

VILLAGE OF HOLLEY

**72 Public Square
Holley, NY 14470**

DWSRF PROJECT # 18414

CONTRACT DOCUMENTS

**FOR
EAST ALBION STREET & PARK PLACE
MATERIALS**

2019

Bids Due August 26, 2019 10:30 AM

00020 - NOTICE TO BIDDERS

Sealed Proposals will be received by the Village Clerk at the Village of Holley, 72 Public Square Holley, NY 14470, up to 10:30 AM E.S.T. or E.D.S.T., whichever prevails at the time, on August 26, 2019 for the work described below at the location indicated.

Description: **Village of Holley**
East Albion Street & Park Place Waterline Replacement,
Materials

The proposed project is the purchase of waterline materials including PVC waterline, ductile iron fittings, fire hydrants, water service materials and stone backfill material to be used for a waterline replacement project within the Village of Holley. These materials will be supplied by the bidder and turned over to the Village of Holley Department of Public Works at their facility for installation.

The Specifications and Contract Documents under which the work is to be done are on file and may be examined at the office of the Village Clerk at the Village of Holley, 72 Public Square Holley, NY 14470

The Village of Holley reserves the right to reject any and all proposals for any reason whatsoever. No bid may be withdrawn for a period of forty-five (45) days after the above date and time for receiving bids.

Each Proposal must be accompanied by a non-collusive bidding certificate in accordance with Section 103-d of the General Municipal Law.

All materials must be delivered within 30 days of Notice of Award.

BY ORDER OF THE VILLAGE BOARD OF HOLLEY

Date: _____

8-9-19



Deborah Schiavone, Village Clerk

00100 - INSTRUCTIONS TO BIDDERS

SCOPE OF WORK

The work to be done under this Contract includes the furnishing and delivery of all materials necessary for the construction of the Project in accordance with the specifications prepared by the Engineers.

This project, including the letting of contracts in connection therewith, will conform to applicable requirements of Federal, State and Local Laws, Ordinances, Rules and Regulations.

EXAMINATION OF DOCUMENTS

It is required that each bidder will examine the specifications for this work. It is also expected that he will obtain firsthand information concerning the available facilities for receiving and storing these materials and concerning other local conditions that may affect his work.

It is understood that statements and representations regarding quantities of materials are offered by the Owner in good faith to acquaint the Contractor with the scope and nature of the work.

In bidding on this Contract, each bidder acknowledges that he has made whatever investigation he has deemed necessary for the purpose of bidding.

In bidding on this Contract each bidder represents to the Owner that he has made all necessary investigation he has deemed necessary for the purpose of bidding and that he shall make no claim against the Owner, and its agents or employees and the Engineer or its Officers, agents, or employees because of incomplete or faulty data. The bidder shall assume full responsibility for the interpretation of this information in connection with this Contract.

The signing of the proposal and submission of a bid shall constitute a release of the Owner and the Engineer, their officers and their agents or employees, from all claims whatsoever respect thereto.

NAME, ADDRESS AND STATUS OF BIDDER

The name and legal status of the bidder, that is, a corporation, partnership or an individual, shall be stated in the proposal. A corporation bidder shall name the state in which its articles of incorporation are held and must give the title of the official having authority, under by-laws, to sign Contracts; a partnership bidder shall give full name and addresses of partners.

Any person signing a proposal as an agent for another or others must submit with his proposal legal evidence of his authority to do so.

The place of residence of each bidder or the office address in this case of a firm or company, with County and State, must be given after his signature.

RESPONSIBILITY

Bidders shall be qualified to do business in New York State or covenant to obtain such qualification prior to signing the Agreement. Bids received from Bidders who have previously failed to complete work within the time required, or who have previously performed similar work in an unsatisfactory manner, may be rejected.

BASIS OF PROPOSAL

Proposals are solicited on the basis provided on the form of proposal. The bidder is requested to submit proposals in each of the elements provided, stating the separate and respective amounts proposed for each.

The bidder shall submit unit prices as required in the proposal form.

FORM OF PROPOSAL

All proposals must be made and signed by the bidder in the form attached hereto and without removal from the bound pamphlet. Additional copies of the proposal form for the bidder's files may be obtained upon request at the office of the Engineer.

All prices stated in the proposal must be plainly written in legible figures and words. Illegibility of any figure or words in the proposal may be sufficient cause for rejection of the proposal by the Owner.

PROPOSAL DATA

Bidders shall furnish in the proposal all information required, together with any supplemental information explaining in detail any special equipment or material offered. In case of manufactured equipment or material, it will be sufficient if the manufacturer files, with the Engineer, a copy of such supplemental information with regard to his product, and the bidder refers thereto with his proposal.

RIGHT TO ACCEPT, TO REJECT AND TO WAIVE DEFECTS

The Owner reserves the right to accept any proposal, to reject any or all proposals, and to waive defects or irregularities in any proposal. In particular, any alteration, erasure or interlineation of the Contract Documents and of the form of proposal shall render the accompanying proposal irregular and subject to rejection by the Owner. Proposals which are clearly unbalanced will also be considered as irregular and subject to rejection by the Owner.

AWARD AND EXECUTION OF CONTRACT

Materials and equipment, as named in the specifications, shall be used in preparing the bid. The Owner shall have the right to accept or reject any and/or all alternates in any order or combination unless otherwise specifically provided in the bidding documents. The award will be made to the lowest responsible bidder on the basis of the base bid and any alternates accepted.

The Contract shall be deemed as having been awarded when formal notice of award shall have been duly served by the Owner upon the bidder.

The bidder to whom the Contract shall have been awarded will be required to execute the Agreement in the form attached hereto. In case of his refusal or failure to do so, he will be considered to have abandoned all his rights and interests in the award and the work may be awarded to another.

WRITTEN AND ORAL EXPLANATIONS

Should a bidder find discrepancies in or omissions from the Contract Documents, Drawings or Specifications, or should he be in doubt as to their meaning, he should at once notify the Engineer and request an interpretation thereof. Every request for such interpretation shall be in writing addressed to the Engineers and to be given consideration, must be received at least five days prior to the date fixed for the opening of the bids. Any and all such interpretations and supplemental instructions will be in writing and will be sent to prospective bidders at the respective addresses furnished for such purposes, not later than three days prior to the date fixed for such opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve the bidder from any obligation under his bid as submitted. The Owner will not be responsible for any oral instructions. Unless the bidder shall have asked for in writing and obtained written decision before the submission of his proposal on any question pertaining to the bid, he shall be deemed to have based his bid on the more expensive way of doing the work and shall relinquish any right to future claims for additional payments.

WITHDRAWAL OF BIDS

Any bidder who has submitted a proposal to the Owner may withdraw his bid at any time prior to the scheduled time for the receipt of bids. No bidder may withdraw his bid after the time stated in the advertisement for opening bids.

EXAMINATION OF CONTRACT DOCUMENTS

The specifications are deemed an essential part of this Contract.

Whenever a standard specification or part thereof is referred to, it shall thereby become a part of these specifications as if written out herein in full.

No consideration will be granted for alleged misunderstanding of materials to be furnished, work to be done or conditions to be complied with, it being understood that the tender of a proposal carries with it the agreement to all items and conditions referred to herein or indicated on the drawings.

Quantities shown in the bid proposal are estimates.

MATERIAL LIST

Each bidder shall indicate, on the forms included in the proposal, the name of the manufacturers for the various materials and equipment included in the bid. The Engineer's opinion will be final as to whether the materials or equipment offered are equal to those specified.

These sheets shall be completed by the three (3) lowest qualified bidders and shall be submitted within seventy-two (72) hours following the opening of the bids. These will become a part of the proposal upon which the award shall be based. Failure to furnish these sheets within the specified time may make a bid informal.

00300 – PROPOSAL

(Unit Price Contract)

Gentlemen:

The undersigned bidder has carefully examined Contract Documents referred to in the "Information for Bidders", and agrees to furnish and deliver all materials called for by the Contract Documents in a manner prescribed therein and in said Contract, and in accordance with the requirements of the Engineer under them.

The undersigned bidder also understands that the quantities of work as shown herein for each bid proposal option are approximate only and are subject to increase or decrease, and offers to do the work whether the quantities are increased or decreased, at the Unit Price stated in the following schedule for either option accepted by the Owner.

The undersigned bidder also understands that he is required to submit a completed proposal for the Proposal. Failure to submit a complete proposal for will be considered sufficient ground to reject the bid.

VILLAGE OF HOLLEY

EAST ALBION STREET & PARK PLACE WATERLINE REPLACEMENT, MATERIALS

PROPOSAL

BIDDER'S PROPOSAL

(This Proposal Form shall not be detached from the Contract Documents and the entire booklet, including any Addenda, shall be included with each signed proposal.)

