

BID PROPOSAL AND CONTRACT DOCUMENTS

FY 20 Water Line Improvements



**Department of Community Development
Engineering Division**

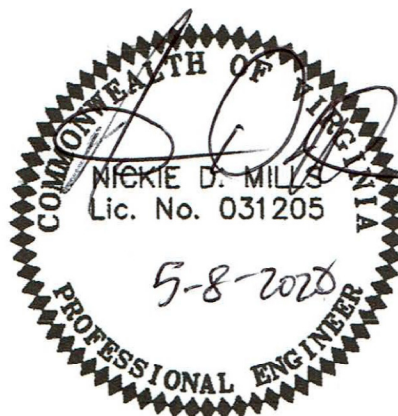


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ADVERTISEMENT FOR BIDS

PROJECT: FY 20 WATER LINE IMPROVEMENTS

City of Staunton, Virginia

May 8, 2020

The City of Staunton, Virginia, (hereinafter called the “Owner”, or “Public Body”) will receive sealed Bids for the furnishing of all labor, materials, supervision, and equipment necessary to complete above titled project at the City’s Purchasing Agent’s Office, located at 116 W. Beverley Street, City Hall, Third Floor, until **2:00 p.m. local time on June 2, 2020**, at which time the Bids will be publicly opened and read aloud. **Due to the Covid-19 state of emergency in the Commonwealth of Virginia the City is following state guidance for conducting Bid Openings and pre-bid meetings.**

The bid opening will be hosted by the City via a **Zoom Webinar**. Actual opening of the bids will be performed in the Finance Department by Chad Horvat, City of Staunton’s Finance Business Manager, along with one other person to witness.

To join the webinar, please enter the following in your web browser:

<https://us02web.zoom.us/j/82885643266?pwd=bkhzY1hzbndlK1I3T1NINXIUQjN6QT09>

The Password is: 602548

Or you may Telephone:

Dial (for higher quality, dial a number based on your current location):

US: +1 929 205 6099 or +1 301 715 8592 or +1 312 626 6799 or +1 669 900 6833
or +1 253 215 8782 or +1 346 248 7799

Webinar ID: 828 8564 3266

Password: 602548

The Zoom Webinar will begin promptly at 2:00 p.m.

BIDS RECEIVED AFTER THE DATE AND TIME SPECIFIED WILL BE REJECTED.

BIDS MUST BE SEALED, MARKED, AND DELIVERED TO:

Mail to:

City of Staunton

Chad Horvat

Finance Business Manager

P.O. Box 58

Staunton, VA 24402-0058

Phone: (540) 332-3819

Overnight To

City of Staunton

Chad Horvat

Finance Business Manager

116 W. Beverley St., 3rd Floor

Staunton, VA 24402-0058

Phone: (540) 332-3819

The work under this Project is at 2 separate locations: Mason Street and Tyler Street, and Mountain View Drive. The proposed improvements consists of approximately 1030+/- LF of 6” ductile iron

water line, 200 +/- LF of 6" Metallic Zinc Coated Pipe, 14 service connections, 350 +/- LF of service line, 2 fire hydrants, associated appurtenances and street repairs, etc. A more complete description of the work and full information for contract bidders is given in the Specifications and Contract Documents.

Bid Security in the amount of five percent (5%) of the Bid shall be submitted with each Bid. Bid Bond must be in the form of a cashier's check or certified check payable to the City of Staunton.

A non-mandatory pre-bid meeting will be held on **May 14, 2020, at 2:00 p.m.** local time. **The pre-bid meeting will be hosted by the City via a Zoom Webinar.**

To join the webinar, please enter the following in your web browser:

<https://us02web.zoom.us/j/83236404855?pwd=WjhNRkdQdVozYjRpd2JDZXFmZVNQdz09>

The Password is: 579178

Or you may Telephone:

US: +1 301 715 8592 or +1 312 626 6799 or +1 929 205 6099 or +1 253 215 8782
or +1 346 248 7799 or +1 669 900 6833

Webinar ID: 832 3640 4855

Password: 579178

Contractor registration in accordance with Title 2.2 Chapter 43, Code of Virginia is required.

The envelopes containing the Bids must be sealed, addressed to the **City of Staunton, City Purchasing Agent's Office, Staunton, Virginia 24401**, and marked as Bid for the **FY 20 WATER LINE IMPROVEMENTS**.

The bidder shall include in its Bid the following notation:

"Licensed Virginia Contractor No. _____" (issued to contractor by DPOR)

"State Corporation Commission Registration No. _____" (issued to contractor by the SCC)

The Bid shall remain subject to acceptance for sixty (60) days.

The Owner reserves the right to reject any and all Bids and to waive any minor non-substantive errors in the Bid.

Withdrawal of Bids due to error shall be subject to and in accordance with Section 2.2-4330 of the Code of Virginia and the Contract Documents.

The City of Staunton does not discriminate in the solicitation or awarding of contracts on the basis of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state or federal law.

END OF ADVERTISEMENT FOR BIDS

INSTRUCTIONS TO BIDDERS

1. SECURING DOCUMENTS

- 1.1. The City of Staunton, Virginia, (hereinafter called the “OWNER”, or “Public Body”) invites bids on the form attached hereto, all blanks of which must be appropriately filled in. Bids will be received by the Owner in the City Purchasing Agent’s office, as specified in the Advertisement for Bid.
- 1.2. Bid documents are available for viewing and downloading from the City’s website at www.ci.staunton.va.us/departments/finance/procurement and also on eVA website at <https://m.vendor.eprocipdc.com/Vendor/public/AllOpportunities>.
- 1.3. The owner may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof.

2. PREPARATION OF BID AND SUBMISSION

Each bid must be submitted on the prescribed form in accordance with the following:

- 2.1. Each bid must be properly signed and with all blank spaces filled out, in ink or typewritten. The foregoing certification must be fully completed and executed when submitted. Do not make any modifications, erasures, deletions, additions or changes to the bid form. Unauthorized conditions, limitations, or provisions attached to the bid may be cause for rejections of the bid. Submit only the original signed copy of the bid.
- 2.2. Address bids to the Owner, and deliver to the address specified in the Advertisement for Bid. Enclose each bid in an opaque, sealed envelope or box bearing on the outside the following:
 - 2.2.1. Project Title
 - 2.2.2. Name of the Bidder
 - 2.2.3. Bidder’s address
 - 2.2.4. Date and hour of the bid opening.
- 2.3. The sealed envelope containing the bid must be enclosed in another envelope and mailed to the address as specified in the Advertisement for Bid. The City of Staunton is not responsible for delays in the delivery of the mail by the U.S. Postal Service, private couriers, or the inter-office mail system. **No in person deliveries will be accepted.** It is the sole responsibility of the bidder to see that his bid is received on time. No faxed or emailed bid will be considered. No bids received after the time fixed for receiving them will be considered. Late or incomplete bids may be returned to the bidder. All expenses for making bids to the City shall be borne by the bidder.

- 2.4. Indicate receipt of issued addenda on the Bid Form. All Bidders are advised to check the City's website at www.ci.staunton.va.us/departments/finance/procurement to assure that all Addenda have been received and that the cost consequences thereof have been included in the Bid. Addenda will also be available on eVA website at <https://m.vendor.eprocipdc.com/Vendor/public/AllOpportunities>.
- 2.5. Any bid may be withdrawn prior to the above scheduled time for the opening of Bids or authorized postponement thereof.
- 2.6. Any bid received after the time and date specified shall not be considered.
- 2.7. Bid shall remain subject to acceptance for sixty (60) days.
- 2.8. The following documents fully completed and signed where appropriate are required for a responsive Bid:
 - 2.8.1. Signed Bid Form which includes acknowledgement of Addenda
 - 2.8.2. Bid Bond
 - 2.8.3. State Corporation Commission Registration
 - 2.8.4. Non-Collusion Affidavit
 - 2.8.5. Reference List

3. SUBCONTRACTS

- 3.1. The bidder is specifically advised that any person, firm, or other party to whom is proposed to award a subcontract under this contract must be acceptable to the Owner. The bidder must name the subcontractor(s), and the City reserves the right to determine whether any named subcontractor is fit and capable to perform the required work.

4. METHOD OF BIDDING

- 4.1. This is a unit price bid for **FY 20 WATER LINE IMPROVEMENTS**. See Bid Schedule.
- 4.2. Although the bid is based upon unit prices, many items are to be priced under lump sum designations. It is the bidder's responsibility to verify the exact scope of work for all items in order to establish the bid price.

5. QUALIFICATIONS OF BIDDER

- 5.1. The Owner may make such investigations as he deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder indicates that the bidder is not properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.

- 5.2. Bids will only be accepted from Contractors who are experienced in and actively engaged in the type of construction of the item(s) called for in the bid. No bid will be accepted from or contract awarded to any person, firm, or corporation that is in arrears or is in default to the City upon any debt or contract, or that is a defaulter, as surety or otherwise, upon any obligation to said City or had failed to perform faithfully any previous contract with the City.
- 5.3. Bidders must certify in the bid form that they are not currently barred from bidding on contracts by any agency of the Commonwealth of Virginia or any federal agency.
- 5.4. Pursuant to Code of Virginia, §2.2-4311.2 subsection B, a bidder or offeror organized or authorized to transact business in the Commonwealth pursuant to Title 13.1 or Title 50 is required to include in its bid or proposal the identification number issued to it by the State Corporation Commission (SCC). Any bidder or offeror that is not required to be authorized to transact business in the Commonwealth as a foreign business entity under Title 13.1 or Title 50 or as otherwise required by law is required to include in its bid or proposal a statement describing why the bidder or offeror is not required to be so authorized.

6. BID SECURITY

- 6.1. Each bid must be accompanied by a Bid Bond in the amount of five percent (5%) of the bid submitted, or a certified check of the Bidder in an amount not less than five percent (5%) of the amount of the bid, payable to the order of the City of Staunton, Virginia. Such bid bonds or checks will be returned to all, except the three bidders submitting the most favorable bids, within three (3) days after the formal opening of the bids. The remaining Bid Bonds or checks will be returned to the three most favorable bidders within forty-eight (48) hours after the Owner and the accepted Bidder have executed the Contract, or if no contract has been so executed, within sixty (60) days after the date of the opening of the bids.

7. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT

- 7.1. The successful bidder, upon his failure or refusal to execute and deliver the contract and bonds required within 10 days after he has received notice of the acceptance of his bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his bid.

8. TIME AND COMPLETION AND LIQUIDATED DAMAGES

- 8.1. Bidder must agree to commence work on or before a date to be specified on a written "Notice to Proceed" from the OWNER.
- 8.2. Bidder must agree to **fully complete the work within 160 working days**. Working days refer to Monday through Fridays, excepting weekends and City of Staunton holidays.

- 8.3. OWNER and CONTRACTOR stipulate that **TIME IS OF THE ESSENCE** and delay by the CONTRACTOR in completion would have significant adverse consequences for the PROJECT; that, however, the actual damages to OWNER from such delay are uncertain and would be impossible and not susceptible to reasonable determination; and that liquidated damages of such failure by CONTRACTOR to perform in a timely manner are a reasonable way and not a penalty to address such adverse consequences. CONTRACTOR also stipulates that it shall not challenge, either directly or indirectly, this liquidated damages provision. OWNER, therefore, may require CONTRACTOR to pay liquidated damages of **\$1,000** per day for the CONTRACTOR's failure to perform timely in strict accordance with the CONTRACT. OWNER may deduct any liquidated damages from amounts due to CONTRACTOR and, otherwise OWNER shall be entitled to receive interest at the rate of 5% until deducted or paid. Liquidated damages shall be, other than for delay, in addition to any other entitlement by OWNER to damages and other remedies for any other damage, loss, or injury for which CONTRACTOR may be responsible.

9. EXAMINATION OF DOCUMENTS AND SITE OF WORK

- 9.1. Each bidder must inform himself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful bidder of this obligation to furnish all material and labor necessary to carry out the provisions of his contract. Insofar as possible, the contractor, in carrying out his work, must employ such methods or means as will not cause any interruption of or interference with the work of any other contractor.
- 9.2. Before submitting a bid, each bidder shall carefully examine and read the Bid Documents, Construction Plans, Project Manual, and all other proposed Contract Documents (including all addenda), and shall visit the site of the work. Each bidder shall fully inform himself prior to bidding as to existing conditions and limitations under which the work is to be performed, and shall include in his bid a sum to cover the cost of items necessary to perform the Work as set forth in the proposed contract documents. No allowance will be made to a bidder because of lack of such examination and knowledge. The submission of a bid will be considered as conclusive evidence that the bidder has made such examination.
- 9.3. Attention is particularly called to those parts of the Contract Documents and Specifications, which deal with the following:
- 9.3.1. Inspection and testing of materials.
 - 9.3.2. Insurance requirements (Section 2-Insurance of General Conditions)
- 9.4. The failure or omission of any bidder to examine any form instrument or document shall in no way relieve any bidder from any obligation in respect of his bid.

10. ADDENDA AND INTERPRETATIONS OF CONTRACT DOCUMENTS PRIOR TO BIDDING

- 10.1. No interpretation of the meaning of the plans, specifications or other pre-bid documents will be made to any bidder orally.
- 10.2. If any person contemplating submitting a bid for construction of the Work is in doubt as to the true meaning of any part of the proposed Contract Documents, or finds discrepancies on or omissions from any part of the proposed Contract Documents, he shall submit a written request. Every request for such interpretation should be emailed to millsnd@ci.staunton.va.us or mailed to address in the Advertisement for Bid. All questions must be received no later than **12:00 p.m. on May 20, 2020.**
- 10.3. Questions will be answered in Addendum format and posted as outlined in the invitation to bid, at www.ci.staunton.va.us/departments/finance/procurement. It is the responsibility of all bidders to ensure that they have received all addenda and to include signed copies of any and all addenda with their bid submission. Any and all such interpretations and any supplemental instructions will be posted on the City website not later than close of business day on **May 21, 2020.**
- 10.4. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under this bid as submitted. All addenda so issued shall become part of the contract documents.

11. SECURITY AND FAITHFUL PERFORMANCE

- 11.1. Simultaneously with his delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of this contract and for the payment of all persons performing labor on the project under the contract and furnishing materials in connection with this contract.
- 11.2. Both payment bond and performance bond shall be in the amount of 100% of the contract price.
- 11.3. All bonds shall be on forms provided in the Contract Documents and written by companies LICENSED TO DO BUSINESS IN VIRGINIA and shall be administered through agent(s) registered in Virginia.

12. POWER OF ATTORNEY

- 12.1. Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

13. NOTICE OF SPECIAL CONDITIONS

13.1. Attention is particularly called to those parts of the contract documents and specifications, which deal with the following:

13.1.1. Inspection and testing of materials (Section 7.12 of General Conditions and Technical Specifications as applicable).

13.1.2. Insurance requirements (Section 2 – Insurance of General Conditions).

14. LAWS AND REGULATIONS

14.1. The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the contract will be deemed to be included in the contract as though herein written out in full.

14.2. Contractor shall comply with Federal and State Requirements.

15. METHOD OF AWARD – LOWEST QUALIFIED BIDDER

15.1. The contract will be awarded on the basis of the sum of the Base Bid and the accepted Alternates.

15.2. The award will be made to the lowest responsible bidder whose bid conforms to the Advertisement, these Instructions and whose qualifications indicate the award will be most advantageous to the City.

15.3. The City reserves the right to reject any or all offers and to waive informalities and minor irregularities in offers received.

15.4. The City will notify all bidders of the award and return Bid Sureties to all but the successful bidder.

16. EXECUTION OF CONTRACT

16.1. The form of the Contract, which the successful bidder will be required to execute, is included in the Project Manual.

16.2. After notice from the City, the successful bidder has fourteen (14) business days to enter into a Contract or forfeit as liquidated damages the security deposit. By executing the Contract, the Contractor certifies that he has reviewed the Contract Documents and the project area and accepts the conditions of each.

16.3. At or prior to delivery of the signed Contract, the bidder to whom the Contract is awarded shall deliver to the Owner the following documents, as required by the Owner and the Contract Documents:

- 16.3.1. Certificates of Insurance and Endorsement
- 16.3.2. Labor and Materials Payment Bonds
- 16.3.3. Performance Bond
- 16.3.4. City Business License
- 16.3.5. Virginia State Contractor's License Number

16.4. Bonds and Certificates of Insurance shall be approved by the Owner before the successful bidder may proceed with the Work. Failure or refusal to provide Bonds or Certificates of Insurance and Endorsement in a form satisfactory to the Owner shall subject the successful bidder to loss of time from the allowable construction period equal to the time of delay in furnishing the required material.

17. OBLIGATION OF BIDDER

17.1. Under Section 2.2-4330, Procedure (A(i)) of the Code of Virginia, a bidder for a contract with the State or any department, institution or agency thereof, or with any county, city, town, school board, or any agency thereof for the construction, demolition, alteration, repair or improvement may withdraw his bid from consideration if the price bid was substantially lower than the other bids due solely to a mistake therein, provided the bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor, or material made directly in the compilation of a bid, evidenced by the inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn. The bidder must give notice in writing of his claim of right to withdraw his bid within two (2) business days after the conclusion of the bid opening procedure.

18. ADJUSTMENT OF CONTRACT

18.1. The Owner reserves the right to expand this contract to include work of the type defined in the project specifications, to other areas of the City. This expansion would be contingent upon the Contractor agreeing to perform the additional work at the same contract prices found in the proposal for the original contract.

18.2. The owner reserves the right to make, at any time during the progress of the work, such increases or decreases in quantities as deemed in the best interest of the Owner. Adjustments of contract unit prices will not be considered for overruns or underruns of the original bid quantities. Unit price adjustments will not be made in the event of the elimination of any other associated bid item.

19. NON-MANDATORY PRE-BID MEETING

- 19.1. A non-mandatory pre-bid meeting will be held. See Advertisement for Bid for details.

20. CITY BUSINESS LICENSE

- 20.1. City of Staunton Business License is required for successful award of this project. At or prior to delivery of the signed Contract, the bidder to whom the Contract is awarded shall deliver to the Owner a copy of their City Business License. The bidder shall ensure that the Business License indicates a basis amount equal to or greater than the awarded Contract value. For information on City Business Licenses contact the Staunton Commissioner of Revenue office at 540- 332-3829.

21. STANDARDS AND SPECIFICATIONS

- 21.1. Work in this project shall conform to the current Virginia Department of Transportation (VDOT) Road and Bridge specifications, the current VDOT Road and Bridge Standards, the current Virginia Erosion and Sediment Control handbook, the current Virginia Erosion and Sediment Control regulations and the current City of Staunton Design and Construction Standards Manual.

22. CONSIDERATION OF PROJECT COMPLEXITIES

- 22.1. In preparing this bid, Contractor shall understand and account in their costs for the complexities involved in administering the construction required by this Contract. Contractor shall be aware that the project area receives regular traffic during the work day. Contractor shall accommodate such traffic through and around the work area in a safe and well-marked manner.
- 22.2. Submission of a bid shall be an affirmation that the Contractor understands these complexities and difficulties associated with this project, that he has included in his bid a sufficient dollar amount to compensate for the additional time and effort these complexities and difficulties will require on his part, and that he understands that the Owner will not accept any claim for time extension or additional costs associated with them.

23. INSURANCE REQUIREMENTS

- 23.1. By signing and submitting a bid or proposal the contractor certifies that if awarded the contract, they will have the insurance coverages as outlined in Section 2 - Insurance of the General Conditions at the time the contract is awarded. If any subcontractors are involved, the subcontractor will have the same insurance. The contractor further certifies that they or any subcontractor will maintain these coverages during the entire term of the contract.

BIDDER STATEMENT

We understand the Insurance Requirements of these specifications and will comply in full if awarded this contract.

Signature: _____ Date: _____

Name: _____ Title: _____

Name of Firm: _____

This document must be completed & returned with bid submission.

END OF INSTRUCTIONS TO BIDDERS

BID FORM

To: City of Staunton
City Hall
P.O. Box 58
Staunton, Virginia 24402

Gentlemen:

The undersigned, as Bidder, does hereby declare that the only person, persons, company or parties interested in this Bid are named herein; that this Bid is made and that the Contract will be executed without collusion with any other person or persons presenting any Bid for the same work, labor and materials; that this Bid is in all respects fair and just and that no person prohibited therefrom by law is directly or indirectly interested in this Bid, nor in the labor and materials to which it relates, nor in any portion of the profits thereof.

The undersigned does further declare that he has personally examined the site of the proposed work and made such investigation as is necessary to determine the general and local conditions and the character of the work to be encountered; that he has carefully examined each and every item of the annexed Contract Documents and the Plans and Specifications pertaining hereto, and that he fully understands the same, and will make no claim, other than as stated therein, because of any misunderstanding or misconception concerning the nature, character or amount of work to be done.

The undersigned does hereby offer and agree to execute and perform the Contract attached hereto, and of which this Bid forms a part; and to furnish all of the labor, materials, tools, equipment, transportation and superintendence for the construction; in strict conformity with the drawings and specifications. The undersigned further proposes to perform the work at the prices set opposite each item, it being understood that the quantities given are estimates only and payment will be made on the basis of actual quantities as developed during the construction.

This document must be completed & returned with bid submission.

BID FORM
BID SCHEDULE
PROJECT: FY 20 WATER LINE IMPROVEMENTS
This document must be completed & returned with bid submission.

Bid No.	Item	Qty.	Unit	Unit Price	Item Total
	Miscellaneous				
1	Mobilization/Demobilization	1	LS		
2	Traffic Control & Temporary Signage	1	LS		
3	As-Builts by Licensed Surveyor	1	LS		
	Earthwork				
4	Solid Rock Excavation	160	CY		
5	Full Stone Backfill (VDOT 21A)	830	LF		
	Water Line				
6	6" Ductile Iron (Class 350) Water line	1030	LF		
7	6" Gate Valve and box	8	EA		
8	6" x 6" Tee	4	EA		
9	6" Fire Hydrant Assembly	2	EA		
10	Bends and Plugs	89	LBS		
11	Connect to Existing Water Line	3	EA		
12	Existing Water line Abandonment	3	EA		
13	3/4" Service Connection (Municipex Water Line)	275	LF		
14	1" Service Connection (Municipex Water Line)	65	LF		
15	Type I Service Connection	11	EA		
16	Type II-A Service Connection	2	EA		
17	Type II-B Service Connection	1	EA		
18	Type III Service Connection	1	EA		
19	1" Air Release Valve Assembly	1	EA		
20	6" Ductile Iron Metallic Zinc Coated Pipe with V-Bio Polywrap	200	LF		
21	Zinc Coated Bolt packs	5	EA		

TOTAL BASE BID:

WORDS

FIGURES

OPT Optional Bid Items

1	Epoxy Coated Bolt Packs	0	EA		
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AMOUNTS ARE TO BE SHOWN IN BOTH WORDS AND FIGURES.
 IN CASE OF DISCREPANCY, THE AMOUNT IN WORDS WILL GOVERN.

BID FORM

The undersigned agrees to complete the work enumerated herein **in accordance with Paragraph 8 of Instructions to Bidders**. It is expressly understood and agreed that the time of beginning, rate of progress, and the date of completion are essential conditions, and that in the event of failure to complete the work within the above specified time, the Contractor will be liable for the payment of liquidated damages as provided in **Paragraph 8 of Instruction to Bidders**. Extensions may be granted, upon written request, for inclement weather and for any other cause not the fault of the Contractor. The City reserves the right to shut the project down for extended periods due to inclement weather. Deadline extensions will be made to equally compensate for periods of shut down.

The undersigned likewise agrees that he will execute and deliver the Contract hereto attached within fourteen (14) business days, and City of Staunton holidays excepted, after notification of the acceptance of this Bid and award of the Contract; and will furnish a performance and a payment bond for the total amount of the accepted Bid on the forms provided in the Contract Documents, satisfactory to the Owner as surety for the faithful performance and completion of the Contract and the payment of all subcontractors, material dealers and labor.

The undersigned certifies that he understands that it is the intent of the drawings, and the Contract Documents, that the work be completed in every respect and that no additional compensation will be allowed for minor tasks necessary to completely perform the work.

The undersigned acknowledges Addenda:

Addenda No. _____

Addenda _____

Addenda No. _____

Addenda _____

The undersigned has checked carefully all the above figures and understands that the Owner will not be responsible for any errors or omissions in making up this Bid.

Contractor

By: _____

Printed Name: _____

Registered Virginia Contractor's License
No.

Title: _____

Address: _____

Classification

Expiration

SCC Number

Telephone: _____

Contractor's IRS Number

Dates this _____ day of _____ 2020

This document must be completed & returned with bid submission.

END OF BID FORM

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned

_____ as Principal, and

_____ as Surety, are hereby held and
firmly bound unto _____ as Owner in the penal
sum of _____ for the payment of
which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs,
executors, administrators, successors and assigns.

Signed, this _____ day of _____, 20____

The condition of the above obligation is such that whereas the Principal has submitted to
_____ a certain bid attached
hereto and hereby made a part of hereof to enter into a contract in writing, for the _____

NOW THEREFORE,

- (a) If said Bid shall be rejected, or in the alternate
- (b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid.

Then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

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

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

Principal (L.S.)

Surety

By: _____

Seal

This document must be completed & returned with bid submission.

