES AND DETAILS

DES. RHF  
 DRAWN SDI  
 APP RHF  
 JOB NO. 12-SP-0172  
 DATE 9-11-13  
 SCALE 1" = 25'

SHEET **5**  
 OF **10** SHEETS



CODE	SOIL NAME	PERMEABILITY	ERODIBLE HAZARD	SHRINK / SWELL	HYDRIC
3B	APPLING	MODERATE	MODERATE	LOW	
4C2	APPLING-WEDOWEE	MODERATE	SEVERE	MODERATE	

NOTE:  
 ALL SOILS INFORMATION (MAP & CHART) WAS TAKEN FROM SOIL SURVEY OF SPOTSYLVANIA COUNTY, VA. BY THE U.S.D.A. SOIL CONSERVATION SERVICE.



**E&S SYMBOLS**

(SF)	SILT FENCE	3.05
(PS)	PERMANENT SEEDING	3.32
(MU)	MULCHING	3.35

**TABLE 3.35-A**  
**ORGANIC MULCH MATERIALS AND APPLICATION RATES**

MULCHES:	RATES:		NOTES:
	Per Acre	Per 1000 sq. ft.	
Straw or Hay	1 1/2 - 2 tons (Minimum 2 tons for winter cover)	70 - 90 lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand.
Fiber Mulch	Minimum 1500 lbs.	35 lbs.	Do not use as mulch for winter cover or during hot, dry periods. * Apply as slurry.
Corn Stalks	4 - 6 tons	185 - 275 lbs.	Out or shredded in 4-6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
Wood Chips	4 - 6 tons	185 - 275 lbs.	Free of coarse matter. Air-dried. Treat with 12 lbs. nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
Bark Chips or Shredded Bark	50 - 70 cu. yds.	1 - 2 cu. yds.	Free of coarse matter. Air-dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.

\* When fiber mulch is the only available mulch during periods when straw should be used, apply at a minimum rate of 2000 lbs./ac. or 45 lbs./1000 sq. ft.

Source: Va. DSWC

**TABLE 3.32-D**  
**SITE SPECIFIC SEEDING MIXTURES FOR PIEDMONT AREA**

	TOTAL LBS. PER ACRE
<b>Minimum Care Lawn</b>	
- Commercial or Residential	175-200 lbs.
- Kentucky 31 or Turf-Type Tall Fescue	95-100%
- Improved Perennial Ryegrass	0-5%
- Kentucky Bluegrass	0-5%
<b>High-Maintenance Lawn</b>	
- Kentucky 31 or Turf-Type Tall Fescue	100%
<b>General Slope (3:1 or less)</b>	
- Kentucky 31 Fescue	128 lbs.
- Red Top Grass	2 lbs.
- Seasonal Nurse Crop *	20 lbs.
- Crownvetch **	150 lbs.
<b>Low-Maintenance Slope (Steeper than 3:1)</b>	
- Kentucky 31 Fescue	108 lbs.
- Red Top Grass	2 lbs.
- Seasonal Nurse Crop *	20 lbs.
- Crownvetch **	150 lbs.

\* Use seasonal nurse crop in accordance with seeding dates as stated below:  
 February 16th through April ..... Annual Rye  
 May 1st through August 15th ..... Foxtail Millet  
 August 16th through October ..... Annual Rye  
 November through February 15th ..... Winter Rye

\*\* Substitute Sericea lespedeza for Crownvetch east of Farmville, Va. (May through September, use hulled Sericea, all other periods, use unhulled Sericea). If Flatpea is used in lieu of Crownvetch, increase rate to 30 lbs./acre. All legume seed must be properly inoculated. Weeping Lovegrass may be added to any slope or low-maintenance mix during warmer seeding period; add 10-20 lbs./acre in mixes.

Source: Va. DSWC

**TABLE 3.31-B**  
**ACCEPTABLE TEMPORARY SEEDING PLANT MATERIALS**  
**"QUICK REFERENCE FOR ALL REGIONS"**

PLANTING DATES	SPECIES	RATE (lbs./acre)
Sept. 1 - Feb. 15	50/50 Mix of Annual Ryegrass ( <i>Lolium multi-florum</i> ) & Cereal (Winter) Rye ( <i>Secale cereale</i> )	50 - 100
Feb. 16 - Apr. 30	Annual Ryegrass ( <i>Lolium multi-florum</i> )	60 - 100
May 1 - Aug. 31	German Millet ( <i>Setaria italica</i> )	50

Source: Va. DSWC

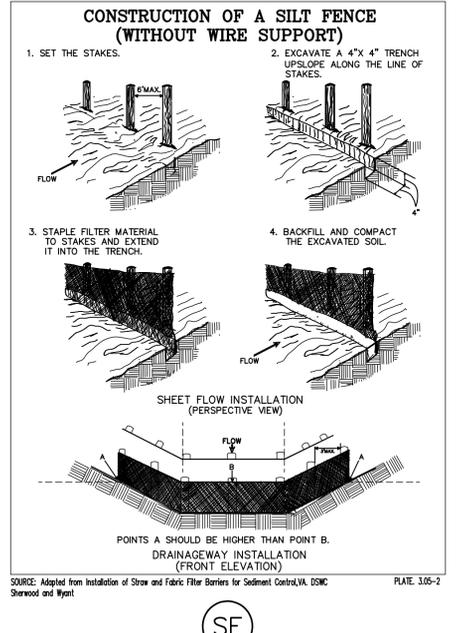
NOTE: SOILS TEST TO BE PERFORMED TO DETERMINE EXACT LIME & FERTILIZER SPECIFICATIONS.

NOTE: SOILS TEST TO BE PERFORMED TO DETERMINE EXACT LIME & FERTILIZER SPECIFICATIONS.

**E&S Control Estimate - Spotsylvania County**

Code	E&S Control	Quantity	Unit
SF	Silt Fence	90	L.F.
PS/MU	Permanent Seeding, Fert., Mulch & Tack(no Fine Grade)	1.0	Lump Sum

Note: Spreadsheet uses Spotsylvania County Erosion and Sediment Control Unit Prices January 2005



**VIRGINIA EROSION AND SEDIMENT CONTROL MINIMUM STANDARDS**

MS-1 Permanent or temporary soils stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant (undisturbed) for longer than 30 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.

Site: Applies to site. See Narrative under "Permanent Stabilization" and "Vegetative Practices" See seeding specification details on sheet 6.

MS-2 During construction of the project. Soil stock piles shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as soil intentionally transported from the project site.

Site: Not applicable to this site. Excess material to be exported from site and disposed of in county approved location.

MS-3 A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that, in the opinion of the local program administrator or his designated agent, is uniform, mature enough to survive and will inhibit erosion.

Site: Applies to site. See Narrative under "Permanent Stabilization" and seeding specification details on sheet 6.

MS-4 Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbances takes place.

Site: Not applicable to this site.

MS-5 Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.

Site: Not applicable to this site.

MS-6 Surface run-off from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The sediment basin shall be designed and constructed to accommodate the anticipated sediment loading from the land-disturbing activity. The outfall device or system design shall take into account the total drainage area flowing through the disturbed are to be served by the basin.

Site: Not applicable, no drainage areas greater than 3 acres on-site.

MS-7 Cut and fill notes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.

Site: Applies to site.

MS-8 Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.

Site: Applies to site.

MS-9 Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.

Site: Applies to site.

MS-10 All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

Site: Not applicable to this site.

MS-11 Before newly constructed conveyance channels are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel.

Site: Not applicable to this site.

MS-12 When work in a live water course is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.

Site: Not applicable to this site.

MS-13 When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary stream crossing constructed of nonerodible material shall be provided.

Site: Not applicable to this site.

MS-14 All applicable federal, state and local regulations pertaining to working in or crossing live water courses shall be met.

Site: Not applicable to this site.

MS-15 The bed and banks of a watercourse shall be stabilized immediately after work on the watercourse is completed.

Site: Not applicable to this site.

MS-16 Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:

- a. No more than 500 linear feet of trench may be opened at one time.
- b. Excavated material shall be placed on the uphill slope of the trenches.
- c. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site property.
- d. Restabilization shall be accomplished in accordance with these regulations.
- e. Applicable safety regulations shall be complied with.

Site: Applies to site. See E&S plan on sheet 5.

MS-17 Where construction vehicle access routes intersect paved public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto paved surface. Where sediment is transported onto a public road surface, the road shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual subdivision lots as well as to larger land-disturbing activities.

Site: Applies to site.

MS-18 All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the local program administrator. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.

Site: Applies to site.

MS-19 Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff for the stated frequency storm of a 24-hour duration in accordance with the following standards and criteria:

a. Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. For those sites where runoff is discharged into a pipe or pipe system, downstream stability analyses at the outfall of the pipe or pipe system shall be performed.

Site: Not applicable to this site.

b. Adequacy of all channels and pipes shall be verified in the following manner:

(1) The applicant shall demonstrate that the total drainage area to the point of analysis within the channel is one hundred times greater than the contributing drainage area of the project in question.

Site: Not applicable to this site.

(2) Natural channels shall be analyzed by the use of a two-year frequency storm to verify that the stormwater will not overtop channel banks nor cause erosion of channel bed or banks.

Site: Not applicable to this site.

(3) All previously constructed man-made channels shall be analyzed by the use of a ten-year frequency storm to verify that stormwater will not overtop its banks and by the use of a two-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks.

Site: Not applicable to this site.

(4) Pipes and storm sewer systems shall be analyzed by the use of a ten-year frequency storm to verify that stormwater will be contained within the pipe or system.

Site: Not applicable to this site.

c. If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, the applicant shall:

(1) Improve the channels to a condition where a ten-year frequency storm will not overtop the banks and a two-year frequency storm will not cause erosion to the channel bed or banks; or

Site: Not applicable to this site.