The undersigned, as bidder, declares that no person or persons other than those named herein are interested in this proposal; that this proposal is made without collusion with any other person, firm or corporation; that he has carefully examined the location of the proposed work, the proposed form of Contract, and the plans therein referred to; that no person or persons acting in any official capacity for the Owner is directly or indirectly interested therein or in any portion of the profit thereof; and that he proposes and agrees, if this proposal is accepted, to execute the form of Contract with the Owner to provide all necessary equipment, tools and other means of construction, insurance, performance, labor and material, and maintenance bonds, bid bond, etc., and to do all work and furnish all the materials shown and specified in the Contract Documents, and that he will take in full payment therefore, the following unit prices or lump sums:

On the following bidding pages the Contractor shall show the amount bid both in words and figures. In case of discrepancy the amount in words will govern.

1. The undersigned, if awarded the Contract, proposes to furnish and deliver the materials specified herein.
2. Failure to submit a completed proposal will be considered sufficient grounds to reject the bid.
3. It is understood that the Owner reserves the right to reject all bids.

The undersigned also agrees as follows:

FIRST: To do any extra work not covered by the above schedule of prices which may be requested by the Engineer and to accept as full compensation therefore such prices as may be agreed upon in writing by the Engineer and the Contractor.

SECOND: That if the foregoing proposal shall be accepted by the Owner, he will, within ten (10) consecutive calendar days after receiving notice of the acceptance of such proposal, enter into Contract, in the appropriate form, to furnish and deliver the materials necessary for the full and complete execution of the work, at and for the price named in his proposal and he will furnish to the Owner such surety for the faithful performance of this Contract and for the payment for all materials used in this work and for all labor expended thereon as shall be approved and accepted by the Owner.

THIRD: That he has received the following Addendum:

No. _____ Date: _____

(If an individual, partnership or non-incorporated organization)

Name of Bidder _____

By _____
Signature

Address of Bidder _____

Names and Addresses of Members of the firm:

(If a Corporation)

Name of Bidder _____

By _____
Signature Title

Business Address _____

Business Phone _____

Incorporated under the laws of the State of _____

Corporated Officers

(President _____
Name Address

(
(

(Secretary _____
Name Address

(
(

Treasurer _____
Name Address

LEGAL STATUS OF BIDDER

A Corporation duly organized and doing business under the laws of the State
of _____ for whom _____ bearing
official title of _____ whose signature
is affixed to this proposal is duly authorized to execute Contracts.

A Partnership, all of the members of which, with addresses are:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

An individual, whose signatures is affixed to this proposal.

(The bidder shall fill out the appropriate form and strike out the other two.)

00430 - REQUIREMENTS FOR PROPOSAL

Material List

The purpose of this requirement to indicate the name of the manufacturer for the material to be supplied is to allow the Owner to be assured that the proposed manufacturers are, in fact, in accordance with the requirements of the specifications. The bidder may indicate more than one manufacturer's name only if it is his intention to use one of the named manufacturers as the supplier of the particular material required. Indication of the name of a supply house is not satisfactory and it is the actual name of the manufacturer which is required.

Reference is, hereby, made to the "Material List" of this Section.

00480 - NON-COLLUSIVE BIDDING CERTIFICATION

1. (a) By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief: (1) The prices in this bid have been arrived at independently without collusion, consultation, communication or agreement for the purpose of restricting competition as to any matter relating to such prices with any other bidder or with any competitor; (2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; (3) No attempt has been or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition;

(b) A bid shall not be considered for award nor shall any award be made where (a) (1) (2) and (3) above have not been complied with, provided however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefor. Where (a) (1) (2) and (3) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder: (a) has published lists, rates, or tariffs covering items being procured; (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items; or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more information, a disclosure within the meaning of subparagraph 1.(a).

2. Any bid hereafter made to any political subdivision of the State or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation, or local law, and where such bid contains the certification referred to in subdivision 1. of this section, shall be deemed to have been authorized by the board of directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificates as to non-collusion as the act and deed of the corporation.

Resolved that

By _____

(Name of Corporation)

be authorized to sign and submit the bid or proposal of this Corporation for the following project:

and to include in such bid or proposal the certificate as to non-collusion required by Section 103(d) of the General Municipal Law as the act and deed of such Corporation and for any inaccuracies or mis-statements in such certificate this corporate bidder shall be liable under the penalties of perjury.

The foregoing is true and correct copy of the resolution adopted by

corporation at a meeting of its Board of Directors held on the _____ day of _____, 20 ____.

(SEAL OF THE CORPORATION)

(Secretary)

CONTRACT DOCUMENTS

00500 - INSTRUCTIONS FOR EXECUTING AGREEMENT

If the Contractor is a Corporation, the following certificate must be executed:

I, _____, certify that I am
the _____ (eg. secretary) of the corporation
named as Contractor hereinabove; that _____
who signs the Agreement on behalf of the Contractor is now _____
of said Corporation; that said Agreement is duly signed for and in behalf of said Corporation by authority of
its governing body and is within the scope of its corporate powers.

Signature

(Corporate Seal)

If the Agreement is signed by the secretary of the corporation, the above certificate shall be executed by some other Officer of the Corporation, under the Corporate Seal. In lieu of the foregoing certificate there may be attached to the Agreement, copies of so much of the records of the Corporation as will show the Official character and authority of the Officers signing, duly certified by the Secretary or Assistant Secretary under the Corporate Seal to be true copies.

The full name and business address of the Contractor shall be inserted and the Agreement should be signed with his Official signature. The name(s) of the signing party or parties must be typewritten or printed under all signatures of the Agreement.

If the Contractor should be operating as a Partnership, each partner should sign the Agreement. If the Agreement is not signed by each partner there shall be attached to the Agreement duly authorized power of attorney evidencing the signer's (signers') authority to sign such Agreement for and in behalf of the partnership.

If the Contractor is an individual, the trade name (if the Contractor be operating under a trade name) shall be indicated in the Agreement and the Agreement should be signed by the individual. If signed by one other than the Contractor, there must be attached to the Agreement a duly authenticated power of attorney evidencing the signer's authority to execute such Agreement in behalf of the Contractor.

00500 - AGREEMENT

This Agreement, made this _____ day of _____
20 _____, by and between _____
hereinafter called "Owner" and _____
doing business as (an individual) or (a partnership) or (a corporation) hereinafter called "Contractor".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The "Contractor" will commence and complete the Construction of the Project as mentioned.
2. The "Contractor" will furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the Project described herein.
3. The "Contractor" will commence the Work required by the Contract Documents after the Notice to Proceed and will complete all Work in accordance with the completion dates in the Notice to Bidders, unless the time for completion is extended as provided for in the Contract Documents.
4. The "Contractor" agrees to perform all the Work described in the Contract Documents and comply with the terms therein for the consideration quoted on the attached Proposal.
5. The term "Contract Documents" is defined in the General Conditions, Section 1 – Definitions.
6. The "Owner" will pay to the Contractor in the manner and at such times as set forth in the General Conditions, such amounts as required by the Contract Documents.
7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, the parties hereto have set their hands and seals, in quadruplicate, the day and year first above written.

VILLAGE BOARD OF THE VILLAGE OF HOLLEY

Brian Sorochty, Authorized Representative

Date

ATTEST:

Deborah Schiavone, Village Clerk

Date

WITNESS:

CONTRACTOR

By: _____

Date: _____

Approved as to form and execution:

Date: _____

John S. Sansone, Counsel for the Owner

VILLAGE OF HOLLEY
 Water Distribution System
 East Albion Street & Park Place Waterline Replacement
MATERIALS BID

DESCRIPTION	ESTIMATED QUANTITIES	COMPUTED TOTALS
Item 1A.8 – For Furnishing & Delivery of 8-inch PVC Waterline The unit price of _____ Dollars and _____ Cents (\$ _____) Per Lineal Foot	1,900 L.F.	\$ _____
Item 1A.12 – For Furnishing & Delivery of 12-inch PVC Waterline The unit price of _____ Dollars and _____ Cents (\$ _____) Per Lineal Foot	20 L.F.	\$ _____
Item 2B – For Furnishing & Delivery Ductile Iron Fittings The unit price of _____ Dollars and _____ Cents (\$ _____) Per Pound	1,600 LBS	\$ _____
Item 4A.8 – For Furnishing & Delivery 8-inch Gate Valve The unit price of _____ Dollars and _____ Cents (\$ _____) Each	1 EA	\$ _____

Item 6.1 – For Furnishing & Delivery

VILLAGE OF HOLLEY
Water Distribution System
East Albion Street & Park Place Waterline Replacement
MATERIALS BID

