2016 ROADWAY IMPROVEMENT PROJECT
SALEM, NH

ADDENDUM No. 1

January 13, 2016

This Addendum forms part of the Bidding and Contract Documents and modifies the Drawings and Contract and Specifications for the 2016 Roadway Improvements Project. The items set forth herein, whether of omission, addition, substitution or clarification, are all to be included in and shall form part of the proposed work and Bids submitted to the Town of Salem, New Hampshire. Inclusion of this Addendum shall be acknowledged by inserting its number in the space provided in the Bid Proposal form (Section 00301A). Failure to acknowledge any and all addenda in the above specified Bid Proposal form may be cause for rejection of the bid by the Owner on the grounds that it is not responsive.

ADDEDNDUM No. 1

Bidders are advised to make the following revisions to the CONTRACT DOCUMENTS AND SPECIFICATIONS:

1. **Insert** the attached Section 00101 (Instructions to Bidders) in the CONTRACT DOCUMENTS AND SPECIFICATIONS and **Discard** the original version of Section 00301A.

   The revised document addresses new Base Bid Section 2 for hydrant and water service installations in Paragraph 24.3.

2. **Insert** the attached Section 00301A (Bid) in the CONTRACT DOCUMENTS AND SPECIFICATIONS and **Discard** the original version of Section 00301A.

   The revised document adds quantities not shown in the original document and adds Base Bid Section 2 for hydrant and water service installations.

3. **Insert** the attached Section 01010 – Summary of Work in the CONTRACT DOCUMENTS AND SPECIFICATIONS and **Discard** the original version of the same.

   The revised document provides "individual street completion requirements" in paragraph 1.6 and addresses new Base Bid Section 2 in paragraph 1.4.

4. **Insert** the attached "Quantity Breakdown by Street" into Appendix B in the CONTRACT DOCUMENTS AND SPECIFICATIONS and **Discard** the original version of the same.

   The revised document adds quantities not shown in the original document and adds Base Bid Section 2 for hydrant and service installations.

5. **Insert** the attached Special Provision 611 – Water System Installation into the CONTRACT DOCUMENTS AND SPECIFICATIONS.

   The added section provides specification on installation of new hydrant and service installations added to the project.

6. **Insert** the attached drawing D1 in the CONTRACT DOCUMENTS and **Discard** the original version of the same.

   The revised document clarifies "Typical Roadway Section" requirements.

7. **Insert** the attached drawing D3 in the CONTRACT DOCUMENTS and **Discard** the original version of the same.

   The revised document identifies double frame and grate requirements on the "Frame Set Detail" if used. Note: no double frame and grates are currently specified.

8. **Insert** the attached drawing D4 in the CONTRACT DOCUMENTS and **Discard** the original version of the same.

   The revised document provides a stone sizing chart on the "Typical Headwall and Stone Apron Detail". Water Details also added to the page.

9. **Insert** the attached **NEW** drawing D6 in the CONTRACT DOCUMENTS.

   The page is added to the set with water details.

****END OF ADDENDA NO. 1****

SECTION 00100

INSTRUCTIONS TO BIDDERS

1. RECEIPT AND OPENING OF BIDS

1.1 Sealed Bids for the work of this Contract will be received at the time and place indicated in the Invitation to Bid. Sealed envelopes containing the bids shall be addressed to the OWNER, and designated as: **PROPOSAL FOR 2016 ROADWAY IMPROVEMENT PROJECT – CORWELL COURT, WINDWARD TERRACE, CAR-MAR LANE, WALTER PALMER LANE.**

1.2 OWNER may consider informal any Bid not prepared and submitted in accordance with the provisions hereof.

1.3 Bidders are cautioned that it is the responsibility of each individual Bidder to assure that his Bid is in the possession of the responsible official or his designated alternate prior to the stated time and at the place of the Bid opening. Owner is not responsible for Bids delayed by mail and/or delivery services, of any nature.

1.4 If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope and addressed to the Purchasing Agent at the address provided in the Invitation to Bid and the contents of the envelope clearly marked.

2. DEPOSIT ON DRAWINGS AND DOCUMENTS (NOT USED)

3. ABILITY AND EXPERIENCE OF BIDDER

3.1 No award will be made to any Bidder who cannot satisfy the Owner that he has sufficient ability and experience in this class of work and sufficient capital and plant to enable him to prosecute and complete the Work successfully within the time named. The Owner's decision or judgment on these matters shall be final, conclusive, and binding.

3.2 The Owner may make such investigations as it deems necessary, and the Bidder shall furnish to the Owner, under oath if so required, all such information and data for this purpose as the Owner may request.

3.3 Bidders must submit a completed Statement of Bidders Qualifications with the Bid. Failure to submit a completed Statement of Bidders Qualifications may be deemed by the Owner as a non-responsive Bid. Refer to Section 00420.

4. INFORMATION NOT GUARANTEED

4.1 All information given on the Drawings or in the other Contract Documents relating to on-site or off-site subsurface and other conditions, natural phenomena, existing pipes, foundations and other structures is from the best sources at present available to the Owner. All such information is furnished only for the information and convenience of Bidders and is not guaranteed to be accurate or all inclusive.

4.2 It is agreed and understood that the Owner does not warrant or guarantee that the subsurface or other conditions, natural phenomena, existing pipes or other structures encountered during construction will be the same as those indicated on the Drawings or in the other Contract Documents.

4.3 It is agreed further and understood that no Bidder or contractor shall use or be entitled to use any of the information made available to him or obtained in any examination made by him in any manner as a basis of or ground for any claim or demand against the Owner or the Engineer, arising from or by reason of any variance which may exist between the information made available and the actual subsurface or other conditions, natural phenomena, existing pipes or other structures actually encountered during the construction work, except as may otherwise be expressly provided for in the Contract Documents.

5. SUBSURFACE INVESTIGATION

5.1 No report of explorations or tests of subsurface conditions are available for this project.

5.2 The Contractor shall become familiar with the existing physical conditions and limits of work at the project site. Site familiarity shall extend to any adjacent condition or physical constraint which, could impact the Contractor's prosecution of work during construction activities. Before submitting a Bid, Bidders may, at their own expense and with permission of the Owner, make such additional investigations and tests as they may deem necessary to determine the Bid for performance of the work in accordance with the time, price and other terms and conditions of the Contract Documents.

5.3 The submission of a Bid will constitute an incontrovertible representation that the Bidder has complied with every requirement of this Article 5 and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the work.

6. EASEMENTS

6.1 Where indicated on the drawings, a portion of the work will be located in easements through private property obtained or which will be obtained by the Owner.

6.2 On all other lands, the Contractor has no rights unless he obtains written agreements for them from the proper parties. Copies of agreements shall be provided to the Owner prior to entry onto those lands.