END OF BID BOND

STATE CORPORATION COMMISSION FORM

Virginia State Corporation Commission (“SCC”) registration information:

The undersigned Offeror:

- ☐ is a corporation or other business entity with the following SCC identification number:
_____ **-OR-**
- ☐ is not a corporation, limited liability company, limited partnership, registered limited liability partnership, or business trust **-OR-**
- ☐ is an out-of-state business entity that does not regularly and continuously maintain as part of its ordinary and customary business any employees, agents, offices, facilities, or inventories in Virginia (not counting any employees or agents in Virginia who merely solicit orders that require acceptance outside Virginia before they become contracts, and not counting any incidental presence of the Offeror in Virginia that is needed in order to assemble, maintain, and repair goods in accordance with the contracts by which such goods were sold and shipped into Virginia from bidder’s out-of-state location) **-OR-**
- ☐ is an out-of-state business entity that is including with this bid an opinion of legal counsel which accurately and completely discloses the undersigned Offeror’s current contacts with Virginia and describes why those contacts do not constitute the transaction of business in Virginia within the meaning of § 13.1-757 or other similar provisions in Titles 13.1 or 50 of the Code of Virginia. **Attach opinion of legal counsel to this form.**

****NOTE**** >> Check the following box if you have not completed any of the foregoing options but currently have pending before the SCC an application for authority to transact business in the Commonwealth of Virginia and wish to be considered for a waiver to allow you to submit the SCC identification number after the due date for proposals (the Commonwealth reserves the right to determine in its sole discretion whether to allow such waiver): ☐

Signature: _____ **Date:** _____

Name: _____
Print

Title: _____

Name of Firm: _____

This document must be completed & returned with bid submission.

END OF STATE CORPORATION COMMISSION FORM

NON-COLLUSION AFFIDAVIT

Under oath, I hereby affirm under penalty of perjury:

- (1) That I am the bidder or a partner of the bidder, or an officer or employee of the bidding corporation with authority to sign on its behalf;
- (2) That the attached bid or bids have been arrived at by the bidder and have been arrived at and submitted without collusion or any design to limit bidding or competition;
- (3) That the contents of the bid or bids have not been communicated to any person not an employee or agent of the bidder on any bid furnished with the bid or bids, and will not be communicated to any such person prior to the official opening of the bid or bids; and
- (4) That I have fully informed myself regarding the accuracy of the statements made in this affidavit.

Signed _____

Title _____

Firm Name _____

CITY / COUNTY OF _____

STATE OF _____, to wit:

I, _____, a Notary Public, do certify that

_____ whose name is signed to the foregoing has this date acknowledged the same before me in my City foresaid.

Given under my hand this _____ day of _____, 20____.

My Commission expired _____.

Notary Public

This document must be completed & returned with bid submission.

END OF NON-COLLUSION AFFIDAVIT

REFERENCE LIST

Indicate below a listing of at least three (3) current or recent client references, either commercial or governmental, that your company is servicing, has serviced, or has provided similar goods or services.

Reference #1

Company: _____
Phone #: _____
Project: _____

Contact Person: _____
Email: _____
Dates of Service: _____

Reference #2

Company: _____
Phone #: _____
Project: _____

Contact Person: _____
Email: _____
Dates of Service: _____

Reference #3

Company: _____
Phone #: _____
Project: _____

Contact Person: _____
Email: _____
Dates of Service: _____

Indicate below a listing of at least one (1) current or recent client/account that has terminated your company's services within the last two (2) years. Account(s) are preferred to be government accounts of a similar size and nature.

Terminated Reference *(if Applicable)*

Company: _____
Phone #: _____
Project: _____

Contact Person: _____
Email: _____
Dates of Service: _____

Company Background *(Attach additional sheets if necessary.)*

Number of Years in Business: _____

Overview of Work History, Experience & Background of Company:

This document must be completed & returned with bid submission.

END OF REFERENCE LIST

CONTRACT

THIS CONTRACT, dated this _____ day of _____, **2020**, for identification, is made by and between the **CITY OF STAUNTON, VIRGINIA** (the “OWNER”), a municipal corporation of the Commonwealth of Virginia acting by and through its City Manager, and _____ (the “CONTRACTOR”), a _____ Corporation licensed and registered to do business in the Commonwealth of Virginia, (SCC # _____).

WITNESSETH: That for and in consideration of the payments and contract hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction described as follows:

PROJECT: FY 20 WATER LINE IMPROVEMENTS

Hereafter called the **PROJECT**, for a sum not to exceed

under the terms of the contract documents.

For said price, the CONTRACTOR is to furnish all materials, labor, superintendence, equipment, tools, machinery, and other accessories and services necessary to complete the said PROJECT.

The Contract Documents, which comprise the entire CONTRACT between OWNER and CONTRACTOR, consist of the following:

- 1. This Contract**
- 2. Instructions for Bidders**
- 3. Bid and Addenda**
- 4. Performance and Payment Bonds**
- 5. General Conditions**
- 6. Special & Supplemental Conditions**
- 7. Technical Specifications**
- 8. Standard Details**
- 9. Plan Sheets**

Said documents are those prepared by the City Engineering Department or its assigned representative for the specific PROJECT.

The OWNER agrees to make payment to the CONTRACTOR in accordance with the General Conditions and for the price specified in the bid for work completed as stated above as the sum to be paid.

OWNER and CONTRACTOR stipulate that **TIME IS OF THE ESSENCE** and that delay by the CONTRACTOR in completion would have significant adverse consequences for the PROJECT; that, however, the actual damages to OWNER from such delay are uncertain and would be impossible and not susceptible to reasonable determination; and that liquidated damages of such failure by CONTRACTOR to perform in a timely manner are a reasonable way and not a penalty to address such adverse consequences. CONTRACTOR also stipulates that it shall not challenge,

either directly or indirectly, this liquidated damages provision. OWNER, therefore, may require CONTRACTOR to pay liquidated damages of **\$1,000** per day for the CONTRACTOR's failure to perform timely in strict accordance with the CONTRACT.

OWNER may deduct any liquidated damages from amounts due to CONTRACTOR and, otherwise OWNER shall be entitled to receive interest at the rate of 5% until deducted or paid. Liquidated damages shall be, other than for delay, in addition to any other entitlement by OWNER to damages and other remedies for any other damage, loss, or injury for which CONTRACTOR may be responsible.

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the contract, subject to additions and deductions as provided in the Proposal and to make payments on account thereof as provided in the General Conditions and the Special and Supplemental Conditions.

IN WITNESS WHEREOF, the parties to these presents have executed this contract in four (4) counterparts, each of which shall be deemed an original, in the year and day first above mentioned.

_____ City Engineer's Initials	_____ City Manager or Authorized Representative
-----------------------------------	--

Director of Finance Initials

Approved as to Legality and Form:

_____ City Attorney	_____ Contractor
------------------------	---------------------

_____ Secretary	By: _____
--------------------	-----------

_____ Witness	_____ Title
------------------	----------------

Address

Note: Secretary of the OWNER should attest. If CONTRACTOR is a corporation, Secretary should attest.

END OF CONTRACT

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That

(Insert full name or legal title and address of Contractor)

as Principal, hereinafter called Contractor, and

(Insert full name or legal title and address of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto

(Insert name and address of Owner)

As Obligee in the amount of _____ dollars (\$ _____)
(Insert sum equal to contract price in both words and figures)

For the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated _____, 20__ entered into a Contract with the Owner for:

**FY 20 Water Line Improvements
Staunton, Virginia**

In accordance with Drawings and Specifications prepared by or for:

**City of Staunton Engineering Division
116 W. Beverley Street
Staunton, Virginia 24401**

Which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, in strict conformity with the Drawings, Specifications and Contract Documents, then this obligation shall be null and void. Otherwise, it shall remain in full force and effect for one (1) year after completion of all work:

- a) The Surety hereby waives notice of any alternation or extension of time made by the Owner.
- b) Any suit under this bond must be instituted, (1) before the expiration of one (1) year after completion of the Contract including the expiration of all warranties and

guarantees, or (2) before the expiration of one (1) year after a defect or breach of warranty is discovered, if the action be for such.

- c) No right of action shall accrue on this bond to or for the use of any Person or corporation other than the Owner named herein or the successors or assigns of Owner and every action brought hereon shall be filed and maintained solely in the General District Court or the Circuit Court of the City of Staunton, Virginia.

SIGNED AND SEALED THIS _____ day of _____, 20____

In the presence of :

PRINCIPAL (SEAL)

WITNESS

BY TITLE

SURETY

WITNESS

BY TITLE

Surety:
(Attach power of attorney)

CONTRACTOR'S PERFORMANCE
BOND

Project:

END OF PERFORMANCE BOND

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That

(Insert full name or legal title and address of Contractor)

as Principal, hereinafter called Contractor, and

(Insert full name or legal title and address of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto

(Insert name and address of Owner)

As Oblige for the use and benefit of claimants as herein below defined in the amount of _____ dollars (\$_____)

(Insert sum equal to contract price in both words and figures)

For the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated _____, 20__ entered into a Contract with the Owner for:

**FY 20 Water Line Improvements
Staunton, Virginia**

In accordance with Drawings and Specifications prepared by or for:

**City of Staunton Engineering Division
116 W. Beverley Street
Staunton, Virginia 24401**

Which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly make payment to all claimants as herein defined, for all labor and materials used or reasonably required for use in the performance of the Contract, then this obligation shall be void. Otherwise it shall remain in full force and effect, subject, however, to the following conditions:

- a) A claimant is defined as one having a direct contract with the Contractor for labor, material, or both, used or reasonably required for use in performance of the

Contract, labor and material be construed to include the part of water, gas, power, light, heat, oil. Gasoline, telephone service, or rental of equipment directly applicable to the Contract.

- b) The above named Contractor and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work of labor was done or performed, or materials were furnished by such claimant, may sue on this bond, prosecute the suit to final judgment for such sum or sums as many be justly due claimant and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.
- c) Any suit or action hereunder by any claimant:
 - 1. Shall not be commenced after the expiration of one (1) year following the date on which the claimant last performed labor or last supplied materials.
 - 2. Shall be filed and maintained solely in the General District Court or the Circuit Court of the City of Staunton, Virginia.

SIGNED AND SEALED THIS _____ day of _____, 20____

In the presence of:

_____ WITNESS	_____ PRINCIPAL
	(SEAL)
	_____ BY TITLE
_____ WITNESS	_____ SURETY

Surety:

(Attach power of attorney)

_____ BY	_____ TITLE
CONTRACTOR'S LABOR AND MATERIAL PAYMENT BOND	
Project:	

END OF PAYMENT BOND

GENERAL CONDITIONS

1. INTENT

- 1.1. The Contract Documents comprise the entire Contract between the City and Contractor concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.
- 1.2. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be furnished and performed whether or not specifically called for. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning.
- 1.3. Plans and Specifications – All Work that may be called for in the Specifications and not shown on the Plans, or shown on the Plans and not called for in the Specifications, shall be executed and furnished by the Contractor as if described in both these ways; and should any work or materials be required which are not detailed in the Specifications or Plans, either directly or indirectly, but which are nevertheless necessary for the proper carrying out of the intent thereof, the Contractor is to understand the same to be implied and required, and shall perform all such work and furnish any such materials as fully as if they were particularly delineated and described. The Contractor shall keep one copy of all Plans and Specifications on the project at all times.
- 1.4. This procurement is being conducted on behalf of other public bodies, in accordance with § 2.2-4304 (A) of the Code of Virginia. If authorized by the bidder, the resultant contract may be extended to any public body in the Commonwealth of Virginia in accordance with contract terms.

2. INSURANCE

- 2.1. The Contractor shall not commence Work under this contract until he has obtained all the insurance required under this paragraph and such insurance has been approved by the City, nor shall the Contractor allow any Subcontractor to commence Work on his subcontract until the insurance required of the Subcontractor has been so obtained and approved.
 - 2.1.1. The Contractor shall procure and maintain during the life of this contract Worker's Compensation Insurance as required by applicable Virginia law for all of his employees to be engaged in Work at the site of the Project under this contract and, in case of any such Work sublet, the Contractor shall require the Subcontractor similarly to provide Worker's Compensation Insurance for all of the latter's employees to be engaged in such Work unless such employees are

covered by the protection afforded by the Contractor's Worker's Compensation Insurance. In case any class of employees engaged in hazardous work on the project under this contract is not protected under the Worker's Compensation Statute, the Contractor shall provide and shall cause each Subcontractor to provide adequate employer's Liability Insurance for the protection of such of his employees as are not otherwise protected.

- 2.1.2. Contractor's General Liability and Vehicle Liability Insurance: The Contractor shall procure and shall maintain during the life of the contract Contractor's General Liability Insurance and Vehicle Liability Insurance in the amounts specified in Section 2.3 below.
- 2.1.3. Subcontractor's General Liability and Vehicle Liability Insurance: The Contractor shall either:
 - 2.1.3.1. require each of his Subcontractors to procure and to maintain during the life of his subcontract, Subcontractor's General Liability and Vehicle Liability Insurance of the type and in the amounts specified in subparagraph (2.1.2) hereof; or
 - 2.1.3.2. insure the activities in his policy, specified in subparagraph (2.1.2) hereof.
- 2.1.4. Fire, Extended Coverage, Vandalism, and Malicious Mischief (Completed Value Builder's Risk) Insurance: The Contractor shall purchase "All Risk" type Builder's Risk Insurance. The policy shall cover not less than the losses due to fire, explosion, hail, lightning, vandalism, malicious mischief, wind, water, flood, collapse, riot, aircraft, and smoke during the contract time, and until the work is accepted by the Owner. The Builder's Risk Insurance shall be for the benefit of the Owner, the Contractor, and the Subcontractors, as their interest may appear.
- 2.1.5. Scope of Insurance and Special Hazards: The insurance required under subparagraphs (2.1.2) and (2.1.3) hereof shall provide adequate protection for the Contractor and his Subcontractors, respectively, against damage claims which may arise from operations under this contract, whether such operations be by the insured or by anyone directly or indirectly employed by him and, also against any of the special hazards which may be encountered in the performance of this contract.
- 2.1.6. Proof of Carriage of Insurance: The Contractor shall furnish the City with certificates showing the type, amount, class of operations covered, effective dates, and date of expiration of policies.

- 2.2. Special Hazards – The Contractor’s and his Subcontractor’s Public Liability and Property Damage Insurance shall provide adequate protection against the following special hazards:

- 2.2.1. Owner’s Protective Liability Insurance
- 2.2.2. Contractor’s Completed Operations

All insurance coverages shall be written by companies licensed to do business in Virginia and shall be administered by a Virginia registered agent and shall list the City as an additional insured.

- 2.3. General Liability, Vehicle Liability, and Worker’s Compensation Insurance: The Contractor's General Liability Insurance, Vehicle Liability Insurance, and Worker’s Compensation Insurance shall not be less than \$2,000,000, \$500,000, and \$500,000 respectively. BUILDERS RISK shall not be less than the contract amount.

- 2.3.1. The Contractor shall either:

- 2.3.1.1. Require each of his Subcontractors to procure and to maintain during the life of his subcontract, Subcontractor’s General Liability and Vehicle Liability Insurance of the type and in the same amounts as specified in the preceding paragraph; or
- 2.3.1.2. Insure the activities of his Subcontractors in his own policy.

3. AVAILABILITY OF LANDS

- 3.1. City shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of Contractor. Upon reasonable written request, City shall furnish Contractor with a correct statement of record legal title and legal description of the lands upon which the Work is to be performed and City’s interest therein as necessary for giving notice of or filing a mechanic’s lien against such lands in accordance with applicable Laws and Regulations. City shall identify any encumbrances or restrictions not of general application but specifically related to use of lands so furnished with which Contractor will have to comply in performing the Work. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by City, unless otherwise provided in the Contract Documents. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.
- 3.2. Construction in Public Rights-of-Way - The Contractor shall perform all his operations in a manner that will cause the minimal possible disruption to the normal vehicular and pedestrian traffic. The Contractor shall not block streets or highway to traffic without the prior consent of the City. Flagmen, lights, barricades, and construction signs shall be provided as directed by City. All barricades, signs, cones, etc. must conform to the guidelines established by the Manual of Uniform Traffic Control Devices (M.U.T.C.D.)

and the Virginia Work Area Protection Manual. All flagmen must be Virginia Department of Transportation certified. Pavement, shoulders, ditches, drainage structures and all other facilities disturbed during the construction shall be restored to their original condition, at the Contractor's expense except for work specifically itemized in the proposal. The Performance Bond shall cover all work on the City's rights-of-way and easements and the Contractor shall be responsible for the repair and maintenance of all areas disturbed within said rights-of-way and easements. No open ditches shall be permitted overnight in public rights-of-way.

- 3.3. Construction on Private and Public Property - The area of the construction shall be left in the same condition as it was found. All private and public utilities pipes, wires, lines, fences, walls, walks, pavements, curb and gutter, graveled areas, driveways, drainage structures, trees, shrubs, mailboxes, guy wires, septic systems, etc., encountered during the work whether shown on the Plans or not, shall be protected from damage by the Contractor. Should any facilities be damaged, the Contractor shall repair, replace, or pay damages for same. The surface of the construction area shall be graded, stoned, paved, seeded, etc.; to fit original conditions encountered. Payment for this work shall be included in the Proposal price of the item under construction.

4. EXISTING UTILITIES

- 4.1. The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to the City or by the owners of such Underground Facilities or by others, unless otherwise expressly provided in the Special and Supplemental Conditions.
- 4.2. City shall not be responsible for the accuracy or completeness of any such information or data; and
- 4.3. The cost of all of the following will be included in the Contract Price and Contractor shall have full responsibility for:
- 4.3.1. reviewing and checking all such information and data;
 - 4.3.2. locating all Underground Utilities shown or indicated in the Contract Documents
 - 4.3.3. coordination of the Work with the owners of such Underground Facilities during construction;
 - 4.3.4. the safety and protection of all Underground Facilities and repairing any damage thereto resulting from the Work.
- 4.4. Existing Utility Lines - The Contractor shall not disturb or damage any existing utility lines found above or below ground whether shown on the Plans or not. If during the course of the work any disturbance, or breakage should occur, the Contractor shall replace, at his own expense, the affected utility lines to the satisfaction of the City and the proper utility company. The Contractor shall bear full responsibility for any damage to life and/or property incurred as a result of such disturbance or damage to existing

utility lines. Special attention should be paid to the Code of Virginia, Sections 59.1-406 - 59.1-414 - "Overhead High Voltage Line Safety Act".

5. SCHEDULE

- 5.1. Schedule of Construction - Commencement of construction shall begin by the date determined by the City. Prior to initiation of construction, the Contractor shall have submitted a detailed work schedule to the City and have received approval of same. The Contractor must proceed according to the approved schedule unless the changes are approved by the City.
- 5.2. Contractor shall submit to City for acceptance proposed adjustments in the progress schedule that will not change the Contract Times. Such adjustments will conform generally to the progress schedule.

6. SHOP DRAWING, MATERIAL DATA SHEETS

- 6.1. Contractor shall submit Shop Drawings to City for review and approval. All submittals will be identified as City may require and in the number of copies specified. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show City the materials and equipment Contractor proposes to provide and to enable City to review the information.
- 6.2. Contractor shall also submit material Data Sheets to City for review and approval. Each submittal will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended and otherwise as City may require to enable City to review the submittal.
- 6.3. Before submitting each Shop Drawing or Material Data Sheet, Contractor shall have determined and verified:
 - 6.3.1. All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto;
 - 6.3.2. All materials with respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work; and
 - 6.3.3. All information relative to Contractor's sole responsibilities in respect of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.
- 6.4. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent or "or-equal" item or no substitution is permitted, other items of

material or equipment or material or equipment of other Suppliers may be accepted by City under the following circumstances:

- 6.4.1. ***“Or-Equal”***: If in City’s sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by City as an “or-equal” item, in which case review and approval of the proposed item may, in City’s sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items.
- 6.4.2. ***Substitute Items***: If in City’s sole discretion an item of material or equipment proposed by Contractor does not qualify as an “or-equal” it will be considered a proposed substitute item. Contractor shall submit sufficient information as provided below to allow City to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall first make written application to City for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor’s achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other Contractors affected by the resulting change, all of which will be considered by City in evaluating the proposed substitute. City may require Contractor to furnish additional data about the proposed substitute.

7. CONTRACTOR’S RESPONSIBILITIES

- 7.1. It is understood and agreed that the Contractor has, by careful examination, satisfied himself as to the nature and locations of the work, the conformation of the ground to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions and all other matters which in any way effect the work under this Contract. No verbal agreement or conversation with any officer, agent or employee of the City either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.

- 7.2. The Contractor shall keep on the work during its progress, a competent superintendent, satisfactory to the City and any directions given to such superintendent shall be as binding as if given to the Contractor. If the Contractor, in the course of the work, finds any discrepancy between the drawings and the physical conditions of the locality or any errors or omissions in drawings or in the layout as given by Points and Instructions, it shall be his duty to immediately inform the City in writing, and the City shall promptly verify the same. Any work done after such discovery, until authorized, will be done at the Contractor's risk.
 - 7.2.1. The contractor shall provide a superintendent and work force that is cooperative and friendly with the business community and general public. Abusive language and actions are prohibited.
- 7.3. Contractor shall supervise, inspect and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. Contractor shall be responsible to see that the completed Work complies accurately with the Contract Documents.
- 7.4. Unless otherwise specified in the Contract Documents, Contractor shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.
- 7.5. All materials and equipment shall be good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of the City. If required Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.
- 7.6. Throughout the course of the construction, the Contractor shall maintain the project free from any conditions, which may result in danger or nuisance to the public, including but not limited to dust and street disrepair.
 - 7.6.1. The Contractor is advised to take steps necessary to provide the safety necessary to protect the general public in the area.
- 7.7. The Contractor shall be responsible for the condition of all excavations made by him. All slides and cave-ins shall be removed without extra compensation, at whatever time and under whatever circumstances they may occur. The neglect, failure, or refusal of the City to order the use of bracing or sheeting, or a better quality, grade, or section, or larger

sizes of steel or timber, or to order sheeting, bracing, struts, or shoring to be left in place, or the giving or failing to give orders or directions as to the manner or methods of placing or driving sheeting, bracing, jacks, wales, rangers, etc., shall not in any way or to any extent relieve the Contractor of any responsibility concerning the condition of excavation or any of his obligations under the Contract; nor shall any delay, whether caused by any action or want of action on the part of the Contractor, or any acts of the City, or his agents, or employees, resulting in the keeping of an excavation open longer than would otherwise have been necessary, relieve the Contractor from the necessity of properly and adequately protecting the excavation from caving or slipping, nor from any of his obligations under the Contract relating to injury of persons or property, nor entitle him to any claim for extra compensation. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN PROPER AND SUFFICIENT SHEETING, SHORING AND BRACING TO PROTECT ALL PERSONS CONNECTED WITH THE WORK FROM INJURY.

- 7.8. Adequate sanitary conveniences for the use of persons employed on the work, properly secluded from public observation, shall be constructed and maintained by the Contractor in such a manner and at such points as shall be approved by the City. These conveniences shall be maintained at all times without nuisance and their use shall be strictly enforced; upon completion of the work they shall be removed leaving the area clean and free from nuisance.
- 7.9. The Contractor will be required to comply with the City's Erosion and Sediment Control Ordinance. Special care shall be taken to prevent siltation of existing sewer, streets, drainage ditches, and private property.
- 7.10. Contractor shall obtain and pay for all construction permits and licenses. City shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening Bids, or, if there are no Bids, on the Effective Date of the Contract.
- 7.11. The Contractor shall provide all field engineering services necessary for laying out the Project. All such services shall be performed by a Professional Surveyor registered with the State of Virginia. Control points shall be established and maintained during the execution of the Project. All documentation and control points shall be made available to the City throughout the execution of the Project.
- 7.12. The Contractor shall provide at their cost an independent testing service, approved by the City, to perform all testing required by the Contract Documents. Written reports shall be provided to the City.
- 7.13. The Contractor shall provide "as built" plans within 30 days of project completion. Such plans shall be prepared by a Licensed Surveyor and shall show such items as final elevations, grades, structure locations, etc.

7.14. Representatives of the City, as well as representatives of Local, State and Federal agencies and parties having an interest in the project shall have access to the work wherever it is in preparation or progress and the Contractor shall provide proper facilities for such access and review.

7.15. During the performance of this contract, the Contractor agrees to

7.15.1. provide a drug-free workplace for the Contractor's employees

7.15.2. 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 and such prohibition

7.15.3. 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

7.15.4. include the provisions of the foregoing clauses in every subcontract or purchase order of over \$10,000.00, so that such provisions will be binding upon each Subcontractor or vendor.

7.16. Contractor certifies that it does not and will not during the performance of this Contract violate:

7.16.1. The provisions of the Federal Immigration Reform and Control Act of 1986, as amended and §40.1-11.1, Code of Virginia, which prohibits the employment of illegal aliens.

7.16.2. The provisions of Federal and State employment and wage hour laws. The Contractor shall include and enforce the language in the last sentence in every subcontract issued under this Contract and shall require the subcontractor to do the same.

8. SUBCONTRACTS

8.1. Contractor shall not employ any Subcontractor, Supplier or other person or organization whether initially or as a substitute, against whom City may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom Contractor has reasonable objection.