(2) Improve the pipe or pipe system to a condition where the ten-year frequency storm is contained within the appurtenances; or

Site: Not applicable to this site.

(3) Develop a site design that will not cause the pre-developed peak run-off rate for the two-year storm to increase when runoff outfalls into a natural channel or will not cause the pre-developed peak runoff rate from a ten-year storm to increase when runoff outfalls into a man-made channel.

Site: Not applicable to this site.

(4) Provide a combination of channel improvement, stormwater detention/retention or other measures which is satisfactory to the plan approving authority to prevent downstream erosion.

Site: Not applicable to this site.

d. The applicant shall provide evidence of permission to make the improvements.

Site: Not applicable to this site.

e. All hydrologic analysis shall be based on the existing watershed characteristics and the ultimate development condition of the subject project.

Site: Not applicable to this site.

f. If the applicant chooses an option that includes stormwater detention/retention, he shall obtain approval from he locality of a plan for maintenance of the detention facilities. The plan shall set forth the maintenance requirements of the facility and the person for performing the maintenance.

Site: Not applicable to this site.

g. Increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property shall be diverted to a stable outlet, adequate channel or detention facility.

Site: Not applicable to this site.

h. In applying these stormwater management criteria, individual lots in a residential subdivision development shall not be considered to be separate development projects. Instead, the residential subdivision development, as a whole, shall be considered to be a single development project. Hydrologic parameters that reflect the ultimate subdivision development shall be used in all engineering calculations.

Site: Not applicable to this site.

i. Proposed commercial or industrial subdivisions shall apply these stormwater management criteria to the development as a whole. Hydrologic parameters that reflect the ultimate subdivision development shall be used in all engineering calculations.

Site: Not applicable to this site.

**GENERAL EROSION & SEDIMENT CONTROL NOTES**

1. UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, VIRGINIA REGULATIONS VR 625-02-50 EROSION AND SEDIMENT CONTROL REGULATIONS, AND COUNTY EROSION AND SEDIMENT CONTROL ORDINANCE.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.
3. A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN AND STORMWATER POLLUTION PREVENTION PLAN (SWPP) SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.
4. PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFF-SITE BORROW OR WASTE AREAS), THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY.
5. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.
6. ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.
7. DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.
8. ALL UTILITY LINES NOT IN STREETS ARE TO BE MULCHED AND SEEDED WITHIN SEVEN DAYS AFTER BACKFILL.
9. THE AREAS USED FOR BURNING DEBRIS SHALL BE SEEDED, USING APPROPRIATE SEEDING MIXTURE RECOMMENDED IN THE PLAN, AFTER DEBRIS REMOVAL IS COMPLETED.
10. THIS PROJECT WILL START \_\_\_\_\_ AND BE COMPLETED \_\_\_\_\_

**SEQUENCE OF CONSTRUCTION**

Utilize Marathon Place adjacent to the Lake Acres Section 1 Subdivision and Ni River Drive adjacent to the Lake Acres Section 2 Subdivision for access to the work zones and staging areas.

First install any perimeter controls (SF) as shown on Sheet 5.

Begin excavation for the pressure reducing valves and its associated components.

Once the water system improvement installation is complete, immediately backfill excavated trench.

Apply permanent stabilization to all disturbed areas not otherwise stabilized.

Once permanent seeding areas are stabilized remove all perimeter E&S Controls.

**EROSION & SEDIMENT CONTROL NOTES**

1. ALL MECHANICAL EROSION AND SEDIMENT CONTROLS ARE TO BE PLACED PRIOR TO, OR AS THE FIRST STEP IN CLEARING AND GRUBBING.
2. ALL SEWER LINES NOT IN STREETS ARE TO BE MULCHED AND SEEDED WITHIN SEVEN DAYS AFTER BACKFILL.
3. ALL TEMPORARY EARTH BERMS, DIVERSIONS, AND SEDIMENT CONTROL DAMS ARE TO BE MULCHED AND SEEDED IMMEDIATELY AFTER GRADING. HAY OR STRAW OR COMPARABLE MULCH IS REQUIRED.
4. ALL LAND, ON OR OFF SITE, WHICH IS DISTURBED BY CONSTRUCTION AND WHICH IS NOT BUILT UPON OR SURFACED SHALL BE ADEQUATELY STABILIZED TO CONTROL EROSION AND SEDIMENTATION.
5. ALL EROSION AND SEDIMENT CONTROLS, INCLUDING SEEDING AND MULCHING SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS CONTAINED IN THE SPOTSYLVANIA COUNTY EROSION AND SEDIMENT CONTROL ORDINANCE.
6. ADDITIONAL SEDIMENT CONTROLS WILL BE INSTALLED IF ONSITE INSPECTIONS REVEAL PROBLEMS.
7. ALL MEASURES ARE TO BE INSPECTED DAILY BY THE SITE SUPERINTENDENT. ANY DAMAGED STRUCTURAL MEASURES WILL BE REPAIRED BY THE CLOSE OF THE FOLLOWING DAY. SEDIMENT CONTROLS WILL BE REMOVED AFTER AREAS ABOVE THEM HAVE BEEN STABILIZED.
8. PERMANENT OR TEMPORARY SEEDING SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SEEDING SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE A FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. PERMANENT SEEDING SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

**E&S NARRATIVE**

PROJECT DESCRIPTION:  
This project generally consists of water system improvements including (2) Pressure Reducing Valves and its associated components at the intersection of Gordon Rd. & Marathon Place and Gordon Rd. & Ni River Dr. The site area will be approximately 0.07 acres of land disturbance. The HUC for this project is Y038. The site drains to the Ni River.

EXISTING SITE CONDITIONS:  
The existing site areas are adjacent to the Ni River Reservoir and the Lake Acres Subdivision. The slopes are generally gentle in nature. The site is mostly 4C2 and 3B soils.

ADJACENT PROPERTY:  
The work sites are generally surrounded by residentially developed properties.

OFF-SITE AREAS:  
There will be no off-site areas outside the work zone.

SOILS:  
This project area mainly contains soil types 4C2 and 3B as scaled from Soil Survey of Spotsylvania County, Virginia, by USDA Soil Survey. See Sheet 5.

CRITICAL AREAS:  
The will be no critical areas associated with this project.

EROSION & SEDIMENT CONTROL MEASURES:

Sediment Control measures will be installed as a first step before grading starts. Adequate precautions will be taken to minimize erosion and trap sediment on the site. The erosion and sediment controls proposed are shown on the Erosion and Sediment Plan. All practices will be constructed and maintained in accordance with the current standards and specifications of Virginia Erosion and Sediment Control Handbook, and County Ordinances.

STRUCTURAL PRACTICES:

SILT FENCE:  
A temporary sediment barrier consisting of a synthetic filter fabric stretched across and attached to supporting posts and entrenched. To intercept and detain small amounts of sediment from disturbed areas during construction operations in order to prevent sediment from leaving the site.

VEGETATIVE PRACTICES:

SURFACE ROUGHING:  
Provide a rough soil surface on newly graded fill slopes by tracking perpendicular to slopes to aid with establishment of vegetative cover.

TOPSOILING (STOCKPILE):  
Topsoil shall be stockpiled on site. The stockpiles shall be protected by a perimeter dike or silt fence and no off-site sediment damage shall result. The topsoil shall be used to provide adequate topsoil in areas that have been graded. Topsoil will primarily be used on side slopes along the perimeter of the site adjacent to the proposed road extension and driveways to a minimum depth of 6 inches. The topsoil pile shall be removed and the area graded, seeded and mulched in accordance with the final grades shown on the grading plan.

TEMPORARY SEEDING:  
All denuded areas which will be left dormant for extended periods of time shall be seeded with fast germinating temporary vegetation immediately following grading. Selection of the seed mixture will depend on the time of year it is applied.

MULCH:  
Mulch (straw or fiber) will be applied as a second step in seeding operations. Chemical soil stabilizers and binders will be used as needed to bind mulches together and prevent displacement. Erosion Control blankets will be used if necessary for steep slope areas or channel lining.

MANAGEMENT STRATEGIES:

1. Contractor to follow all applicable E&S Minimum Standards.
2. Construction will be sequenced so that grading operations can begin and end as quickly as possible.
3. Dust must be controlled during land disturbance and construction. Contractor to use water trucks as needed to keep dust levels down.
4. Temporary seeding or other stabilization will follow immediately after grading.

PERMANENT STABILIZATION:  
All areas disturbed by construction shall be stabilized with permanent seeding immediately following finish grading. Seeding shall be done according to Std. & Spec. 3.32, PERMANENT SEEDING, of the handbook. Mulch (straw or fiber) will be applied as a second step in seeding operations. Chemical soil stabilizers and binders will be used as needed to bind mulches together and prevent displacement. Erosion Control blankets will be used for steep slope areas to protect them from fill and gully erosion and to allow seed to germinate. In all seeding operations, seed, fertilizer and lime will be applied prior to mulching.

STORMWATER MANAGEMENT:  
N/A

MAINTENANCE PROGRAM:  
All measures are to be inspected daily by the site superintendent. Any damaged structural measures or seeded areas will be repaired by the close of the day. Sediment shall be removed and silt traps restored to their original dimensions when the sediment has accumulated to 1/2 of their design volume. If ponding occurs at any filtering device, the device is to be drained in such a way as to prevent accidental discharge of trapped sediment into any swale.