6.3 The Contractor shall not work on property requiring obtaining of an easement until the Owner has obtained the necessary easements.

6.4 The Contractor shall have no claim for additional compensation or damage on account of any delay in obtaining the necessary easements.

7. OTHER CONTRACTS

7.1 It is essential that all parties interested in the project cooperate to the end that the entire project will be brought to a successful conclusion as rapidly as possible, but the Owner cannot guarantee that no interference or delay will be caused thereby. Interference and delay resulting from such cooperation shall not be the basis of claims against the Owner.

7.2 In as much as the Owner will be undertaking other construction near this project, Bidders should anticipate coordinating their efforts with the following potential near-by construction projects:

1. I-93 Construction (ongoing)

2. Town Farm Road Bridge

3. Haverhill Road Re-Construction

4. South Shore Road Re-Construction

8. BIDDERS TO INVESTIGATE

8.1 Bidders must satisfy themselves by personal examination of the site of the Work and by such other means as they may wish, as to the actual conditions there existing, the character and requirements of the Work, the difficulties attendant upon its execution, and the accuracy of all estimated quantities stated in the Bid.

9. QUESTIONS REGARDING DRAWINGS AND DOCUMENTS

9.1 In general, no answer will be given to prospective Bidders in reply to an oral question if the question involves an interpretation of the intent or meaning of the Drawings or other Contract Documents, or the equality or use of products or methods other than those designated or described on the Drawings or in the Specifications. Any information given to Bidders other than by means of the Drawings and other Contract Documents, including Addenda, as described below, is given informally, for information and the convenience of the Bidder only and is not guaranteed. The Bidder agrees that such information shall not be used as the basis of nor shall the giving of any such information entitle the Bidder to assert any claim or demand against the Owner or the Engineer on account thereof.

9.2 To receive consideration, questions shall be submitted in writing to the Owner at least seven days before the established date for receipt of Bids.

9.3 The Owner will neither approve nor disapprove particular products prior to the opening of Bids; such products will be considered when offered by the Contractor for incorporation into the Work in accordance with the requirements of Section 01300.

9.4 The Owner will set forth as Addenda, which shall become a part of the Contract Documents, such questions received as above provided as in his sole judgment are appropriate or necessary and his decision regarding each. At least two days prior to the receipt of Bids, the Owner will fax or email a copy of these Addenda to those prospective Bidders and parties known to have taken out sets of the Drawings and Contract Documents.

9.5 The Contractor agrees to use and base his/her Bid on the products and methods designated or described in the Specifications as amended by the Addenda.

10. BLANK FORM FOR BID

10.1 All Bids must be upon the blank form for Bid annexed hereto, state the proposed price of each item of the Work, both in words and in figures, and be signed by the Bidder with his business address. Bidders must bid on each item. All entries in the entire BID must be made clearly and in ink. In case of discrepancy between prices in words and in figures, the words shall govern. In case of discrepancy between the product obtained by multiplying the estimated quantity by the unit price, and the extended amount, the product obtained shall govern. In case of discrepancy between total of extended amounts and total amount of bid stated, total of items shall govern.

11. SUBCONTRACTORS

11.1 The Bidder is advised that any person, firm, supplier, or other party to whom it is proposed to award a subcontract under this contract must be acceptable to the Owner. Failure to do so will result in a bid that is incomplete and may be rejected by the Owner.

11.2 The low Bidder shall supply the names and addresses of major material and equipment suppliers when requested to do so by the Owner.

11.3 All Bids shall include a listing of Subcontractors that are anticipated to be awarded a subcontract under this contract, and shall identify what work the listed subcontractor will be performing.

12. BID ALTERNATES (NOT USED)

13. BID SECURITY

13.1 Each Bid must be accompanied by a certified check on, or a treasurer's or cashier's check issued by, a responsible bank or trust company and payable to the order of the Owner or by a Bid Bond prepared on the form of Bid Bond attached hereto duly executed and acknowledged by the Bidder, as Principal, and by a surety company qualified to do business in The State of New Hampshire and satisfactory to the Owner, as Surety. The check or Bid Bond shall be in the sum of 5% of the Bid amount and shall be enclosed in the sealed envelope containing the Bid.

13.2 Each such check or Bid Bond may be held by the Owner as security for the fulfillment of the Bidder's agreements as hereinabove set forth and as set forth in the Bid. Should the Bidder fail to fulfill such agreements his Bid check shall become the property of the Owner or if a Bid Bond was furnished the Bid Bond shall become payable to the Owner, as liquidated damages; otherwise, the Bid check shall be returned to the Bidder as

hereinafter provided, or if the security is a Bid Bond, the Bid Bond shall become null and void.

13.3 Bid security's will be returned to all except the three lowest Bidders within five business days after the opening of Bids, and to the three lowest Bidders within five business days after the Owner and the accepted Bidder have executed the AGREEMENT. In the event that the AGREEMENT has not been executed by both the accepted Bidder and the Owner within 90 consecutive days after the opening of Bids, the Bid security will be returned promptly upon demand of any Bidder who has not been notified of the acceptance of his Bid.

13.4 Bid security's accompanying Bids which are rejected will be returned within five business days after rejection.

13.5 None of the three lowest Bids shall be deemed rejected, notwithstanding acceptance of any Bid, until the AGREEMENT has been executed by both the Owner and the accepted Bidder.

14. WITHDRAWAL OF BIDS

14.1 Except as hereinafter in this subsection otherwise expressly provided, once his Bid is submitted and received by the Owner for consideration and comparison with other Bids similarly submitted, the Bidder agrees that he may not and will not withdraw it within 90 calendar days after the actual date of the opening of Bids.

14.2 Upon proper written request and identification, Bids may be withdrawn only as follows:

1. At any time prior to the designated time for the opening of Bids.

2. Provided the Bid has not theretofore been accepted by the Owner, at any time subsequent to the expiration of the period during which the Bidder has agreed not to withdraw his Bid.

14.3 Unless a Bid is withdrawn as provided above, the Bidder agrees that it shall be deemed open for acceptance until the AGREEMENT has been executed by both parties thereto or until the Owner notifies a Bidder in writing that his Bid is rejected or that the Owner does not intend to accept it, or returns his Bid deposit. Notice of acceptance of a Bid shall not constitute rejection of any other Bid.

15. RIGHT TO REJECT BIDS

15.1 **Approval of funds to finance the contract will be subject to Town appropriation in March 2016.** If funds for this project are not approved, the Owner reserves the right to reject any or all Bids.