8.2. Contractor shall be fully responsible to City for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with Contractor just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier or other person or organization any contractual relationship between City and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of the City to pay or to see the payment of any moneys due any such Subcontractor, Supplier

or other person or organization except as may otherwise be required by Laws and Regulations.

- 8.3. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with Contractor. Contractor shall require all Subcontractors, Suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with the City through Contractor.
- 8.4. The Contractor shall, as directed by the Owner, remove from all public and private property, at his own expense, all temporary structures, rubbish and waste materials, resulting from his operations; and shall leave the site in a neat, orderly condition.

9. OWNER'S RESPONSIBILITY

- 9.1. The Owner through his designated representatives shall have general supervision and direction of the work. He has the authority to stop the work whenever such stoppage may be necessary to ensure the proper execution of the Contract. He shall also have authority to reject all work and materials which do not conform to the Contract, to direct the application of forces to any portion of the work as in his judgment is required, to order the force increased or diminished and to decide questions which arise in the execution of the work.
- 9.2. Wherever work being done by the City's forces or by other Contractors is contiguous to work covered by this Contract the respective rights of the various interests involved shall be established by the City to secure the completion of the various portions of the work in general harmony.
- 9.3. If the Contractor should neglect to execute the work properly or fail to perform any provision of this Contract, the City after three days' written notice to the Contractor, may without prejudice to any other remedy make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.
- 9.4. City shall promptly furnish the data required under the Contract Documents and shall make payments to Contractor promptly when they are due.
- 9.5. City shall provide inspection of the Contractors Work.
- 9.6. The City shall have the right at any time, for reasons which appear good to them, to annul this Contract upon giving written notice to the Contractor, in which event the Contractor shall be entitled to the full amount of the estimate for the work done by him under this Contract up to the time of such annulment, including the retained percentage. The Contractor shall be reimbursed by the City for such expenditures that are not otherwise compensated for, and as are required in preparing for and moving to and from the work; the intent being that an equitable settlement shall be made with the Contractor.

10. CHANGES IN WORK

- 10.1. Without invalidating the Contract and without notice to any surety, City may, at any time or from time to time, order additions, deletions or revisions in the work. Any additions, deletions or revisions will be authorized by a Change Order. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents.
- 10.2. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented.
- 10.3. City and Contractor shall execute appropriate Change Orders covering:
 - 10.3.1. Changes in the Work which are ordered by City;
 - 10.3.2. Changes in the Contract Price or Contract Times which are agreed to by the parties; and
 - 10.3.3. Changes in the Contract Price or Contract Times, which embody the substance of any written decision, rendered by the City.

11. CHANGES IN CONTRACT PRICE

- 11.1. The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to Contractor for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change in Contract Price.
- 11.2. The Contract Price may only be changed by a Change Order. Any claim for an adjustment in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to City promptly after the start of the occurrence or event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within 20 days after the start of such occurrence or event and shall be accompanied by claimant's written statement that the adjustment claimed covers all known amounts to which the claimant is entitled as a result of said occurrence or event. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph 11.2.
- 11.3. The value of any Work covered by a Change Order or of any claim for an adjustment in the Contract Price will be determined as follows:
 - 11.3.1. Where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved.
 - 11.3.2. Where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum.

12. CHANGES IN CONTRACT TIMES

- 12.1. The Contract Times may only be changed by a Change Order except for inclement weather days as determined by the City. Such inclement weather days shall be maintained by the City and added to the number of days permitted for completion of the Project. Any claim for an adjustment of the Contract Times shall be based on written notice delivered by the party making the claim to the other party and to City promptly after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within 20 days after such occurrence and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Times shall be determined by City. No claim for an adjustment in the Contract Times will be valid if not submitted in accordance with the requirements of this paragraph 12.1.
- 12.2. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a claim is made therefor as provided in paragraph 12.1. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by City, acts or neglect of utility owners, fires, floods, epidemics, abnormal weather conditions or acts of God. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within control of Contractor.
- 12.3. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of both City and Contractor, an extension of the Contract Times in an amount equal to the time lost due to such delay shall be Contractor's sole and exclusive remedy for such delay. In no event shall City be liable to Contractor, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:
- 12.3.1. delays caused by or within the control of Contractor, or
 - 12.3.2. delays beyond the control of both parties including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God or acts or neglect by utility owners.

13. INDEMNIFICATION

- 13.1. The Contractor agrees to indemnify, defend and hold harmless the City, its members of Council, officers, directors, agent and employees, against any and all claims, liabilities, losses, damages, costs and expenses (including reasonable attorney fees) arising out of, or resulting from any and all injuries to persons or damage to property arising out of services performed hereunder or by reason of the intentional or negligence acts or omissions of the Contractor, its employees, agents or sub-consultants, including any independent contractors.

14. SEPARATE CONTRACTS

- 14.1. The City reserves the right to let other contracts in connection with this work. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs.

15. PAYMENT

- 15.1. 5% of the dollar amount of the estimate of work completed shall be withheld until the final acceptance of the project. Payment shall be made based on estimates of work completed in the preceding month submitted on, or before the 5th day of the month for the duration of the contract. Application for partial payments shall be submitted on Standard City form.
- 15.2. Material stored on site shall be paid for based on supplier invoice only.
- 15.3. Failure by the City to make payments at the time provided by this Contract shall give the Contractor the right to suspend work until payment is made, or, at his option, after thirty days written notice, should the City continue to default; to terminate this Contract and recover the price of all work done and materials provided and all damages sustained; and such failure to make payment at the time provided shall be a bar to any claim by the City against the Contractor for delay in completion of the work, due to such suspension or failure to pay.
- 15.4. Payments to Subcontractors: The Contractor shall take one of two actions within seven days after receipt of payment by the City:
- 15.4.1. Pay the Subcontractor for the proportionate share of the total payment received from the City attributable to the work performed by the Subcontractor under that contract; or
 - 15.4.2. Notify the City and Subcontractor, in writing, of his intention to withhold all or part of the Subcontractor's payment with the reason for nonpayment.

The Contractor shall pay interest to any Subcontractor on all amounts owed by the Contractor that remain unpaid after seven days following receipt by the Contractor of payment by the City for work performed by the Subcontractor. Interest shall accrue at the rate of 1 percent per month.

- 15.5. Upon the completion of the work and its final acceptance by the City, the Contractor shall submit his final estimate over his signature, covering work provided for in this Contract, completed and accepted by the City under the terms and condition hereof, whereupon the balance found to be due the Contractor, shall be paid to the Contractor within 30 days of receipt of the final estimate by the City, provided that, before the payment of said final estimate the Contractor shall submit evidence satisfactory to the City that all payrolls, material bills and outstanding indebtedness in connection with the work have been paid.

The payment of the final estimate due under this Contract and any and all alterations of same, shall release the City and the officers and agents thereof, from any and all claims or liabilities on account of the work performed and materials furnished under this Contract or any alterations thereof.

16. DISCRIMINATION

16.1. During the performance of this contract, the Contractor agrees as follows:

- 16.1.1. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there 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 applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
- 16.1.2. 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.
- 16.1.3. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

The Contractor will include the provisions of the foregoing paragraphs 16.1.1, 16.1.2, and 16.1.3 in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each Subcontractor or vender.

17. CLAIM PROCESS

- 17.1. The OWNER and CONTRACTOR each hereby waive all right to trial by jury in any matter arising out of or in any way connected with this CONTRACT or their relationship, whether contractual or extra-contractual. They agree that prior to the assertion of any claim against the other, they will endeavor to resolve the claim through discussion, including the optional use of non-binding mediation. Absent agreed resolution, the process to assert a claim against the City is to present it in writing to the Appropriate City Department Director; and absent acceptance of the decision of the City Engineer, then appeal in turn to the City's Director of Community Development and Economic Development, City Manager or designee and ultimately to Council, with each such appeal to be submitted in writing within 10 calendar days of prior decision, identifying in writing on what specific basis, with citation to controlling and supporting documentation and legal authority, the appeal is sought and challenge made to the prior decision and the resolution or remedy which would be acceptable. With any claim that reaches City Council, the City Council shall decide the claim within 60 days of when it was submitted to the City Manager or designee.

END OF GENERAL CONDITIONS

SPECIAL AND SUPPLEMENTAL CONDITIONS

FY 20 Water Line Improvements

These Special and Supplemental Conditions amend or supplement the General Conditions and Specifications and other provisions of the Contract Documents as indicated. All provisions which are not so amended or supplemented remain in full force and effect.

Technical Specifications:

1. Section 102 Traffic Control

- a. Temporary closure of Mountain View Drive will be permitted during working hours only. Access to residences and access for emergency vehicles shall be maintained at all times.

2. Section 109 Water Distribution System

- a. All water service connections shall be replaced from water main to water meter using Cross-Linked Polyethylene (XLPE) Pressure Pipe (Municipex or approved equal) with tracer wire. See Section 107.2.4 of the Technical Specifications and Standard City Details.
- b. Metallic Zinc Coated Pipe shall conform to AWWA/ANSI C151/A21.5, current revisions, with regard to materials used and method of installation. Care shall be taken when installing Metallic Zinc Coated Pipe with V-Bio Enhanced Polywrap. Spot repairs shall be made as necessary.
- c. Polyethylene Encasement shall conform to AWWA/ANSI C105/A21.5, current revisions, with regard to materials used and method of installation.
- d. External Zinc Based Coating shall conform to ISO 8179-1, current revisions, with regard to materials used and method of installation. No separate payment will be made for spot repairs to zinc coated pipe or polyethylene encasement.

3. Section 110 – Curb & Gutter, Sidewalk, Miscellaneous Concrete

- a. Sections 110.4 of the Technical Specifications is revised. There shall be no separate payment for restoration of bituminous pavement, concrete, aggregate shoulders, or lawns. Associated cost shall be included in related bid items.

4. Section 111 – Street Construction and Repair/Patching

- a. Sections 111.4 of the Technical Specifications is revised. There shall be no separate payment for restoration of bituminous pavement, concrete, aggregate shoulders, or lawns. Associated cost shall be included in related bid items.

END OF SPECIAL AND SUPPLEMENTAL CONDITIONS

SECTION 101 MOBILIZATION

101.1 GENERAL

Work shall consist of performing preparatory operations, moving personnel and equipment to the job site, paying bonds and insurance premiums and establishing a Contractors field office.

101.2 MEASUREMENT & PAYMENT

When listed as a separate pay item, mobilization will be paid for at the rate of 50% with the first month's request for payment and 50% with the second month's request for payment. The mobilization bid shall not exceed 10% on projects with a value less than \$200,000 and 7.5% on projects over \$200,000. If mobilization is not listed as a separate pay item, it will be considered incidental to all other work and the cost distributed accordingly.

END OF MOBILIZATION

SECTION 102 TRAFFIC CONTROL

102.1 GENERAL

All traffic control devices and traffic patterns shall conform to the standards in the Manual of Uniform Traffic Control Devices (MUTCD) and the Virginia Work Area Protection Manual unless shown otherwise on the plans.

102.1.1 Referenced Specifications are referred to by abbreviation as follows:

- A. Manual of Uniform Traffic Control Devices (MUTCD)
- B. Virginia Department of Transportation (VDOT)
- C. Virginia Work Area Protection Manual (VWAPM)

102.1.2 The contractor is responsible for providing the required signage and cones.

102.1.3 No rerouting of traffic or street closings will be done without prior approval from the City. All signage and traffic control shall be subject to the City's approval.

102.1.4 All traffic cones are to be 36" tall and clean.

102.1.5 When left unattended, any work zone adjacent to a City street shall have lighted barricades every 30'. No open excavations will be permitted overnight in a City right-of-way.

102.1.6 Rerouting of traffic shall be delineated with traffic cones.

102.1.7 Flagmen must be used when stopping traffic and for equipment entering and exiting a work zone.

102.1.8 All flagmen shall be certified by VDOT and be in possession of a valid flagging card.

102.2 MEASUREMENT AND PAYMENT

When listed as a separate bid item, Traffic Control will be paid for as a lump sum item. Payment will be made as a percentage of the associated items that are completed. When there is not a separate bid item for Traffic Control, it will be considered incidental to all other work and the cost distributed accordingly.

END OF TRAFFIC CONTROL

SECTION 103

SITE CLEARING

103.1 GENERAL

This section provides for general site clearing operations, including trees and vegetation removal, protection of existing trees to be left standing, and clearing and grubbing.

- 103.1.1 Related requirements specified in other Sections of the Specifications.
 - A. Section 104 - Trenching & Backfilling
 - B. Section 106 - Seeding
- 103.1.2 Provide barricades, coverings, or other types of protection necessary to prevent damage to existing improvements not indicated to be removed, and improvements on adjoining properties.
- 103.1.3 Protect existing trees and other vegetation indicated to remain in place against cutting, breaking, or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary fences, barricades or guards as required to protect trees and vegetation to be left standing.
- 103.1.4 Burning where allowed by local ordinances will be allowed by permit only.

103.2 EXECUTION

- 103.2.1 Clearing
 - A. Remove from the site trees, brush, shrubs, down timber, rotten wood, rubbish, other vegetation, including stumps, as well as fences, and incidental structures necessary to allow for new construction.
 - B. Clearing work shall be restricted to area within rights-of-way or easements or within "Construction Limits" indicated on Drawings.
- 103.2.2 Existing Trees and Shrubs
 - A. Trees and shrubs that are to remain within "Construction Limits" shall be marked by the owner prior to clearing operations.
 - B. Ownership of Trees: Unless otherwise noted, felled trees within the "Construction Limits" shall become the property of the Contractor and shall be removed from the site.
 - C. Use only hand methods for grubbing inside the drip lines of trees which are to remain.

- 103.2.3 Clean up debris resulting from site clearing operations continuously with the progress of the work.
- 103.2.4 Remove all waste material from site.
- 103.2.5 Remove debris from site in such a manner as to prevent spillage. Keep pavement and area adjacent to site clean and free from mud, dirt and debris at all times.

103.3 MEASUREMENT AND PAYMENT

When listed as a separate bid item, site clearing shall be paid for as a lump sum. When not listed as a separate bid item, site clearing shall be considered incidental to associated work items.

END OF SITE CLEARING

SECTION 104 TRENCHING & BACKFILLING FOR UTILITY LINES

104.1 GENERAL

Work included in this Section includes trenching and backfilling for underground pipelines and related structures only.

104.1.1 Related requirements specified in other Sections of the Specifications.

- A. Section 102 - Traffic Control
- B. Section 103 - Site Clearing
- C. Section 105 - Rock Excavation
- D. Section 106 - Seeding
- E. Section 107 - Sanitary Sewer System
- F. Section 108 – Storm Drainage System
- G. Section 109 - Water Distribution System

104.1.2 Reference Specifications are referred to by abbreviation as follows:

- A. American Society for Testing and Materials – ASTM
- B. American Association. of State Highway and Transportation Officials – AASHTO
- C. Virginia Department of Transportation – VDOT

104.1.3 The contractor shall provide compaction testing as deemed necessary by the City.

104.1.4 Locate existing utilities, culverts and structures, above and/or below ground, before any excavation starts. Coordinate work with utility companies. Protect, maintain in service, and prevent damage to utilities not designated to be removed. When utilities are encountered and are not shown on Drawings or when locations differ from those shown on Drawings, notify Engineer for instructions before proceeding.

104.2 PRODUCTS

104.2.1 Pipe Bedding Fill

- A. Granular fill shall meet requirements for VDOT #68 or #57 aggregate.

104.2.2 Select Backfill

- A. Aggregate fill shall be VDOT #21A.

- B. Clean earth fill shall be approved material free of debris, roots, frozen materials, organic matter, rock or gravel larger than 2 inches in any dimension or other harmful matter.
 - C. Flowable Fill shall conform to VDOT Road and Bridge Standards and VDOT Special Provision for Flowable Fill.
- 104.2.3 Concrete for bedding, backfill or encasement shall have at least 2,000 psi compressive strength.
- 104.2.4 Rip rap, where shown on the Drawings, shall conform to VDOT Road and Bridge Specifications.

104.3 EXECUTION

- 104.3.1 Strip existing topsoil, leaf mold and organic materials, meeting topsoil requirements of Section 106 - "Seeding." Deposit in storage piles separate from other excavated material.
- 104.3.2 Unauthorized excavation consists of the removal of material beyond indicated subgrade elevations or side dimensions without specific approval of the City Engineer. Where unauthorized excavations occur, restore these areas to the elevations and dimensions shown on the Drawings with granular fill.
- 104.3.3 Where removal of unsatisfactory material is due to fault or negligence of the Contractor, by inadequate shoring or bracing, dewatering, material storage or other failure to meet specified requirements, any work deemed necessary by the City Engineer to correct the faulty condition shall be performed at no additional cost.
- 104.3.4 Excavation and Bedding
- A. Open trenches are limited to 100'.
 - B. The width of the trench at and below the top of the pipe shall be the outside diameter of the pipe plus 24 inches.
 - C. The trench width shall be of adequate width to allow for a mechanical compactor between the pipe and the trench wall.
 - D. Pressure lines shall be installed with bedding as indicated in the Standard Drawings.
 - E. Gravity sewer lines in good material shall be installed with a modified class B bedding as shown on standard drawing S-8.
 - F. Dewater excavation as necessary to provide proper protection. If deemed necessary, the Engineer may require continuous dewatering 24 hours per day by adequate pumping or well-points until backfilling is completed.

The method, and equipment used for dewatering shall be subject to the approval of the Engineer.

- G. Where unsuitable soil is encountered, excavate to depth determined by the City Engineer and replace with suitable material approved by the City Engineer.
- H. Where underground streams or springs are found, provide temporary drainage and notify City Engineer.
- I. Remove from the project site and dispose of material unsatisfactory for backfill, trash, and all excess material continuously with the progress of the work.
- J. Remove shoring and all form materials, unless otherwise directed.
- K. Where rock is encountered which will serve as a foundation for a manhole, vault, or other structure, it shall not be removed. Where only a part of the foundation would bear on rock, excavate to an even depth of 8 inches below the entire structure and backfill with aggregate fill and thoroughly compact. Provide a minimum of 8 inches between rock excavation and sides of structures.
- L. Compact pipe bedding by mechanical tamping to prevent settlement.

104.3.5 Sheeting

- A. Maintain trench walls in a safe condition at all times. The City Engineer reserves the right to require the use of sheeting and/or shoring at any time the Engineer deems it necessary.
- B. Sheeting and shoring left in place shall be cut off to a depth of not less than 18 inches below finish grade.

104.3.6 Compaction

- A. Percentage of maximum density requirements: Compact each layer of fill or backfill to not less than the following percentages of the maximum density at optimum moisture content as determined by ASTM D 698 (AASHTO T-99):
 - 1. 100 percent beneath and within 25 feet of buildings and structures, including those shown for future construction.
 - 2. 95 percent beneath pavements, walks, and road shoulders, including those shown for future construction.
 - 3. 90 percent in other unpaved areas.

104.3.7 Backfill

- A. Backfill trench to a compacted depth of 1 foot over the pipe with approved earth fill. Backfill shall be properly placed uniformly on each side of the pipe and compacted as required. Do not backfill on muddy or frozen soil, or with muddy or frozen soil.
- B. Backfill over any plastic or PVC pipe to 1' over the top of the pipe with VDOT #68 or #58 aggregate.
- C. Backfill trench from 1 foot above the pipe to grade with clean earth fill free of stones larger than 6 inches or 1/2 the layer thickness, whichever is smaller. Layers shall not exceed 12 inches, except that under road shoulders and under existing or future paved areas, layers shall not exceed 8 inches. Backfill shall be compacted to the density specified for the areas in which it is located except that minimum compaction in any area shall be to the density of the adjacent soil. Compaction shall be achieved by vibratory mechanical tamping.
- D. When specified the trench shall be backfilled full depth with VDOT 21A aggregate.
- E. When specified the trench shall be backfilled from 6" above the pipe to the bottom of the pavement repair detail with VDOT Flowable Fill.
- F. Excavation depressions caused by removal of stumps or other clearing operations to firm subgrade shall be filled with clean earth fill and compacted as specified.
- G. Place backfill materials adjacent to structures evenly. Take care to prevent wedging action of the backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.
- H. Compact backfill materials using equipment suitable for the materials being compacted and the work area locations. Use power-driven hand tampers for compacting materials adjacent to structures.
- I. Compact aggregate fill placed under manholes or other structures to required density.
- J. Full stone backfill will be used only at the discretion of the City Engineer where native backfill is deemed unsuitable.

104.3.8 Grading

- A. Uniformly grade all areas within the limits designated on the Drawings, including adjacent transition areas.

- B. Finish all surfaces to be free from irregular changes.
- C. Finish subgrade areas to receive topsoil to within 0.10 foot of required subgrade elevations.
- D. Shape subgrade under walks to line, grade, and cross-section to within 0.10 foot of required subgrade elevations.
- E. Shape subgrade under pavement to line, grade, and cross-section to required subgrade elevations.
- F. Protect newly graded areas from traffic and erosion. Repair and reestablish grade in settled, eroded, or rutted areas to the specified tolerances.
- G. Where compacted areas are disturbed by subsequent construction or adverse weather scarify the surface, reshape and compact to the required density. Use hand tamper for re-compaction over underground utilities.

104.3.9 Utilities to be Abandoned or Removed

- A. When underground utilities are to be abandoned in place, plug, cap or seal with concrete at the "construction limits" or at points shown.
- B. Remove underground utilities indicated on the Drawings to be removed and backfill resulting excavation with suitable material compacted as specified. Plug, cap or seal utilities with concrete, at the construction limits or at points shown.

104.3.10 Clean Up

- A. Keep areas of work cleaned up at all times, and promptly remove all materials and debris not intended for incorporation in the work. Broom clean the surfaces of all paved areas immediately after backfilling operations.
- B. Maintain backfilled trenches from the nuisance of dust, mud or settling during the entire length of the Contract and for a period of one-year following Final Acceptance of the Work.
- C. In the event the Contractor fails to satisfy these requirements to the satisfaction of the City, or otherwise prosecute the Work in a reasonable or proper manner, and after a reasonable period of time has elapsed after notification by the City of unsatisfactory conditions, the City reserves the right to employ outside services to take such corrective action as deemed necessary by the City Engineer. The cost incurred in taking corrective actions will be deducted from any monies due the Contractor by the City or such other means of collection as may be available to the City.

104.3.11 Preparation for Final Inspection

- A. Locate and adjust all manholes, valve boxes, etc. to final grade and flush out all gravity pipelines as necessary prior to final inspection by the City Engineer.

104.4 MEASUREMENT AND PAYMENT

- 104.4.1. Excavation – Excavation for utility work is incidental to all other work. No separate payment is made.
- 104.4.2. Rip Rap - When specified as a separate bid item, rip rap will be paid for by the ton or square yard for the Class specified.
- 104.4.3. Backfill - When there is not enough suitable backfill material on site, VDOT 21A Aggregate shall be used and paid for by the ton. Otherwise there is no separate payment for backfill.

END OF TRENCHING & BACKFILLING FOR UTILITIES

SECTION 105 ROCK EXCAVATION

105.1 DESCRIPTION OF WORK

- 105.1.1 Furnish all labor, material and equipment to excavate rock and dispose of rock as specified herein.

105.2 REQUIREMENTS OF REGULATORY AGENCIES

- 105.2.1 Observe all municipal ordinances and State and Federal laws relating to the transportation, storage, handling and use of explosives.
- 105.2.2 Blasters shall be duly licensed and shall have their license on the work site at all time during blasting activities.

105.3 DEFINITION

- 105.3.1 The word "rock," wherever used as the name of an excavated material or material to be excavated, shall mean solid ledge rock which, in the opinion of the City Engineer, requires, for its removal, drilling and blasting or mechanical hammer.
- 105.3.2 No soft or disintegrated ledge rock, no loose, shattered, or broken stone, regardless of size, in rock fills or elsewhere; no frozen earth or existing paving; and no rock exterior to the maximum limits of measurement allowed, which may fall into the excavation, will be measured or allowed for payment as rock excavation.

105.4 EXECUTION

- 105.4.1 Excavate rock to the lines and grades indicated on the drawings and as specified in 105.6 - Measurement and Payment. Dispose of excavated material not suitable for backfill in a location approved by the Owner.
- 105.4.2 Excavate rock in trenches to 6-inches below the bottom of the pipe to be installed.
- 105.4.3 Excavate rock in structure excavations to 6" below the bottom of the foundation.
- 105.4.4 Conduct operations involving explosives by experienced personnel only, with all possible care to avoid injury to persons and damage to property.
- 105.4.5 Blast only with such quantities and strengths of explosives and in such manner as to break the rock approximately to the intended lines and grades.
- 105.4.6 Care shall be taken to avoid excessive cracking of the rock upon or against which any pipe or structure will be built, and to prevent damage to existing pipes or other structures and property above or below ground.

- 105.4.7 Cover rock with blasting mats where required.
- 105.4.8 Give sufficient warning to all persons in the vicinity of the work before a charge is detonated. Employ flagmen to stop or direct traffic as required.
- 105.4.9 When required by the City, the contractor shall have a seismograph on site to monitor vibration.