DESCRIPTION	ESTIMATED QUANTITIES	COMPUTED TOTALS
<p>New Hydrant & Valve Assembly (Typical) The unit price of</p> <p>_____ Dollars</p> <p>and _____ Cents</p> <p>(\$ _____) Each</p>		
	3 EA.	\$ _____
<p>Item 7.14 - For Furnishing and Delivery 1" Corporation Stop and Saddle The unit price of</p> <p>_____ Dollars</p> <p>and _____ Cents</p> <p>(\$ _____) Per Each</p>		
	43 EA.	\$ _____
<p>Item 7.24 - For Furnishing and Delivery 1" Curb Stop and Box The unit price of</p> <p>_____ Dollars</p> <p>and _____ Cents</p> <p>(\$ _____) Per Each</p>		
	43 EA.	\$ _____
<p>Item 7.34 - For Furnishing and Delivery 1" Copper Service Pipe The unit price of</p> <p>_____ Dollars</p> <p>and _____ Cents</p> <p>(\$ _____) Per Lineal Foot</p>		
	1,200 L.F.	\$ _____

VILLAGE OF HOLLEY
Water Distribution System
East Albion Street & Park Place Waterline Replacement
MATERIALS BID

TOTAL BID AMOUNT

_____ DOLLARS

AND _____ CENTS

\$ _____

SECTION 331000 - WATER DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications sections, apply to work specified in this section.

1.2 DESCRIPTION OF WORK

- A. Extent of water distribution system work is shown on Drawings.
- B. Water distribution system work includes, but is not limited to, the following:
 - 1. Piping
 - 2. Control Valves
 - 3. Hydrants
 - 4. Casings
 - 5. Restoration
 - 6. Testing
 - 7. Disinfection
- C. Comply with requirements of applicable Division 31 sections for Excavation and Backfilling required in connection with water distribution system.
- D. Comply with requirements of applicable Division 33 sections for Horizontal Directional Drilling (HDD) requirements in connection with water distribution system.
- E. Comply with requirements of applicable Division 03 sections for Concrete Work required in connection with water distribution system.
- F. All ductile iron pipe, ductile iron fittings, couplings, restraints, valves, hydrants, bolts & nuts, etc. must be domestically produced (in the United States) as per NYS Environmental Facilities Corporation (EFC) and American Iron & Steel (AIS) regulations and requirements.

1.3 SUBMITTALS

- A. Product Data: Submit product data from each manufacturer of materials to be incorporated into the construction of the water distribution system to verify that the material meets the specifications of this section. Refer to Submittals specification section(s) for procedures.

1.4 NOTIFICATIONS

- A. Notify the Engineer of the starting date of water distribution system construction, in writing, five (5) days in advance of construction. Notify the Owner two (2) weeks in advance of locations for pressure taps in writing.

PART 2 - MATERIALS

2.1 DUCTILE-IRON WATER PIPE FOR DIRECT BURY

- A. Ductile-Iron water pipe in sizes three inches (3") to sixty-four inches (64") in diameter inclusive will be centrifugally cast conforming with the applicable requirements of the AWWA Standard for Ductile-Iron Pipe, Centrifugally Cast for Water, ANSI/AWWA C151/A21.51- (latest revision), as manufactured by the U.S. Pipe Co. or equal.
- B. Ductile-Iron pipe less than 16" diameter shall be thickness Class 52 unless otherwise specified on the plans.
- C. Ductile-Iron pipe 16" diameter and larger shall be minimum thickness Class 51 unless otherwise specified on the plans.
- D. Mechanical and push-on joints for ductile-iron pipe shall conform to the AWWA Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings. ANSI/AWWA C111/A21.11- (latest revision).
- E. All ductile-iron pipe shall be double thickness cement lined in accordance with the requirements of the AWWA Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water. ANSI/AWWA C104/A21.4- (latest revision).
- F. Where use is approved by the Engineer, integral restrained joint ductile-iron pipe shall be: "TR-Flex" joint as manufactured by McWane, Inc. or US Pipe; "Flex-Ring" as manufactured by American Cast Iron Pipe Co.; or approved equal.
 - 1. Flexible restrained joint pipe shall be a boltless, glandless restraining system utilizing patented ductile iron locking segments or flex ring with factory applied spigot retainer weldment.
 - 2. Weldments must be factory applied. Field applied weldments will not be allowed.
 - a. Field cut pipe and joints requiring restraint must utilize wedge action retainer glands or a flexible restrained closure.
 - 3. Pipe that utilizes gaskets with embedded restraining gripper or friction segments will not be acceptable.
- G. Pipes must be protected from contamination during transit.

2.2 POLYETHYLENE TUBE ENCASING

- A. Polyethylene encasement shall conform with the applicable requirements of the AWWA Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems, ANSI/AWWA C105/A21.5- (latest revision).
- B. The polyethylene material shall have a minimum thickness of 0.008 inches (8 mils).
- C. Minimum Tube size or sheet width for each size of pipe shall be as follows:

<u>Nominal Pipe Size</u>	<u>Flat Tube Width</u>	<u>Sheet Width</u>
3	14"	28"
4	16"	32"
6	20"	40"
8	20"	40"

10	27"	54"
12	27"	54"
14	34"	68"
16	34"	68"
18	37"	74"
20	41"	82"
24	54"	108"
30	67"	134"
36	81"	162"

- D. Polyethylene tube shall be as manufactured by American Ductile Iron Pipe, McWane Ductile, U.S. Pipe & Foundry, or equal.
- E. Tape required to complete the installation shall be approximately two (2") inches wide, polyethylene adhesive tape as manufactured by Polyken #900, Scotchwrap #50 or equal.

2.3 POLYVINYL CHLORIDE PIPE FOR DIRECT BURY

- A. Polyvinyl Chloride Pipe in sizes four inches (4") to twelve inches (12") in diameter inclusive shall conform to the applicable requirements of the AWWA Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inches through 12 inches, for Water Transmission and Distribution, ANSI/AWWA C900 – (latest revision).
 - 1. Pipe shall be DR-18 (Pressure Class 235) plain end and elastomeric-gasket integral wall thickened bell-end.
 - 2. The outside diameter (OD) dimensions of the pipe shall conform with the outside diameter (OD) dimensions of Ductile Iron Pipe.
- B. Polyvinylchloride pipe shall be blue in color for potable water use.
- C. Pipes must be protected from contamination and discoloration during transit.

2.4 POLYETHYLENE (PE) PRESSURE PIPE AND FITTINGS

- A. Polyethylene pressure pipe in sizes four inches (4") to sixty three inches (63") in diameter inclusive shall conform to the applicable requirements on the AWWA Standard for Polyethylene (PE) Pressure Pipe and Fittings, 4 inch through 63 inches, for Water Distribution and Transmission, ANSI/AWWA C906–(latest revision).
 - 1. The outside diameter (OD) dimensions of the pipe shall conform to the outside diameter (OD) dimensions of ductile iron pipe (DIPS).
 - 2. The inside diameter (ID) dimensions of the pipe shall be the equivalent nominal diameter of the pipeline specified, as noted on the plans, or as determined by the Engineer. This will typically result in a larger pipe OD.
 - 3. All polyethylene pressure pipe joints shall be fused using acceptable methods as specified herein and/or as approved by the Owner and/or Engineer.
 - 4. All necessary connections shall be of the type specifically designed for ductile iron pipe size (DIPS) polyethylene.
 - 5. Polyethylene pressure pipe and fittings shall be manufactured per ASTM F714 and have a minimum Working Pressure Rating (WPR) of 250 psi and minimum Pressure Class (PC) of 200 or 250 psi (DR-9) with PE 3408/4710 material conforming to ASTM D3350.
- B. All Polyethylene (PE) pipe and fittings must be approved by the Owner.

- C. The external fusion bead shall be removed from each fused pipe joint, flush with the O.D. of the pipeline, prior to insertion into a casing pipe, or other host pipe for sliplining purposes. Bead removal is not required for pipeline installed by standard Horizontal Directional Drilling (HDD) or open cut/direct bury methods unless otherwise required by the Owner or other agency having jurisdiction.
- D. Pipes must be protected from contamination and discoloration during transit.

2.5 LOCATE/TRACER WIRE

- A. Locate/tracer wire, for placement directly on Fusible PVC and HDPE pipe installed by Horizontal Directional Drilling (HDD) methods, shall be #10 solid copper or copper clad steel conductor with 30 mil polyethylene insulation, color blue, as manufactured by Kris-Tech Wire Co., Inc., Pro-Line Safety Products Co., or acceptable equivalent.
- B. Locate/tracer wire, for placement directly over Fusible PVC and HDPE pipe installed by Open Cut methods, shall be minimum #14 AWG solid copper or copper clad steel conductor with 30 mil polyethylene insulation, THHN, THWN, or oil and gasoline resistant, color blue, as manufactured by Kris-Tech Wire Co., Inc., Pro-Line Safety Products Co., or acceptable equivalent.
- C. Tracer wire shall be adhered to the waterline at appropriate intervals as required for proper installation.