15.2 The Owner reserves the right to reject any or all Bids, should the Owner deem it to be in the public interest to do so

15.3 The Owner may reject Bids which in its sole judgment are incomplete, conditional, obscure or not responsive or which contain additions not called for, erasures not properly initialed, alterations, or similar irregularities, or the Owner may waive such omissions, conditions or irregularities.

15.4 The Owner may reject Bids which in its sole judgment are unbalanced to the potential detriment of the Owner. An unbalanced bid is defined as a bid that generates reasonable doubt that award to the Bidder will result in the lowest ultimate cost to the Town of Salem or a bid that contains lump sum or unit items that do not reflect reasonable costs plus a reasonable proportionate share of the bidder's anticipated profit, overhead costs and other interests.

15.5 If, at the time this contract is to be awarded, all Bids submitted by responsible Bidders exceed the amount of the funds available to finance the contract, the Owner may reject all bids or take any other action deemed to be in the best interest of the Owner.

16. COMPARISON OF BIDS

16.1 The Owner agrees to examine and consider each Bid submitted in consideration of the Bidder's agreements, as hereinabove set forth and as set forth in the Bid.

17. REDUCTION IN SCOPE OF WORK

17.1 The Owner reserves the right to decrease the scope of the work to be done under this contract and to omit any work in order to bring the cost within available funds. To this end, the Owner reserves the right to reduce the quantity of any items or omit all of any items as set forth in the Bid, either prior to executing the contract or at any time during the progress of the work. The Owner further reserves the right, at any time during the progress of the work, to restore all or part of any items previously omitted or reduced. Exercise by the Owner of the above rights shall not constitute any ground or basis of claim for damages or for anticipated profits on the work omitted.

18. CONTRACT BONDS

18.1 The Bidder whose Bid is accepted agrees to furnish the Contract Bonds in the forms which follow in Section No. 00615 Construction Performance Bond and Section 00620 Construction Payment Bond, each in the sum of the full amount of the Contract and Section 00621 Warranty Bond in the sum of Fifty Thousand Dollars ($50,000.00) all duly executed by the said

Bidder as Principal and by a surety company qualified to do business under the laws of the State of New Hampshire and satisfactory to the Owner, as Surety, for the faithful performance of the Contract and payment for labor and materials. The premiums for such Bonds shall be paid by the Contractor.

19. EXECUTION OF AGREEMENT

19.1 The Bidder whose Bid is accepted will be required and agrees to duly execute the AGREEMENT and furnish the required Contract Bonds within the time limit stated in the Bid after notification that the AGREEMENT is ready for signature.

20. INSURANCE CERTIFICATES

20.1 The Contractor will not be permitted to start any construction work or layout or deliver materials and equipment to the site until he has submitted certificates covering all insurances called for under Supplementary Conditions.

21. SALES AND USE TAX (NOT USED)

22. SAFETY AND HEALTH REGULATIONS

22.1 This project is subject to all of the Safety and Health Regulations (CFR 29 Part 1926 and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974. Contractors are urged to become familiar with the requirements of these regulations.

23. PRE-BID CONFERENCE

23.1 A pre-Bid conference may be held by the Owner at a time and location indicated in the Invitation to Bid. Representatives of the Owner will be present to discuss the Project. Owner will transmit to all prospective Bidders of record such Addenda, as Owner considers necessary in response to questions arising at the conference. Oral statements made at the pre-Bid conference may not be relied upon and will not be binding or legally effective.

24. BASIS OF AWARD

24.1 The Owner reserves the right to award the contract to a Bidder that is not the lowest responsible and responsive Bidder. Although the Bid price will be a substantial factor in the Owner's award, the final award will be based on the Owner's determination, in its sole discretion, of which Bid will be in the best interest of the Owner.

24.2 The Owner will evaluate the Bid price submitted by Bidders based on unit prices and any combination of the total base bid and add or deduct alternative amounts in such a manner as is deemed to be in the best interests of the Owner.

24.3 The Owner will award the Contract based on the total of Base Bid Section 1 plus Base Bid Section 2.

END OF SECTION 00100

SECTION 00301A

BID

To the Town of Salem, New Hampshire, herein called the Owner, acting by and through its Engineering Department, for the 2016 Roadway Improvement Project – Cornwell Court, Windward Terrace, Car-Mar Lane, Walter Palmer Lane.

The Undersigned, as bidder, herein referred to as singular and masculine, declares as follows:

(1) The only parties interested in this BID as Principals are named herein;

(2) This BID is made without collusion with any other person, firm, or corporation;

(3) No officer, agent, or employee of the Owner is directly or indirectly interested in this BID;

(4) He has carefully examined the site and adjacent areas of the proposed Work and fully informed and satisfied himself as to the conditions and restraints existing, the character and requirements of the proposed Work, the difficulties attendant upon its execution given said conditions and restraints, and the accuracy of all estimated quantities stated in this BID, and he has carefully read and examined the Contract Documents therein referred to and knows and understands the terms and provisions thereof;

(5) He understands that information relative to subsurface and other conditions, natural phenomena, existing pipes, foundations, and other structures (surface and/or subsurface) has been furnished only for his information and convenience without any warranty or guarantee, expressed or implied, that the subsurface and/or other conditions, natural phenomena, existing pipes, foundations, and other structures (surface and/or subsurface) actually encountered will be the same as those shown in the Contract Documents and he agrees that he shall not use or be entitled to use any such information made available to him through the Contract Documents or otherwise or obtained by him in his own examination of the site, as a basis of or ground for any claim against the Owner or the Engineer arising from or by reason of any variance which may exist between the aforesaid information made available to or acquired by him and the subsurface and/or other conditions, natural phenomena, existing pipes, foundations, and other structures (surface and/or subsurface) actually encountered during the

construction work, and he has made due allowance therefore in this BID;

(6) He understands that protection of public or private property is the Contractor's responsibility and any damage, whether in or out of the work limit, to any public or private property, facility, structure or utility resulting from any action of his in the prosecution of work shall be his sole burden to correct to the fullest satisfaction of the owner of such public or private property, facility, structure or utility. He understands that no additional compensation of any kind is warranted or will be granted for any damage to any public or private property, facility, structure or utility damaged as a result of his prosecution of any work;

(7) he understands that the quantities of work tabulated in this BID or indicated in the Contract Documents are only approximate and are subject to increase or decrease as deemed necessary by the Engineer;

(8) he agrees that, if this BID is accepted he will contract with the Owner, as provided in the copy of the Contract Documents deposited in the office of the Engineer, this BID form being part of said Contract Documents, and that he will perform all the work and furnish all the materials and equipment, and provide all labor, services, plant, machinery, apparatus, appliances, tools, supplies and all other things required by the Contract Documents in the manner and within the time therein prescribed and according to the requirements of the Engineer as therein set forth, and that he will take in full payment therefore the lump sum or unit price applicable to each item of the Work as stated in the schedule below.