DATE	REVISIONS
9-23-2015	V001 SUBMITTAL
5-09-2016	REVISE PRV LOCATION

ENGINEERS, LAND PLANNERS & SURVEYORS  
SULLIVAN  
DONAHOE &  
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P. O. BOX 614  
10720 COLUMBIA DRIVE  
FREDERICKSBURG, VIRGINIA 22404  
TELEPHONE 540-888-5878



WATER SYSTEM IMPROVEMENT PROJECT  
CHANCELLOR MAGISTERIAL DISTRICT  
SPOTSYLVANIA COUNTY, VIRGINIA  
EROSION AND SEDIMENT CONTROL PLAN  
NOTES

DES. RHF  
DRAWN SDI  
APP RHF  
JOB NO. 12-SP-0172  
DATE 9-11-13  
SCALE N/A

TABLE 6C-2  
LENGTH OF LONGITUDINAL BUFFER SPACE TABLE

POSTED SPEED LIMIT	DISTANCE (FEET)
<20	115 - 120
25	155 - 160
30	200 - 210
35	250 - 260
40	305 - 320
45	360 - 380
50	425 - 445
55	500 - 520
60	570 - 590
65	645 - 675
70	730 - 760
75	820 - 850

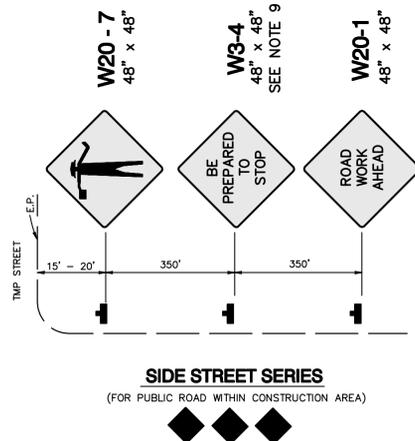
TABLE 6H-3  
BUFFER SPACE / FLAGGER DISTANCE FROM WORK AREA

POSTED SPEED LIMIT (MPH)	DISTANCE (FEET)
<20	115 - 120
25	155 - 160
30	200 - 210
35	250 - 260
40	305 - 320
45	360 - 380
50	425 - 445
55	500 - 520
60	570 - 590
65	645 - 675
70	730 - 760

**TABLE 6H-5, ADVANCE WARNING SIGN SPACING**

URBAN STREET WITH 25 MPH OR LESS POSTED SPEED	100' - 200'
URBAN STREET WITH 30 TO 35 MPH POSTED SPEED	250' - 350'
* ALL OTHER ROADWAYS WITH 45 MPH OR LESS POSTED SPEED	350' - 500'
ALL OTHER ROADWAYS WITH GREATER THAN 45 MPH POSTED SPEED	500' - 800'
LIMITED ACCESS HIGHWAYS:	1300' - 1500'

\* URBAN STREETS WITH GREATER THAN 40 MPH POSTED SPEED LIMITS FALL INTO THIS CATEGORY.  
NOTE: FOR URBAN CONDITIONS, IT IS GENERALLY BETTER TO PLACE ALL ADVANCE WARNING SIGNS WITHIN A ONE BLOCK AREA VERSUS SPREADING OUT THE SIGNS OVER SEVERAL BLOCKS, HOWEVER, MOTORIST MUST HAVE TIME TO RECOGNIZE AND REACT TO EACH WARNING SIGN SEE SECTION 66-11.



**PUBLIC COMMUNICATIONS PLAN**

Notification of construction start/end dates and work zone information will be entered into the VA traffic system.

Transportation Operations Plan

- The process to notify the Regional Traffic Operation Center to place lane closure information on the 511 system and VA Traffic will be:
  - Contractor is to advise the VDOT's Fredericksburg District Permits Office 48 hours in advance of proposed road/lane closures.
  - Fredericksburg District Permits Office is to advise TOC to have the information entered into the Virginia Traffic and 511 systems.
  - Contractor is to call the TOC when lane/road closures are installed and when they are removed from the roadways.
- The following is a list of local emergency contact agencies:  
Virginia State Police - (540) 829-7401 or 1-800-572-2260 or \*77 Cellular Haz-Mat Center (if spilled) - 911.
- Procedures to respond to traffic incidents that may occur in the work zone:
  - Contractor to notify Virginia State Police and VDOT's Fredericksburg District Permits Office and the Regional Traffic Operations Center.
  - Depending upon the severity of the incident, the Contractor may have to shut down work.
  - Upon arrival at the scene, Virginia State Police will determine the response necessary to allow traveling public around incident.
  - Contractor should take pictures as necessary, especially pictures of work zone to verify the proper setup.
- Process of notification of incident to be followed is: Contractor to call:
  - Regional Traffic Operations Center: Shift Supervisor 703-877-4301
  - District Work Zone Safety Coordinator: Jeffery Stone 540-899-4547 Or 540-907-8621
  - Area Traffic Engineer: Robert Vlak 804-524-6119
  - Spotsylvania County Sheriff's Office 540-582-7115
- The Virginia State Police will take control of the incident and direct its clearing and restoration to normal traffic conditions.
- The Virginia State Police report of the incident will be reviewed by VDOT's Fredericksburg District Permits Section to determine if any modification of the Temporary Traffic Control Plan is necessary. If it is determined that it is necessary to alter the plan, then a meeting will be called with Contractor, VDOT, project personnel, VDOT traffic safety representatives and the Virginia State Police (if necessary) to discuss modification and implementation of an improved traffic control plan.
- Spotsylvania County, Sheriff Dept.: Phone (540) 582-7115 non emergency  
Spotsylvania County, Fire Dept. and Rescue: Phone (540) 582-7100 non emergency

**TEMPORARY TRAFFIC CONTROL GENERAL NOTES**

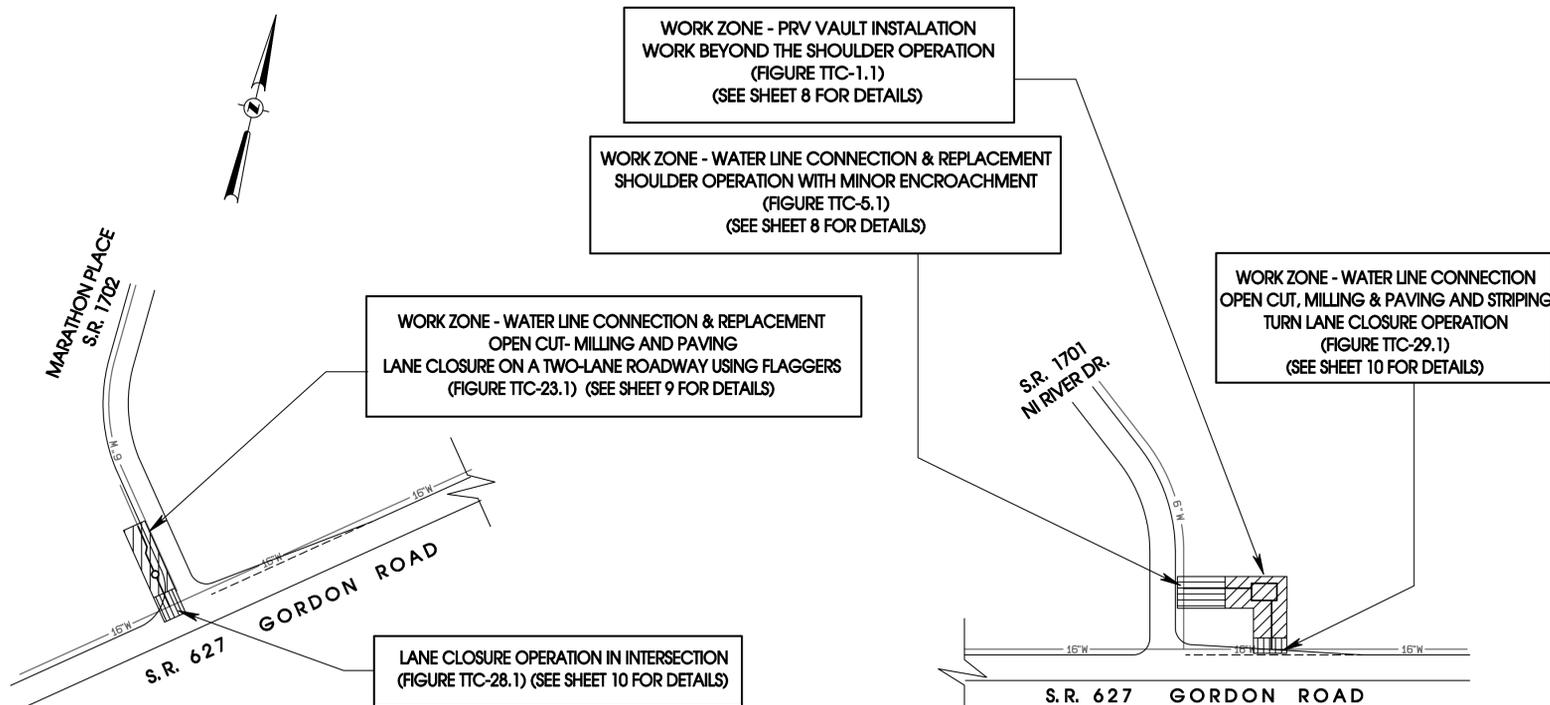
- The work zone of the contract work is at two locations along N River Drive, S. R. 1701. The first site is just northwest of S.R. 627, Gordon Road and the second site is just east of Marathon Place, S.R. 1702, within Lake Acres Subdivision, Spotsylvania County, Virginia. This is a Type A TMP Traffic Management Plan. Off site detours not needed.
- Unless otherwise approved or directed by the Engineer (VDOT), the Contractor shall plan and prosecute the work in accordance with the following:
  - Generally, construction activities will be conducted while highway travel is temporarily limited. Notification shall be in accordance with the VDOT permit.
  - It is anticipated that the following 2011 Virginia Work Area Protection Manual typical traffic control applications will be used to perform the contract work: TTC-1.1, TTC-5.1, TTC-23.1, TTC-28.1 & TTC-29.1. During periods that operations are performed under traffic, the speed limit shall be, as posted. In addition, two (2) "ROAD WORK AHEAD" signs shall be placed in advance of the work zone.
  - The contractor shall submit a maintenance of traffic plan, including all proposed lane and shoulder closures, at least two weeks prior to the actual closures are to begin for review and approval.
  - The contractor shall submit the final plan of all proposed lane and shoulder closures by close of business Wednesday for work in the following week requiring the lane or shoulder closures in order for the Department to notify the general public, appropriate public entities, Traffic Management Center, and the Regional Traffic Engineer.
  - An onsite review of the project's work zone traffic control by the project management team, Regional Traffic Engineer and contractor shall be conducted within 24 hours of any fatal incident/crash within the work zone.
  - Periodic work zone reviews shall be conducted jointly by the project management team, Regional Traffic Engineer and contractor.
  - All traffic control devices and signs necessary for the maintenance of traffic are to be supplied, installed, maintained and removed by the Contractor.
  - All traffic control device locations shall be marked by the Contractor and reviewed by the Engineer prior to installation.
  - Construction signs shall be fabricated and installed in accordance with the Manual of Uniform Traffic Control Devices 2009 Edition, Standard Highway Sign Manual 2004 Edition, Virginia Work Area Protection Manual 2011 Edition (Revision 1), 2008 Road and Bridge Standards and the 2007 Road and Bridge Specifications.
  - All signs will be either removed from the roadway when not needed or covered per section 6F.04 of the Virginia Work Area Protection Manual, 2011 (Revision 1) Edition.
  - Some sketches and drawings are not to scale and shall be used for reference only.
  - Traffic consists of commuters, residents and trucks.
  - Sidewalk closure shall be in accordance with TTC-35.0 and TTC-36.1 if applicable.
- Group 2 Channelizing Devices are to be placed as directed by the Engineer, per VWAMP page A-7.
- Work activity in the roadway will be allowed from 9:00am and 3:30pm Monday thru Friday. For alternate work hours the contractor must submit in writing the proposed alternate hours to the Fredericksburg District Permits Office for review and approval. Holiday restrictions outlined in the 2007 Road and Bridge Specifications Section 108.02.
- Lane closures will be permitted.
- Temporary lane widths not to be less than existing lane width with desirable being 11' minimum, without concurrence of the Regional Traffic Engineer.
- No obstacle will interfere with sight distances of entrances and intersections.
- Portable changeable message signs shall be placed per the Virginia Work Area Protection Manual, or as directed by the Engineer.
- VDOT will not assist contractor in securing staging area for equipment and materials within the State R/W.
- Contractor shall maintain access to private entrances during operations.
- The contractor needs to contact Central Region Operations Traffic Signals at (804) 524-6592 for a mark out of the traffic signal equipment a minimal of 72 hours prior to work beginning when working within a 1,000 feet of a traffic signal.
- All areas excavated below existing pavement surfaces at the conclusion of each workday shall be backfilled to form an approximate 6:1 wedge against the existing pavement surface for the safety and protection of vehicular traffic. All costs for placing, maintaining and removing the 6:1 wedge shall be included in the price bid or other items and no additional compensation will be allowed.
- The contractor shall provide temporary drainage as required to prevent ponding of water on the roadway and adjacent properties at no additional cost to VDOT.
- Contractor shall protect any existing guardrail and supports within construction area from damage. Any guardrail or supports damaged during construction operations shall be repaired or replaced to pre-construction conditions by the contractor.
- Maintenance of traffic shall be done in accordance with the Virginia Work Area Protection Manual dated 2011 (Revision 1) Edition of the Virginia Work Area Protection Manual and the 2009 Edition on Uniform Traffic Control Devices.
- All coordination for maintenance of traffic shall be performed by the Fredericksburg District Land Use Permits Office. The contact numbers are:  
David Beale, PE, VDOT (Area Land Use Engineer) - 540-654-1973  
VDOT Permit Inspector - 540-654-1612 (Stafford County)  
VDOT Permit Inspector - 540-654-1613 (Stafford County)  
VDOT Permit Inspector - 540-374-3398 (Spotsylvania County)
- This Traffic Management Plan was prepared by Richard H. Furnival, P.E. who successfully completed the Advanced WZTC Course in August 2014.