2.6 DETECTABLE TAPE

- A. Detectable tape, for laying directly above PVC & HDPE potable water main piping installed by open cut, shall be magnetic marker tape, colored blue, three inches (3") wide, labeled "CAUTION WATERLINE BURIED BELOW", and be as manufactured by Reef Industries Inc., C.H. Hanson Products, or approved equal.

2.7 FITTINGS

- A. Ductile Iron Mechanical Joint Fittings
 1. Ductile-Iron fittings shall conform to the AWWA Standard for Ductile-Iron Compact Fittings for Water Service, ANSI/AWWA C153/A21.53-(latest revision) as manufactured by Tyler Pipe Co. or equal.
 2. Ductile-iron fittings shall have a minimum working pressure rating of: 350 psi for 3" through 24" diameter; 250 psi for 30" through 48"; and 150 psi for 54" through 64".
 3. All ductile-iron fittings shall be double thickness cement lined in accordance with the requirements of the AWWA Standard for Cement - Mortar Lining for Ductile-Iron Pipe and Fittings for Water, ANSI/AWWA C104/A21.4- (latest revision).
 4. All ductile-iron fittings shall have mechanical joint ends and be furnished with sufficient quantities of accessories. All nuts and tee bolts for fittings shall be Fluorocarbon coated, high strength, corrosion resistant, low alloy steel or Type 304 Stainless Steel and shall conform to AWWA C-111/A21.11-(latest revision). Restrained joints utilizing mechanical joint wedge action retainer glands will be required.
 5. Where use on ductile-iron pipe is approved by the Engineer, integral restrained joint ductile-iron fittings shall be: "TR-Flex" joint as manufactured by McWane, Inc. or US Pipe; "Flex-Ring" as manufactured by American Cast Iron Pipe Co.; or approved equal.

- a. Flexible restrained joint fittings shall be a boltless, glandless restraining system utilizing patented ductile iron locking segments or flex ring with factory applied spigot retainer weldment.
 - b. Weldments must be factory applied. Field applied weldments will not be allowed.
 - c. Fittings connected to field cut pipes without weldments must be mechanical joint utilizing wedge action retainer glands.
 - 1) If flexible restrained joint fittings are used, a number of mechanical joint fittings must also be provided and on-hand to allow for field adjustments.
 - d. Fittings that utilize gaskets with embedded restraining gripper or friction segments will not be acceptable.
6. Additional restraint and internal joint stiffeners will be required for all mechanical joints, push joints, and bolted couplings used on polyethylene pipe.
 7. Ductile Iron fittings weight noted in the bid proposal is the actual number of pounds of bare fittings. No weight allowance will be made for glands, bolts & nuts, gaskets, or restraining hardware and accessories required.
- B. PE Fittings
1. Fittings for Polyethylene pressure pipe in sizes four inches (4") to sixty three inches (63") in diameter inclusive shall conform to the applicable requirements on the AWWA Standard for Polyethylene (PE) Pressure Pipe and Fittings, 4 inch through 63 inches, for Water Distribution and Transmission, ANSI/AWWA C906-(latest revision).
 - a. The outside diameter (OD) dimensions of the pipe shall conform to the outside diameter (OD) dimensions of ductile iron pipe (DIPS).
 - b. All Polyethylene fittings shall be fused to the polyethylene piping using acceptable methods as specified herein and/or as approved by the Owner and/or Engineer.
 - c. All necessary connections shall be of the type specifically designed for ductile iron pipe size (DIPS) polyethylene.
 - d. Polyethylene pressure fittings shall be manufactured per ASTM F714 and have a minimum Working Pressure Rating (WPR) of 250 psi and minimum Pressure Class (PC) of 200 or 250 psi (DR-9) with PE 3408/4710 material conforming to ASTM D3350.
 - e. Additional restraint and internal joint stiffeners will be required as necessary for all mechanical joints, push joints, and bolted couplings used on polyethylene pipe.
- C. Both thrust blocks and mechanical restraints may be required where fittings are used for direction changes as shown on the plans and details, and wherever specified by the Engineer.

2.8 RESILIENT SEATED GATE VALVES

- A. Valves three inches (3") to twelve inches (12") shall be iron body with fusion bonded epoxy coating, and resilient seated conforming to the requirements of the AWWA Standard for Resilient-Seated Gate Valves, for Water Supply Service, ANSI/AWWA C509- (latest revision), as manufactured by the Mueller Co. or Kennedy Valve Mfg. Co.
- B. Valves fourteen inches (14") to forty-eight inches (48") shall be iron body with fusion bonded epoxy coating, and resilient seated conforming to the requirements of the AWWA Standard for Reduced Wall, Resilient-Seated Gate Valves, for Water Supply Service, ANSI/AWWA C515- (latest revision), as manufactured by the Mueller Co. or Kennedy Valve Mfg. Co.
- C. All valves shall have non-rising stems, "O" ring seals (capable of being replaced under pressure), two inch (2") square operating nut, stainless steel bonnet bolts and nuts, open counterclockwise

(to the left), and have mechanical joint ends, unless specified otherwise. Sufficient quantities of accessories shall be provided to install the valve in the pipeline.

- D. Valves up to 12" diameter shall be designed to operate vertically in a horizontal pipeline.
- E. Valves larger than 12" diameter shall be designed to lie horizontally, unless otherwise noted, and shall be equipped with bevel gear operator so the valve can be operated with a key held in the vertical position. Valves installed in the horizontal position shall have a cleanout port at the bottom of the wedge guides.
- F. Gate valves three inches (3") to twelve inches (12") shall be designed for a minimum design working pressure of 200 psig. Gate valves fourteen inches (14") to forty-eight inches (48") shall be designed for a minimum design working pressure of 150 psig.
- G. All gate valves shall be designed for a minimum test pressure equal to the test pressure specified for the watermain.
- H. All valves to have epoxy coating compliant with ANSI/AWWA C550.
- I. Payment for the gate valves shall be made on a per each basis and will be paid under Bid Item 4A.8. This bid item shall include the valve assembly, bolts, nuts, gaskets, retaining glands, restraints and valve box.

2.9 BUTTERFLY VALVES

- A. Butterfly valves shall be iron body, and conform to the requirements of the AWWA Standard for Rubber Seated Butterfly Valves, ANSI/AWWA C504- (latest revision).
- B. All valves to have epoxy coating compliant with ANSI/AWWA C550.
- C. All butterfly valves shall be of the tight-closing, rubber seat type with rubber seats that are securely fastened to the valve body. No metal to metal seating surfaces shall be permitted. Valves shall be bubble tight at rated pressures with flow in either direction, and shall be satisfactory for applications involving throttling service and/or frequent operation and for applications involving valve operation after long periods of inactivity. Valve discs shall rotate 90 degrees from the full open to the tight shut-off position.
- D. Valve discs shall be constructed of cast iron with Ni-Chrome edge.
- E. All butterfly valves shall be bi-directionally tested.
- F. Valve shafts shall be turned, ground and polished. Shafts shall be constructed of 18-8 type 304 or type 316 stainless steel.
- G. Valve seats shall be of a synthetic compound. Valve shall have seats that are simultaneously molded in, vulcanized and bonded to the body. Seat bond must withstand 75 lbs. Pull under test procedure ASTM D-429, method B.
- H. Valve shall be fitted with sleeve type bearings. Bearings shall be corrosion resistant and self-lubricating.
- I. Valve packing shall be self-adjusting Chevron type.
- J. All butterfly valves and their operators shall be designed for buried and submersible service. Operators shall be attached to the body of the valve so that the valve may be installed in a horizontal pipeline and the valve operated with a key held in a vertical position. The operator shall have a two inch (2") square nut and open counterclockwise (to the left).

- K. All butterfly valves shall have mechanical joint ends unless otherwise specified and be furnished with sufficient quantities of accessories. All valves shall be designed to withstand a minimum working pressure of 150 psig and a minimum test pressure equal to the test pressure specified for the watermain.
- L. Butterfly valves shall be minimum Class 150B and be the Groundhog Model as manufactured by Henry Pratt Co., Mueller Linesal III as manufactured by Mueller Co., or approved equal.