Note: Bidders must submit a completed Statement of Bidders Qualifications with the Bid. Failure to submit a completed Statement of Bidders Qualifications may be deemed by the Owner as a non-responsive Bid. Refer to Section 00420.

Note: Bidders must bid on each item. All entries in the entire BID must be made clearly and in ink. In case of discrepancy between prices in writing and in figures, the writing shall govern. In case of discrepancy between the product obtained by multiplying the estimated quantity by the unit price, and the extended amount, the product obtained shall govern. In case of discrepancy between total of extended amounts and total amount of bid stated, total of items shall govern. Use the pages in this document when submitting proposal and submit contract documents intact.

This BID includes Addenda number(s) _____ (To be filled in by Bidder if Addenda are issued.)

Bid Schedule
Base Bid
2016 Roadway Improvement Program
Salem, New Hampshire

ITEM	DESCRIPTION	EST. QTY.	UNIT	UNIT PRICE		EXTENDED TOTAL
				Words	Figures	(Figures)
201.02	Grubbing	600	SY			
201.21	Remove Small Tree (5"-23")	15	EA			
201.22	Remove Large Tree (over 24")	5	EA			
201.321	Tree Trimming and Pruning	1	LUMP			
201.4	Removal of Stumps	4	EA			
202.31	Fill and Abandon pipe	3	CY			
202.41	Removal of Pipe (0-24")	38	LF			
202.5	Removal of CB	1	EA			
203.1	Common Excavation for driveways	495	CY			
203.11	Common Excavation (F)	1070	CY			
203.2	Rock Structure Excavation	50	CY			
203.4	Excavation of Unsuitable Material	65	CY			
203.6	Embankment in Place	260	CY			
206.19	Exploratory Excavation (test pits)	20	CY			
214	Fine Grading	1	UNIT			
304.2	Gravel	286	CY			
304.4	Crushed Stone Fine for Driveways	340	CY			
306.108	Reclaimed Stabilized Base In-Place (8" Deep)	7061	SY			
306.110	Reclaimed Stabilized Base In-Place (10" Deep)	1657	SY			
306.208	Reclaim, Remove and Rehandle Recl Stab Base (8" Deep)	4072	SY			
306.36	1.5" Stone for Reclaimed stabilized base	240	TONS			

403.11	2 1/2" HBP Permanent Base Pavement	1907	TONS			
403.11	1-1/2" HBP Wearing Course	1144	TONS			
403.12	HBP Hand Method	340	TONS			
417	Cold Planing (at intersections)	100	SY			
572.1	R&R Stone Wall	155	LF			
585.3	Class C Stone Fill	20	CY			
603.00412	12" RCP Drain Pipe	24	LF			
603.83212	12" HDPE Drain Pipe	684	LF			
603.83215	15" HDPE Drain Pipe	214	LF			
604.0007	Polyethylene Liner	14	EA			
604.12	Catch Basin	7	EA			
604.22	Drop Inlet	1	EA			
604.32	Drain Manhole	3	EA			
604.4	Reconstructing/Remodel Catch Basins	5	EA			
604.45	Adjust Catch Basin Grates & Frames	1	EA			
604.51	Adjust Sewer Manhole	6	EA			
604.72	New Frame & Grate, Type B	5	EA			
605.506	6" HDPE Underdrain (Unspecified)	400	LF			
608.131	3" Bituminous Sidwalke	10	SY			
608.26	6" Concrete Sidwalk for H.C. ramps	5	SY			
608.54	Detectable Warning Panels	2	SY			
609.5	Reset Granite Curb	20	LF			
609.813	Bituminous Curb	450	LF			
611	Adjust water services	4	EA			
611.90001	Adjust valve boxes	4	EA			
612.43015	15" Ductile Iron Pipe, CL50	40	LF			

615.032	Traffic Sign, Type C w/Break away post	55	SF			
618	Uniformed Police for Traffic Control	ALLOWANCE		Fifty Thousand Dollars and no cents	$ 50,000.00	$ 50,000.00
619.1	Maintenance of Traffic	1	LUMP			
621.331	Delineator	4	EA			
622.55	Reset Monuments	13	EA			
628.2	Sawed Bituminous Pavement	1300	LF			
632.3118	Retroreflective Thermoplastic Pavment (18" Stop)	75	LF			
645.2	Erosion Control Blanket	120	SY			
645.441	Sediment Filter Logs	25	EA			
645.51	Hay Bales	40	EA			
645.531	Silt Fence	175	LF			
645.533	Inlet Filter Baskets	14	EA			
645.71	Monitoring SWPPP and Erosion & Sediment Controls	50	HR			
646.512	Turf Establishment w/ Mulch, Tackifiers, & Loam	7127	SY			
651.001	Evergreen Tree - 6'-8' height	4	EA			
652.001	Deciduous Tree - 2-1/2"-3" Caliper	4	EA			
670.0662	Relocate mailbox	87	EA			
692	Mobilization	1	LUMP			
900	15" Precast headwall	3	EA			
912	Landscape (remove and reset)	1	LUMP			
1010.2	Asphalt Cement Adjustment	ALLOWANCE		Five Thousand Dollars and no cents	$ 5,000.00	$ 5,000.00
TOTAL AMOUNT (BASE BID SECTION 1)						

Key to Units: LF = Linear Feet; VF = Vertical Feet; SY = Square Yards; CY = Cubic Yards; LS = Lump Sum; EA = Each

SECTION 2 - BASE BID

ITEM	DESCRIPTION	EST. QTY. total	UNIT	UNIT PRICE Words	Figures	EXTENDED TOTAL (Figures)
611.05206	6" Cement Lined Ductile Iron Pipe, CL 52	40	LF			
611.05208	8" Cement Lined Ductile Iron Pipe, CL 52	10	LF			
611.5001	1" Water Service (complete)	5	EA			
611.70008	8" Fitting	3	EA			
611.71006	6" Gate Valve	1	EA			
611.8111	Install Hydrant (Hydrant supplied by Owner)	4	EA			
TOTAL AMOUNT (BASE BID SECTION 2)						

Key to Units: LF = Linear Feet; VF = Vertical Feet; SY = Square Yards; CY = Cubic Yards; LS = Lump Sum; EA = Each

Total Amount of Base Bid – Section 1:

$_____

(Amount in Figures)

_____

(Amount in Words)

Total Amount of Base Bid – Section 2:

$_____

(Amount in Figures)

_____

(Amount in Words)

Total Amount of Base Bid – Section 1 + 2:

$_____

(Amount in Figures)

_____

(Amount in Words)

The undersigned agrees that extra work, if any, performed in accordance with the Article 10 of the General Conditions of the Contract will be paid for in accordance with Article 11 of the General Conditions of the Contract.