**ADVANCED WORK ZONE TRAFFIC CONTROL TRAINING CERTIFICATION :**

*Richard H. Furnival*  
RICHARD H. FURNIVAL  
P.E. #24835 (VA.)

062714005  
CERTIFICATION NUMBER

6-30-2018  
EXPIRATION DATE



DATE	REVISIONS
9-23-2015	VDOT SUBMITTAL
5-09-2016	REVISE PRIV LOCATION

ENGINEERS, LAND PLANNERS & SURVEYORS  
P. O. BOX 614  
10720 COLUMBIA DRIVE  
FREDERICKSBURG, VIRGINIA 22404  
TELEPHONE 540-888-5878



**WATER SYSTEM IMPROVEMENT PROJECT**  
CHANCELLOR MAGISTERIAL DISTRICT  
SPOTSYLVANIA COUNTY, VIRGINIA

**TRAFFIC MANAGEMENT PLAN**

DES.	RHF
DRAWN	SDI
APP	RHF
JOB NO.	12-SP-0172
DATE	9-11-13
SCALE	NONE

P:\Active Jobs\SP Lake Acres Waterline PRV Task #78 12-SP-0172\CADD\Utility Plans\LAKE ACRES PRVs.pro  
JN:\project info - SDI\PROJECT PROJECT (proj. info)  
Last Plotted: Thu May 12 11:31:14 2016

TYPICAL TRAFFIC CONTROL  
SHOULDER OPERATION WITH MINOR ENCROACHMENT  
(FIGURE TTC-5.1)

NOTES

- STANDARD:
- FOR REQUIRED SIGN ASSEMBLIES FOR MULTI-LANE ROADWAYS SEE NOTE 1, TTC-4.1
- GUIDANCE
- SIGN SPACING SHOULD BE 1300'-1500' FOR LIMITED ACCESS HIGHWAYS, FOR ALL OTHER ROADWAYS THE SIGN SPACING SHOULD BE 500'-800' WHERE THE POSTED SPEED LIMIT IS GREATER THAN 45 MPH, AND 350'-500' WHERE THE POSTED SPEED LIMIT IS 45 MPH OR LESS.
  - WHEN WORK TAKES UP PART OF A LANE ON A HIGH VOLUME ROADWAY, VEHICULAR TRAFFIC VOLUMES, VEHICL MIX, SPEED AND CAPACITY SHOULD BE ANALYZED TO DETERMINE WHETHER THE AFFECTED LANE SHOULD BE CLOSED, UNLESS THE LANE ENCROACHMENT ANALYSIS PERMITS A REMAINING LANE WIDTH OF 10 FEET, THE LANE SHOULD BE CLOSED. UNLESS THE LANE ENCROACHMENT ANALYSIS PERMITS A REMAINING LANE WIDTH OF 10 FEET, THE LANE SHOULD BE CLOSED. IF THE CLOSURE OPERATION IS ON A LIMITED ACCESS HIGHWAY, THE MINIMUM LANE WIDTH IS 11 FEET.
- GUIDANCE
- THE ROAD WORK AHEAD (W20-1) SIGN ON AN INTERSECTING ROADWAY MAY BE OMITTED WHERE DRIVERS EMERGING FROM THAT ROADWAY WILL ENCOUNTER ANOTHER ADVANCE WARNING SIGN PRIOR TO THIS ACTIVITY AREA.
- STANDARD:
- A SHADOW VEHICLE WITH EITHER AN ARROW BOARD OPERATING IN THE CAUTION MODE, OR AT LEAST ONE HIGH-INTENSITY AMBER ROTATING, FLASHING, OR OSCILLATING LIGHT SHALL BE PARKED 80'-120' IN ADVANCE OF THE FIRST WORK CREW.
  - VEHICLE HAZARD WARNING SIGNALS SHALL NOT BE USED INSTEAD OF THE VEHICLE'S HIGH-INTENSITY AMBER ROTATING, FLASHING, OR OSCILLATING LIGHTS. VEHICLE HAZARD WARNING SIGNALS CAN BE USED TO SUPPLEMENT HIGH-INTENSITY AMBER ROTATING, FLASHING, OR OSCILLATING LIGHTS.
  - TAPER LENGTH (L) AND CHANNELIZING DEVICE SPACING SHALL BE AT THE FOLLOWING:

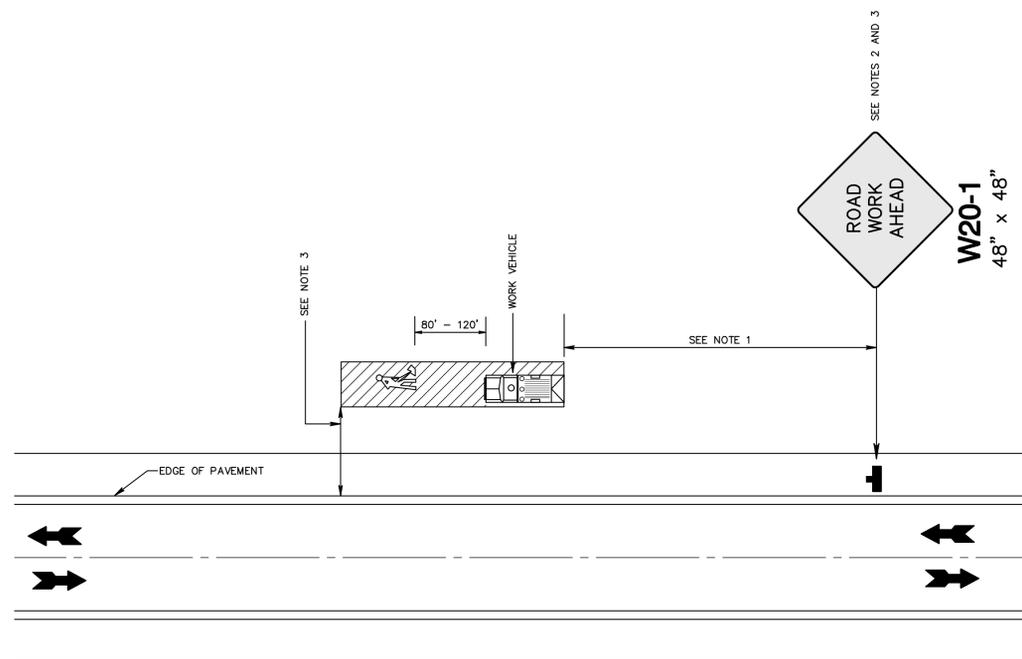
SPEED LIMIT (MPH)	TAPER LENGTH (L)			
	9	10	11	12
25	95	105	115	125
30	135	150	165	180
35	185	205	225	245
40	240	270	295	320
45	405	450	495	540
50	450	500	550	600
55	495	550	605	660
60	540	600	660	720
65	585	650	715	780
70	630	700	770	840