105.5 EXCESS ROCK EXCAVATION

- 105.5.1 If rock is excavated beyond the limits of excavation indicated on the drawing, specifications, or not authorized in writing by the Engineer, the excess excavation, whether resulting from over breakage or other causes, shall be backfilled, by and at the expense of the Contractor, as specified below.
- 105.5.2 In pipe trenches, excess excavation below 6" from the bottom of the pipe shall be filled with material of the same type, placement and compaction as specified for the bedding.
- 105.5.3 In excavations for structures, excess excavation in the rock beneath foundations shall be filled with 3,000 psi concrete. Other excess excavation shall be filled with earth.
- 105.5.4 If rock below normal depth is shattered due to drilling or blasting operations and such shattered rock is unfit for foundations, the shattered rock shall be removed and the excavation shall be backfilled as described in "EXCESS ROCK EXCAVATION." All such removal and backfilling shall be classified as excess rock excavation.
- 105.5.5 Keep and submit to the Engineer an accurate record of each blast. The record shall show the general location of the blast, the depth and number of drill holes, the kind and quantity of explosive used, and other data required for a complete record.

105.6 MEASUREMENT AND PAYMENT

- 105.6.1 The contractor shall notify the owner when rock measurements can be performed. If backfill commences before measurement is made, the contractor will not be paid for that portion of the rock removed. Maximum measurement for rock excavation in pipe trenches shall be to six (6) inches below bottom of pipe with the width of trench at 2'-0" plus the interior diameter of pipe, regardless of the excess width excavated. Maximum measurement for precast and cast-in-place structures shall be structure width plus four (4) feet; structure length plus four (4) feet; and base of structure. Payment shall be the price bid per cubic yard and is to include aggregate fill to bring the ditch to plan grade.

END OF ROCK EXCAVATION

SECTION 106 SEEDING

106.1 GENERAL

- 106.1.1 Related requirements specified in other Sections of the Specifications:
Section 104 - Trenching & Backfilling
- 106.1.2 Reference Specifications are referred to by abbreviation as follows:
American Society for Testing and Materials – ASTM
Virginia Department of Transportation – VDOT
- 106.1.3 Submit two copies of the following:
 - A. Seed Test Report
 - B. Fertilizer Analysis
- 106.1.4 Materials shall be delivered in unbroken containers, clearly marked by the manufacturer as to contents. Seed, lime, and fertilizer shall be labeled as to proportions, analysis and quality. Store all materials in a manner affording protection from damage by weather or vandalism.
- 106.1.5 Seed only when wind velocity is less than 15 miles per hour.

106.2 PRODUCTS

- 106.2.1 Topsoil shall be the top 4 inches or original soil from the site, unless otherwise noted on the Drawings. Topsoil obtained off-site shall be fertile, friable loam or silt, containing not less than 2 pct., by weight, of finely divided, decomposed vegetable matter. Topsoil shall be free of subsoil, clay lumps, brush, weeds, roots larger than ½ inch diameter, stones larger than ½ inch diameter and other material toxic or harmful to growth.
- 106.2.2 Fertilizer shall be 5-10-5 applied at 1000 pounds per acre.
- 106.2.3 Seed mixture shall be 40% lawn fescue, 40% lawn bluegrass, 10% annual rye grass and 10% white Dutch clover applied at 5 pounds per 1000 square feet unless otherwise specified.
- 106.2.4 Lime shall be ground agricultural grade lime containing not less than 85 pct. calcium and magnesium carbonates. Fineness shall be such that 100 pct. will pass a No. 20 sieve, not less than 50 pct. will pass a No. 100 sieve. Burnt lime or hydrated lime may be substituted in equivalent carbonates, if requested.
- 106.2.5 Mulch shall be clean, seed free, loose, unweathered, unchopped small grain straw. Spray mulch of an approved wood cellulose fiber material that is in

accordance with the Virginia Department of Transportation (VDOT) specifications shall be accepted.

- 106.2.6 Sod shall be composed of at least 70 pct. of Kentucky 31 tall fescue and be cut to provide a minimum thickness of 2 inches. Vegetation more than 5 inches in height shall be cut to 3 inches or less before sod is lifted.

106.3 EXECUTION

- 106.3.1 Prepare soil for permanent seeding by tilling of topsoil in place to loosen thoroughly and break up all clods to a depth of 6 inches. Remove all stumps and roots, coarse vegetation, stones larger than 1-1/2 inches and all construction debris. Soil shall be worked by suitable agricultural equipment to a depth of not less than 4 inches. Rake to a uniform, smooth and drainable surface.

Apply lime and fertilizer uniformly and mix well into top 4 inches of seed bed. Apply lime at the rate of 100 lbs. per 1000 sq. ft. Apply fertilizer at the rate of 50 lbs. of 5-10-5 per 1000 sq. ft.

- 106.3.2 Sow permanent grass seed between dates of March 15 and May 31 or August 15 and October 31st unless otherwise approved. Temporary seeding and/or mulching is required at all other times.

- 106.3.3 Sow seed by mechanical seeder as follows:

- A. Mix seed thoroughly with clean dry sawdust and broadcast at rate of 5 lbs. of seed per 1000 sq. ft. in cross directions to ensure uniform distribution. Rake surface lightly and roll with appropriate type of lawn roller weighing maximum of 150 lbs. per foot of width.
- B. Protect the complete seeded area against erosion by mulching with straw at a rate of one (1) bale per 1000 square feet or by spray mulching with a wood cellulose fiber material applied by hydro-jet method at a rate of 35 pounds (dry weight) per 1000 square feet, in accordance with the VDOT Standard method.
- C. Anchor mulch by the following methods.
 - (1) In residential areas, apply synthetic mulch binder at rate recommended by manufacturer.
 - (2) On slopes steeper than 4 horizontals to 1 vertical, fasten heavy jute mesh to wooden stakes.

- 106.3.4 Remove all soiling or staining of finished walks, drives and parking area resulting from seeding work. Maintain paved areas in clean condition.

- 106.3.5 Turf grass Maintenance

- A. Water as required to keep soil moist during germination period.

B. Mowing

- (1) When grass reaches height of 3-1/2 to 4 inches, mow to height to 2-1/2 inches.
- (2) Maintain grass height between 2-1/2 and 4 inches.
- (3) Do not remove more than 33 pct. of total height of grass in one mowing.

C. Reseed and mulch spots larger than 1 square foot without uniform stand of grass.

D. Mow and maintain all seeded areas until uniform stand of grass is acceptable to Engineer.

E. In the event that growth is not established by final project inspection, continue the specified attention until stand is accepted by Engineer.

F. Correct or repair all undue settling as evidence by complaints received within one year after final inspection.

106.4 HYDROSEEDING

106.4.1 The Contractor may elect the use of approved hydraulic seeder (s) for the application of seed and mulch.

106.4.2 Hydraulic applications shall not begin until the topsoil preparation and the lime application has been completed, as specified herein. The method shall be in accordance with VDOT specifications.

106.4.3 Hydraulic Seeder(s) shall be equipped with an agitation system capable of maintaining all mixture solids in complete suspension and shall be equipped with spray nozzles that produce an even distribution.

106.4.4 Wood Fiber Mulch shall consist of specially prepared wood cellulose fibers. Mulch shall not contain growth or germination inhibiting factors. Mulch shall be dyed an appropriate color to facilitate visual detection during application.

106.4.5 Slurry mix for hydro seeding shall supply the following rates per acre:

Kentucky 31 Tall Fescue (100%) or,	32 pounds
Kentucky 31 Tall Fescue (67%) and,	21.5 pounds
Red Creeping Fescue (33%)	10.5 pounds
Fertilizer 10-20-10	1,000 pounds
Wood Fiber Mulch, or	1,500 pounds
Straw tacked with,	3,000 pounds
Wood Fiber	750 pounds

106.5 INSPECTION AND ACCEPTANCE

106.5.1 At the beginning of the next planting season after that in which the permanent grass crop is sown, the seeded areas will be inspected. Any section not showing dense, vigorous growth at that time shall be promptly reseeded by the Contractor at his own expense. The lawns shall be watered, weeded, cut and otherwise maintained until the end of that planting season, when they will be accepted.

106.6 MEASUREMENT AND PAYMENT

- 106.6.1 Topsoil and Seeding. Measurement and payment shall be per acre or lump sum as listed on the Bid Schedule. When there is no topsoil and seeding bid item the work is considered incidental to other associated work items.
- 106.6.2 Sod – when specified sod shall be paid for by square foot.
- 106.6.3 Maintenance – There shall be no separate payment for maintenance of seeded or sodded areas.

END OF SEEDING

SECTION 109 WATER DISTRIBUTION SYSTEM

109.1 GENERAL

Work in this Section includes all water system piping including all valves, hydrants, fittings, anchors, air vents and other appurtenances or material as indicated on the construction plans

109.1.1 Related requirements specified in other Sections of the Specifications:

- A. Chapter 8 - General Construction Standards
- B. Section 103 - Site Clearing
- C. Section 104 - Trenching & Backfilling
- D. Section 106 - Seeding
- E. Section 107 - Sanitary Sewer System

109.1.2 Reference Specifications are referred to by abbreviation as follows:

- A. American National Standards Institute - ANSI
- B. American Railway Engineering Association - AREA
- C. American Society for Testing and Materials - ASTM
- D. American Water Works Association - AWWA

109.2 EXISTING FACILITIES

109.2.1 Domestic Water Service - It shall be the Contractor's responsibility to maintain water service to residents during the life of this project; however, during different phases of construction, it will be necessary to temporarily disrupt water service. Any disruption of water service shall be to the Owner's approval and the Contractor shall give residents sufficient warning of the disruption.

109.2.2 Abandoned Facilities - The Contractor shall abandon the existing water lines by closing valves, cutting/sleeving lines, removing valve boxes, and plugging the lines as directed by the City or as shown on the plans. The Contractor shall remove abandoned fire hydrants as directed. All salvageable materials will be delivered to the City's storage yard. All work associated with this Article will be considered incidental to the project and will have no separate pay item unless specifically identified on the bid schedule.

109.3 PRODUCTS

Submit shop drawings on all products as required by the City. Provide certified test results of pipe testing.

- 109.3.1 Ductile iron pipe shall meet requirements of AWWA C151, Class 350. All pipe shall have a cement mortar lining on the interior and a bituminous coating on the exterior. Unless otherwise noted, all joints shall be slip joints.
- 109.3.2 Copper tubing shall meet requirements of ASTM B88 for Type "L" copper, hard drawn, for above ground and Type "K" hard drawn for below ground.
- 109.3.3 Cross-linked Polyethylene (XLPE) Pressure Pipe and tubing shall meet requirements of AWWA C904 and NSF/ANSI 61, 1/2 inch (13mm) through 3 inches (76mm) for Water Service. Tubing shall be minimum pressure class 200, copper tube size, meeting the requirements of AWWA C904. Couplings for use in joining gravity pipe of differing materials and/or sizes shall be push on type.
- 109.3.4 Conduits of non-ferrous material buried underground shall have a detectable tracer wire buried in the trench with the conduit. Tracer wire shall be copper wire, 12 gage or larger, securely attached to the main line and meter base, as applicable, to provide a strong locating signal. Tracer wire shall be insulated with high density polyethylene coating, blue for water, and green for sewer. Non-ferrous conduits buried more than 36" shall have a non-metallic warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, blue for water, and green for sewer, buried in the top 24-36 inches of cover above the conduit.
- 109.3.5 2" thru 3" Water Line - To be galvanized steel pipe, exceeding requirements of ASTM A33, threaded joint, with malleable iron fittings.
- 109.3.6 Steel casing pipe for boring, jacking, or open cutting under highways and railroads shall meet the requirements of ASTM A139, Grade B. Nominal pipe diameter shall be as indicated on the Drawings. Wall thickness shall be a minimum of 0.375". No protective coating or lining will be required.
- 109.3.7 Fittings shall be ductile iron. Ductile iron fittings shall be in accordance with AWWA C110 or C153. Pressure rating shall be 350 psi All fittings shall be mechanical joint, or mechanical joint plain end unless otherwise approved by the Engineer. All fittings shall have a cement mortar lining on the interior and a bituminous coating on the exterior in accordance with AWWA C104.
- 109.3.8 Ductile Iron Fittings - To be ANSI & AWWA Specification, cement line, Class 350 with mechanical joints.

- A. Mechanical joint retainer glands shall meet requirements of AWWA C111 except that retainer gland shall be modified to accommodate set screws.
 - B. Locked type mechanical joints may be used where restrained joints are required.
- 109.3.9 Push-on joint and rubber gasket shall meet requirements of AWWA C111. Restrained push-on joints may be used where restrained joints are required.
- 109.3.10 Flanged joints for ductile iron pipe shall meet requirements of ANSI B16.1.
- 109.3.11 Flanged joint gaskets shall be full-face, made of rubber, and shall meet requirements of ANSI B16.21.
- 109.3.12 Cement mortar lining with bituminous seal coat for ductile iron pipe and fittings shall meet requirements of AWWA C104. Cement mortar lining shall be standard thickness.
- 109.3.13 Exterior, bituminous coating for ductile iron pipe and fittings shall meet requirements of AWWA C106 or AWWA C151 as applicable.
- 109.3.14 Metal harness shall be galvanized rods and clamps as detailed on Drawings.
- 109.3.15 Detector Check Valves shall be epoxy coated UL and FM approved, hot dipped galvanized cast iron with brass by-pass meter trim. Valves shall be ITT Grinnell/Kennedy Model 1371G, or 1369G Hersey Model EDC, Mueller #4-2133-6, Viking Model E-1, Ames 3000 DCDA 4"-10", Wilkins 950 DA 2-1/2"-10", Grinnell Model B-2 detector check valves, or approved equal.
- 109.3.16 Gate valves, smaller than 12 inches shall be iron body, non rising bronze stem and resilient wedge gates meeting the requirements of AWWA C509 or AWWA C515. Valve ends shall be mechanical joint for underground service or flanged for meter vaults and above ground service. Valves shall open counter-clockwise and shall be equipped with a 2-inch square AWWA operating nut. Valves shall be factory tested in accordance with AWWA C509 and upon request the manufacturer shall furnish certified copies of test reports.
 - A. Valves shall be American Flow Control, Clow, Dresser, Kennedy, Mueller, A.P. Smith, or approved equal meeting this Specification.
- 109.3.17 Butterfly valves, 12 inches through 24 inches shall be of the rubber-seated tight closing type meeting requirements of AWWA C504, Class 250B.
 - A. Valve ends shall be mechanical joint in accordance with AWWA C111. Accessories (bolts, glands, and gaskets) shall be supplied by the valve manufacturer.
 - B. Valve operators shall be of the traveling-nut type, sealed, gasketed and lubricated for underground service. Operators shall be capable of

withstanding an input torque of 450 ft. lbs. at full open or closed position, without damage to the valve and valve operators.

- C. A rubber seat may be applied to the body or the disc.
 - D. Valves shall open counter clockwise and shall be equipped with a 2-inch square AWWA operating nut.
 - E. Valves shall be factory tested in accordance with Section 5 AWWA C504 specification; and upon request, the manufacturer shall furnish certified copies of test reports.
 - F. Valves shall be American-Darling, Dresser "450", Mueller "Lineseal XP", Pratt "HP 250II", or approved equal.
- 109.3.18 "Hot Tap" valves shall be the equivalent of The Romac 7.00 310-0700010 Quickvalve and sleeve. Valves shall open counter clockwise and shall be equipped with a 2" square operating nut.
- 109.3.19 Valve boxes shall be 2-piece adjustable screw type, cast iron, Tyler Model No. 562-S or Capitol Foundry Model No. 562-S-HD.
- 109.3.20 Pressure Reducing Valve.
- A. Valves shall be hydraulically operated and shall generally function to reduce high upstream pressure to a preset lower downstream pressure without shock or hammer.
 - B. The valve body shall be cast iron with 125 lb. flanges. The piston shall be guided above and below the seat. The piston, seat, and guide shall slide on replaceable "leathers." No metal to metal sliding contact will be allowed.
 - C. The valve body shall be constructed to allow the removal and servicing of all parts without removing the valve body from the water line. An indicator shall be furnished as an integral part of the valve to show piston position within the body.
 - D. The working pressure (both HIGH PSI and LOW PSI) shall be determined by the Engineer, approved by the City and shown on the Plans. The valve shall be ordered with the PSI specified and the factory shall preset the pilot for the specified pressure.
 - E. The external pilot (although preset to the specified pressure when shipped from the factory) shall be field adjustable between 40 and 100 PSI.
 - F. The valve shall be a Cla-Val or approved equal.
- 109.3.21 Tapping Sleeve and Valves shall be Mueller H-615 tapping sleeve with duck tipped end gasket and H-667 tapping valve open left, or approved equal. The

contractor shall provide all material and labor with the exception that the City will use its tapping machine to make the tap. The contractor needs to schedule this service with the City's Utilities Superintendent. An alternate tapping sleeve can be all stainless steel (18-8 type 304) Style FAST as manufactured by Ford Meter Company, or approved equal.

- 109.3.22 Flexible couplings shall be of gasketed, sleeve type. Each coupling shall consist of a steel middle ring, two steel followers, two rubber compounded wedge section gaskets and sufficient galvanized track, head steel bolts to properly compress the gaskets. Couplings shall be of the type to match piping in which installed. Couplings shall be manufactured by Dresser Manufacturing Division of Dresser Industries, Smith-Blair, Ford, or approved equal.
- 109.3.23 Fire Hydrants shall be Mueller "Centurion" Model A-421 or Kennedy "Guardian" with 6" shoe, mechanical joint, two 2 1/2" hose nozzles, or approved equal, and one 4 1/2" pump connection with National Standard outlet threads, left turn open with 1 1/2" pentagon operating nut. Hydrant bury mark to match ground surface. One cubic foot stone pocket to be installed at Hydrant Drain. Hydrants to be painted according to AWWA standards. All paints currently being used are Pittsburg Paints Interior/Exterior Gloss Oil, other equivalent paints are acceptable.

The colors and Pittsburg code follows:

Blaze Orange	6-313
Black	6-253
Safety Yellow	6-330
Brilliant Red	6-306
Ivy Green	#7013

- 109.3.24 Flanged adapters for joining plain-end pipe to flanged items shall be Style 128 or 127 as manufactured by Dresser Manufacturing Division of Dresser Industries or Smith-Blair Type 912 or 913, or approved equal.
- 109.3.25 Pressure gauges shall be open front case type with bronze bourdon tube soldered to socket and tip, stainless steel movement, and a 4-1/2-inch white coated dial graduated from 0 to 100 psi. Gauges shall be similar to Ashcroft No. 1279.
- 109.3.26 Concrete Thrust Blocks - Install concrete thrust blocks at all appurtenances except under valves. Concrete to be Class C1-1500 psi using Type I cement. Contractor may use retainer glands in lieu of concrete thrust blocks for 11 1/4 and 22 1/2 bends. The MEGAlug by Ebba Iron, INC., or approved equal, is an acceptable alternate.

109.3.27 Service Connection

- A. The Type I service connection shall include water main tap, corporation stop, replacement of entire meter/box assembly, connection of service line to both sides of the meter/box assembly, and connection to the existing service line on the customer side of the meter assembly.
- B. The Type II-A and Type II-B service connection shall include water main tap, corporation stop, and connection of the service line. All galvanized service lines encountered shall be treated as a Type I service connection.
- C. The Type III service connection shall include water main tap, a 1" corporation stop, splitting the service with a 1"x3/4"x3/4" wye, installation of two (2) meter/box assemblies, and connection to the existing service line on the customer side of the meter.

109.4 EXECUTION

109.4.1 Pipe Laying

- A. Take all precautions necessary to insure that pipe, valves, fittings, and other accessories are not damaged in unloading, handling, and placing in trench. Examine each piece of material just prior to installation to determine that no damage has occurred. Remove any damaged material from the site and replace with undamaged material.
- B. Exercise care to keep foreign material and dirt from entering pipe during storage, handling, and placing in trench. Close ends of in-place pipe at the end of any work period to preclude the entry of animals and foreign material.
- C. Bedding of pipe shall be as specified in Section 104 - Trenching & Backfilling.
- D. Do not lay pipe when the trench bottom is muddy or frozen, or has standing water.
- E. Use only those tools specifically intended for cutting the size, material, and type pipe involved. Make cuts to prevent damage to pipe or lining and to leave a smooth end at right angles to the axis of the pipe.
- F. Lay pipe with bell ends facing the direction of laying. Where grade is 10 percent or greater, lay pipe uphill with bell ends upgrade.
- G. Separation of sanitary sewer lines and water lines shall be in accordance with Virginia Department of Health and Regulations.

109.4.2 Joining Mechanical Joint Pipe

- A. Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joining pipe to remove oil, grit, excess coating and other foreign matter. Paint the bell and the spigot with soap solution (half cup granulated soap dissolved in 1-gallon water). Slip cast-iron gland on spigot end with lip extension of gland toward end of pipe. Paint rubber gasket with or dip into the soap solution and place on the spigot end with thick edge toward the gland.
- B. Push the spigot end forward to seat in the bell. Then press the gasket into the bell so that it is located evenly around the joint. Move the gland into position, insert bolts and tighten nuts finger tight. Then tighten all nuts to the torque listed below:

<u>Bolt Size - Inches</u>	<u>Torque Foot - Pounds</u>
5/8	40 - 60
3/4	60 - 90
1	70 - 100
1-1/4	90 - 120

Tighten nuts on the alternate side of the gland until pressure on the gland is equally distributed.

- C. Join lock-type mechanical joint pipe according to manufacturer's recommendations.
- D. Permissible deflection in mechanical joint pipe shall not be greater than 2/3 of that listed in AWWA C600.
- E. Permissible deflection in lock-type mechanical joint pipe shall be as recommended by manufacturer.

109.4.3 Joining Push-On Joint Pipe

- A. Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joining pipe to remove oil, grit, excess coating, and other foreign matter. Flex the rubber gasket and insert it in the gasket recess of the bell socket. Apply a thin film of gasket lubricant supplied by the pipe manufacturer, to either the gasket or the spigot end of the joining pipe. Start the spigot end of the pipe into the socket with care. Then complete the joint by forcing the plain end of the bottom of the socket with a forked tool or jack-type pipe device. File the end of field cut pipe to match the manufactured spigot end.
- B. Join restrained push-on joints according to the manufacturer's recommendations.

- C. Permissible deflection in push-on joint pipe shall not be greater than 2/3 of that listed in AWWA C600.
- D. Permissible deflection in restrained push-on joint pipe shall be as recommended by the manufacturer.

109.4.4 Setting Valves and Valve Boxes

- A. Install valves with operator stems in the vertical plane through the pipe axis and perpendicular to the pipe axis. Locate valves where shown on Drawings. Thoroughly clean valves before installation. Check valves for satisfactory operation before and after installation.
- B. Equip all underground valves with valve boxes where shown on the Drawings. Set valve boxes in accordance with Standard Drawings. Set the valve box in alignment with the valve stem centered on the valve nut. Set the valve box to prevent transmitting shock or stress to the valve. Set the box cover flush with the finished ground surface or pavement. PVC extensions shall not be permitted.

109.4.5 Locate Fire Hydrants as shown on Drawings and in accordance with Standard Drawings. The bottom flange of the fire hydrant shall be at finish grade with an acceptable allowance of up to 6" above finish grade.

109.4.6 Provide air and vacuum valves at locations shown on Drawings. Install gate valves between the water main and relief valves. Construct manholes for air and vacuum relief valve as shown on Drawings.

109.4.7 Use sleeves where pipes, valve stem extensions or equipment parts pass through concrete or masonry walls or slabs. Sleeves shall be either cast iron or schedule 40 steel of sufficient size to allow sealing around pipes and clearance for valve stems or equipment. Extend vertical sleeves through slabs 1 inch above top surface.

- A. Use cast iron sleeves with intermediate collars to anchor and provide a water stop on outside of sleeves that go through exterior walls below grade.
- B. Provide "link-seal" pipe to wall closures manufactured by Thunderline Corp., Wayne, Michigan, or approved equal, where shown on Drawings. Seals shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to fill annular space between pipe and wall opening to provide water-tight seal between pipe and wall opening.

109.4.8 Provide reaction thrust blocks as shown on typical details.

- A. Concrete reaction anchors shall bear against undisturbed earth and shall be of the size and shape shown on the typical details.

- B. Use metal harness restraints as shown on Drawings.
- C. “Mega-Lug” retainer glands may be used on bends of 22 ½ degrees or less in lieu of a concrete thrust block.
- D. Where retainer glands are used, extreme care shall be taken so that each set screw is tightened as recommended by the manufacturer before the pipe is backfilled and tested.

109.4.9 When specified, encase water pipelines crossing under highways and railways in a larger pipe or conduit called a casing pipe. Joining of steel casing pipe shall meet requirements of AWWA C206. Install by jacking, boring or open cut if permitted. The carrier pipe shall be supported by full diameter, mechanically adjusted spacers, 8’ on center. The installation shall meet requirements of AREA Standards for installation of pipelines carrying nonflammable substances under railway tracks. Brick up casing pipe ends to protect against foreign matter, but do not tightly seal. Prior to beginning work, notify the Railroad or Street Department.

109.4.10 Installation of Tapping Sleeves and Tapping Valves

- A. All tapping sleeves shall be set to avoid interference with existing pipe joints.
- B. The contractor shall provide and install the tapping sleeve and valve. Unless otherwise noted the City will make the tap for main lines (no service taps will be made by the City). This service must be scheduled with the Department 48 hours in advance of the tap.