If this BID is accepted by the Owner, the undersigned agrees to complete the entire work provided to be done under the Contract within the time stipulated in the AGREEMENT.

As provided in the INSTRUCTIONS TO BIDDERS, the bidder hereby agrees that he will not withdraw this BID for a period of 90 days after the actual date of the opening of the Bid and that, if the Owner shall accept this BID, the bidder will duly execute and acknowledge the AGREEMENT and furnish, duly executed and acknowledged, the required CONTRACT BONDS within ten (10) days after notification that the AGREEMENT and other Contract Documents are ready for signature.

Should the bidder fail to fulfill any of his agreements as hereinabove set forth, the Owner shall have the right to retain as liquidated damages the amount of the bid security which shall become the Owner's property. If a bid bond was given, it is agreed that the amount thereof shall be paid as liquidated damages to the Owner by the Surety.

The bidder, by submittal of this BID, agrees with the Owner that the amount of the bid security deposited with this BID fairly and reasonably represents the amount of damages the Owner will suffer due to the failure of the bidder to fulfill his agreements as above provided.

The undersigned further certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this paragraph the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The attached CERTIFICATE OF NON-COLLUSION must be signed and submitted as part of the Bid Proposal.

(SEAL)_____
(Name of Bidder)

By _____
(Signature and title of authorized representative)

_____
(Telephone)

_____
(Business address)

_____
(Fax Number)

_____
(City and State)

Date _____

The bidder is a corporation incorporated in the State (or Commonwealth) of _____ - a partnership - an individual. (Bidder must add and delete as necessary to make this sentence read correctly.)

Note: If the bidder is a corporation, affix corporate seal and give below the names of its president, treasurer, and general manager if any; if a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address.

_____

_____

_____

CERTIFICATE OF NON-COLLUSION

By submission of this Proposal, the bidder and each person signing on behalf of the bidder, certifies as to its own organization, under penalty of perjury, that to the best of their knowledge and belief:

1. The prices in this Bid Proposal have been arrived at independently without collusion, consultation, communication, or agreement with any other bidder or with any competitor for the purpose of restricting competition.

2. Unless required by law, the prices that have been quoted in this Bid Proposal have not been knowingly disclosed and will not knowingly be disclosed by the bidder, directly or indirectly, to any other bidder or competitor prior to opening of Proposals.

3. No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a proposal for the purpose of restricting competition.

4. The signers of the Proposal hereby tender to the Owner this sworn statement that the named Contractor(s) has not, whether directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action to restrain free competitive bidding in connection with this Proposal.

A Bid Proposal will not be considered for award nor will any award be made where there has not been compliance with the statements in the certification above.

_____

(Name of person signing bid or proposal)

_____

(Name of business)

END OF SECTION 00301A

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 LOCATION OF WORK

A. The work of this Contract is located in the Town of Salem, New Hampshire. Construction locations will generally include, but not necessarily be limited to Cornwell Court, Windward Terrace, Car-Mar Lane and Walter Palmer Lane.

1.3 SUMMARY

A. In general and without limitation, the work to be done under this Contract includes drainage improvements and roadway reconstruction. The work to be performed shall include the work shown on the Drawings and Details, as specified herein, and as indicated below.

B. A general description of the work to be performed under this Contract shall include but will not necessarily be limited to the following construction operations:

1. Clearing and grubbing, stripping and stockpiling and protection of plantings and existing above-grade structures and features.

2. Excavating, filling, backfilling, grading and compacting for installation of drainage and appurtenances.

3. Furnishing, installing, and testing drain pipe, drain manholes, catch basins, level spreaders and rip rap aprons complete with necessary appurtenances.

4. Furnishing and installing guardrail, guardrail ends and platforms complete with all necessary appurtenances.

5. Locating, protecting and shoring all existing utilities, structures and property. Shoring and/or guying all utilities, utility structures, structures and property as required by utility authority or Owner. Coordinating all construction activities with appropriate utility authorities.

6. Repairing and/or relocating any utilities broken or conflicting with construction.

7. Providing all traffic control and maintenance of detours, and coordination with other projects in the vicinity of the work limit.

8. Disposal of excess excavated material not required for fill or backfill. Materials deemed as not being needed for fill or backfill shall be offered to the Owner prior to disposal. If the Owner wishes to keep the material, the Contractor shall transport the material to a Town of Salem facility at no cost to the Owner. If the material is deemed to be unusable by the Owner, disposal shall be at the expense of the Contractor to the satisfaction of the Owner and in accordance with all local, state and federal regulations.

9. Removal and salvage and/or disposal of existing drainage, water or sewer materials to be replaced. Materials to be salvaged and their location for storage shall be determined by the Owner. Materials not desired for salvage by Owner shall become the property of the Contractor and disposed of by the Contractor, at no additional cost to Owner, in accordance with all local, state and federal regulations.

10. Excavating, rock excavation, filling, backfilling, reclaiming, grading and compacting gravel base courses. Transport of excess reclaimed material to a location to be identified by Owner, and/or disposal of excess material by Contractor.

11. Furnishing, placing and compacting hot bituminous pavement, tack coat, saw cutting, cold planing, and pavement markings for roadway reconstruction, Cape Cod berm, driveway aprons, and drainage swales.

12. Furnishing and installing new curbing or removing and resetting existing curb.

13. Replacement and restoration of disturbed pavement surfaces, utilities, plantings, mulch, landscaping stone, grass, loam/seed, posts, fences, signs, mailboxes, bounds etc. within the limits of work, and in areas outside the limits of work disturbed by construction operations.

14. Replace any disturbed property pins, monuments or bounds utilizing the services of a Registered Land Surveyor licensed in the State of New Hampshire to perform such work.

15. Reconstruction of stone walls in the locations specified as indicated on the Contract Drawings and as directed by the Engineer and shall be in accordance with the State of New Hampshire – Roadside Stonewall Reconstruction Policy.

16. Completion of all clean up.

C. The work shall also conform to such additional drawings and addenda to these Specifications and Drawings as may be published or exhibited prior to the opening of the bids and to such drawings in explanation of details, or as may be furnished by the Engineer from time to time during the construction.

D. Work and materials which are necessary in the construction but which are not specifically referred to in the Specification, or shown on the Drawings, but implied by the Contract shall be furnished by the Contractor at his own cost and expense and shall be such as will correspond with the general character of the work as may be determined by the Engineer, whose decisions as to the necessity for and character of such work and materials shall be final and conclusive. It is the intent of these Specifications and Drawings to produce a complete, finished job whether shown in every detail or not.

1.4 SCHEDULE OF BASE BID SECTIONS AND ALTERNATES

This project includes two base bid sections without alternates.