LOCATION	CHANNELIZING DEVICE SPACING	
	0 - 35	36+
TRANSITION SPACING	20'	40'
TRAVELWAY SPACING	40'	80'
CONSTRUCTION ACCESS *	80'	120'

\* SPACING MAY BE INCREASED TO THIS DISTANCE, BUT SHALL NOT EXCEED ONE ACCESS PER 1/4 MILE

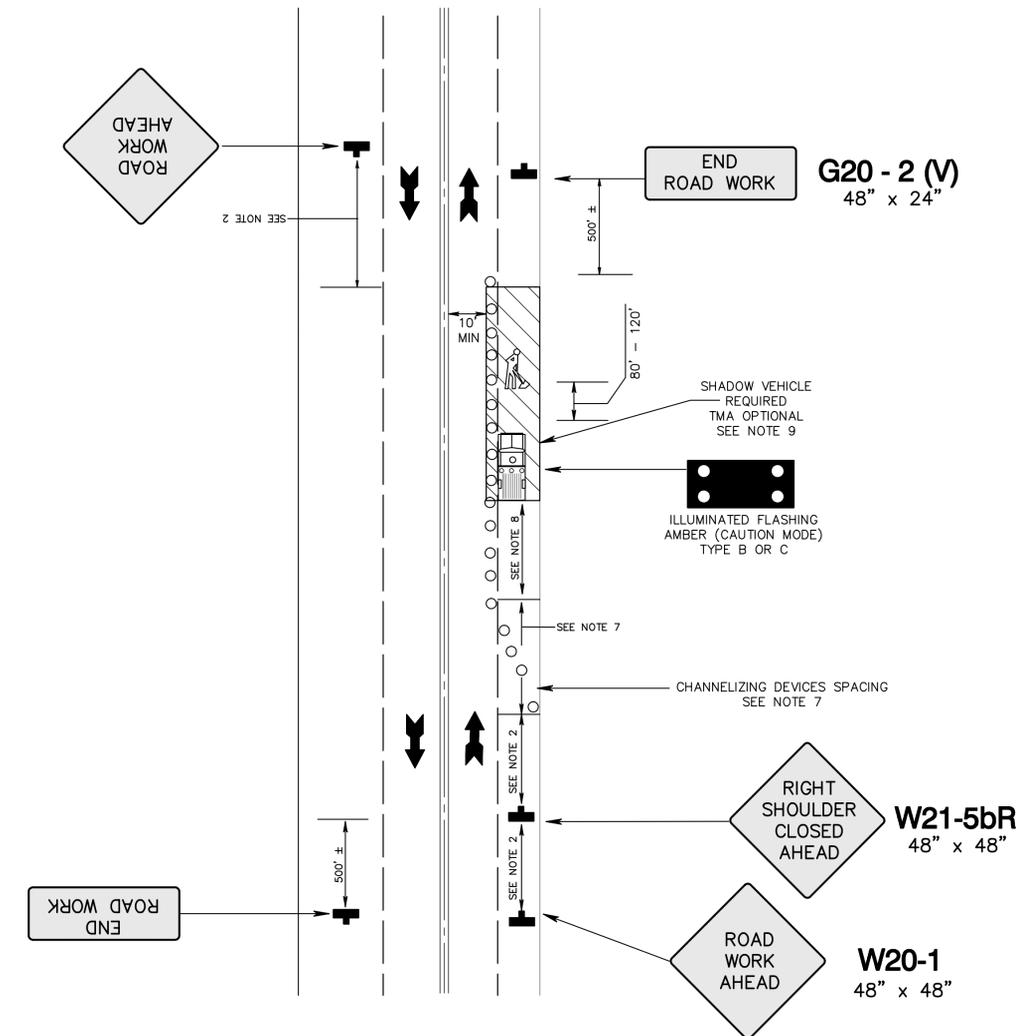
ON ROADWAYS WITH PAVED SHOULDERS HAVING A WIDTH OF 8 FEET OR MORE, CHANNELIZING DEVICES SHALL BE USED TO CLOSE THE SHOULDER IN ADVANCE OF THE MERGING TAPER TO DIRECT VEHICULAR TRAFFIC TO REMAIN WITHIN THE TRAVELED WAY.

- THE BUFFER SPACE LENGTH SHALL BE AS SHOWN IN TABLE 6H-3 ON PAGE 6H-5 FOR THE POSTED SPEED LIMIT.
- A TRUCK-MOUNTED ATTENUATOR (TMA) SHALL BE USED ON THE LIMITED ACCESS HIGHWAYS AND MULTI-LANE ROADWAYS WITH POSTED SPEED LIMIT EQUAL TO OR GREATER THAN 45 MPH FOR OPERATIONS.
- WHEN A SIDE ROAD INTERSECTS THE HIGHWAY WITHIN THE TEMPORARY TRAFFIC CONTROL ZONE, ADDITIONAL TRAFFIC CONTROL DEVICES SHALL BE PLACED AS NEEDED.



WORK BEYOND THE SHOULDER OPERATION  
(FIGURE TTC-1.1)

NO SCALE



SHOULDER OPERATION WITH MINOR ENCROACHMENT  
(FIGURE TTC-5.1)

TYPICAL TRAFFIC CONTROL  
WORK BEYOND THE SHOULDER OPERATION  
(FIGURE TTC-1.1)

NOTES

- GUIDANCE:
- THE MINIMUM DISTANCE BETWEEN SIGN AND WORK VEHICLE SHOULD BE 1300'-1500' ON LIMITED ACCESS HIGHWAYS, AND ON ALL OTHER ROADWAYS 500'-800' WHERE POSTED SPEED LIMIT IS GREATER THAN 45 MPH, AND 350'-500' WHERE POSTED SPEED LIMIT IS 45 MPH OR LESS.
- OPTION:
- THE "ROAD WORK AHEAD" (W20-1) SIGN MAY BE REPLACED WITH OTHER APPROPRIATE SIGNS SUCH AS THE "SHOULDER WORK" (W21-5) SIGN. THE "SHOULDER WORK" SIGN MAY BE USED FOR WORK ADJACENT TO THE SHOULDER.
  - THE "ROAD WORK AHEAD" SIGN MAY BE OMITTED WHERE THE WORK SPACE IS BEHIND A BARRIER, MORE THAN 4 FEET BEHIND VERTICAL CURB (STANDARD CG-2 AND CG-6) ON URBAN ROADWAYS, OR OUTSIDE OF THE CLEAR ZONE FOR ALL OTHER ROADWAYS. FOR CLEAR ZONE VALUES SEE PAGE A-4 OF APPENDIX A.
  - FOR SHORT-TERM, SHORT-DURATION OR MOBILE OPERATIONS, ALL SIGNS AND CHANNELIZING DEVICES MAY BE ELIMINATED IF A VEHICLE WITH ACTIVATED HIGH-INTENSITY AMBER ROTATING, FLASHING, OR OSCILLATING LIGHTS IS USED.
- STANDARD:
- VEHICLE HAZARD WARNING SIGNALS SHALL NOT BE USED INSTEAD OF THE VEHICLE'S HIGH-INTENSITY AMBER ROTATING, FLASHING, OR OSCILLATING LIGHTS. VEHICLE HAZARD WARNING SIGNALS CAN BE USED TO SUPPLEMENT HIGH-INTENSITY AMBER ROTATING, FLASHING, OR OSCILLATING LIGHTS.
  - IF THE WORK SPACE IS IN THE MEDIAN OF A DIVIDED HIGHWAY, AN ADVANCE WARNING SIGN SHALL ALSO BE PLACED ON THE LEFT SIDE OF THE DIRECTIONAL ROADWAY.



DATE	REVISIONS
9-23-2015	ROOT SUBMITTAL
5-09-2016	REVISE PRIV LOCATION

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**SDI**  
SULLIVAN  
DONAHOE &  
INGALLS

WATER SYSTEM IMPROVEMENT PROJECT

CHANCELLOR MAGISTERIAL DISTRICT  
SPOTSYLVANIA COUNTY, VIRGINIA

TRAFFIC MANAGEMENT PLAN DETAILS

DES. RHF  
DRAWN SDI  
APP RHF  
JOB NO. 12-SP-0172  
DATE 9-11-13  
SCALE NONE

SHEET 8  
OF 10 SHEETS



TYPICAL TRAFFIC CONTROL  
LANE CLOSURE ON A TWO-LANE ROADWAY USING FLAGGERS  
(FIGURE TTC-23.1)

NOTES

GUIDANCE:

- SIGN SPACING DISTANCE SHOULD BE 350'-500' WHERE THE POSTED SPEED LIMIT IS 45 MPH OR LESS, AND 500'-800' WHERE THE POSTED SPEED LIMIT IS GREATER THAN 45 MPH.
- CARE SHOULD BE EXERCISED WHEN ESTABLISHING THE LIMITS OF THE WORK ZONE TO INSURE MAXIMUM POSSIBLE SIGHT DISTANCE IN ADVANCE OF THE FLAGGER STATION AND TRANSITION, BASED ON THE POSTED SPEED LIMIT AND AT LEAST EQUAL TO OR GREATER THAN THE VALUES IN TABLE 6H-3. GENERALLY SPEAKING, MOTORISTS SHOULD HAVE A CLEAR LINE OF SIGHT FROM THE GRAPHIC FLAGGER SYMBOL SIGN TO THE FLAGGER.