109.4.11 Acceptance Tests

- A. When water is available at the site; the owner will supply water at no cost for testing potable water lines only.
- B. After the line has been backfilled and at least seven days after the last concrete reaction anchor has been poured, subject the line or any valved section of the line to a hydrostatic pressure test in accordance with AWWA C600, except as modified herein. Fill the system with water at a velocity of approximately 1 foot per second while necessary measures are taken to eliminate all air. After the system has been filled, raise the pressure by pump to 1.5 x the working pressure.

Test pressures shall:

- (1) not be less than 1.50 x the working pressure at the highest point along the test section
- (2) not exceed thrust restraint pressure

- (3) not vary by more than + or - 5 psi
- (4) not exceed twice the rated pressure of the valves or hydrants when the test includes closed gate valves
- (5) not exceed rated pressure of valves if resilient-seated butterfly valves are used
- (6) be at least 100 psi.

Measure pressure at the low point on the system compensating for gauge elevation. Maintain this pressure for two hours. If the pressure cannot be maintained, determine the cause, make repairs and repeat the test until successful.

- C. A leakage test shall be conducted concurrently with the pressure test. Leakage is defined as the quantity of water required to maintain a pressure within 5 psi of the specified test pressure, after air has been expelled and the pipe is filled with water. Leakage shall not exceed 10 gallons per day per mile per inch of diameter. If leakage exceeds that specified, find and repair the leaks, and repeat the test until successful.
- D. All visible leaks shall be repaired regardless of the amount of leakage.

109.4.12 Disinfect, flush and test water mains and accessories in accordance with the procedures listed below. The water used in the disinfecting process shall be potable water from an approved supply. If water is to be transported to the subject site, then the tank on the truck must also be properly disinfected prior to transporting water. Disinfection of the vehicle should also include all appurtenances used such as valves, hoses, etc.

- A. Preliminary Flushing: The main shall be flushed prior to disinfection, except when the tablet method is used. Flushing shall be at a velocity of not less than 2.5 feet/second. Adequate provisions shall be made for drainage of flushing water.
- B. Form of chlorine for Disinfection:
 - (1) Liquid chlorine shall be used only when suitable equipment is available and only under the direct supervision of a person familiar with the physiological, chemical, physical properties of this element, and who is properly trained and equipped to handle any emergency that may arise. Introduction of chlorine-gas directly from the supply cylinder is unsafe and shall not be permitted.
 - (2) Calcium hypochlorite contains 70 percent available chlorine by weight. It shall be either granular or in tablet form. The tablets, 6-8 to the ounce, are designed to dissolve slowly in water. A

chlorine-water solution shall be prepared by dissolving the granules in water in the proportion requisite for the desired concentration.

- (3) Sodium hypochlorite is supplied in strengths from 5.25 to 16 percent available chlorine. The chlorine-water solution shall be prepared by adding hypochlorite to water. Product deterioration shall be reckoned with in computing the quantity of sodium hypochlorite required for the desired concentration.
- (4) Application: The hypochlorite solutions shall be applied to the water main with a gasoline or electrically-powered chemical feed pump designed for feeding chlorine solutions. For small applications, the solutions may be fed with a hand pump, for example, a hydraulic test pump. Feed lines shall be of such material and strength as to withstand safely the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the hypochlorite solution is applied to the main.

C. Methods of Chlorine Application:

- (1) Continuous Feed Method: Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the newly-laid pipeline. The water shall receive a dose of chlorine, also fed at a constant, measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 50 MG/L available chlorine. To assure that this concentration is maintained, the chlorine residual shall be measured at intervals not exceeding 2,000 feet in accordance with the procedures described in the current edition of "Standard methods" and AWWA M12-"simplified procedures for water examination." In the absence of a meter, the rate may be determined either by placing a pilot gauge at the discharge or by measuring the time to fill a container of known volume. Table 1 gives the time to fill a container of known volume, and gives the amount of chlorine required for each 100 feet of pipe of various diameters. Solutions of 1 percent chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires approximately 1 lb. of calcium hypochlorite in 8.5 gallons of water.

TABLE 1

Chlorine Required to Produce 50 MG/L Concentration in
100 FT. of Pipe – By Diameter

100 Percent		1 Percent
<u>Pipe Size</u>	<u>Chlorine</u>	<u>Chlorine Solutions</u>
<u>IN.</u>	<u>LB.</u>	<u>GAL.</u>
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88
16	0.430	5.12
20	0.675	8.00

During the application of the Chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the line supplying the water. The chlorine application shall not cease until the entire main is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least 24 hours, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this 24-hour period, the treated water shall contain no less than 25 MG/L chlorine throughout the length of the main.

- (2) Slug Method (use only if authorized by the Utilities Department): Water from the existing distribution system or other approved source of supply shall be made to flow at a constant, measured rate into the newly laid pipeline. The water shall receive a dose of chlorine, also fed at a constant, measured rate. The two rates shall be proportioned so that the concentration in the water entering the pipeline is maintained at no less than 300 MG/L. The chlorine shall be applied continuously and for a sufficient period to develop a solid column or “slug” of chlorinated water that will, as it passes along the line, expose all interior surfaces to a concentration of at least 300 MG/L for at least 3 hours. The application shall be checked at a tap near the upstream end on the line by chlorine residual measurements.

As the chlorinated water flows past tees and crosses, related valves and hydrants shall be operated so as to disinfect appurtenances.

- (3) Tablet Method: Use only when scrupulous cleanliness has been exercised, because preliminary flushing cannot be used. Do not use this method if trench water or foreign material has entered the main or if the water is below 41 deg. F (5 deg. C). This method may be used for mains up to 12 inches in diameter and where the total length of the main is less than 2,500 feet. Tablets shall not be used with PVC pipe.

Place tablets in each section of pipe and also in hydrants, hydrant branches, and other appurtenances. Attach tablets using Permatex No. 1 adhesive or other adhesive approved by the engineer, except for the tablets placed in hydrants and in the joints between the pipe sections. Tablets shall be free of adhesive except on the one broad side to be attached. Place all tablets at the top of the main. If the tablets are attached before the pipe section is placed in the trench, mark the position of the tablet in the pipe and assure that the pipe is placed with the tablet at the top.

The following table shows the number of 5 grain HTH tablets necessary per joint of pipe to obtain 50 PPM chlorine:

<u>Pipe Size (Inches)</u>	<u>Tablets Per 18 – 20 Feet Joint</u>
3	1
4	1
6	2
8	3
10	4
12	7

When installation is completed, fill the main with water at a velocity of less than 1 foot per second. The water shall remain in the pipe for at least 24 hours. Operate valves so that the strong chlorine solution will not flow back into the line supplying the water.

- D. Final Flushing: After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentration is no higher than that generally prevailing in the system, or less than 1 MG/L. Chlorine residual investigation shall be made to ascertain that the heavily chlorinated water has been removed from the pipeline. Flushing shall be through a fire hydrant. When a fire hydrant is not available for complete flushing, it shall be through a minimum 2" tap to ensure removal of any debris in the pipe. Flushing of heavily

chlorinated water shall be through a dechlorinator approved by the City Engineer.

E. Bacteriologic Tests:

- (1) After final flushing, and before the water main is placed in service, samples shall be collected and tested for bacteriological quality and shall show the absence of coliform organisms. At least two samples shall be collected at least 24 hours apart at intervals not exceeding 2,000 feet and tested by a State Health Department approved laboratory and the results shall be submitted to the engineer.
- (2) Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate. If laboratory results indicate the presence of coliform bacteria, the samples are unsatisfactory and disinfection shall be repeated until the samples are satisfactory. Cleaning, disinfection and testing shall be the responsibility of the contractor. Water for these operations will be furnished by the owner, but the contractor shall include in his bid the cost of loading, hauling, and discharging the water.
- (3) A sampling tap consisting of a corporation cock with metal pipe shall be installed within two feet of valves. The corporation stop inlet shall be male, one inch in size, and the outlet shall have one inch I.P. threads and a cap.

F. Testing and disinfection of the completed sections shall not relieve the contractor of his responsibility to repair or replace any cracked or defective pipe. All work necessary to secure a tight line shall be at the contractor's expense.

109.5 MEASUREMENT AND PAYMENT

- 109.5.1 Waterline - Measurement shall be parallel to the pipe including the length occupied by appurtenances. Bid price shall include all excavation bedding and backfill. Payment shall be per linear foot for the size and type specified. Payment for water lines and all appurtenances shall be made after completion of ditch restoration including bituminous pavement, concrete, aggregate shoulders, and lawns.
- 109.5.2. Valves - Measurement shall be per each installed. The bid price shall include all incidental materials, including the valve box. Payment shall be per each for the size and type specified.
- 109.5.3 Bends, Plugs, and Reducers - Measurement for ductile iron fittings shall be based on the weight of the fitting only (no miscellaneous hardware). Payment

shall be at the bid price per pound. The price shall include all incidental work and thrust blocks.

- 109.5.4 Tees and Crosses - Measurement and payment shall be per each for the size specified. All incidental materials and work shall be included.
- 109.5.5 Tapping Sleeve and Valve – Measurement and payment shall be per each for the size specified. All incidental materials and work shall be included.
- 109.5.6 Fire Hydrant - Measurement and payment shall be per each. The cost of fire hydrant extensions is to be included in the bid price. All other incidental materials and workmanship shall be included. The cost of valves, tees, and water line shall be paid for separately.
- 109.5.7 Service Line - Measurement will be per lineal foot of line installed including all associated work. Payment will be the bid price per lineal foot installed for the size indicated.
- 109.5.8 Air Release Valve - Measurement and payment shall be per each including all incidental materials and workmanship. The bid price shall also include the valve vault. Service line shall be paid for separately.
- 109.5.9 Service Connections - Measurement will be per each type connection made including all miscellaneous materials and associated work. Payment shall be the bid price per each for the appropriate type. Service line shall be paid for separately.
- 109.5.10 Existing Line Abandonment - When specified as a separate item on the Bid Schedule, payment shall be lump sum for all efforts and material to locate the existing line and performing the directed abandonment. Line abandonment shall be identified as being valve closure or remove and splice.
- 109.5.11 Connection to existing water system – Measurement and payment shall be per each with no regard to size. This work involves connecting the new water system with the existing water lines after line testing and acceptance. Separate payment will be made for all related pay items such as pipe, bends, valves, etc. This pay item is separate from a main line wet tap.
- 109.5.12 Blow Off – Measurement and payment shall be per each and shall include the tee, valve, and pipe, blow off and box.
- 109.5.13 Check Valve – Measurement and payment shall be per each and include installation of the check valve and vault.
- 109.5.14 Concrete Restoration - All concrete sidewalk, curb and gutter disturbed during construction, shall be replaced at the Contractor's expense. Full sections will be replaced. Payment is incidental unless a separate pay item is listed.

END OF WATER DISTRIBUTION SYSTEM

SECTION 110

CURB & GUTTER, SIDEWALK, MISCELLANEOUS CONCRETE

110.1 GENERAL

Work included in this Section consists of all new and/or replacement/repair of curb and gutter, curb, sidewalk and other miscellaneous concrete work.

110.1.1 Referenced Specification by Abbreviation:

Virginia Department of Transportation-(VDOT)

110.1.2 All materials and workmanship associated with this Section will be accordance with VDOT's Road and Bridge Standards and Specifications unless otherwise noted.

110.2 PRODUCTS

110.2.1 Submit shop drawings of all products as by the City.

110.2.2 Provide Certified test results and/or mix designs.

110.2.3 Concrete shall be VDOT A-3 unless otherwise noted.

110.2.4 Base aggregate shall be VDOT 21A unless otherwise noted.

110.2.5 Brick pavers shall be standard 4" x 8" x 2-3/8" Pine Hall Pathway or Lawrenceville I-875.

110.2.6 Concrete pavers shall be 4"x 8" Holland Stone Interlocking Paving System.

110.3 EXECUTION

110.3.1 Regular excavation shall include removal and disposal of all existing concrete and asphalt, existing steps as required, as well as earth and all other materials associated with normal excavation to a depth to allow for the installation of the proposed project. All bituminous concrete paved surface immediately adjacent to the excavated areas must be saw cut in a straight line so that when excavation procedures are performed, existing paved surfaces will not be damaged. All concrete surfaces adjacent to the proposed project shall be saw cut in a neat straight line.

All areas beneath the proposed construction shall be excavated and/or graded to a smooth uniform surface and compacted prior to installation procedures. All excavation shall be disposed of off the project by the Contractor. All excavation shall be considered incidental to the contract.

Unstable Subgrades and Fill - Concrete shall be placed on the earth subgrade if the said subgrade is stable. In unstable areas, the subgrade shall be undercut and replaced with approved material to provide a sound subbase. All fill material

required on this project shall be VDOT 21-A compacted to 95% modified proctor density.

- 110.3.2 Formwork shall be in accordance with VDOT Road and Bridge Specifications.
- 110.3.3 Protection and Curing shall be in accordance with VDOT Road and Bridge Specifications. Curing compound shall be white.
- 110.3.4 Sidewalks shall be the combination curb and walk type as shown on the detail drawing. Brick veneer sidewalks are to be constructed at locations designated by the Owner.
- 110.3.5 Sidewalks are to be installed so that the back of the walk is on the street right-of-way line, or as directed by the Owner.
- 110.3.6 All sidewalk slabs shall receive a steel trowel float and broom finish and all curbs shall receive a broom finish.
- 110.3.7 All concrete sidewalks shall receive a score line in finished surface every five feet (5'). Depth of the score line shall be a minimum of 5/8".
- 110.3.8 Expansion material shall be installed every 40' in sidewalks and between all existing and proposed concrete surfaces. Along areas where the new walk abuts against an existing uneven retaining wall expansion material shall be installed 4.5' behind and parallel to the face of curb or as directed by the Owner. Concrete shall then be poured behind the expansion material to fill the void area between the face of the walls and expansion. This is done to allow the expansion material to be installed in a smooth straight line. Expansion material shall be of a type equal to the asphalt impregnated fiberboard conforming to ASTM c 175 for exterior work. Expansion material shall extend full depth of slab, less 1/2" at top of slab.
- 110.3.9 After front forms have been removed along the edge of pavement, the contractor shall rub the face of newly installed curb to fill any voids and remove rough spots from the face of curb. In addition, the contractor shall place 21-A aggregate in the void area between the face of curb and the edge of pavement to an elevation which will match the grade of the existing pavement.
- 110.3.10 All curb and gutter shall be CG-6 or "roll-top" when specified.
- 110.3.11 All curb shall be CG-2.
- 110.3.12 Expansion material shall be installed every 100' in curb and gutter. Expansion material shall be of a type equal to the asphalt impregnated fiberboard conforming to ASTM C 175 for exterior work. Expansion material shall extend full depth of curb and gutter, less 1/2" at top of concrete.
- 110.3.13 All properties which have existing entrance ways shall have new entrances installed at their present location. Entrances will vary in width depending upon

field conditions but the standard width shall be 12' at the back. On all existing concrete driveways, the contractor shall tie the driveway into the back of the new entrance using concrete to provide a smooth ride across the entrance onto the existing driveway. The contractor shall perform all asphalt driveway connections to the back of the new entrance. The contractor will be required to place stone behind the new entrance for all driveway connections, both concrete and asphalt, as a temporary measure to allow for the use of the entrance prior to its final completion. The exact number of entrances may vary from those shown on the proposal. Entrances may be added or deleted from those anticipated thus affecting the quantities for both entrances, sidewalks, and curb and gutter. The contractor shall schedule entrance construction to inconvenience property owners no more than necessary.

- 110.3.14 All existing walks and steps that serve private residences, businesses, etc., shall be tied to the back of the newly installed sidewalk. In performing this portion of the work, the Contractor will encounter a multiple of different situations due to grade problems, height and number of steps, etc. For bidding purposes, the contractor shall base his bid on the following breakdown:
- A. All existing sidewalk connections which are tied flush to the newly installed sidewalk shall be paid as miscellaneous concrete installation. Payment shall be based on field measurements.
 - B. All steps constructed to facilitate a connection to back of the new sidewalk shall be paid for on a per each basis. Steps for this project shall be defined as any step with a minimum rise of 4", a maximum width of 5' and a maximum tread of 2'. A change in elevation from the new sidewalk to an existing walk or step is not considered a step for payment purposes. All steps shall be constructed using the same type material as that of the existing walk. If no walk exists, steps shall be constructed using concrete.
- 110.3.15 All yard areas immediately behind newly installed sidewalks shall be topsoiled and seeded so as to provide a smooth tie in with the existing yard and back of the walk.
- 110.3.16 Brick sidewalks are to be installed per the Standard Drawing. Base stone shall be VDOT 21A.
- The bricks shall be set in a minimum 1/2" mixture of dry 1-part cement and 3 parts sand. Sand shall be swept between the brick joints. Brick pavers shall have a smooth surface that is flush with the curbing.
- 110.3.17 Detectable warning surface shall be constructed at each street intersection and/or as directed by the City. They shall be VDOT standard CG-12.

- 110.3.18 Existing limestone curb is to be adjusted for a straight alignment and raised to provide a 6" curb height. Thoroughly compact 21-A aggregate under all disturbed limestone curb.
- 110.3.19 When an entrance is required across a brick sidewalk, it shall be a herringbone design. The standard concrete entrance shall be modified to leave a depth equal in thickness to the brick paver and mortar bedding with a 4" wide lip on the back. The brick pavers shall tie in flush with the front curb, back lip and adjacent sidewalk.
- 110.3.20 The Contractor shall be responsible for both the adjustment and relocation of water meter boxes. Adjustment means the vertical and/or minimal horizontal adjustment of the meter box only. Relocated water meters will be any meter that will require cutting into the existing service lines. The City will provide the yoke assembly and box for relocations.

110.4 MEASUREMENT AND PAYMENT

- 110.4.1 Sidewalk - Measurement shall be the horizontal surface area (including curb on monolithic curb and sidewalk) of sidewalk. Work is to include excavation, backfill, and materials, etc. Payment shall be at the bid price per square yard.
- 110.4.2 Curb and Gutter - Measurement shall be parallel to the curb and gutter excluding entrances. There shall be no separation between straight and radial curb and gutter. Work is to include all excavation, backfill, and materials. Payment shall be at the bid price per linear foot.
- 110.4.3 Curb - Measurement includes entrances. There shall be no separation between straight and radial curb. Work is to include all excavation, backfill, and materials. Payment shall be at the bid price per linear foot.
- 110.4.4 Sidewalk Entrance - Measurement shall be the horizontal area (including curb on monolithic curb and sidewalk) of entrance. Work is to include all excavation, backfill and materials. Payment shall be the bid price per square yard.
- 110.4.5 Curb and Gutter Entrance - Measurement shall be parallel to the curb and gutter entrances. There shall be no separation between straight and radial curb and gutter entrances. Work is to include all excavation, backfill, and materials. Payment shall be at the bid price per linear foot.
- 110.4.6 Brick Sidewalk - Measurement shall be the horizontal surface of brick sidewalk. Work is to include all excavation, backfill and materials. Payment shall be the bid price per square yard.
- 110.4.7 Detectable Warning Surface - Measurement shall be per each in addition to payment for sidewalk. Payment shall be the bid price per each.

- 110.4.8 Steps - Measurement shall be per each 5' in width. Steps created by increasing the height of the sidewalk are not a pay item. Work is to include excavation, backfill, and all associated for concrete steps. Payment shall be per the bid price for each concrete step constructed.
- 110.4.9 Miscellaneous Concrete - Measurement shall be the horizontal surface area of concrete adjacent to the street sidewalk (private, walks, driveways, etc.) Work includes all excavation backfill, work and materials required. Payment shall be the bid price per square yard of miscellaneous concrete installed.
- 110.4.10 Stone Base - Measurement shall be by the ton of base stone placed under sidewalk, curb and gutter, gutter, miscellaneous concrete and street patch. Work is to include all excavation and incidental work. Payment shall be the bid price per ton.
- 110.4.11 Saw Cut - Measurement shall be parallel to the saw cut. Payment is for concrete saw cuts only as directed by the City and when identified as a separate pay item. Payment will be the bid price per linear foot.
- 110.4.12 Stone Curb - Measurement shall be per linear foot measured parallel to the sidewalk. Payment shall be the bid price per linear foot only for those curbs adjusted.
- 110.4.13 Concrete Entrance with Brick veneer - Measurement shall be the horizontal surface of brick veneer entrance. Payment shall be the bid price per square yard and shall include all excavation, backfill, concrete entrance and brick veneer. There shall be separate payment for linear footage of curb across the entrance. There shall be no separate payment for concrete entrance.

END OF CURB & GUTTER, SIDEWALK, MISCELLANEOUS CONCRETE

SECTION 111 STREET CONSTRUCTION and REPAIR

111.1 GENERAL

Work covered by this section includes all work associated with construction of a new street and the repair or patching of an existing street.

111.1.1 Referenced Specifications by Abbreviation:

Virginia Department of Transportation - (VDOT)

111.1.2 All materials and workmanship associated with this Section shall be in accordance with VDOT's Road and Bridge Standards and Specifications unless otherwise noted.

111.2 PRODUCTS

111.2.1 Submit shop drawings of all products as by the City.

111.2.2 Provide Certified test results and/or mix designs.

111.2.3 All materials shall meet the specifications of VDOT's Road and Bridge Specifications.

111.3 EXECUTION

111.3.1 All excavation, backfill, base stone, and plant mix for new streets shall be constructed in accordance with VDOT's Road and Bridge Specifications.

111.3.2 The typical street section shall be as shown on the plans.

111.3.3 The street shall be graded to the right-of-way line before beginning cut and fill slopes. Protection and Curing shall be in accordance with VDOT Road and Bridge Specifications.

111.3.4 Street repair/patching shall be in accordance with the Standard Drawing or Plans.

111.3.5 Make a neat saw cut on all sides of a street repair/patch. Square up all patches.

111.3.6 Maintain all street excavations to a smooth transition until final street repair/patch is complete.

111.3.7 A temporary repair/patch of prime and double seal is permitted when plant mix is not available.

111.3.8 The street shall be milled to the finished elevations less the allowance for the final overlay. All manholes, water valve boxes, etc. shall be adjusted to final elevations immediately after milling.

111.4 MEASUREMENT AND PAYMENT

- 111.4.1 Excavation and Fill for new streets shall be in accordance with VDOT Standards.
- 111.4.2 Base Stone for new streets shall be in accordance with VDOT Standards.
- 111.4.3 Bituminous Concrete for new streets shall be in accordance with VDOT Standards.
- 111.4.4 Street Repair/Patch - Measurement shall be for the horizontal area of pavement not exceeding the pay limits. Work is to include all excavation, saw cut, stone base, and bituminous concrete required to complete the repair/patch. Payment shall be the bid price per square yard. There are no separate payments for stone, bituminous concrete or saw cut.

END OF STREET CONSTRUCTION and REPAIR

SECTION 112 EARTHWORK

112.1 GENERAL

Work included in this section includes all work associated with earth moving operations and grading.

112.1.1 Related requirements specified in other sections of the Specifications:

- A. Section 103 - Site Clearing
- B. Section 106 - Seeding
- C. Section 110 - Curb and Gutter, Sidewalk, Misc. Concrete
- D. Section 111 - Street Construction & Repairing/Patching

112.2 EXECUTION

112.2.1 The work includes demolition, clearing and grubbing the site, dewatering, stripping and storing of topsoil, excavation, filling and backfilling, rough and finish grading over the areas indicated, erosion control, distribution of topsoil, and utility earthwork. Any water that accumulates in the excavations shall be promptly removed.

112.2.2 Any existing structures shall be carefully demolished and removed from the site. The demolition work shall be done carefully so as to not disrupt the Owner's operations, and so as to not endanger or harm adjacent property, structures or the public.

112.2.3 The entire area within the limit of work shall be cleared and grubbed and shall be cleaned of all debris. Topsoil shall be stripped from all areas to be graded, paved and built upon to the depth encountered and stored for reuse later in the work. Under the structures, paved, and fill areas, stumps, roots, logs, matted roots and other debris not suitable for foundation purposes shall be removed to a minimum depth of eighteen (18) inches below any subgrade. The resulting hole shall be backfilled with suitable material and compacted as specified hereinafter for backfill. Cleared material shall be completely removed from the site, and disposed of by the Contractor, at his expense. All areas to receive fill shall be stripped of root mat five feet beyond toe of anticipated fills. Topsoil, all vegetation, such as roots, brush, heavy sods, heavy growth of grass, and all decayed vegetable matter, rubbish and other debris within the area upon which fill is to be placed, shall be stripped or otherwise removed before the fill is started. In no case will such objectionable material be allowed to remain in or under the fill area. Sloped ground surfaces steeper than one vertical to four horizontals on which fill is to be placed shall be plowed, stepped, benched, or broken up in such manner that fill material will bond with the existing surface,

as directed. Before starting the fill or before placing structures or pavement, the area shall be proof rolled with a rubber tired vehicle, typically a loaded dump truck. Any soft, pumping, or rutting spots that are discovered shall have the soft material excavated and the void filled with suitable material, compacted as hereinafter specified.

- 112.2.4 Topsoil shall be carefully stripped to its full depth from all areas indicated to be graded, or to be built upon. Stripped topsoil shall be stored and protected for reuse later.
- 112.2.5 The Contractor shall store and use explosives in accordance with the Occupational Safety and Health Act and with other Federal, State and Local ordinances and regulations. The Contractor shall hold the Owner harmless for any injuries and for all damage caused by the explosives and shall satisfactorily correct and pay for all injuries and damage resulting from his use of explosives. Prior to firing blasts, the Contractor shall have a competent man, carrying a red flag, stationed at a reasonable distance from the blast at each avenue of approach to give warning of the blast. Blasting in the vicinity of any existing utilities shall be done carefully and with the knowledge and approval of the owner of the utility. The Contractor shall conduct pre-blasting inspection of nearby facilities and structures, and vibration monitoring during blasting.