1.5 WORK BY OTHERS

A. The Contractor's attention is drawn to the fact that there may be work being conducted at the site by Fairpoint, Liberty Utilities, Comcast, Unitil or other utilities. This work generally consists of moving above ground utilities from old poles to newly relocated poles and relocating underground utilities. This work may limit the Contractor's ability to complete certain aspects of the work. However, the Owner will not be responsible for delay claims resulting from the work required of Fairpoint, National Grid, Comcast, Unitil or other utilities.

1.6 WORK SEQUENCE

A. The proposed work sequence shall be in accordance with the approved schedule submitted by the Contractor and in general compliance with the construction schedule identified on the plans.

1. The Project Schedule shall be updated every two (2) weeks and submitted to the Owner and Engineer for review.

2. The project shall be substantially complete by the date stipulated in the Invitation to Bid.

B. Contractor shall complete all work (Final Completion) associated with the 2016 Roadway Improvement Project – Cornwell Court, Windward Terrace, Car-Mar Lane, Walter Palmer Lane by the date stipulated in the Invitation to Bid.

C. Individual street completion requirements: Upon the start of any excavation or reclamation activities on any individual street the Contractor shall bring that street to a level of completion within 60 days. Work to be completed in the 60-day window shall be drainage facilities installed and functional, all paving and curbing installed, driveway aprons finished to top course pavement, and loam and seed application on all disturbed areas.

D. Refer to Project Permits in Appendices and Project Drawings for any additional requirements.

1.7 CONTRACTOR'S USE OF PREMISES

A. Contractor shall assume full responsibility for security of all his and his subcontractors' materials and equipment stored on the site.

B. Contractor shall limit use of premises to areas within the Contract work area. Do not cause disruption to portions of the Project beyond areas in which the Work shall be conducted.

C. If directed by the Owner, Contractor shall move stored items which interfere with operations of Owner for no additional compensation.

D. If necessary, Contractor shall obtain and pay for use of additional storage or work areas if needed to perform the Work.

1.8 UNDERGROUND UTILITIES

A. Underground utilities shown on the Drawings have been located primarily from information furnished by others and are considered approximate both as to size and location. There may be additional utilities to be encountered that are not shown on the Drawings, and it shall be the Contractor's responsibility to locate all existing utilities and to protect same from damage or harm. All utilities interfered with or damaged shall be properly restored, at the expense of the Contractor, to the satisfaction of the Owner and the utility authority.

1.9 WORK SCHEDULE

The major items of work as listed in Section 00800 – Supplementary Conditions of the Contract shall be completed for Substantial Completion.

A. Normal construction activity shall be limited to normal business hours of 7:00 AM to 3:30 PM, Monday through Friday (except holidays) unless otherwise approved by the Engineer or the Town of Salem in writing.

B. If the Contractor requires assistance from the Department of Public Works (DPW) after normal business hours (3:30 PM), the Contractor will be charged for DPW time, including manpower and vehicles. Payments of all fees accrued for this reason are the sole responsibility of the Contractor with no additional expense to the Owner.

C. Work in streets, roadways and areas adjacent to them is not allowed on legal holidays and shall cease at noon on the day before legal holidays and at noon on Friday prior to Monday holidays. The holidays are as follows:

New Year's Day
President's Day
Independence Day
Columbus Day
Thanksgiving Day
Christmas Day
Civil Rights Day
Memorial Day
Labor Day
Veterans Day
Day after Thanksgiving

1.10 SUBSIDIARY ITEMS

The following items of work are considered subsidiary to other items of work and no additional compensation will be allowed. This list is not considered to be complete and other items may be identified in these contract documents. The partial list is as follows:

1. Preconstruction Video.
2. Sweeping existing pavement prior to tack coat and overlays.
3. Cleaning new catch basins and drain pipes.
4. Materials testing.
5. Bituminous tack coat.
6. All hauling costs associated with transport of salvaged materials/items to the Owner in a designated location.
7. Thrust blocks/joint restraints for water or sewer work.
8. Resetting individual stones.
9. Coordination with Town departments.
10. Coordination with utility companies.
11. Dewatering of any kind.
12. Temporary earth support and shoring.
13. Meeting the requirements of all project permits.
14. General site cleanup.
15. Field survey including layout.
16. As-built Survey and Record drawings.
17. Water and Sewer swing tie sketches.
18. All property restoration (whether public or private) for which no specific pay item exist. The Contractor shall anticipate property impacts resulting from their own operations and consider impacts in preparation of their bid. All disturbed areas shall be restored to a pre-construction or better condition.
19. All incidental work shown or indicated on the Drawings for which no Pay Item exists.
20. Project Submittals.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01010

SPECIAL PROVISION

SECTION 611 -- WATER SYSTEM INSTALLATION

Description

1.1 This work shall consist of all plant, labor, equipment, and materials, and performing all operations in connection with the furnishing and installing pipe, pipe fittings, specials, jointing, encasement materials, and accessories, of various sizes, classes, joints and types, and appurtenant work, at the locations and to the lines and grades indicated, complete in place in accordance with the plans and as specified herein or as ordered.

1.1.1 The Contractor shall furnish all materials, labor, tools and equipment, and perform all operations, testing, disinfection, flushing, and incidentals necessary for a complete operating water main installation, as outlined herein and on the plans and setting up and maintaining a temporary water system to maintain water service at all times, except for authorized shutdowns approved by the Salem Water Department. The Contractor shall be fully responsible for achieving the specified test results and shall submit results of pressure and leakage tests and bacteriological tests to certify compliance with the Specifications.

1.2 This work shall consist of all plant, labor, equipment, and materials, and performing all operations in connection with the furnishing, installing and testing of valves and appurtenances at the locations indicated and/or as directed, complete in place, in accordance with the Drawings and Specifications.

1.3 This work shall consist of furnishing of all plant, labor, equipment, appliances, and materials, and performing all operations in connection with individual water services including but not limited to furnishing, installing and testing of pipe, pipe fittings, corporations, curb stops, jointing materials, and accessories of various materials, sizes, classes, joints, and types and appurtenant work, complete in place, in accordance with the Drawings and Specifications.

1.4 This work shall consist of furnishing of all plant, labor, equipment, and materials, and performing all operations in connection with the furnishing, installing and testing of hydrants and appurtenances at the locations indicated and/or as directed, complete in place, in accordance with the Drawings and Specifications.

1.5 This work shall consist of maintaining continuous water service to affected customers via a temporary water system, except when construction requires an interruption of water service. A service interruption may last for a maximum of six hours. The Contractor must obtain written approval from the Owner prior to interruption of water service to affected water users.