OPTION:

- WHERE RIGHT-OF-WAY OR GEOMETRIC CONDITIONS PREVENT THE USE OF 48" x 48" SIGNS, 36" x 36" SIGNS MAY BE USED.

STANDARD:

- FLAGGING STATIONS SHALL BE LOCATED FAR ENOUGH IN ADVANCE OF THE WORK SPACE TO PERMIT APPROACHING TRAFFIC TO REDUCE SPEED AND/OR STOP BEFORE PASSING THE WORK SPACE AND ALLOW SUFFICIENT DISTANCE FOR DEPARTING TRAFFIC IN THE LEFT LANE TO RETURN TO THE RIGHT LANE BEFORE REACHING OPPOSING TRAFFIC (SEE TABLE 6H-3 ON PAGE 6H-5).
- ALL FLAGGERS SHALL BE STATE CERTIFIED AND HAVE THEIR CERTIFICATION CARD IN THEIR POSSESSION WHEN PERFORMING FLAGGING DUTIES. (SEE SECTION 6E.01, QUALIFICATIONS FOR FLAGGERS).
- CONE SPACING SHALL BE BASED ON THE POSTED SPEED AND THE VALUES IN TABLE 6H-4 ON PAGE 6H-6.
- A SHADOW VEHICLE WITH AT LEAST ONE HIGH INTENSITY AMBER ROTATING, OSCILLATING, OR STROBE LIGHT SHALL BE PARKED 80'-120' IN ADVANCE OF THE FIRST WORK CREW.

OPTION:

- A SUPPLEMENTAL FLAGGER MAY BE REQUIRED IN THIS AREA TO GIVE ADVANCE WARNING OF THE OPERATION AHEAD BY SLOWING APPROACHING TRAFFIC PRIOR TO REACHING FLAGGER STATION OR QUEUED TRAFFIC.

GUIDANCE:

- IF THE QUEUE OF TRAFFIC REACHES THE "BE PREPARED TO STOP" (W3-4) SIGN, THEN THE SIGNS, AND IF USED THE PORTABLE TEMPORARY RUMBLE STRIPS (PTRS), SHOULD BE READJUSTED AT GREATER DISTANCES.
- WHEN A HIGHWAY-RAIL CROSSING EXISTS WITHIN OR UPSTREAM OF THE TRANSITION AREA AND IT IS ANTICIPATED THAT THE QUEUES RESULTING FROM THE LANE CLOSURE MIGHT EXTEND THROUGH THE HIGHWAY-RAIL GRADE CROSSING, THE TEMPORARY TRAFFIC CONTROL ZONE SHOULD BE EXTENDED SO THAT THE TRANSITION AREA PRECEDES THE HIGHWAY-RAIL CROSSING (SEE FIGURE TTC-56.0 FOR ADDITIONAL INFORMATION ON HIGHWAY-RAIL CROSSINGS).

STANDARD:

- AT NIGHT, FLAGGER STATIONS SHALL BE ILLUMINATED, EXCEPT IN EMERGENCIES (SEE SECTION 6E.08)

OPTION:

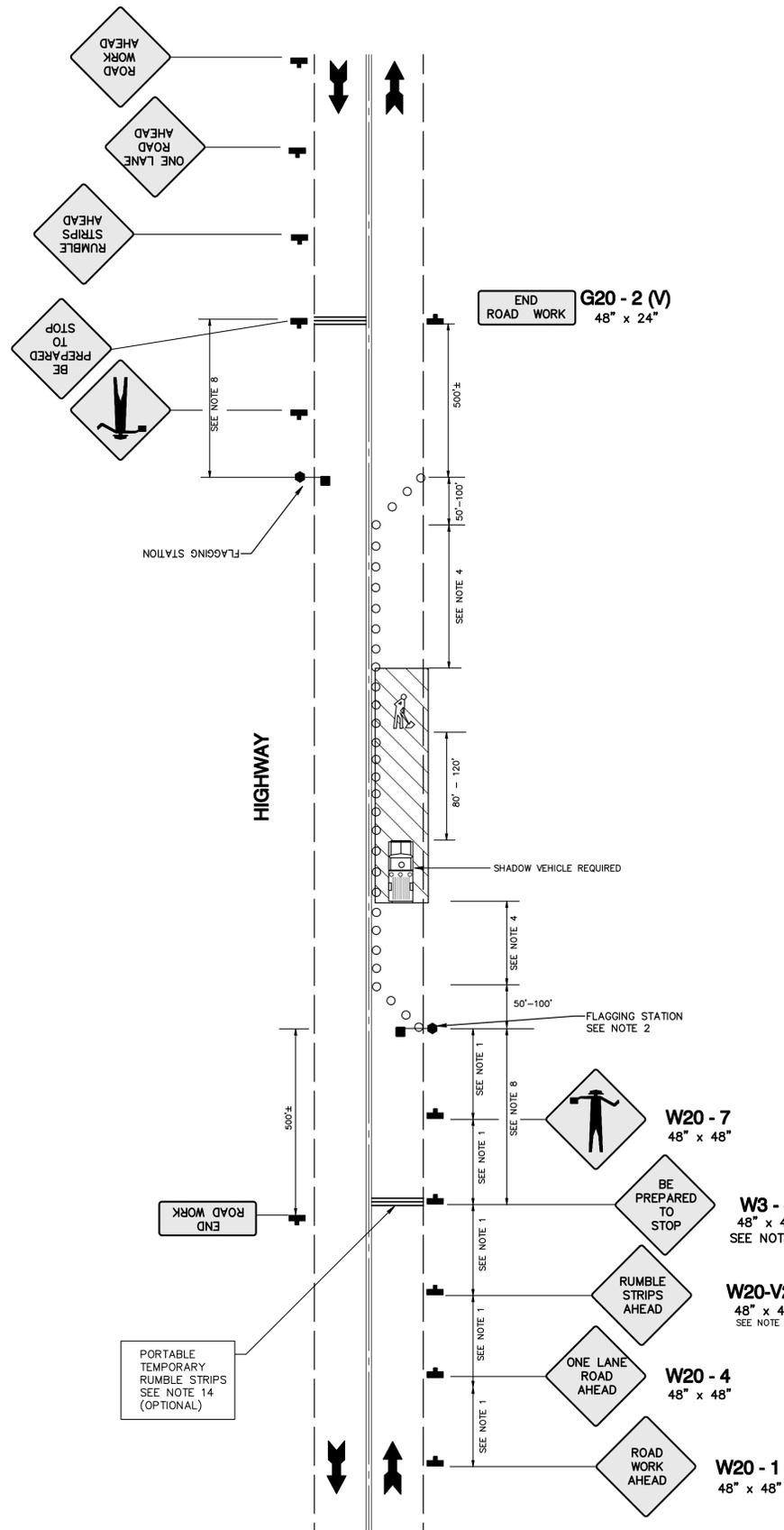
- CONES MAY BE ELIMINATED WHEN USING A PILOT VEHICLE OPERATION OR WHEN THE TOTAL ROADWAY WIDTH IS 20 FEET OR LESS.

- FOR LOW-VOLUME SITUATIONS SHORT WORK ZONES ON STRAIGHT ROADWAYS WHERE THE FLAGGER IS VISIBLE TO ROAD USERS APPROACHING FROM BOTH DIRECTIONS, A SINGLE FLAGGER, POSITIONED TO BE VISIBLE TO ROAD USERS APPROACHING FROM BOTH DIRECTIONS, MAY BE USED (SEE CHAPTER 6E).

STANDARD:

- WHEN APPROVED FOR USE, THREE PORTABLE TEMPORARY RUMBLE (PTRS) STRIPS SHALL BE INSTALLED ACROSS THE ENTIRE TRAVEL LANE ADJACENT TO THE BE PREPARED TO STOP (W3-4) SIGN. THE PORTABLE TEMPORARY RUMBLE STRIPS SHALL BE MONITORED AND ADJUSTED AS NECESSARY DURING THE WORK SHIFT TO ENSURE PROPER PLACEMENT ON THE ROADWAY. WHEN THE PTRS ARE INSTALLED, THE RUMBLE STRIPS AHEAD (W20-V26) SIGN SHALL ALSO BE UTILIZED.