112.3 EXCAVATIONS

- 112.3.1 All excavations shall be performed to the grades, slopes, and elevations indicated. All excavated materials which are not considered suitable for fill and any surplus of excavated material which is not required for fill shall be disposed of by the Contractor. Excavations shall extend a sufficient distance away from the walls to permit erection and removal of forms and installation of drains and other permanent work. Excavations shall be carefully made to the depths indicated, with the bottoms level, free of loose material, and free of all loam, organic material and other unsuitable material as hereinafter specified. All excavations shall be approved by the Engineer prior to the placing of any concrete. Sloping rock shall be stepped, as directed. Excavations carried below the required depth, other than that specified for occasional rock outcropping, shall be backfilled with trench stabilization material, except general rock areas where the backfill shall be concrete.
- 112.3.2 The Contractor shall clear and grub all vegetation, debris and any other material encountered within the limits of grading and as required for trenches and ditches indicated to be worked on, but where grading contours are not shown. All material from the demolition, the clearing and grubbing and debris removal shall be disposed of off the site by the Contractor at his expense.

112.3.3 Filling, Backfilling, and Compaction

- A. Suitable material for fill, backfill and subgrade preparation shall be GW, GP, GM, GC, SW, SP, SM, ML, CL, or SC as classified in the Unified Soil Classification System in accordance with ASTM D 2487-69 (R1975). The suitability of material to be used as fill shall be determined by the classification method specified and by the moisture density tests in accordance with ASTM D698. Testing shall be by an independent soils laboratory, at the Owner's expense, and the results shall be approved by the Engineer prior to the soil's use. Suitable material removed from the excavation shall be used in forming the necessary fill. Material shall be free of debris, roots and organic matter. Frozen material shall not be used as fill or backfill. Any additional material necessary for establishing the indicated grades shall be excavated from the approved borrow sites as shown on the plans by the Contractor and approved by the Engineer as part of this contract. The maximum particle size shall be six inches largest dimension, except in the uppermost lift, where the maximum particle size shall be two inches largest dimension. Fill material shall be placed in successive horizontal layers not to exceed eight (8) inches of loose material, and then thoroughly compacted as hereinafter specified.
- B. Fill or backfill adjacent to the foundation and retaining walls shall be placed in eight (8) inch horizontal layers, each layer being moistened or dried and compacted as hereinafter specified. Special care shall be taken to prevent wedging action as the backfill proceeds.
- C. Embankment slopes shall be constructed by filling one (1) foot beyond the proposed finished slope surface for each lift. Compaction equipment shall work to the edge of each lift. After the entire fill is placed and compacted, the outside foot of the slope shall be trimmed to the design slope with a dozer. No slopes shall be steeper than 3 horizontals to 1 vertical.
- D. Unsuitable materials shall be those materials not meeting the requirements specified hereinbefore for suitable materials.

112.3.4 Compaction and Testing

- A. Compaction shall be performed by hand compaction equipment adjacent to the structures. General area compaction equipment shall be the Contractor's option, subject to the approval of the Engineer. The compaction in grassed areas shall be 90 percent of maximum density obtained in the procedure in ASTM D698. The compaction under pavement areas shall be 98 percent of maximum density in ASTM D698. The materials shall be aerated or moistened, as required to provide a moisture content that falls within 3 percentage points of either side of

optimum, unless otherwise approved by the Engineer. Moisture determinations shall be made. Field density tests and moisture tests shall be performed at the Contractor's expense by an independent soils testing laboratory, approved by the Engineer, on each lift at locations selected by the Engineer to assure that the correct compaction has been performed. If any test fails, additional testing at the Contractor's expense shall be performed to determine the extent of the improperly compacted material. The improperly compacted material shall then be removed, replaced and re-compacted, and the area shall then be retested to insure proper compaction.

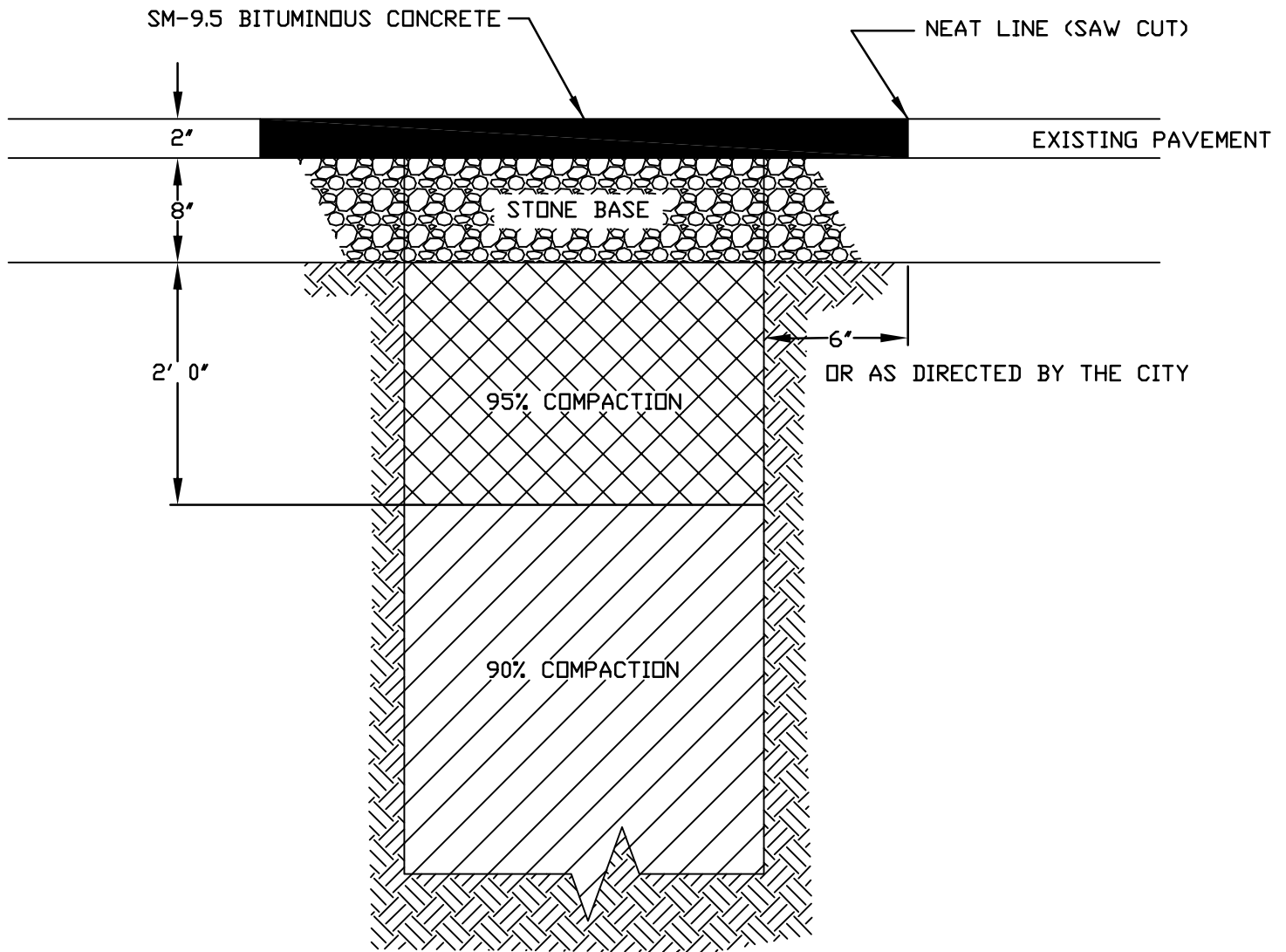
112.3.5 Finish Grading

- A. Finish grading shall be done as required to establish the slopes indicated. The grades shall be formed to easy contours sloping toward inlets and ditches. The grading shall eliminate low spots and pockets that do not drain. Ditches shall be excavated to the sections and elevations shown and shall be excavated on smooth slopes to avoid low spots and pockets that do not drain.
- B. The surface of all excavations and fill and all disturbed areas shall be finished to a smooth surface, with the grades sloping away from the buildings. Swales and ditches shall be finished so that effective drainage results. Proper allowance shall be made for topsoil and for pavement thickness. Any settling or washing prior to acceptance of the work shall be repaired at no additional expense to the Owner. Topsoil and seeding of all disturbed areas shall be performed in accordance with the Section "Seeding."

112.4 MEASUREMENT AND PAYMENT

- 112.4.1 Measurement shall be either lump sum and per cubic yard, whichever is indicated on the Bid Schedule. Unless otherwise indicated all excavation is unclassified except solid rock in utility line ditches.
- 112.4.2 Payment will be made as a percentage of lump sum excavation complete or if bid by the cubic yard, actual quantity excavated.

END OF EARTHWORK

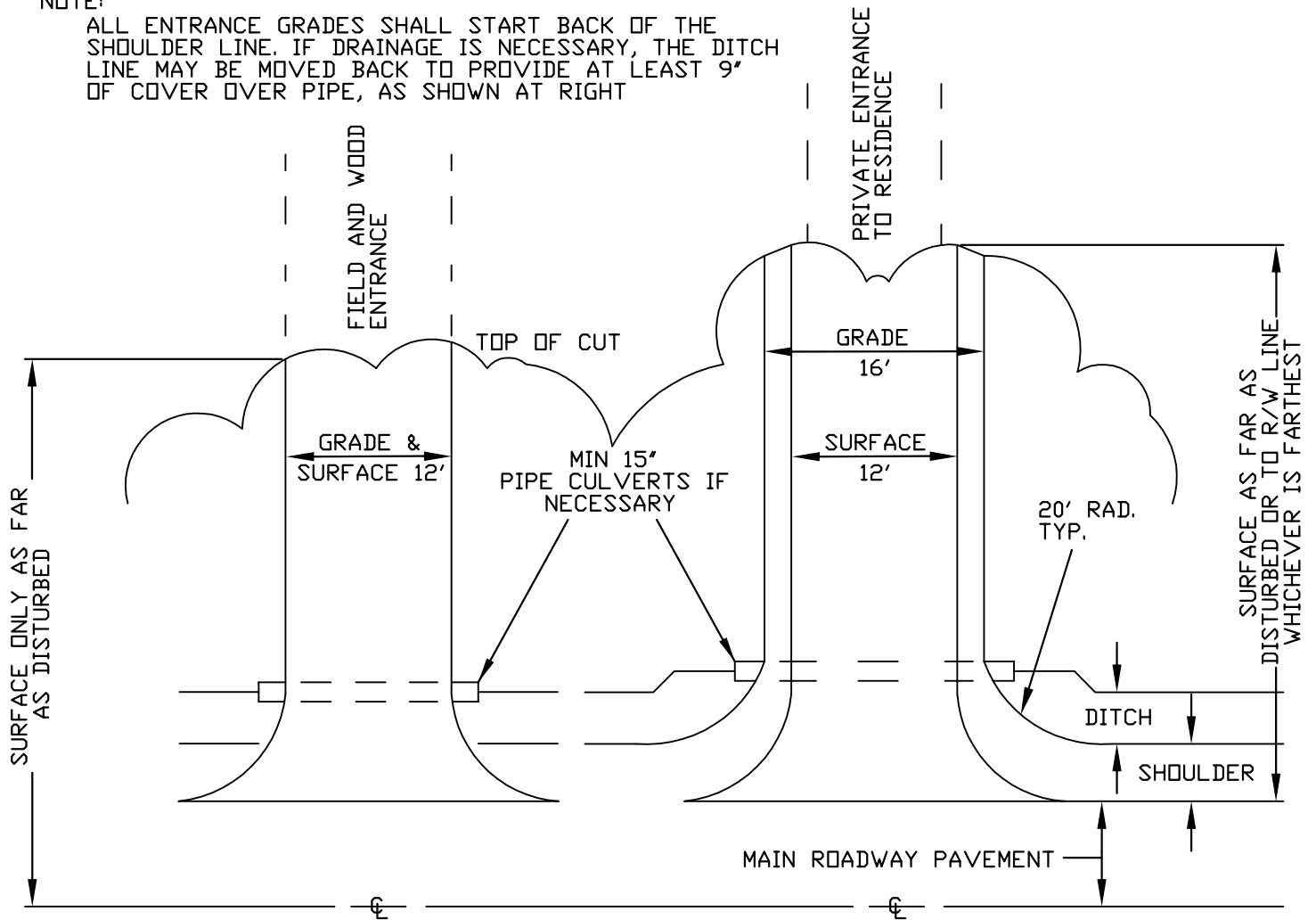


NOTE:

1. COMPLETED PATCH TO BE FLUSH WITH EXISTING PAVEMENT

NOTE:

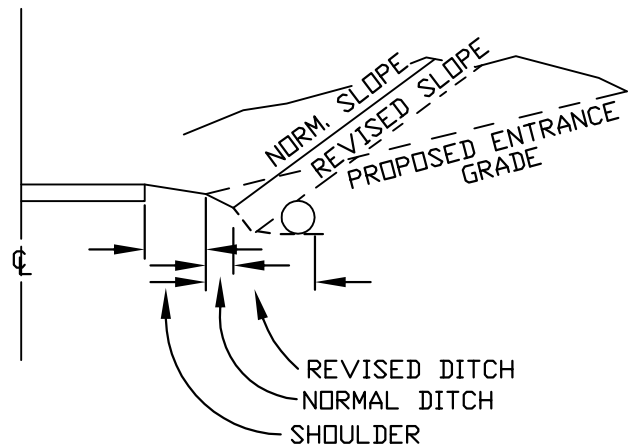
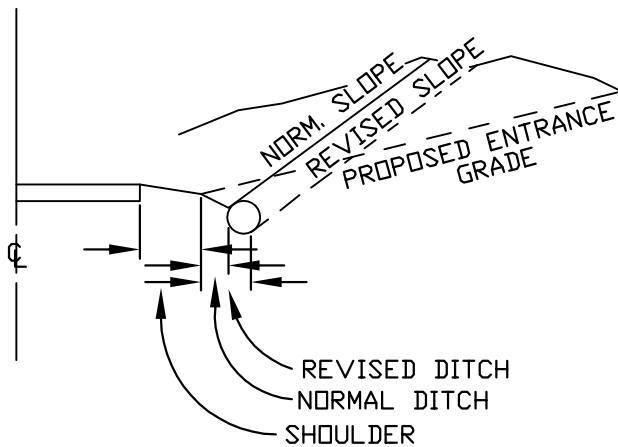
ALL ENTRANCE GRADES SHALL START BACK OF THE SHOULDER LINE. IF DRAINAGE IS NECESSARY, THE DITCH LINE MAY BE MOVED BACK TO PROVIDE AT LEAST 9" OF COVER OVER PIPE, AS SHOWN AT RIGHT



NOTE:

LENGTHS OF CULVERTS SHOWN ON ROAD PLANS FOR ENTRANCES ARE APPROXIMATE AND SHALL BE ADJUSTED TO OBTAIN ABOVE ROADWAY WIDTHS.

ENTRANCES IN FULL TO BE SAME AS ABOVE EXCEPT LOCATION OF CULVERT (WHEN NECESSARY)



ALTERNATE METHODS FOR PLACING PIPES UNDER ENTRANCES

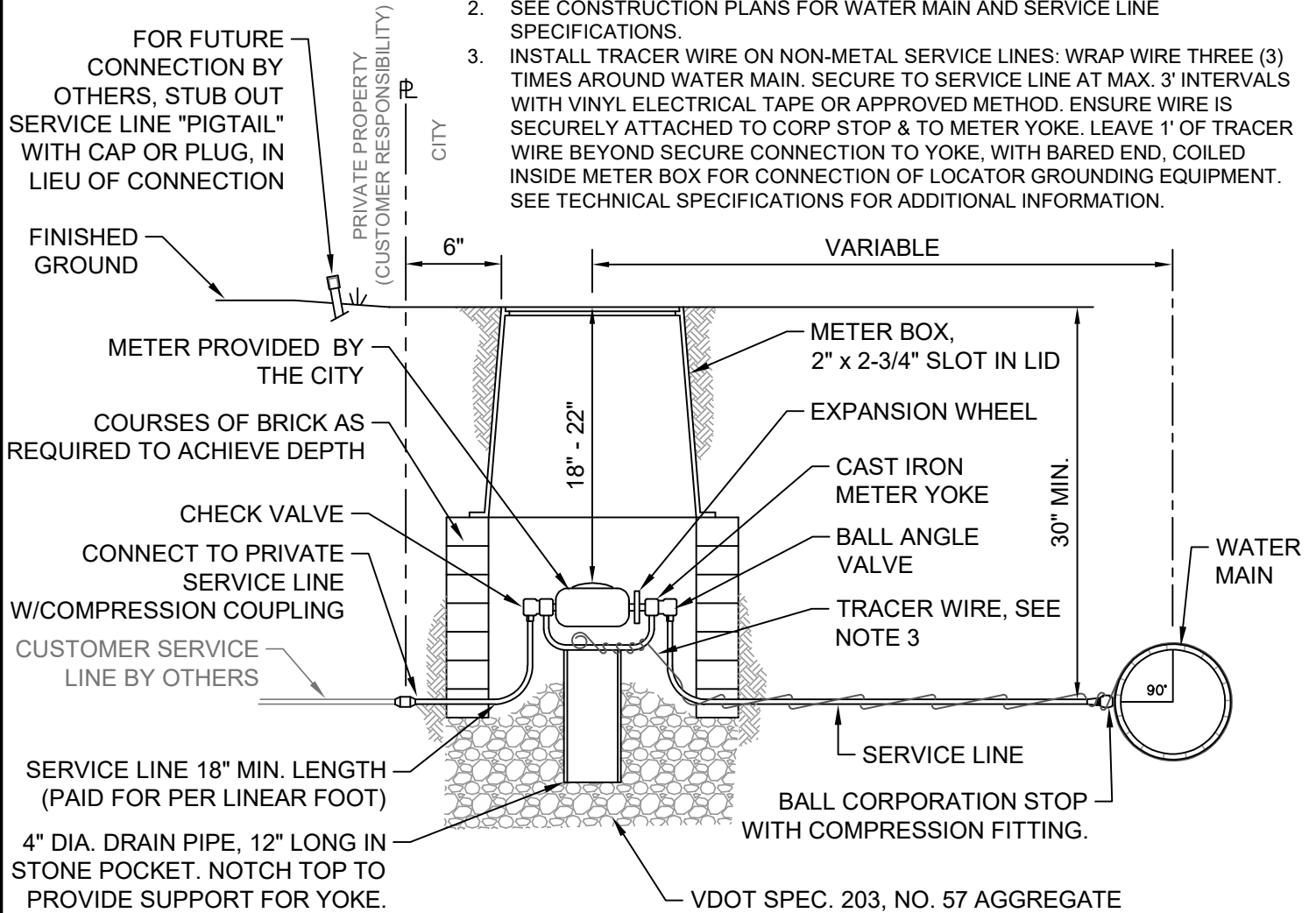
CITY OF
STAUNTON, VA

STANDARD PRIVATE ENTRANCE

Draw No.
M-6

NOTES:

1. ALL SERVICE LINE CONNECTIONS AND FITTINGS SHALL BE COMPRESSION.
2. SEE CONSTRUCTION PLANS FOR WATER MAIN AND SERVICE LINE SPECIFICATIONS.
3. INSTALL TRACER WIRE ON NON-METAL SERVICE LINES: WRAP WIRE THREE (3) TIMES AROUND WATER MAIN. SECURE TO SERVICE LINE AT MAX. 3' INTERVALS WITH VINYL ELECTRICAL TAPE OR APPROVED METHOD. ENSURE WIRE IS SECURELY ATTACHED TO CORP STOP & TO METER YOKE. LEAVE 1' OF TRACER WIRE BEYOND SECURE CONNECTION TO YOKE, WITH BARED END, COILED INSIDE METER BOX FOR CONNECTION OF LOCATOR GROUNDING EQUIPMENT. SEE TECHNICAL SPECIFICATIONS FOR ADDITIONAL INFORMATION.



PARTS SCHEDULE - WATER SERVICE LINE

PART DESCRIPTION	MANUFACTURER	MODEL# for METER SIZE INDICATED		
		5/8"	3/4"	1"
CORP STOP	FORD	FB1001-3-G-NL		FB1001-4-G-NL
	MUELLER	B-25009N 3/4"		B-25009N 1"
	A.Y. McDONALD	74701B-3Q 3/4"		74701B-3Q 1"
BALL ANGLE VALVE	FORD	BA94-313W-G-NL	BA94-323W-G-NL	BA94-444W-G-NL
	MUELLER	B-24273-N 5/8"	B-24273-N 3/4"	B-24273-N 1"
	A.Y. McDONALD	74642BYG 3/4"x5/8"	74642BYG 3/4"	74642BYG 1"
CAST IRON METER YOKE	FORD	Y501	Y503	Y504
	MUELLER	5010	H5030	H5040
	A.Y. McDONALD	14-1	14-3	14-4
EXPANSION WHEEL	FORD	EC-1-NL	EC-23-NL	EC-4-NL
	MUELLER	H-14234-5/8"	H-14234-3/4"	H-14234-1"
	A.Y. McDONALD	714-1EHG	714-2EHG	714-4EHG
ANGLE CHECK VALVE	FORD	HHCA94-313-G-NL	HHCA94-323-G-NL 3/4"	HHCA94-444-G-NL
	MUELLER	H-14466-AN 5/8"x3/4"	H-14466-AN 3/4"	H-14466-AN 1"
	A.Y. McDONALD	712-3YT 23	712-3YT 33	712-3YT 44
COMPRESSION UNION	FORD	C44-33-4-75-G-NL		C44-44-G-NL
	MUELLER	H-15409N 3/4"		H-15409N 1"
	A.Y. McDONALD	74758-11 3/4"		74758-11 1"
COMPRESSION WYE: 1" x 3/4" x 3/4"	FORD	Y44-243-G-NL		(TYPE III CONNECTION ONLY)
	MUELLER	H-15354N		
	A.Y. McDONALD	708YSQZ 1x3/4"		
METER BOX	CAPITAL FOUNDRY of VA	MBX3130		N/A
	DFW	N/A		1324C-18MAFDEEP

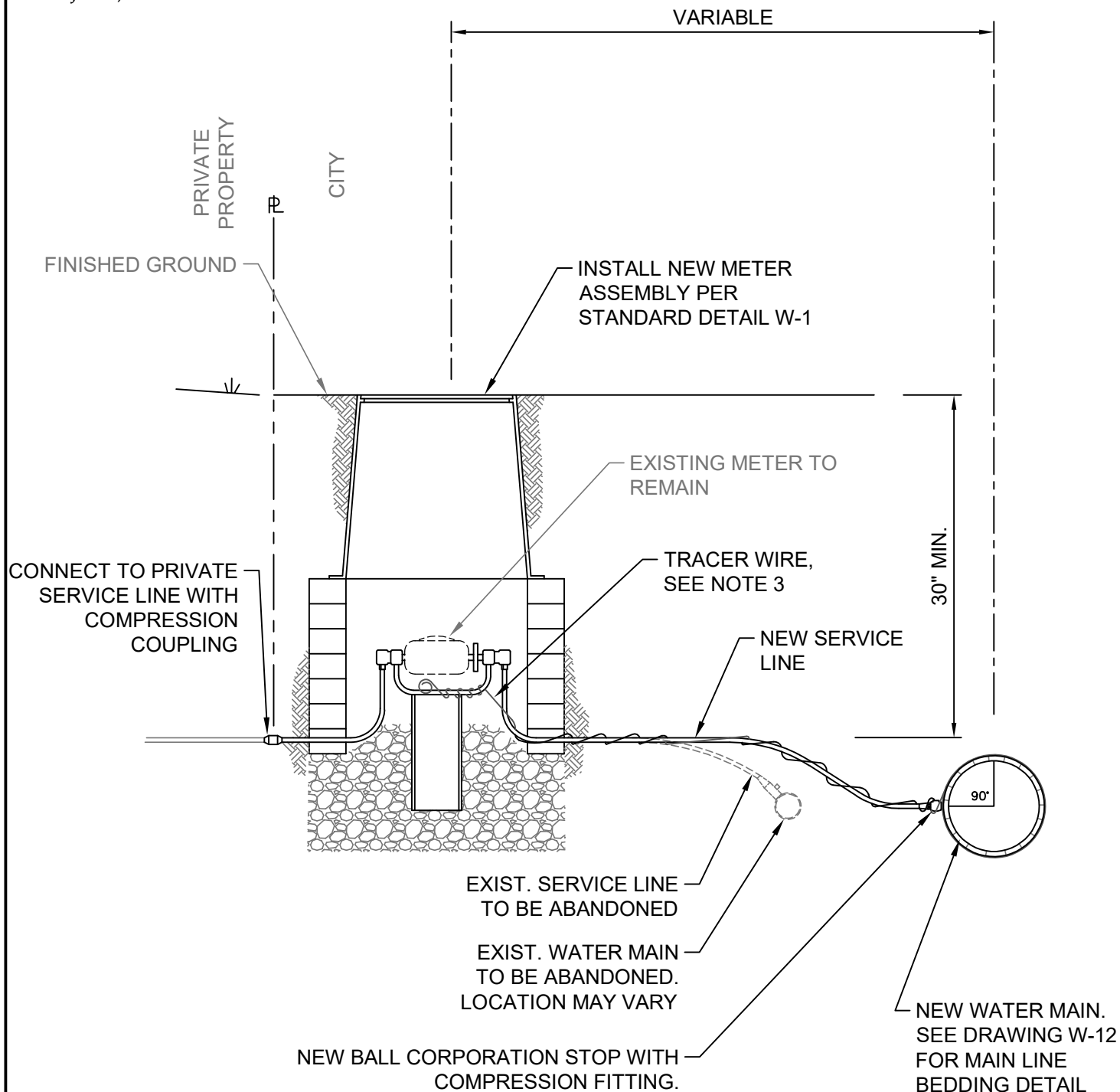
NOT TO SCALE

CITY of
STAUNTON,
VIRGINIA

**TYPICAL NEW WATER SERVICE
CONNECTION & METER ASSEMBLY
UP TO 1"**

DRAWING
NUMBER
W-1

REV. May 1, 2020
REV. Jul. 2, 2018



NOTES:

1. ALL SERVICE LINE CONNECTIONS AND FITTINGS SHALL BE COMPRESSION.
2. SEE CONSTRUCTION PLANS FOR WATER MAIN AND SERVICE LINE SPECIFICATIONS.
3. INSTALL TRACER WIRE ON NON-METAL SERVICE LINES: WRAP WIRE THREE (3) TIMES AROUND WATER MAIN. SECURE TO SERVICE LINE AT MAX. 3' INTERVALS WITH VINYL ELECTRICAL TAPE OR APPROVED METHOD. ENSURE WIRE IS SECURELY ATTACHED TO CORP STOP. SEE TECHNICAL SPECIFICATIONS AND STANDARD DETAIL W-1 FOR ADDITIONAL INFORMATION.