2.10 TAPPING SLEEVES & VALVES

- A. Tapping sleeves for four inch (4") through twenty-four inch (24") diameter ductile-iron, PVC, and asbestos-cement pipe shall be ductile iron, or stainless steel constructed of Type 304 (18-8) stainless steel, and be built in two halves, for assembly around the main. Rubber gaskets shall be provided for a watertight joint the full length of the sleeve. Bolts holding the two halves shall be closely spaced to insure uniform gasket pressure. Ductile Iron tapping sleeve ends shall be mechanical joint with split rings and gaskets sized for the pipe being tapped. Sufficient accessories shall be provided to install the sleeve on the pipe. The outlet end of the sleeve shall be flanged and the entire sleeve shall be designed to withstand a minimum 150 psi working pressure. Tapping sleeves which incorporate a single ring gasket which seals one side of the sleeve against the face of the pipe around the tap hole will not be accepted.
- B. Ductile Iron Sleeves for tapping asbestos-cement pipe shall be as manufactured by Mueller Co. Model H-619, or approved equal.
- C. Ductile Iron Sleeves for tapping cast iron, ductile iron or PVC pipe shall be as manufactured by Mueller Co. Model H-615, or approved equal.
- D. Stainless Steel Sleeves for tapping asbestos-cement, cast iron, ductile iron or PVC pipe shall be as manufactured by Mueller Co. Model H-304, or Smith-Blair Model 665, or approved equal.
- E. Tapping valves three inches (3") to sixteen inches (12") shall be iron body with fusion bonded epoxy coating, and resilient seated conforming to the applicable requirements of the AWWA Standard for Resilient – Seated Gate Valves for Water Supply Service, ANSI/AWWA C509- (latest revision) as manufactured by the Mueller Co., or Kennedy Valve Co.
- F. Tapping valves fourteen inches (14") and larger shall be iron body with fusion bonded epoxy coating, and resilient seated conforming to the requirements of the AWWA Standard for Reduced Wall, Resilient-Seated Gate Valves, for Water Supply Service, ANSI/AWWA C515- (latest revision), as manufactured by the Mueller Co., or Kennedy Valve Mfg. Co.
- G. All tapping valves shall have non-rising stems, "O" ring seals (capable of being replaced under pressure), two inch (2") square operating nut, stainless steel bonnet bolts and nuts, and open counterclockwise (to the left). Inlet ends shall be flanged to fit the respective tapping sleeve to which they will be attached and the outlet ends shall be mechanical joint. Sufficient quantities of accessories shall be provided to complete the assembly and connect the valve to the new pipeline.
- H. All tapping valves shall be designed for a minimum design working pressure of 200 psig and a minimum test pressure equal to the test pressure specified for the watermain.
- I. Tapping valves three-inches (3") to twelve inches (12") shall be designed to operate vertically in a horizontal pipeline.
- J. Tapping valves larger than twelve inches (12") shall be designed to lie horizontally, unless otherwise noted, and shall be equipped with a bevel gear operator so the valve can be operated

with a key held in the vertical position. Valves twenty-four inches (24") and larger installed in the horizontal position shall have a cleanout port at the bottom of the wedge guides.

2.11 HYDRANT

- A. Hydrants shall conform to the requirements of the AWWA Standard For Dry-Barrel Fire Hydrants, ANSI/AWWA C502-(latest revision) and as follows:
1. Type - "breakaway" with "0" ring seals
 2. Valve opening – 5¼" diameter
 3. Inlet - 6" mechanical joint
 4. Nozzles: one 5" pumper nozzle with STORZ connection, cap and cable; and two 2½" hose nozzles, with National Standard Threads, caps and chains.
 5. Bury - designed to allow 4½ feet of cover on the branch and allow 15 to 18 inches between the centerline of the lowest nozzle and the surface of the ground. For greater trench depths, deeper bury hydrants or barrel extensions shall be provided.
 6. Operating nut – 1½" pentagon
 7. Direction of opening - left (counterclockwise)
 8. Direction of opening shall be cast on the head of the hydrant in the form of an arrow with the word "OPEN" adjacent to the arrow.
 9. Color – Red, (manufacturer applied)
 10. Valve shall open against pressure and close with pressure
 11. All working parts are to be in the bonnet of the hydrant above the nozzles, not in the waterway
 12. Valve opening limit stops shall be in the shoe of the hydrant
 13. All hydrants shall be as manufactured by the Mueller Co. of the Centurian Pattern, including a bronze seat ring and weather shield/seal.
 14. All hydrants shall be furnished with weeps unless otherwise noted or determined in the field by the Engineer.
- B. All new hydrants shall have touch-up paint applied in the field as necessary after installation with matching paint color by Rust-Oleum, Pennsbury "Hydrant-Hide", or equal.
- C. One adjustable hydrant operating wrench shall be furnished for every twenty (20) hydrants with a minimum of two (2) required.
- D. Payment for the fire hydrant shall be made on a per each basis and will be paid under Bid Item 6.1. This bid item shall include the hydrant assembly, accessories, 10.0 feet of 6-inch ductile iron lateral piping, bolts, nuts, gaskets, restraints, retaining glands, 6-inch guard valve, and valve box.

2.12 VALVE BOXES

- A. Valve boxes shall be as manufactured by Mueller Co., Bibby-LaPerle, USA or equal as follows:
1. Valve boxes for gate valves and butterfly valves 4" and larger shall be three piece adjustable screw type, 5¼" shaft, with base to fit the valve on which it is to be installed. Enlarged base required for gate valves.
 2. Valve boxes for 2" and 3" valves shall be 4½" shaft, and as noted above.
 3. Valve boxes shall have the word "WATER" cast on the lid.

2.13 ANCHORAGES

- A. General: Provide anchorages for tees, plugs, caps, bends, valves, couplings and pipe as shown on the plans and as follows:
1. Retainer glands shall be wedge action EBAA Iron Series 1100 for ductile iron pipe or EBAA Iron Series 2000 PV for PVC pipe or approved equal to fit mechanical joints.
 2. Restraint harnesses shall be wedge action EBAA Iron Series 1700 Megalug for push joint ductile iron pipe or EBAA Iron Series 1600 for push joint PVC pipe or approved equal. Restraint harnesses for cast iron pipe joints shall be of the friction clamp type with threaded rods.
 3. All anchorages shall have fusion bonded epoxy coating.
 4. All bolts and nuts for buried joints shall be Fluorocarbon coated, high strength, corrosion resistant, low alloy steel, or Type 304 Stainless Steel conforming to ANSI/AWWA C-111/A21.11- (latest revision).
 5. All bolts and nuts for use inside chambers shall be Fluorocarbon coated, high strength, corrosion resistant, low alloy steel, or Type 304 Stainless Steel conforming to ANSI/AWWA C-111/A21.11- (latest revision).
 6. Thrust Blocks shall be 3000 psi concrete.

2.14 ANCHOR PIPE, COUPLINGS, TEES AND ELBOWS

- A. All M.J. anchoring pipe, couplings, tees and elbows shall be as manufactured by Tyler Pipe Co. or equal. They shall be cement-lined in accordance with the requirements of the AWWA Standard for Cement - Mortar Lining for Ductile Iron Pipe and Fittings for Water, ANSI/AWWA C104/A21.4- (latest revision) and the thickness shall not be less than 1/8". All anchoring pipe, couplings, tees and elbows shall meet pressure requirements equivalent to that for pipe.
- B. All nuts and bolts for joints shall be Fluorocarbon coated, high strength, corrosion resistant, low alloy steel or Type 304 Stainless Steel and shall conform to AWWA C-111/A21.11 (latest revision).

2.15 COUPLINGS AND REPAIR CLAMPS

- A. Couplings and clamps shall be as manufactured by Smith-Blair Inc., Ford Meter Box Co., Inc., Romac Industries, Inc., or approved equal.
- B. Couplings and clamps shall be equipped with either Type 304 stainless steel bolts and nuts or high strength, low alloy steel bolts and nuts having a fluorocarbon SC-1 coating.
- C. Gaskets for couplings and joint clamps shall be molded rubber, Smith-Blair grade 30, Ford SBR compound, Romac SBR, or equal. Gaskets for repair clamps shall be molded rubber, grade 60, SBR compound, Nitrile (Buna N), or equal.
- D. Sleeve type, Flexible Couplings shall be of the Smith-Blair type #411 (or #441 "Omni" where specified); Ford style FC1; Romac style 501; or equal. All couplings shall have fusion bonded epoxy coating finish.
- E. Bell joint leak clamps shall be: Smith-Blair type #274; Ford style FBC; Romac style 516 or 416; or equal.
- F. Transition couplings shall be: Smith-Blair type #413; Ford style FC2A; Romac style 501; or equal. All couplings shall have fusion bonded epoxy coating finish.
- G. Repair clamps shall be full circle, 18-8 type 304 stainless steel, provided in minimum length of twelve inches (12"), unless otherwise noted.