POSTED SPEED	0 - 35 MPH	36 - 55 MPH
PTRS SPACING (CENTER TO CENTER)	5 FEET	8 FEET



LANE CLOSURE ON A TWO-LANE ROADWAY USING FLAGGERS  
(FIGURE TTC-23.1)

DATE	REVISIONS
9-23-2015	VOOT SUBMITTAL
5-09-2016	REVISE PRV LOCATION

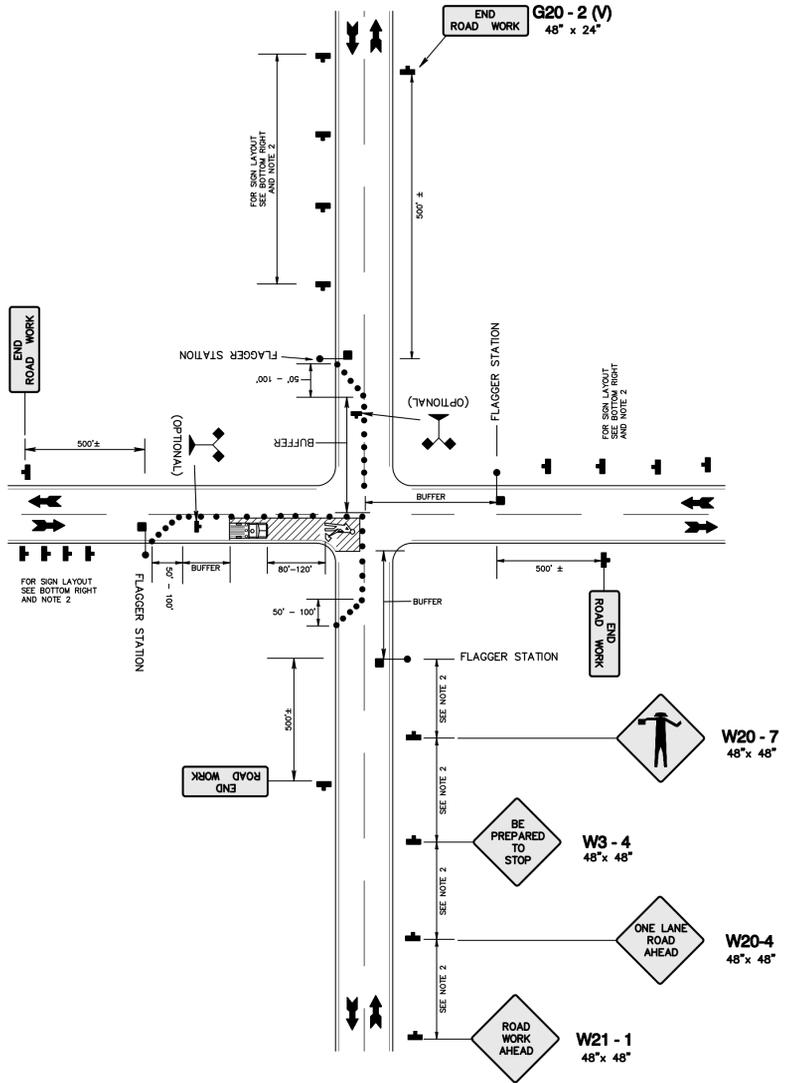
ENGINEERS, LAND PLANNERS & SURVEYORS  
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TELEPHONE 540-898-5878

**SULLIVAN  
DONAHOE &  
SDI  
INGALLS**

**WATER SYSTEM IMPROVEMENT PROJECT**  
CHANCELLOR MAGISTERIAL DISTRICT  
SPOTSYLVANIA COUNTY, VIRGINIA  
**TRAFFIC MANAGEMENT PLAN DETAILS**

DES. RHF  
DRAWN SDI  
APP RHF  
JOB NO. 12-SP-0172  
DATE 9-11-13  
SCALE NONE

SHEET **9**  
OF **10** SHEETS

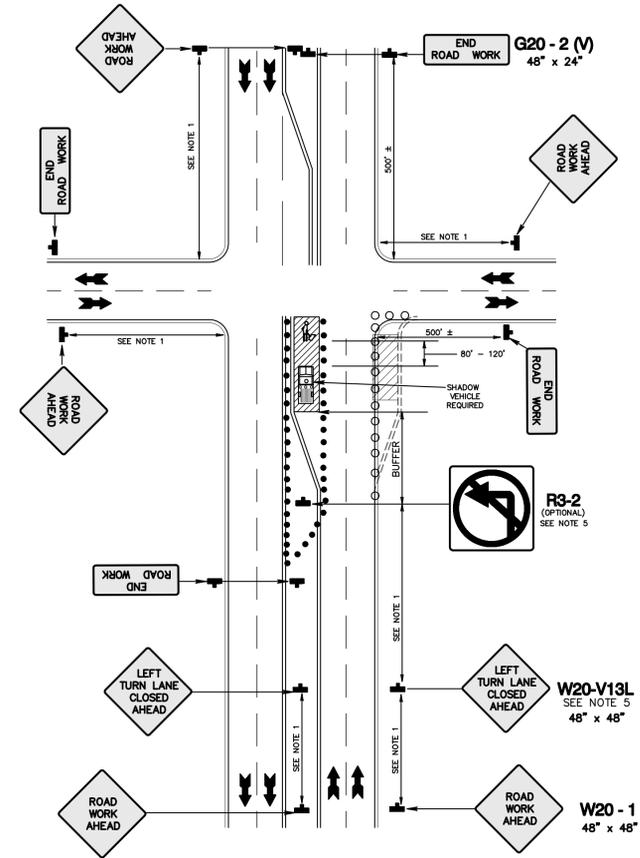


**LANE CLOSURE OPERATION IN INTERSECTION  
(FIGURE TTC-28.1)**

TYPICAL TRAFFIC CONTROL  
LANE CLOSURE OPERATION IN INTERSECTION  
(FIGURE TTC-28.1)

**NOTES**

- GUIDANCE:**
- THE CONTROL OF TRAFFIC THROUGH THE INTERSECTION IN ORDER OF PREFERENCE SHOULD BE:
    - OBTAIN THE SERVICES OF LAW ENFORCEMENT PERSONNEL.
    - DETOUR THE EFFECTED ROUTES TO OTHER ROADS AND STREETS AS APPROVED AND DIRECTED BY THE REGIONAL TRAFFIC ENGINEER.
    - PLACE A STATE CERTIFIED FLAGGER ON EACH LEG OF THE INTERSECTION CONTROLLING A SINGLE LANE OF TRAFFIC. APPROPRIATE SIGNING AS SHOWN SHOULD BE USED FOR LAW ENFORCEMENT AND FLAGGING OPERATIONS. FOR DETOUR SIGNS SEE FIGURE TTC-34.
  - SIGN SPACING DISTANCE SHOULD BE 350' - 500' WHERE THE POSTED SPEED LIMIT IS 45 MPH OR LESS, 500' - 800' WHERE THE POSTED SPEED LIMIT IS GREATER THAN 45 MPH.
- STANDARD:**
- CHANNELIZING DEVICE SPACING SHALL BE ON 20' CENTERS OR LESS.
- GUIDANCE:**
- IF ROOM PERMITS, A SHADOW VEHICLE WITH AT LEAST ONE ROTATING AMBER LIGHT OR HIGH INTENSITY AMBER FLASHING OR OSCILLATING LIGHT SHOULD BE PARKED 80'-120' IN ADVANCE OF THE FIRST WORK CREW.
- STANDARD:**
- IF THE POSTED SPEED LIMIT IS 45 MPH OR GREATER, THE SHADOW VEHICLE SHALL HAVE A TRUCK MOUNTED ATTENUATOR.
- GUIDANCE:**
- FOR EMERGENCY SITUATIONS (ANY NON-PLANNED OPERATION) OF 30 MINUTES OR LESS DURATION, TWO ROTATING AMBER LIGHTS OR HIGH INTENSITY AMBER FLASHING OR OSCILLATING LIGHTS MOUNTED ON THE VEHICLE AND VISIBLE FOR 360° SHALL BE REQUIRED IN ADDITION TO THE CHANNELIZING DEVICES SHOWN AROUND THE VEHICLE. ALSO, VEHICLE HAZARD WARNING SIGNALS OR AMBER OSCILLATING LIGHTS SHALL BE USED.
  - IF THE WORK SPACE EXTENDS ACROSS A CROSSWALK, THE CROSSWALK SHOULD BE CLOSED USING THE INFORMATION AND DEVICES SHOWN IN FIGURE TTC-36.1
- SUPPORT:**
- TURNS CAN BE PROHIBITED AS REQUIRED BY VEHICULAR TRAFFIC CONDITIONS. UNLESS THE STREETS ARE WIDE, IT MIGHT BE PHYSICALLY IMPOSSIBLE TO MAKE CERTAIN TURNS, ESPECIALLY FOR LARGE VEHICLES.



**TURN LANE CLOSURE OPERATION  
(FIGURE TTC-29.1)**

TYPICAL TRAFFIC CONTROL  
TURN LANE CLOSURE OPERATION  
(FIGURE TTC-29.1)

**NOTES**

- GUIDANCE:**
- SIGN SPACING DISTANCE SHOULD BE 350'-500' WHERE THE POSTED SPEED LIMIT IS 45 MPH OR LESS, 500'-800' WHERE THE POSTED SPEED LIMIT IS GREATER THAN 45 MPH.
- STANDARD:**
- ON DIVIDED HIGHWAYS HAVING MEDIAN WIDER THAN 8', RIGHT AND LEFT SIGN ASSEMBLIES SHALL BE REQUIRED.
  - TO PREVENT ACCIDENTAL INTRUSION INTO WORK AREA, CHANNELIZING DEVICE SPACING SHALL NOT EXCEED 20' ON CENTERS.
- OPTION:**
- THIS LAYOUT MAY BE USED FOR EITHER RIGHT OR LEFT TURN LANE CLOSURES.
  - FOR A HIGH VOLUME OF TURNING MOVEMENTS, ADDITIONAL TRAFFIC CONTROL DEVICES, SUCH AS SIGNS (GRAPHIC NO LEFT TURN (R3-2), OR LEFT LANE MUST TURN LEFT (R3-7L)), CHANNELIZING DEVICES AND VEHICLES MAY BE USED.
- STANDARD:**
- TAPER LENGTH (L) SHALL BE:
- | SPEED LIMIT (MPH) | TAPER LENGTH (L) |      |     |     |
|-------------------|------------------|------|-----|-----|
|                   | 9                | 18   | 11  | 12  |
| 25                | 95               | 185  | 115 | 125 |
| 30                | 135              | 265  | 165 | 180 |
| 35                | 195              | 395  | 245 | 265 |
| 40                | 248              | 495  | 325 | 350 |
| 45                | 295              | 595  | 405 | 440 |
| 50                | 345              | 695  | 485 | 520 |
| 55                | 395              | 795  | 565 | 600 |
| 60                | 445              | 895  | 645 | 680 |
| 65                | 495              | 995  | 725 | 760 |
| 70                | 545              | 1095 | 805 | 840 |
- SHOULDER TAPER= 1/3 L MINIMUM
- BUFFER SPACE LENGTH SHALL BE:
- | POSTED SPEED LIMIT (MPH) | DISTANCE (FEET) |
|--------------------------|-----------------|
| 20                       | 115 - 128       |
| 25                       | 155 - 165       |
| 30                       | 200 - 210       |
| 35                       | 250 - 260       |
| 40                       | 305 - 325       |
| 45                       | 360 - 380       |
| 50                       | 425 - 445       |
| 55                       | 490 - 510       |
| 60                       | 570 - 600       |
| 65                       | 645 - 675       |
| 70                       | 730 - 760       |
- GUIDANCE:**
- IF THE WORK SPACE EXTENDS ACROSS A CROSSWALK, THE CROSSWALK SHOULD BE CLOSED USING THE INFORMATION AND DEVICES SHOWN IN FIGURE TTC-36.
- SUPPORT:**
- TURNS CAN BE PROHIBITED AS REQUIRED BY VEHICULAR TRAFFIC CONDITIONS. UNLESS THE STREETS ARE WIDE, IT MIGHT BE PHYSICALLY IMPOSSIBLE TO MAKE CERTAIN TURNS, ESPECIALLY FOR LARGE VEHICLES.