NOT TO SCALE

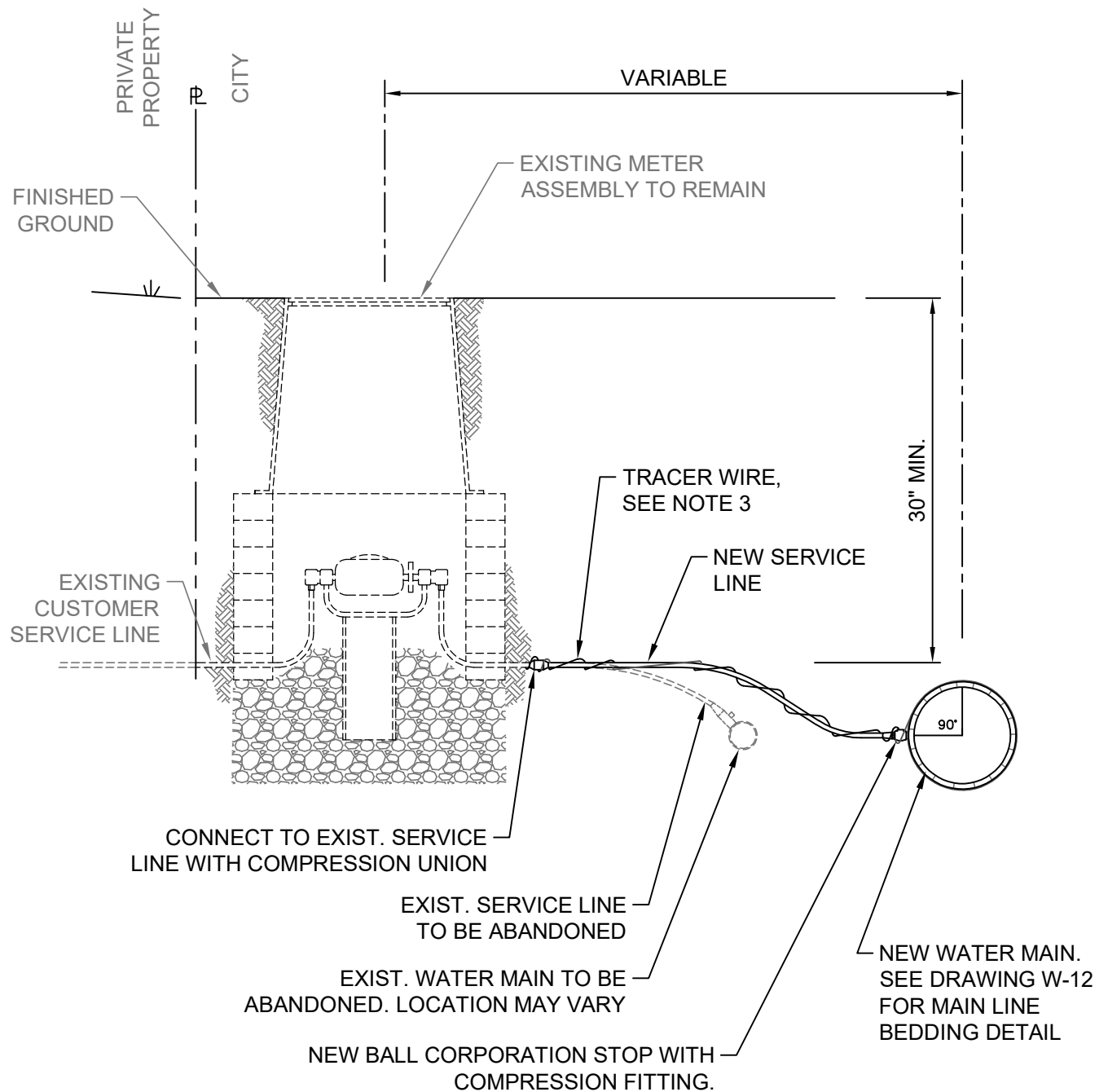
CITY of
STAUNTON,
VIRGINIA

**TYPE I CONNECTION
RECONNECT WATER SERVICE & REPLACE
METER ASSEMBLY**

DRAWING
NUMBER
W-7

REV. May 1, 2020

REV. Jul. 2, 2018



NOTES:

1. ALL SERVICE LINE CONNECTIONS AND FITTINGS SHALL BE COMPRESSION.
2. SEE CONSTRUCTION PLANS FOR WATER MAIN AND SERVICE LINE SPECIFICATIONS.
3. INSTALL TRACER WIRE ON NON-METAL SERVICE LINES: WRAP WIRE THREE (3) TIMES AROUND WATER MAIN. SECURE TO SERVICE LINE AT MAX. 3' INTERVALS WITH VINYL ELECTRICAL TAPE OR APPROVED METHOD. ENSURE WIRE IS SECURELY ATTACHED TO CORP STOP. AT CONNECTION TO EXISTING SERVICE, BARE END AND SECURE TO EXISTING TRACER WIRE IF PRESENT. IF NO EXISTING TRACER WIRE WRAP AROUND EXISTING SERVICE LINE FIVE (5) TIMES AND SECURE. SEE TECHNICAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

NOT TO SCALE

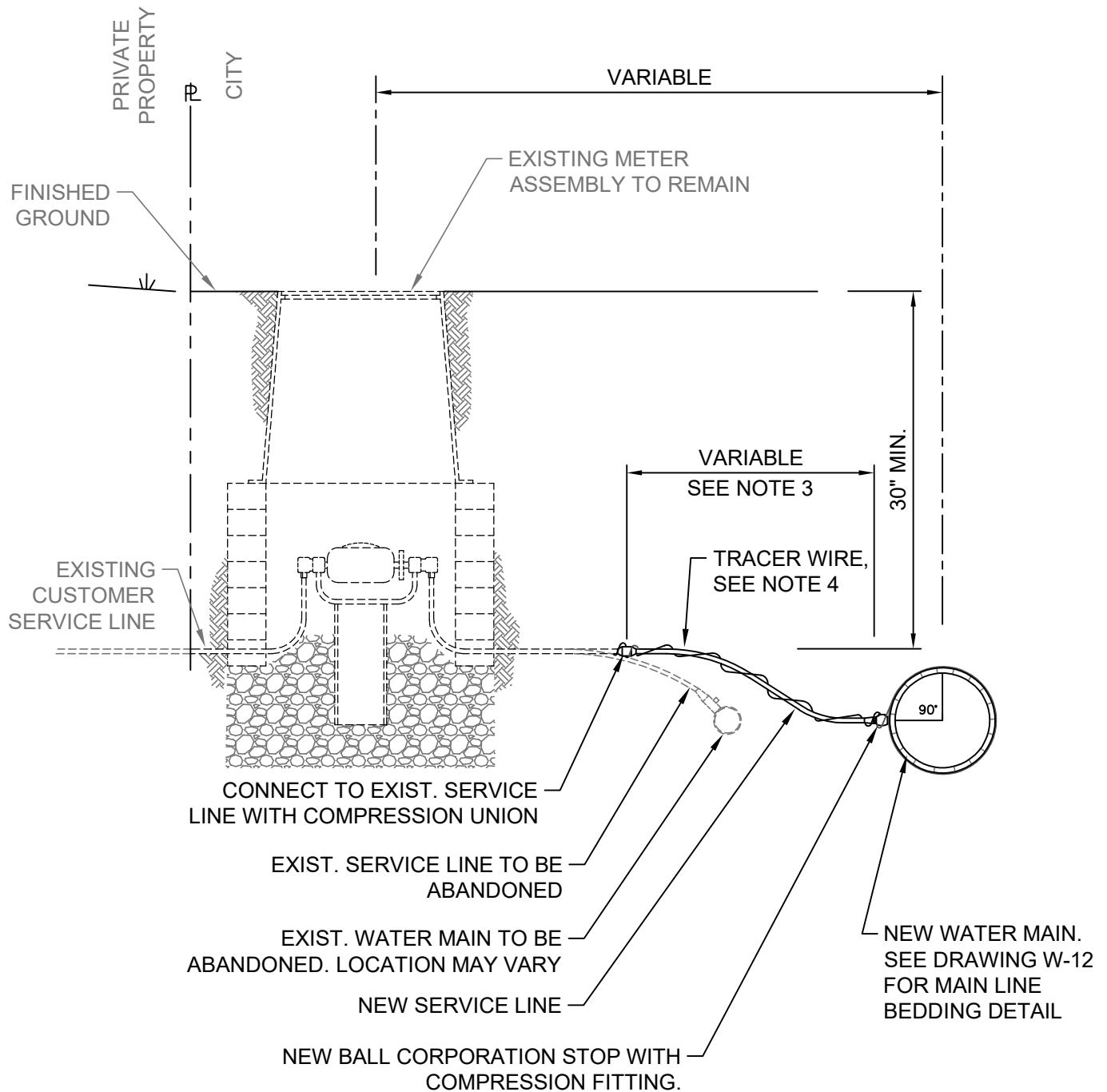
CITY of
STAUNTON,
VIRGINIA

TYPE II-A CONNECTION
RECONNECT WATER SERVICE TO EXISTING
METER ASSEMBLY

DRAWING
NUMBER
W-8A

REV. May 1, 2020

REV. Jul. 2, 2018



NOTES:

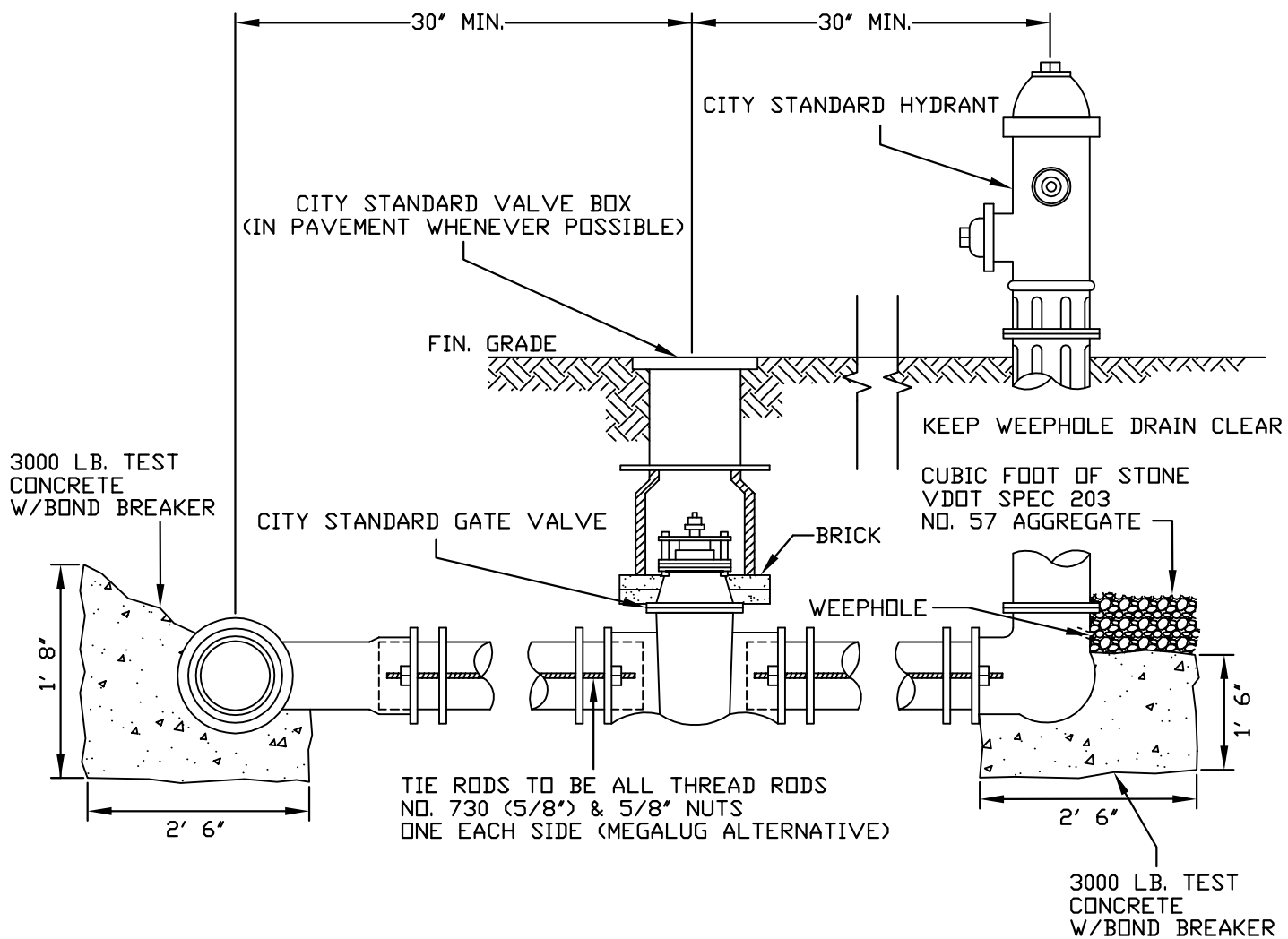
1. ALL SERVICE LINE CONNECTIONS AND FITTINGS SHALL BE COMPRESSION.
2. SEE CONSTRUCTION PLANS FOR WATER MAIN AND SERVICE LINE SPECIFICATIONS.
3. CONNECT NEW SERVICE LINE TO NEAREST ACCESSIBLE POINT ON EXISTING SERVICE LINE.
4. INSTALL TRACER WIRE ON NON-METAL SERVICE LINES: WRAP WIRE THREE (3) TIMES AROUND WATER MAIN. SECURE TO SERVICE LINE AT MAX. 3' INTERVALS WITH VINYL ELECTRICAL TAPE OR APPROVED METHOD. ENSURE WIRE IS SECURELY ATTACHED TO CORP STOP. AT CONNECTION TO EXISTING SERVICE, BARE END AND SECURE TO EXISTING TRACER WIRE IF PRESENT. IF NO EXISTING TRACER WIRE WRAP AROUND EXISTING SERVICE LINE FIVE (5) TIMES AND SECURE. SEE TECHNICAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

NOT TO SCALE

CITY of
STAUNTON,
VIRGINIA

TYPE II-B CONNECTION
RECONNECT WATER SERVICE TO EXISTING
SERVICE LINE

DRAWING
NUMBER
W-8B



NOTES:

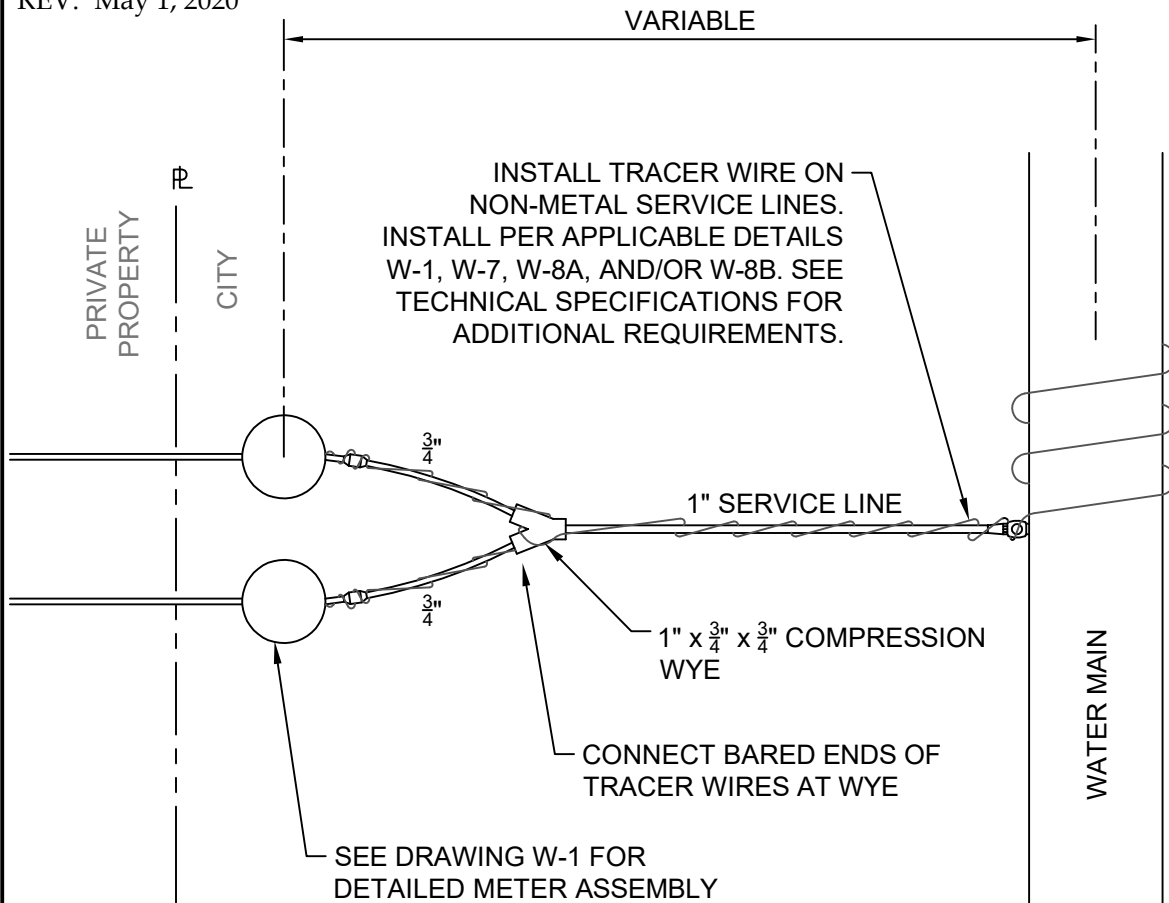
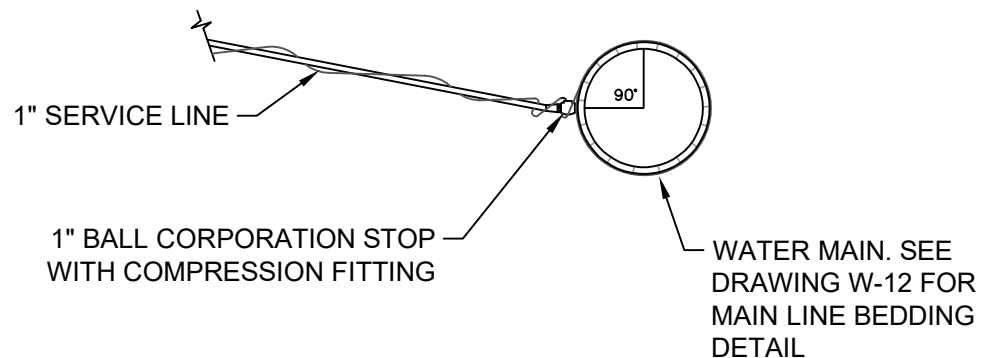
LOCATE VALVE IN PAVEMENT WHERE APPLICABLE

WEEP HOLES SHALL BE LOCATED ABOVE THE SEASONAL WATER TABLE

CITY OF
STAUNTON, VA

**STANDARD FIRE HYDRANT
ASSEMBLY**

Draw No.
W-10

PLANNOTES:

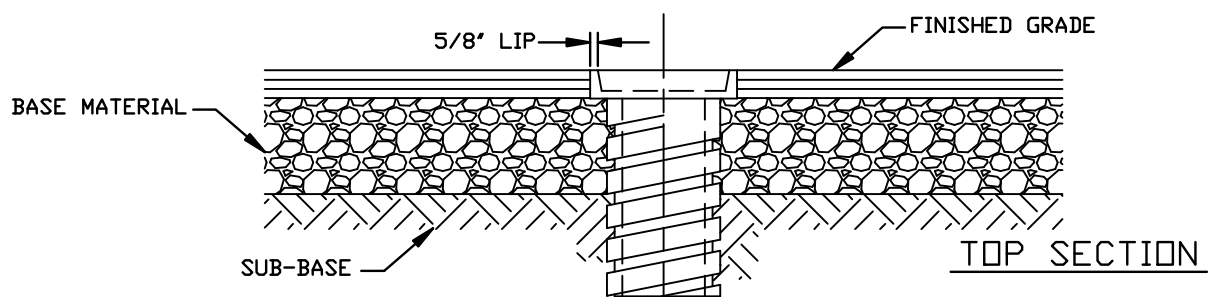
1. SEE CONSTRUCTION PLANS FOR WATER MAIN AND SERVICE LINE SPECIFICATIONS.
2. SEE DETAILS W-1, W-7, W-8A, & W-8B FOR SERVICE LINE AND METER ASSEMBLY PARTS AND SPECIFICATIONS.

NOT TO SCALE

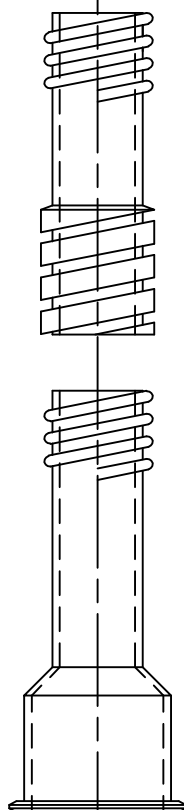
CITY of
STAUNTON,
VIRGINIA

TYPE III CONNECTION TANDEM WATER SERVICE CONNECTION

DRAWING
NUMBER
W-9



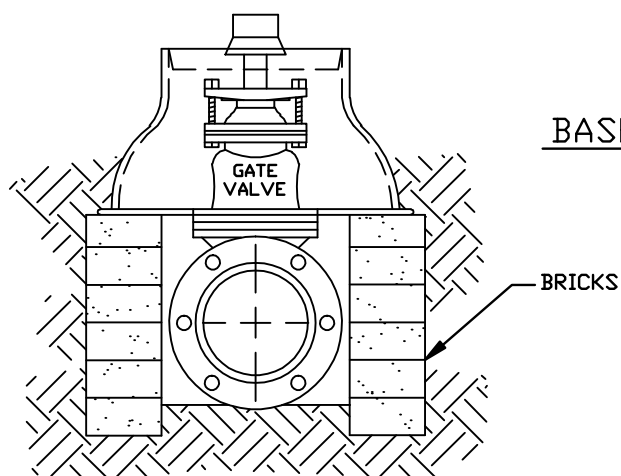
CENTER SECTION

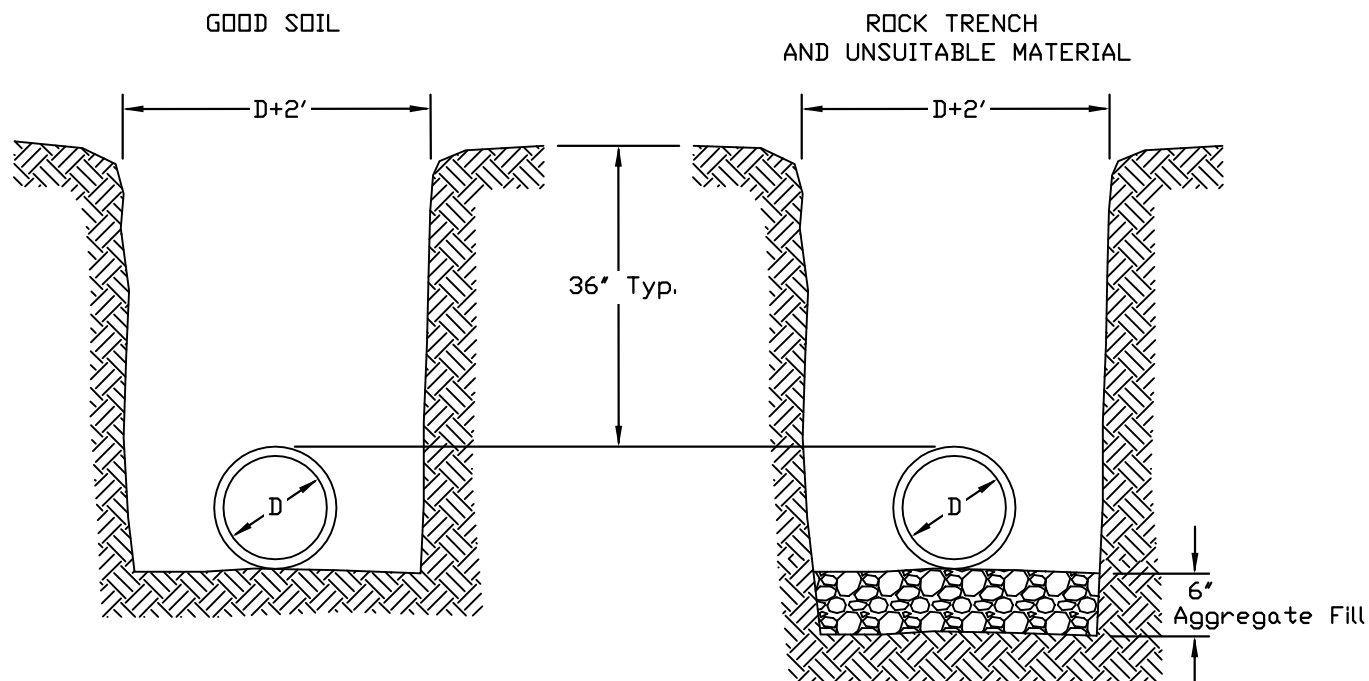


BOTTOM SECTION

NOTE: SCREW TYPE ADJUSTABLE
VALVE BOX SHALL BE
CAST IRON BY TYLER
OR CAPITOL FOUNDRY
HEAVY DUTY BOX
(STAUNTON SPEC.)