1. Repair clamps for diameters up to twelve inches (12") shall be single band as manufactured by: Smith-Blair type #261; Ford style FS1; Romac style SS1; or approved equal.
2. Repair clamps for sizes over twelve inches (12") shall be with two or three sections as manufactured by: Smith-Blair type #263; Ford style FS2 or FS3; Romac style SS3; or approved equal.
3. All Repair Clamps shall be equipped with either Type 304 stainless steel stud bolts and nuts or high strength, low alloy steel stud bolts and nuts having a fluorocarbon SC-1 coating.
4. Repair clamps with a separate keeper bar will not be accepted.
5. Cast iron or ductile iron fingers are not allowed except as noted or as approved by the Engineer.

2.16 HYMAX STYLE COUPLINGS

- A. Hymax style couplings may be used only when approved by the Owner and/or Engineer.
- B. Hymax style couplings for diameters up to twelve inches (12") shall be as manufactured by: Mueller/Krausz Industries, "Hymax Wide Range Coupling" or "Hymax Grip Wide Range Coupling"; Romac "Macro HP"; Smith-Blair #421; or approved equal. For diameters over twelve inches (12"): Mueller/Krausz Industries, "Hymax Wide Range Coupling"; "Hymax Grip Wide Range Coupling"; or approved equal.
- C. Center sleeve shall be fabricated of high strength carbon steel tubing with NFS-61 approved, fusion bonded epoxy coating on both interior and exterior.
- D. Compression end rings to be either one bolt or two and fabricated of carbon steel.
- E. Buried or submerged couplings shall be provided with Type 304 stainless steel bolts and nuts with anti-seize coating to prevent galling.
- F. Gaskets shall be one piece, or two layered of which inner ring is removable to expand the range of the coupling. Gasket material shall be EPDM according to NSF61.

2.17 COUPLINGS FOR POLYETHYLENE (PE) PIPE & FITTINGS

- A. Couplings shall be Ductile Iron Pipe Size (DIPS), PE 3408, Electrofusion for use on PE potable water pipe.
- B. Couplings shall be designed and manufactured in accordance with ASTM F-1055 for use with pipe conforming to ASTM D2513/3035.
- C. Couplings shall be as manufactured by Central Plastics Co. or equal.

2.18 SERVICE MATERIALS

NOTE: Unless otherwise noted, the Village has standardized with 1" diameter water services for all typical household installations.

- A. Corporation Stops:
 1. Corporation stops shall conform to the requirements of the AWWA Standard for Underground Service Line Valves and Fittings, ANSI/AWWA C-800-(latest revision) and the following supplemental details:

- a. Service components in contact with potable water shall be manufactured from low-lead or no-lead brass alloys either CDA/UNS C89520 or C89833, and comply with the latest requirements of the Federal Safe Drinking Water Act. Brass components that do not come in contact with potable water shall be made from CDA/UNS C83600 alloy.
- b. ¾" through 2" shall have standard AWWA C-800 inlet threads and compression outlet connection for copper tube service pipe. Manufactured by: Mueller Co., Model B-25008N; Ford FB1000-x-Q-NL; or approved equal.
- c. Fittings shall be stamped or embossed indicating that the product is manufactured from low-lead alloys.

B. Curb Stops:

1. Curb stops shall conform to the requirements of the AWWA Standard for Underground Service Line Valves and Fittings, ANSI/AWWA C-800- (latest revision) and must include the following supplementary details:
 - a. Service components in contact with potable water will be manufactured from no-lead or low-lead brass materials and comply with the latest requirements of the Federal Safe Drinking Water Act.
 - b. Manufactured by: Mueller Co., Model B-25209N; Ford Model B44-xxx-Q-NL; or approved equal.
 - c. Compression connections for copper tube service pipe on inlet and outlet will be required.
 - d. Fittings shall be stamped or embossed indicating that the product is manufactured from low-lead alloys.
 - e. One curb stop operating key shall be furnished for every one hundred (100) curb stops with a minimum of two (2) required.

C. Curb Boxes:

1. Curb boxes shall be screw type adjustable, 2½" shaft, Buffalo Style, size 94E or 95E for ¾" and 1" curb stops as manufactured by Bibby Ste.-Croix USA, or approved equal.
2. For 1½" and 2-inch curb stops, use enlarged base.
3. Each curb box shall be supplied with a stainless steel rod and pin with guide ring unless otherwise noted or determined in the field by the Village Water Department and/or the Engineer.
4. The word "WATER" shall be cast on the lid.

D. Service Pipe:

1. Copper service pipe shall be provided as required in sizes ¾" through 2" diameter. Copper service pipe shall be Type K copper water tube in accordance with ASTM Specification B88. Copper service pipe shall be manufactured and tested in the United States.

E. Service Saddles:

1. Service saddles shall be used on all PVC and Asbestos-Cement pipe service connections and under the following conditions unless otherwise noted or determined by the Engineer: when services are installed on 4" diameter or smaller pipes; when services larger than 1" are installed on a 6" diameter pipe; and when services larger than 1-1/2" are installed on any 8" diameter or larger pipe.
2. Service saddles shall be double strapped bronze with O-ring seal cemented in place as manufactured by: Mueller Co., BR2 Series; Ford Style 202B Series; or approved equal, to be compatible with correct pipe materials and diameters.

3. Saddles shall be manufactured from CDA/UNS C83600 brass alloy.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Pressure Taps: After installation of the tapping sleeve, but prior to tapping, the sleeve shall be pressure tested to determine if it is watertight and disinfected. Tapping sleeves and saddles shall be tested to a water test pressure of 150 psi for taps on all pipe materials except PCCP. For taps on PCCP pipe, the test pressure shall typically be ten percent (10%) over the existing line pressure. If any leakage does occur, the sleeve shall be made watertight in a customary manner. Tapping sleeves, saddles and valves shall also be disinfected by swabbing with chlorine solution prior to tapping.
 1. After each tap has been completed, the Contractor shall keep the tapping area uncovered for one hour to determine if any leakage has occurred. If leakage has occurred, the tap shall be made watertight in a manner acceptable to the Engineer.
 2. Upon completion of the tap, 100 percent retrieval of the coupon is required by the Contractor to be provided to the Owner and/or Engineer.
 - a. If any part of the coupon is discovered to be missing and knowingly broken off inside the main being tapped, the Contractor will be responsible to retrieve the missing piece(s) and to pay for all costs associated with the retrieval including coordination of shutdowns, dewatering, and costs and fees incurred by the Owner, the Utility Owner, and the Engineer unless otherwise determined by the Owner and Engineer.
- B. New valves shall be kept closed until approval from the Engineer is given to open the valve.
- C. Polyvinyl Chloride Pressure Pipe: Install in accordance with AWWA Manual M-23 and manufacturers' instructions.
- D. Push joint PVC waterpipe shall not be deflected when changes in directions are required; mechanical joint fittings shall be used for this purpose.
- E. Thrust restraints for water main piping shall be installed at all changes in direction, changes in size, dead ends and other locations where shown or noted in the Contract Documents or as determined in the field by the Engineer.
- F. Polyvinyl chloride (PVC) and Polyethylene (PE) pressure pipe installed by open cut shall have a magnetic tape marker laid directly above the pipe for the full length of the pipe and approximately 18 inches below the ground surface.
- G. Polyethylene pipe: Install in accordance with recommended procedures of AWWA C901, AWWA C906 and AWWA M-55 -- (latest revision), the manufacturers' recommendations, and the following:
 1. Fusion equipment
 - a. Workers must be properly trained.
 - b. Equipment must be in good repair.
 - c. Equipment must have three (facing, heating, and pressure) preset gauges.
 2. Fusion must conform to NYSDOT Part 192.
 3. Install per recommendations outlined in ASTM D2774.
- H. Ductile-Iron Pipe: Install in accordance with recommended procedures of AWWA C-600- (latest revision).