DATE	REVISIONS
9-23-2015	V001 SUBMITTAL
5-09-2016	REVISE PRV LOCATION

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**SDI**  
SULLIVAN &  
DONAHOE &  
INGALLS

**WATER SYSTEM IMPROVEMENT PROJECT**  
CHANCELLOR MAGISTERIAL DISTRICT  
SPOTSYLVANIA COUNTY, VIRGINIA

**TRAFFIC MANAGEMENT PLAN DETAILS**

DES. RHF  
DRAWN SDI  
APP RHF  
JOB NO. 12-SP-0172  
DATE 9-11-13  
SCALE NONE

P:\Active Jobs\SP Lake Acres Waterline PRV Task #78 12-SP-0172\CADD\Utility Plans\LAKE ACRES PRVs.pro  
JN:\project info - SDI\PROJECT PROJECT (proj. info)  
Last Plotted: Thu May 12 11:52:16 2016



**Attachment C  
Bid Form  
IFB #17-14-EG  
Lake Acres Water System Improvements**

**(Please include any documentation of authority. For example, resolution of the board of directors, articles of incorporation, etc.)**

In compliance with this Information For Bid, Addenda's and to all the Terms and Conditions imposed therein and hereby incorporated by reference, the authorized undersigned offers and agrees to furnish the goods/services at the price(s) indicated on the Bid Form, in accordance with this Signed Bid Form.

**The signer of this bid form must be an authorized officer of the company.**

Name and Address of Firm:

\_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_ By: \_\_\_\_\_

(Signature In Ink)

\_\_\_\_\_ Name: \_\_\_\_\_

(Please Print)

\_\_\_\_\_ Zip Code: \_\_\_\_\_ Title: \_\_\_\_\_

EIN: \_\_\_\_\_ E-mail: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_ Fax: (\_\_\_\_) \_\_\_\_\_

If Corporation or LLC, list State of Incorporation or Corporation: \_\_\_\_\_

Contractors License Number: \_\_\_\_\_

Commonwealth of Virginia State Corporation Commission Number: \_\_\_\_\_

**(ATTACH A COPY OF YOUR STATE CORPORATION COMMISSION CERTIFICATE AND A LIST OF OFFICERS)**

D-U-N-S Number: \_\_\_\_\_

The named party hereby submits a bid in response to this Spotsylvania County IFB to furnish construction services and materials as described in the Specification and bid form to this IFB. The entire Bid form, including Response Statement, license certifications, and any supplemental materials required to be provided by the bidder pursuant to the terms and conditions of the IFB, constitute the entire bid submission.

The party hereby certifies that such bid is genuine and not collusive or sham; that said bidder has not colluded, conspired, connived or agreed, directly in directly, with any bidder or person, to put in a sham bid or to refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion or communication or conference, with any person to fix the bid price or affiant or any bidder, or to fix any overhead, profit or cost element of said bid price, or of that of any other bidder, or to secure any advantage against Spotsylvania County or any person interested in the proposed contract.

The party submitting the forgoing bid acknowledges the provisions, terms and conditions of this IFB including all attachments and addenda, and agrees to be bound by those provisions, terms and conditions. Further, the party certifies that all information submitted in response to this IFB is correct and true.

**Receipt of the following Addenda are acknowledged:**

Addendum No. \_\_\_\_\_, dated \_\_\_\_\_ Addendum No. \_\_\_\_\_, dated \_\_\_\_\_

Addendum No. \_\_\_\_\_, dated \_\_\_\_\_ Addendum No. \_\_\_\_\_, dated \_\_\_\_\_

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Provide construction services and materials to complete the Lake Acres Water System Improvements project as described in the Spotsylvania County IFB, Technical Specifications, and Construction Drawings contained in this IFB #17-14-EG.

<b>Bid Item No.</b>	<b>Description</b>	<b>Units</b>	<b>Estimated Quantity</b>	<b>Unit Price</b>	<b>Total Price</b>
A-1	Furnish and install 6" Dia. Pressure Class 350 DIP. Complete in-place.	L.F.	110'		
A-2	Furnish and install 6-inch gate valve and box. Complete in-place.	Each	2		
A-3	Furnish and install 6-inch Tapping gate valve and box. Complete in-place.	Each	2		
A-4	Furnish and install 6-inch ductile iron 90 degree bend. Complete in-place.	Each	2		
A-5	Furnish and install 6-inch ductile iron 45 degree bend. Complete in-place.	Each	2		
A-6	Furnish and install 6-inch ductile iron 22-1/2 degree bend. Complete in-place.	Each	2		
A-7	Furnish and install 16-inch by 6-inch ductile iron Tapping Sleeve. Complete in-place.	Each	2		
A-8	Asphalt Patches - Open cut and install 6" ductile iron pipe. Restore per plan details.	L.S.	1		
A-9	Concrete Ditch - Open cut and install 6" ductile iron pipe. Restore ditch per plan details.	L.S.	1		
A-10	Furnish and install Silt Fence	L.F.	90		
A-11	Mobilization	L.S.	1		
A-12	Traffic Control	L.S.	1		
A-13	Topsoil, Permanent Seeding, Fertilizing & Mulching	L.S.	1		

**Sign here to confirm accuracy of Bid Form and conformity with provisions of IFB #17-14-EG**

**Signature:** \_\_\_\_\_ **Name of Firm:** \_\_\_\_\_

**(RETURN THIS FORM)**

<b>Bid Item No.</b>	<b>Description</b>	<b>Units</b>	<b>Estimated Quantity</b>	<b>Unit Price</b>	<b>Total Price</b>
A-14	Furnish and install 6' dia. manhole. Complete in place	L.S.	1		
A-15	Furnish and install 6' by 8' vault. Complete in place	L.S.	1		
A-16	Install 6" CLA-Val Model #90-01	L.S.	1		
A-17	Contingency Item - Over-Excavation of Unsuitable Subgrade with Porous Refill - Furnish and install additional miscellaneous gravel bedding for water line bedding in excess of normal bedding requirements contingent on decision of the county.	C.Y.	250		
A-18	Contingency Item - Allowance for Testing & Lab Services	N.T.E.	1	\$10,000.00	\$10,000.00
A-19	Contingency Item - Allowance for Inspection	N.T.E.	1	\$5,000.00	\$5,000.00
<b>Total Bid Price - Items A1 through A-19</b>					

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Signature: \_\_\_\_\_ Name of Firm: \_\_\_\_\_  
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Response Statement

This Response Form is to be completed by the Bidder to more specifically describe and define the proposed services. Any deviations from the IFB specifications shall be stated on this form or attached to this form.

1. Item Description

**Lake Acres Water System Improvements**

2. Deviations from IFB Specification

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**Signature:** \_\_\_\_\_ **Name of Firm:** \_\_\_\_\_

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**SUBCONTRACTOR IDENTIFICATION SHEET**

Bidder proposes to use the following Subcontractors who will perform work on this project.

<b>Name of Firm, Address, and Contact Person By Subcontractor</b>	<b>Work to be Performed by Subcontractor</b>	<b>Value of work to be completed</b>

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**Signature: \_\_\_\_\_ Name of Firm: \_\_\_\_\_**

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**Lake Acres Water System Improvements**

A list of 3 References for which the Contractor has provided similar work over the last 5 years similar in Scope to that which is described herein shall be provided with the Bid Package. **Spotsylvania County cannot be listed as a reference.**

**Please list references below:**

Company Name: \_\_\_\_\_  
Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_  
Email Contact: \_\_\_\_\_  
Project Name: \_\_\_\_\_  
Location Address: \_\_\_\_\_

Additional Information: \_\_\_\_\_

Company Name: \_\_\_\_\_  
Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_  
Email Contact: \_\_\_\_\_  
Project Name: \_\_\_\_\_  
Location Address: \_\_\_\_\_

Additional Information: \_\_\_\_\_

Company Name: \_\_\_\_\_  
Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_  
Email Contact: \_\_\_\_\_  
Project Name: \_\_\_\_\_  
Location Address: \_\_\_\_\_

Additional Information: \_\_\_\_\_

**Sign here to confirm accuracy of Bid Form and conformity with provisions of IFB #17-14-EG**  
**Signature:** \_\_\_\_\_ **Name of Firm:** \_\_\_\_\_

**(RETURN THIS FORM)**