BASE SECTION

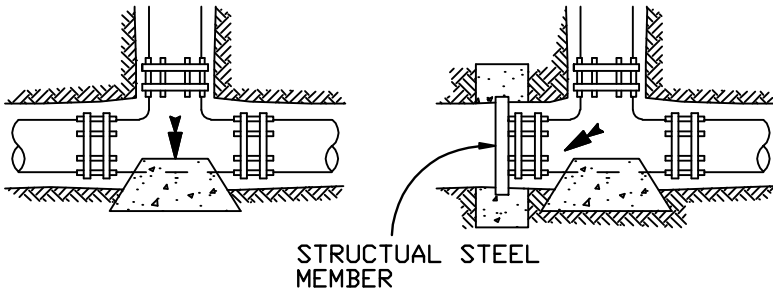




NOTE:

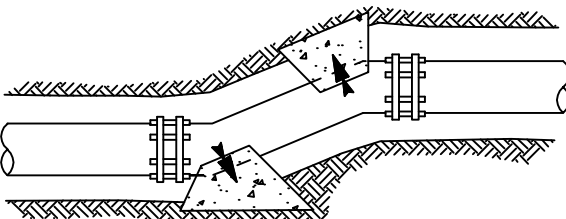
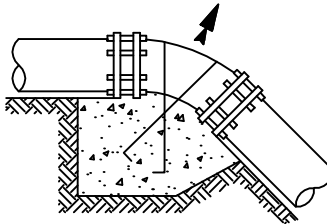
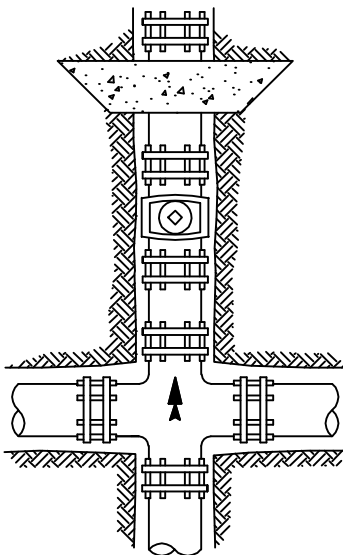
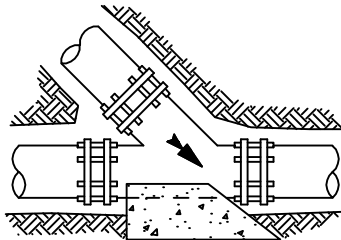
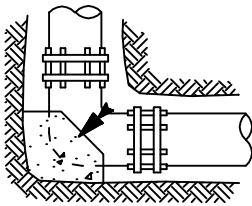
1. ALL BEDDING SHALL BE CONTINUOUS AND UNIFORM
2. EXCAVATION IS REQUIRED TO ENSURE THERE IS NO ROCK WITHIN 6" OF THE BOTTOM OF THE PIPE

XXV



XXIV

UTILIZE: TO DETERMINE THE THRUST
TO BE RESTRAINED BY A THRUST BLOCK



ARROW INDICATES
THE DIRECTION OF THE
RESULTANT THRUST FORCE

RESULTANT THRUST AT FITTINGS AT 100 PSI WATER PRESSURE
TOTAL POUNDS

NOM. PIPE DIA. IN.	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4	1,810	2,559	1,385	706	355
6	3,739	5,288	2,862	1,459	733
8	6,433	9,097	4,923	2,510	1,261
10	9,677	13,685	7,406	3,776	1,897
12	13,685	19,353	10,474	5,340	2,683
14	18,385	26,001	14,072	7,174	3,604
16	23,779	33,628	18,199	9,278	4,661
18	29,865	42,235	22,858	11,653	5,855
20	36,644	51,822	28,046	14,298	7,183
24	52,279	73,934	40,013	20,398	10,249
30	80,425	113,738	61,554	31,380	15,766
36	115,209	162,931	88,177	44,952	22,585
42	155,528	219,950	119,036	60,684	30,489
48	202,683	286,637	155,127	79,083	39,733
54	256,072	362,140	195,989	99,914	50,199

TO DETERMINE THRUST AT PRESSURES OTHER THAN 100
PSI, MULTIPLY THE THRUST OBTAINED IN THE TABLE BY
THE RATIO OF THE PRESSURE TO 100

FOR EXAMPLE, THE THRUST ON A 12 INCH, 90° BEND AT

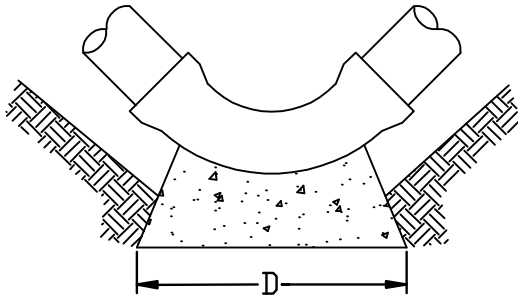
$$125 \text{ PSI IS } 19,353 \times \frac{125}{100} = 24,191 \text{ POUNDS}$$

**CITY OF
STAUNTON, VA**

**THRUST BLOCK
TABLES XXV, XXIV**

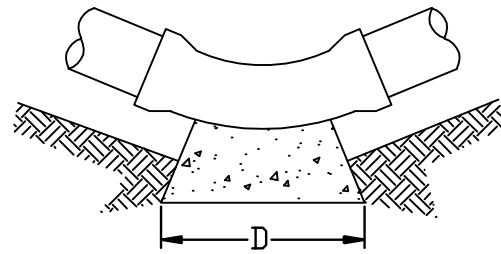
**Draw No.
W-13**

90° BEND PLAN



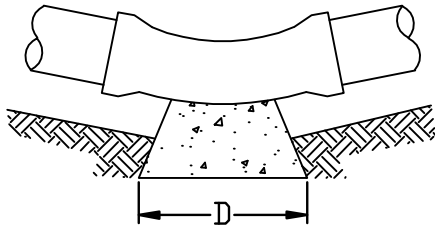
D = 3' 6" FOR 4" PIPE
 D = 4' 0" FOR 6" PIPE
 D = 4' 6" FOR 8" PIPE
 D = 5' 0" FOR 10" PIPE

45° BEND PLAN



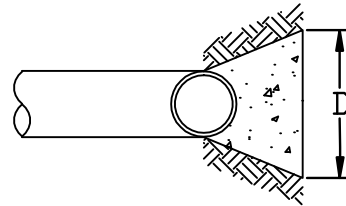
D = 1' 8" FOR 4" PIPE
 D = 2' 4" FOR 6" PIPE
 D = 3' 0" FOR 8" PIPE
 D = 3' 6" FOR 10" PIPE

22 1/2° BEND PLAN



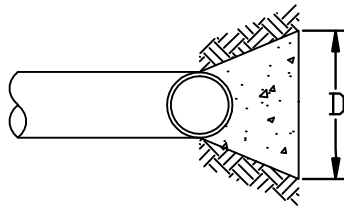
D = 1' 8" FOR 4" PIPE
 D = 2' 0" FOR 6" PIPE
 D = 2' 10" FOR 8" PIPE
 D = 3' 6" FOR 10" PIPE

SECTION



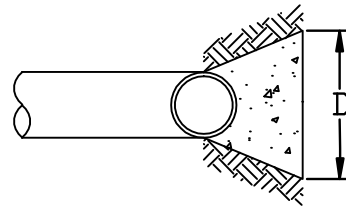
D = 1' 0" FOR 4" PIPE
 D = 1' 8" FOR 6" PIPE
 D = 2' 3" FOR 8" PIPE
 D = 2' 8" FOR 10" PIPE

SECTION



D = 1' 0" FOR 4" PIPE
 D = 1' 6" FOR 6" PIPE
 D = 1' 10" FOR 8" PIPE
 D = 2' 4" FOR 10" PIPE

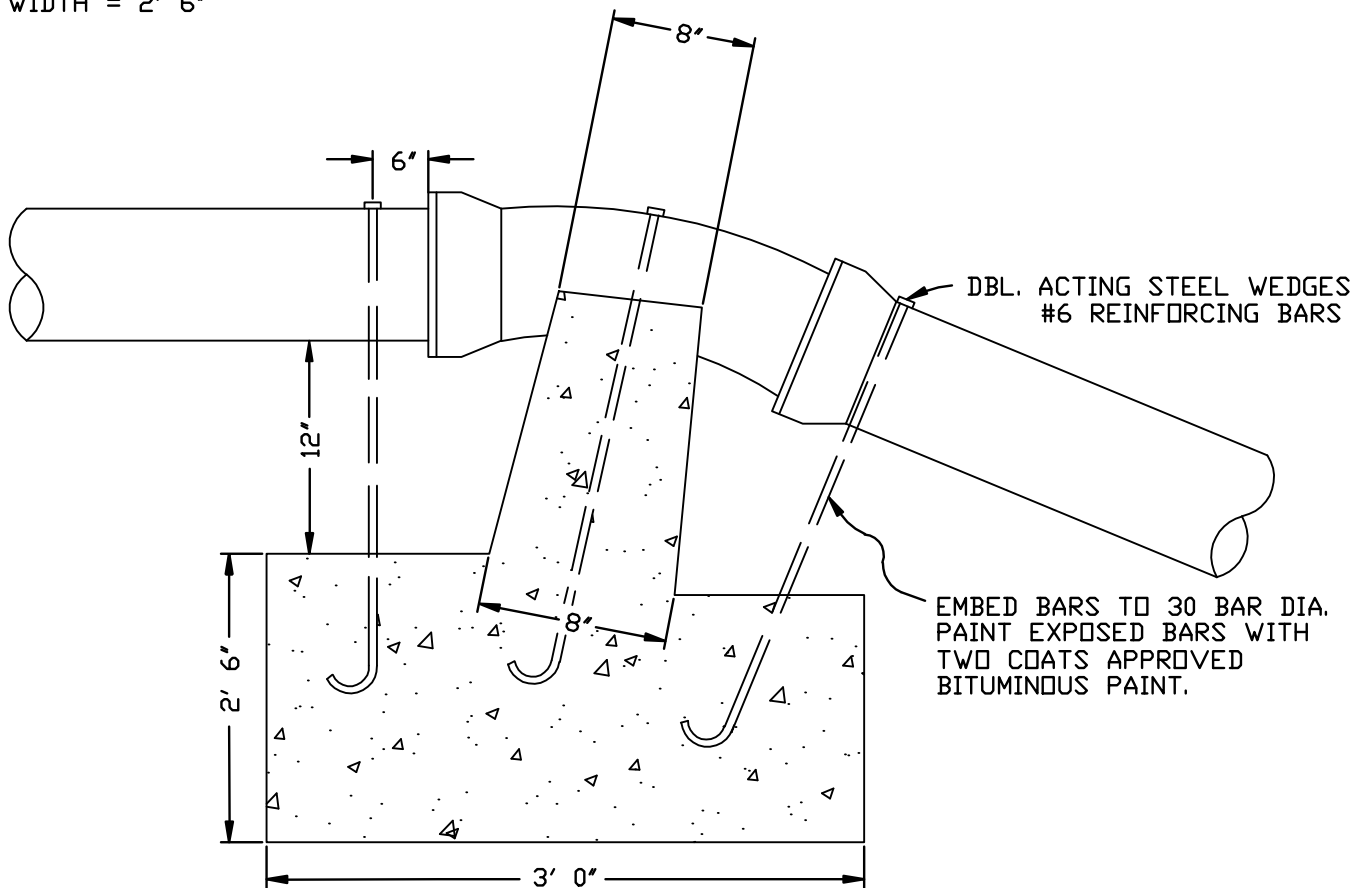
SECTION



D = 1' 0" FOR 4" PIPE
 D = 1' 3" FOR 6" PIPE
 D = 1' 5" FOR 8" PIPE
 D = 2' 0" FOR 10" PIPE

MEGA-LUG ALTERNATIVE FOR BENDS 22 1/2° AND LESS

WIDTH = 2' 6"

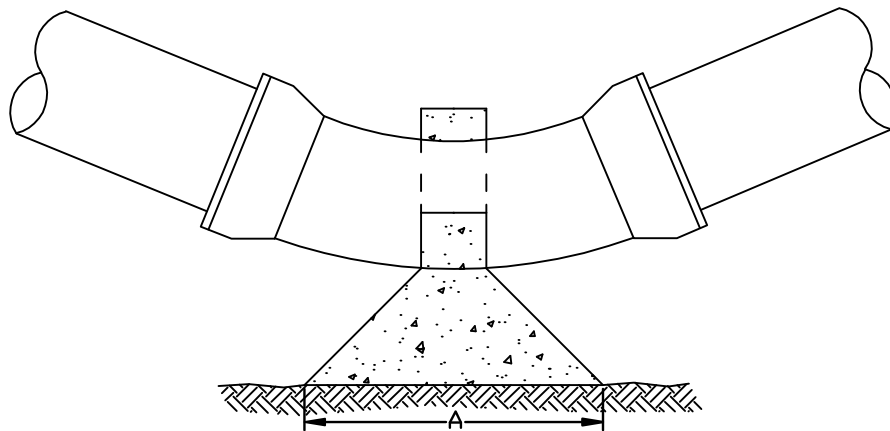
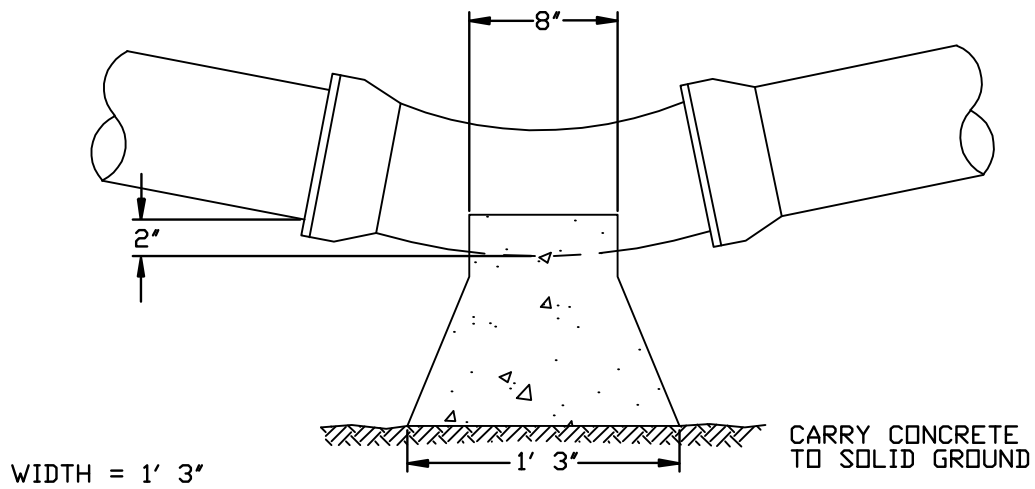


MEGA-LUG ALTERNATIVE FOR BENDS $22\frac{1}{2}^{\circ}$ OR LESS

**CITY OF
STAUNTON, VA**

THRUST BLOCK VERTICAL BEND

**Draw No.
W-15**



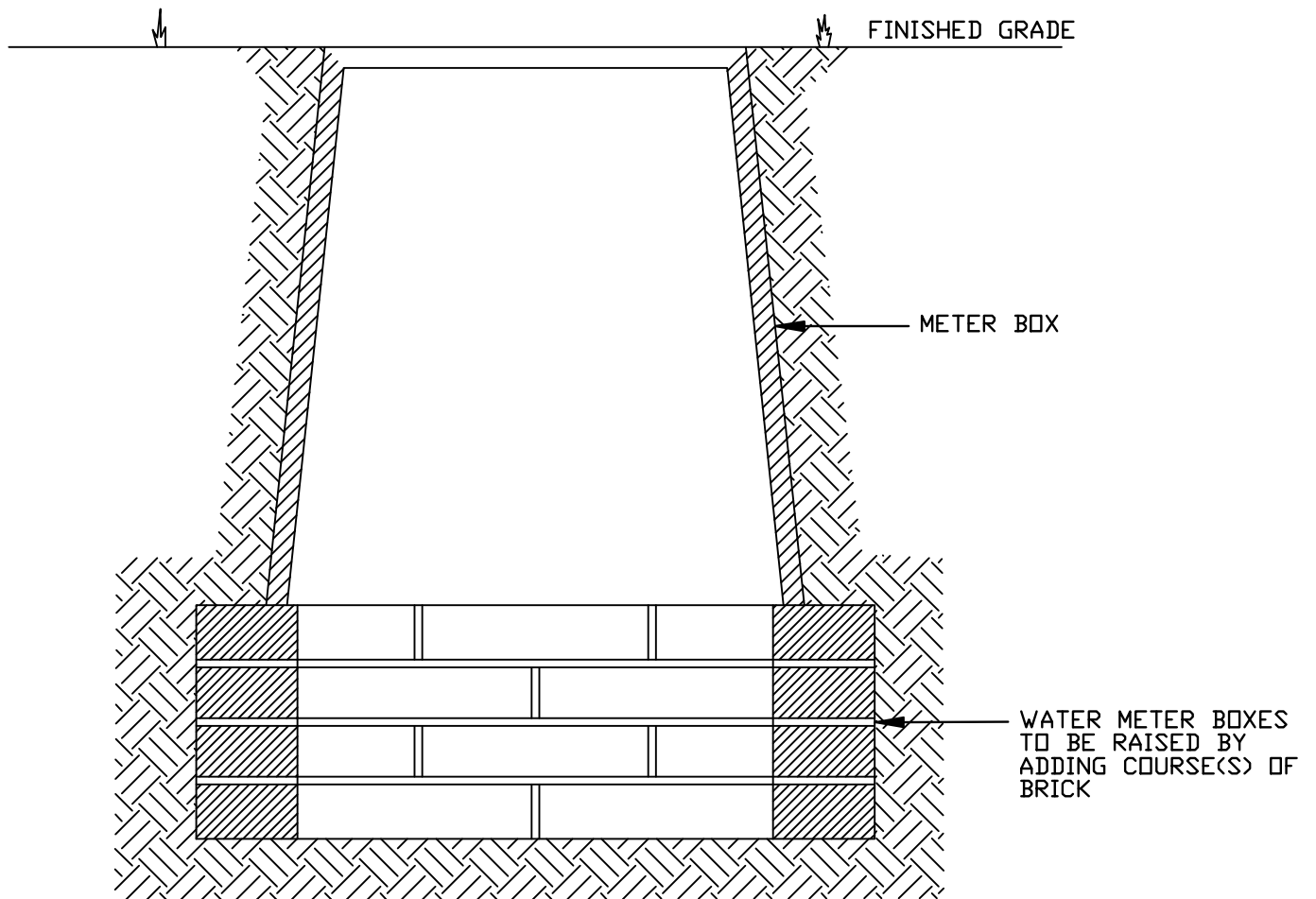
BEND	A
11 1/4°	1' 3"
22 1/2°	1' 3"
45°	1' 3"
90°	2' 0"

MEGA-LUG ALTERNATIVE FOR BENDS 22 1/2° OR LESS

**CITY OF
STAUNTON, VA**

**THRUST BLOCK
HORIZONTAL & VERTICAL BENDS**

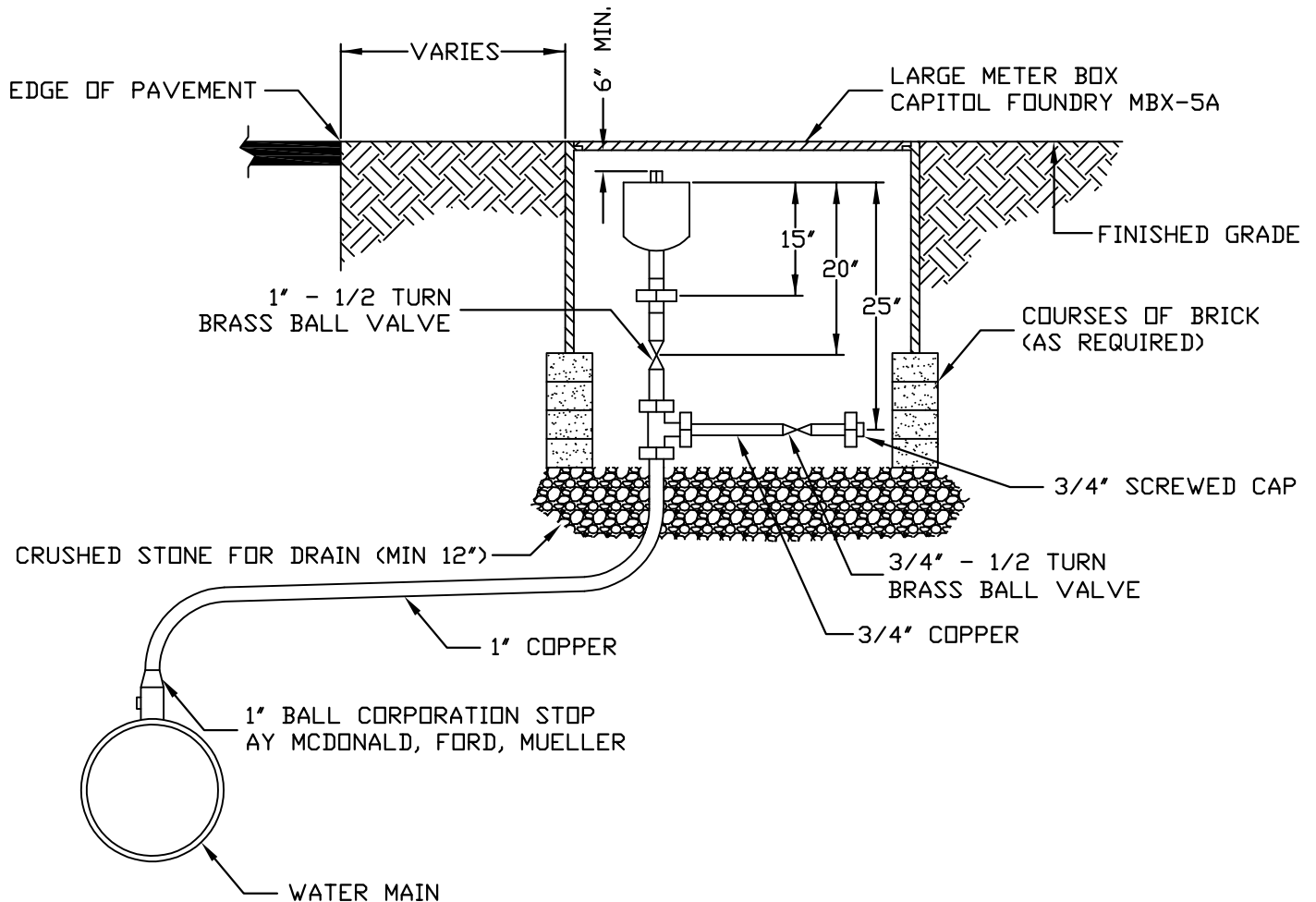
**Draw No.
W-16**



**CITY OF
STAUNTON, VA**

WATER METER BOX ADJUSTMENT

**Draw No.
W-17**



NOTES:

1. ALL COPPER CONNECTIONS AND FITTINGS SHALL BE COMPRESSION
2. AIR RELIEF VALVE TO BE VALMATIC 202C.1

NOT TO SCALE

CITY of
STAUNTON,
VIRGINIA

1" AIR RELIEF VALVE INSTALLATION

DRAWING
NUMBER
W-18A