- I. Where ductile iron pipe, valves or fittings are installed, they shall be installed with Polyethylene Tube Encasement held in place with adhesive tape.
 - 1. The cost for installing the polyethylene tube encasement shall be included in the unit prices bid for installing the pipe, valves or fittings.
- J. Polyethylene Tube Encasement: Install in accordance with ANSI/AWWA C105/A21.5-(latest revision) and manufacturer's instructions.
- K. Control Valves: Install in accordance with manufacturer's instructions.
 - 1. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Valve shall be cleaned and well lubricated prior to installation.
 - 2. Operate valves from fully open to fully closed positions. Examine guides and seats made accessible by such operation.
 - 3. Examine mechanical joint ends and/or mating flange faces for conditions that might cause leakage. Check bolting for proper size, length and material. Check gasket material for proper size, material composition suitable for service, and freedom from defects and damage.
 - 4. Do not attempt to repair defective valves; replace with new valves.
- L. Hydrants: Install in accordance with AWWA recommended standards and manufacturer's instructions.
- M. Hydrants shall be set so that the pumper/steamer nozzle faces the paved portion of the street, and as nearly as possible at right angles to the street, unless otherwise noted or determined in the field.
- N. Small diameter service taps on new or existing pipe must be installed in accordance with AWWA recommended standards and manufacturer's instructions.
- O. Interior Inspection: Inspect conduit to determine whether line displacement or other damage has occurred.
 - 1. If the inspection indicates poor alignment, debris, displaced pipe, infiltration or other defects, correct such defects to satisfaction of Engineer.
- P. Cleaning Conduit: Clear interior of conduit of dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull past each joint as it is completed.
- Q. Place plugs in end of uncompleted pipeline at end of day or whenever work stops to prevent entry of animals, liquids, and entrance or insertion of deleterious materials into the pipe.
- R. Install pipe stands or concrete support piers as shown on the plans or as necessary to properly support exposed piping and valves but not interfere with maintenance and/or removal of the valves.

PART 4 - TESTING (As per ANSI/AWWA C600, latest revision, for DIP; ANSI/AWWA C605, latest revision, for PVC; and ANSI/AWWA C901 and/or C906, latest revision, for PE)

4.1 TESTING AND DISINFECTION PROCEDURE

- A. Prior to performing any work as described in this part, the Contractor shall submit to the Engineer for approval a flushing, testing and/or disinfection procedure. The procedure shall include when the work will be performed, source points for water, flush points for water, length and location of waterline to be included, and de-chlorination procedures.

4.2 LOW PRESSURE AIR TEST

- A. Following fusion of joints but prior to installation of waterline by horizontal directional drill, a low pressure air test shall be performed. All fused joints shall be tested.
- B. The Contractor shall perform the air test by placing airtight plugs in the ends of the openings of the section of pipeline being tested and adding air slowly to this section until the pressure reaches four (4) psi. This pressure must be maintained initially for two minutes. If the pressure is not maintained, the pipeline and/or connection shall be carefully inspected for leaks and repaired before the test proceeds. Once the test starts a stopwatch shall be used for the exact time which is required for the pressure to be maintained with no allowable loss. The minimum time allowed is shown in the accompanying chart.

<u>Pipe Diameter</u> <u>Inches</u>	<u>Minimum Time Required</u> <u>for No Pressure Drop (Minutes)</u>
6	12
8	16
10	20
12	24
14	28
15	30
16	32

- C. In the event that the time required with no pressure drop exceeds the chart value for the size pipe under test, it shall be considered acceptable.
- D. In the event that there is any loss of pressure within the specified time required as indicated by the chart value, the test shall be considered unacceptable. Unacceptable sections shall be carefully inspected for defects, improperly fused or leaking joints, cracked or broken pipes, or any other defects, all which shall be repaired or replaced at the expense of the Contractor. After this work has been completed, the test shall be repeated until an acceptable test is achieved.
- E. Air for Testing: The Contractor shall provide an air compressor, air hose, fittings, gauges and other equipment necessary to perform the required air test.

4.3 PRELIMINARY FLUSHING

- A. Prior to the pressure and leakage tests, and line valve tests, each potable water system shall be flushed until three (3) pipe volumes have passed through the new waterline and the water runs visually clear. Each valved system of the newly installed piping system shall be flushed separately with potable water from the public supply.
- B. Flushing must have sufficient flowrate to achieve a fluid velocity of 3.0 feet per second inside the waterline. A 2-inch minimum diameter tap is required for proper flushing of all watermains having a diameter of 8-inches or less. Multiple or larger taps/outlets may be required to achieve minimum 3.0 ft./sec. flushing velocities as referenced in AWWA C651 and as determined by the Engineer.
- C. Water from flushing procedures shall not be discharged into a public roadway and shall not cause damage to any public or private property.
- D. When filling of the new line for flushing is achieved by accepting water from an existing water line, the Contractor shall, as a minimum, maintain an open outlet on the new work at all times

that the connection between the existing water line and the new work is open. After initial filling/flushing, the Contractor shall, as a minimum, furnish and install a reduced pressure zone (RPZ) backflow preventer at the source of the supply to protect against the backflow of water from the new line into the existing line. When water is obtained from existing waterlines for these purposes, the water shall be metered.

4.4 Perform hydrostatic testing of completed conduit lines in accordance with the following:

A. Test No. 1 - Pressure Test:

1. Assumptions:
 - a. AWWA requirement of hydrostatic test pressure to be based on the elevation of the lowest point in the line or section under test corrected to the elevation of the test gauge.
 - b. Test pressure shall be minimum 150 psi for DIP, PVC and PE up to 12-inch diameter.
2. The maximum length of pipeline to be tested at any one time shall not exceed 3,000 lineal feet, or valve to valve, whichever is less.
3. The pressure gauge must have markings at no greater than 2 psi increments to allow accurate readings.
4. The Engineer is responsible for reading and recording gauge pressures.

B. Test No. 2 - Leakage Test:

1. The hydrostatic pressure shall be the same as determined for Test No. 1 Pressure Test.
2. The leakage test may be conducted concurrently with the pressure test.
3. The maximum length of pipeline to be tested at any one time shall not exceed 3,000 lineal feet or valve to valve, whichever is less.
4. The leakage under the conditions of the test for water pipe shall be determined by the following formula and as per AWWA standards:
 - a. For fusible PE pipe: no leakage allowed
 - b. For Ductile Iron and push joint PVC Pipe:

$$L = \frac{ND\sqrt{P}}{7,400}$$

Where:

L = Allowable leakage in gallons per hour.

N = Number of joints in the length of pipeline tested, or length of pipeline tested (in feet)/typical length per pipe (in feet)

D = Nominal diameter of the pipe, in inches.

P = Average pressure during the leakage test, in pounds per square inch gauge.

- C. When making repairs, connections of the approved water main to the existing system, or when specified or determined in the field by the Engineer, all joints, fittings, and portions of pipe lines not able to be tested by conventional methods as specified herein, shall be left exposed and shall be carefully examined for visible leakage while under existing water system line pressure. Those portions of the pipeline covered by backfill shall be observed for leakage appearing on the ground surface. Any leaks discovered in the joints shall be corrected until tight. Any cracked or defective pipe, fittings, etc., discovered in consequence of this pressure test shall be removed and replaced by the Contractor with new material as previously specified and the test repeated until satisfactory to the Engineer.

4.5 DURATION

- A. The duration of the pressure test (Test No. 1) shall be a minimum of:
 - 1. two (2) hours for all push joint Ductile Iron & PVC pipe
 - 2. four (4) hours for fusible PE pipe
- B. The duration of the leakage test (Test No. 2) shall be a minimum of:
 - 1. two (2) hours for all push joint Ductile Iron & PVC pipe
 - 2. four (4) hours for fusible PE pipe
- C. The pressure test may be conducted concurrently with the leakage test.
- D. Pressure should not fluctuate by more than 5 psi during testing.

4.6 PROCEDURE

- A. The pipe shall be slowly filled with water and the specified test pressure, measured at the point of lowest elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connections, all necessary apparatus, taps into the pipe, gauges, and measuring devices, will be furnished by the Contractor. All work shall be accomplished by the Contractor.
- B. When initial filling/flushing of the new line is achieved by accepting water from an existing water line, the Contractor shall, as a minimum, maintain an open outlet on the new work at all times that the connection between the existing water line and the new work is open. After initial filling/flushing, the Contractor shall, as a minimum, furnish and install a reduced pressure zone (RPZ) backflow preventer at the source of supply to protect against the backflow of water from the new line into the existing line. When water is obtained from existing waterlines for these purposes, the water shall be metered.
- C. Testing shall be done as soon as practical after the main line and services are installed, after initial flushing, but prior to, disinfection and secondary/final main line connections.

4.7 EXPELLING AIR BEFORE TESTING

- A. Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at various locations and elevations in the test section including the points of highest elevation in the test section. After satisfactory test results, the blow-off tubing and corporation stop shall be removed and replaced with a plug unless the tap will be used for an individual water service connection.

4.8 EXAMINATION UNDER PRESSURE (TEST NO. 1)

- A. All exposed pipes, joints and fittings which are exposed when the test is conducted, shall be carefully examined for visible leakage. Those portions of the pipeline covered by backfill shall be walked to observe leakage appearing on the ground surface. Any leaks discovered in the joints shall be corrected until tight. Any cracked or defective pipe, fittings, etc., discovered in consequence of this pressure test shall be removed and replaced by the Contractor with new material as previously specified and the test repeated until satisfactory to the Engineer.
- B. If the pressure drop is greater than 5 psi in 2 hours, or if the Engineer believes the line is suspect, the Contractor shall explore for the cause of the excessive leakage and after repairs have been

made, the line shall be retested. This procedure shall be repeated until the pressure loss is less than the maximum allowable and the Engineer is satisfied.