1.6 This work shall also consist of removal and salvage of all hydrants, valves, fittings, pipe, curb boxes, and any other system component in accordance with the plans and as specified herein or as ordered.

1.7 At project close-out, submit record drawings showing locations of installed services to include at least two swing ties to fittings, bends, corporation stops, curb stops, existing water system components discovered or known, sketches at adjacent structures, and any other information as may be required by the Salem Water Department. Record drawings shall be subsidiary to water system items. Swing ties shall be from permanent points such as building corners, property markers, manholes, hydrants, and

other existing water system components. Unacceptable swing tie points are those subject to movement such as signs, pavement corners, fences, and utility poles.

1.7.1 Record Drawings shall consist of any and all information as may be required by the Salem Water Department necessary for accuracy in locating water system components. Necessary information shall include, but is not limited to various swing tie information as identified in Paragraph 1.7; material size, type, and configurations; ledge locations and elevations; depth from grade and elevations of any and all system components; pipe elevations every 50-feet; any necessary dimensioning as may be required to determine the path and location of the water main; sketches adjacent to structures, pipes, utilities, any type of crossing, and similar conflict points.

Materials

2.1 The Contractor shall provide the following material for the installation of the water mains, services, and appurtenances. Any material which does not conform to the requirements of these Specifications shall be immediately removed from the site and replaced by the Contractor without compensation.

2.1.1 Common Backfill. Common backfill shall be granular material, consisting of hard sand and gravel meeting NHDOT Item 209. Common backfill shall conform to NHDOT Item 209.1.

2.1.2 Sand Bedding and Blanket. Sand bedding and blanket material required for installation of the water mains, services, and appurtenances shall meet NHDOT Item 304.1.

2.1.3 Gravel Fill. Gravel fill shall meet material requirements of NHDOT Item 304.2 and consist of hard, durable gravel free from trash, organic matter, clay, surface coatings, and other deleterious materials.

2.1.3.1 When approved by the Owner, gravel fill used for pipe bedding shall have a maximum stone size of 1-1/2 inches (37.5 mm).

2.1.4 Crushed Gravel. Crushed gravel shall meet material requirements of NHDOT Item 304.3 and consist of hard durable sand and gravel, free from trash, organic matter, clay, surface coatings, and other deleterious materials.

2.2 Water Mains and Appurtenances. All products and materials shall conform to the Town of Salem Water Department requirements and to the latest appropriate section of American Water Work Association (AWWA) and American National Standards Institute (ANSI) Standards and as otherwise specified hereinafter.

2.2.1 Handling and Storage: Pipe and accessories shall be kept in a sound, undamaged condition. Pipe and accessories shall, at all times, be handled with care and shall not be bent, dropped, dumped or bumped against any other object. Only nylon-protected slings shall be used for handling the pipe. No chains, hooks or bare cables will be permitted during the handling or installation of pipe. Gaskets shall be shipped in cartons and stored in a clean area, away from grease, oil, heat, direct sunlight and ozone producing electric motors. Damaged material shall be replaced at no cost to the Owner, at any time during the construction that the damage is identified or occurs. Pipe shall be stored off the ground at a height no greater than 5 feet, and with even support for the pipe barrel.

2.2.2 Ductile Iron Water Main Pipe:

2.2.2.1 Class 52 push-on type ductile iron water pipe - Water pipe for shall be minimum 18-foot long ductile iron complying with ANSI A21.51 and AWWA C 151, Class 52. Pipe shall be double cement-lined 1/8" (3 mm) thick and seal coated inside and out in accordance with ANSI A21.4 and AWWA C 104. All pipe shall be marked with the class, thickness designation and initials of the manufacturer. Joints shall be mechanical joints or rubber gasket, push-on type in accordance with ANSI A21.11 and AWWA C 111. Use only lubricant that is specified by the pipe manufacturer.

2.2.2.1.1 Pipe shall be furnished with necessary materials and equipment recommended by the manufacturer for use in joining pipe lengths and fittings.

2.2.2.1.2 Pipe shall be manufactured in the United States by U.S. Pipe and Foundry Company, Atlantic States Cast Iron Pipe Co., Clow Corporation, Griffin Pipe Co., or approved equal.

2.2.2.1.3 In accordance with Section 01300 of the Contract Specifications the Contractor shall submit manufacturer's certificates of compliance with these Specifications and certification that ductile iron pipe has been tested at the foundry with the Ball Impression Test, Ring Bending, or approved equal.

2.2.2.2 Mechanical Joint Ductile Iron Pipe for use on bridge crossings shall conform to ANSI A21.51/AWWA C 151 Class 52. Mechanical joint fittings shall be ductile iron conforming to ANSI A21.10/AWWA C 110. Pipe and fitting joint shall meet ANSI A21.11/AWWA C 111 standards and shall include plain rubber gaskets. Pipe and fittings shall be double cement lined and seal coated inside and outside in accordance with ANSI A21.4/AWWA C 104. All pipe and fittings shall be furnished with ductile iron retainer glands.

2.2.2.3 Flanged joints will be made with bolts, bolt studs with a nut on each end or studs with nuts where the flange is tapped. The number and size of bolts will conform to the same ANSI Standard as the flanges. Bolts and nuts will, except as otherwise specified or noted on the drawings, be Grade B conforming to the ASTM Standard Fasteners, Designation A307. Bolts and studs will be of the same quality as machine bolts. Flanged ductile iron pipe from 3 to 48 inches in diameter will be classified by Underwriter Laboratories, Inc., in accordance with ANSI/AWWA C115/A21.15, latest edition.

2.2.2.4 Alternate pipe material: In general all new pipe installations shall be ductile iron as described in this section. However; in some cases the Town of Salem Water Department may allow alternate pipe material based on a specific need such as very aggressive and corrosive soils or avoiding open cuts in environmentally sensitive areas such as wetland crossings. Use of alternate pipe materials will be solely at the digression of the Salem Water Department.

2.2.2.4.1 Tracer wire: Where alternate pipe material such as plastic is authorized by the Salem Water Department tracer wire shall be installed. Wire shall be 10-gage high-tensile strength as manufactured by BMS, Division of Ablestar Corporation, Avon, MA, or equal. Tracer wire shall be subsidiary to the pipe item number.

2.2.3 Brass Wedges. Brass wedges shall be installed in all push-on type joints to provide electrical conductivity between pipe lengths. For pipe sizes 4" to 12" the Contractor shall install two brass wedges 180-degrees apart at the 3 o'clock and 9 o'clock position. For pipe sizes 14" to 24" the Contractor shall install 4 wedges (2 pairs) 180-degrees apart at the 3 o'clock and 9 o'clock position. Brass wedges shall be subsidiary to the pipe item.