4.9 PERMISSIBLE LEAKAGE (TEST NO. 2)

- A. Suitable means (acceptable to the Engineer) shall be provided by the Contractor for determining the quantity of water loss by leakage under the specified test pressure. No pipe installation will be acceptable until, or unless, this leakage is less than that specified in this Section, at the test pressure specified.
- B. Should any test of pipe laid disclose leakage greater than that specified in this section, the Contractor shall, at his own expense, locate and repair the defective joints or pipe until the leakage is within the specified allowable.

4.10 LEAKAGE DEFINED

- A. Leakage is defined as the quantity of water to be supplied into the newly laid pipe necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.
- B. At the end of each test, the pressure shall be increased to the starting pressure so leakage test data may be acquired.

4.11 WATER FOR TESTING

- A. Water for performing all tests shall be furnished and disposed of by the Contractor, at his expense. If the water for filling and testing is obtained from an existing Town waterline a meter shall be installed to measure the quantity of water used for these purposes. No water shall be obtained from an existing water line unless the Contractor first obtains the consent of the Owner or agency having jurisdiction over the existing main. Existing conditions may restrict the amount and rate of water that can be obtained from the existing line and the Contractor shall comply with the directions of the Owner or agency of jurisdiction.
- B. When filling of the new line is achieved by accepting water from an existing water line, the Contractor shall, as a minimum, furnish and install a reduced pressure zone (RPZ) backflow preventer at the source of the supply to protect against the backflow of water from the new line into the existing line. When water is obtained from existing waterlines for these purposes, the water shall be metered.

PART 5 - DISINFECTION (As per ANSI/AWWA C651-(latest revision))

5.1 ADJUST AND CLEAN

- A. Disinfection of Potable Water Systems: All piping connecting to, and forming a part of, a potable water system shall be disinfected in a manner acceptable to the New York State Department of Health. The method described as follows, or other method acceptable to the Health Department having jurisdiction, shall be used. Water for disinfection and flushing shall be furnished and disposed of by the Contractor.

5.2 CHLORINATION

- A. Disinfect the piping system with chlorine applied by introduction of a hypochlorite solution derived from either Sodium Hypochlorite (NaOCl) solution, or Calcium Hypochlorite ($\text{Ca}(\text{OCl})_2$) granules, conforming to ANSI/AWWA B300. The use of Liquefied Elemental Chlorine Gas (Cl_2), Calcium Hypochlorite in tablet form, and Calcium Hypochlorite intended for swimming pool disinfection shall not be allowed.
1. Sodium Hypochlorite shall be provided in liquid form containing approximately 5% to 15% available (free) chlorine.
 2. Calcium Hypochlorite shall be provided in commercial grade granular form containing approximately 65% available (free) chlorine by weight. Hypochlorite granules shall first be made into a paste and then thinned to about 1% chlorine solution. This will require about 7.5 gallons of water to each pound of dry powder.
 3. Solutions shall be prepared in a plastic or rust-free steel barrel and any solids permitted to settle out.
- B. The clear supernatant shall be applied to the main through a rubber hose by a suitable pump feeder. The point of application of the chlorinating agent shall be at the beginning of the piping system or any valved sections thereof, through a corporation inserted in the top of the newly installed pipe. Water from the existing distribution system shall be controlled so as to flow slowly into the newly installed piping system during the application of the chlorine. The rate of chlorine mixture flow shall be in such proportion to the water entering the newly installed pipe that the resulting free chlorine residual shall be between 50 and 100 ppm (mg/l). Concentrations over 100 ppm (mg/l) shall not be allowed to enter the piping system. Valves shall be manipulated so that the strong chlorine solution in the pipe being treated will not flow back into the line supplying the water.
- C. The chlorinated water shall be retained in the main for at least 24 hours without any water usage, 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 ppm (mg/l) chlorine throughout the length of the main.
- D. When making repairs, connections of the approved water main to the existing system, or when specified, the structures and portions of pipe lines not able to be disinfected by conventional methods, shall be chlorinated by a concentrated chlorine solution containing between 200 ppm (mg/l) and 300 ppm (mg/l) of free chlorine. The solution shall be applied with a brush or sprayed on the entire inner surface of the empty pipes and structures. The surfaces disinfected shall remain in contact with the strong chlorine solution for at least 30 minutes.
- E. The Contractor must use an approved test method to determine chlorine levels. Test strips and test kits will be allowed for testing chlorine levels if the kit is new, in the original bottle, is not past the expiration date, and has a color coded scale on the side with legible concentrations defined. Sending samples to an approved laboratory is also acceptable.
- 5.3 FINAL FLUSHING (As per ANSI/AWWA C655-(latest revision))
- A. After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentrated in the water leaving the main is no higher than that generally prevailing in the system, or less than 1 ppm (mg/l). Chlorine residual determination shall be made at each bacteriological water sampling location, including the end of the main, to ascertain that the heavily chlorinated water has been removed from the pipeline.

- B. Superchlorinated water shall be emptied into a tank truck, or similar containment device, and neutralized using a reducing agent (such as Sodium Thiosulfate) prior to being discharged in a manner that will not adversely affect flora and fauna, and shall conform to applicable state regulations for waste discharge as found in ANSI/AWWA C655-(latest revision) and NYSCRR Title 6, Chapter X, parts 700 - 705 (Water Quality Regulations).
- C. Discharge of water into a storm or sanitary sewer system will require prior written approval from the municipality or owner/operator of the utility.
- D. Water from flushing procedures shall not be discharged into a public roadway and shall not cause damage to any public or private property.

PART 6 - BACTERIOLOGICAL TEST (As per ANSI/AWWA C651-(latest revision), Section 5)

6.1 PROCEDURE

A. Sampling:

1. After completion of final flushing, before the new water main is connected to the distribution system, and in the presence of the Engineer, two (2) sets of bacteriological water samples shall be collected from an acceptable outlet(s) of the treated piping system (one immediately after final flushing and a second one after a minimum of 16 hours).
2. Other than the amount of water required to collect samples at each location, all water must be retained in the new main after final flushing until after the final set of bacteriological samples is collected. No additional flushing will be allowed during the sampling procedure.
3. If additional flushing is required to reduce chlorine residual, bacteriological sampling must cease and not resume until flushing operations have stopped and chlorine residual has reached acceptable levels.

B. Testing and Analysis:

1. All water samples shall be tested to show the presence of a free chlorine residual and the absence of coliform organisms in accordance with the latest Health Department requirements. A standard heterotrophic plate count or test for HPC bacteria will also be required for each water sample. In accordance with Part V of the New York State Sanitary Code, Table 11, a water sample with an HPC result greater than 500 colonies per milliliter is considered to be lacking a measurable free chlorine residual. Therefore, a sample with an HPC of greater than 500 colonies per milliliter is considered unfit for human consumption and will not be accepted. If, at this time, the samples show unsatisfactory results, the chlorine treatment shall be repeated until all samples show safe results.
2. Bacteriological testing and analysis must be performed at a laboratory approved by the Health Department and the Owner (ELAP certified) and shall be paid for by the Contractor. Samples must be picked up by laboratory personnel and delivered to the laboratory. The certified bacteriological test results must be delivered to the Owner and/or Engineer immediately upon completion.
3. Bacteriological test results shall expire 30 calendar days after the samples are taken. After 30 calendar days, if the new main has not been placed into service, the Contractor will be required to repeat the process, taking two sets of samples and submitting the results to the Engineer for review.
4. Per AWWA C651 standards, the maximum length of new pipe that can be installed without bacteriological sampling is 20 lineal feet unless otherwise approved by the Owner, Engineer, and the Health Department having jurisdiction.

- C. Sampling Locations:
1. The number of bacteriological water samples taken along the full length of pipeline shall be as determined by the Engineer and shall be acceptable to the Health Department having jurisdiction.
 2. As a minimum, bacteriological water samples shall be taken as follows:
 - a. At a maximum of every 1,000 feet along the new water main
 - b. At every branch off of the new water main greater than one pipe length
 - c. Within 10 feet of each end of each section of water main
 - d. Fire hydrants and hoses are not considered acceptable sampling ports
 3. The Contractor shall, at his expense, provide all necessary taps (wet or dry), outlets, fittings, piping, apparatus, labor, materials, equipment, water, etc. required.

END OF SECTION