2.2.4 Ductile Iron Fittings shall be short body ductile iron Class 350 mechanical joint type with a 350 psi (2.40 Mpa) pressure rating in accordance with ANSI A21.53/AWWA C153, latest edition, for pipe sizes 24 inches and smaller, unless specifically stated otherwise in the Specifications or on the Drawings. Fittings shall have the same lining and coating as the pipe specified above. All fittings shall be marked with the weight and shall have distinctly cast upon them the pressure rating, the manufacturer's identification, nominal diameter of openings and the number of degrees or fraction of the circle on all bends. Fittings shall be manufactured in the United States by U.S. Pipe and Foundry Company, Atlantic States Cast Iron Pipe Co., Clow Corporation, Griffin Pipe Co., or equal. See paragraph 2.3 for thrust restraint.

2.2.4.1 Caps and plugs installed in all new work shall be provided with a ¾ inch threaded corporation so that air and water pressure can be relieved prior to future connection. Alternate methods of pressure relief may be approved by the Salem Water Department when requested by the Contractor in writing.

2.2.4.2 Contractor shall provide all adapters, fittings, and couplings as determined in the field, necessary to complete all connections whether or not specifically stated on the Drawings and in the Specifications.

2.2.5 Mechanical Joint Restraining Devices shall be used with all mechanical joints. Glands shall be manufactured of ductile iron conforming to ASTM A 536. The ring shall be grade 65-45-12 ductile iron in accordance with ASTM A 536. Mechanical Joint restraining devices shall be shall be Mega-Lug as manufactured by Ebaa Iron Co., or equal. Restraints for push-on joints shall be "fieldlock" wedge gaskets manufactured by US Pipe, or approved equal. Restrained mechanical joints shall be furnished for installation on all fittings, valves and hydrants. At a minimum, restrained joints shall be furnished for installation on all push-on joints for pipe adjacent to fittings, valves and hydrants according to the following:

1. For pipe adjacent to tees, restrain all branch pipe joints within 18 linear feet of tee.
2. For pipe adjacent to 45° bends, restrain all pipe joints within 15 linear feet of bend.
3. For pipe adjacent to 22.5° bends, restrain all pipe joints within 2 linear feet of bend.
4. For pipe adjacent to 11.25° bends, restrain all pipe joints within 1 linear feet of bend.
5. For pipe adjacent to valves, restrain all pipe joints within 24 linear feet of valve.
6. For pipe adjacent to caps, restrain all pipe joints within 24 linear feet of cap.
7. Restrain all pipe joints located between anchor tee and hydrant.

Note: these recommended distances are a minimum standard and shall be verified with AWWA M41 design criteria when considering soil conditions, pipe size, and bury depth.

2.2.5.1 Push on Joint Restraint may be authorized and/or required under specific guidance of the Salem Water Department. Where authorized, restraint at push-on pipe joints shall be Field-Lok 350 gaskets.

2.2.6 Couplings shall be Class 350 mechanical joint solid sleeve-type couplings for plain-end pipe shall be provided with plain rubber gaskets and steel tee-head bolts with nuts. This type coupling will be used for all new pipe to new pipe connections requiring couplings, and all new pipe to existing

pipe of the same outside diameter connections requiring couplings. All couplings located within areas of restrained joints shall be restrained with bituminous coated tie-rod assemblies.

2.2.6.1 Couplings or adapters as required for connecting new pipe to existing pipe of varied outside diameters will be ductile or cast iron type and furnished as required and designed for compatibility with the pipe and operating pressures encountered. Couplings will be Smith-Blair "441", Romac "501" or approved equal.

2.2.6.2 Couplings shall be provided with gaskets of a composition suitable for exposure to the liquid within the pipe. The gaskets shall have metallic tips to provide electrical continuity through the joint.

2.2.6.3 Couplings for exposed pipe shall be of steel and shall be Dresser Style 38, Smith-Blair Style 411, Baker Allsteel, or equal. The couplings shall be provided with steel bolts and nuts.

2.2.7 Gate Valves shall be in accordance with AWWA C 509 or C 515, current version. Gate valves shall be resilient-wedge type with a non-rising bronze stem, 2-inch (50 mm) AWWA operating nut, double O-ring seals (two above and one below the thrust collar), and ferrous coated surfaces with a fusion bonded epoxy coated both inside and out conforming to AWWA C550, latest revision. The valves shall be Model R/W as manufactured by Clow Corporation, AFC, Kennedy, M&H, Mueller, or equal. Valves shall open right.

2.2.7.1 Resilient wedge valves shall be iron body, bronze mounted, resilient seated type, with mechanical joint ends. The valves shall be designed for 200 psi working pressure and 400 psi test pressure.

2.2.7.2 Wedge rubber will be molded in-place and bonded to the ductile iron portion. The wedge rubber will not be mechanically fastened with screws and rivets or similar fasteners.

2.2.7.3 Gate valves shall have restrained mechanical joints as specified above.

2.2.7.4 Valve operating nuts with depths from finish grade of more than 5 feet, must have an approved operating nut extension.

2.2.8 Tapping valve and sleeve. Tapping valve shall be as herein specified for gate valves and in accordance to AWWA C223-07. Sleeves shall be ductile iron, flanged by mechanical joint and designed to fit transite, AC, ductile or cast iron pipe. Tapping sleeves shall be flanged along the vertical centerline and furnished with o-ring gaskets. All exposed portions of any bolts shall be bituminous coated. Tapping sleeve and valve shall be as manufactured by Mueller Company or U.S. Pipe Company. The Contractor may use stainless steel in-lieu sleeves in-lieu of ductile iron components.

2.2.9 Butterfly Valves shall be in accordance with AWWA C 504. Butterfly valves shall be used for size 18 in and above. The valves shall be Henry Pratt Co. 'Groundhog', Dresser 450BF, or Allis-Chambers 'Steamseal'.

2.2.10 Valve Boxes shall be cast iron, tar coated, sliding, heavy pattern type, consisting of three (3) pieces; a flanged bell type base section; a top flange type upper section; and a cover with two lifting holes and the word "WATER" cast on the top. A minimum 6-inch overlap is required between sliding sections. The upper section shall have a bottom flange of sufficient bearing area to prevent settling. The bottom of the lower section shall enclose the stuffing box and operating nut of the valve. The inside diameter of boxes shall be a minimum 5-1/4 inches. Section lengths shall be as necessary to

suit ground elevation. Valve boxes shall be Caldwell #664 by Tyler Pipe, #5664 by Central Foundry, Bibby V683STF, or approved equal. Valve boxes shall be provided for each buried valve.

2.2.11 Hydrants and Appurtenances:

2.2.11.1 Hydrants shall have a rated working pressure of 200 psi and test pressure of 400 psi and shall conform to the latest revision of AWWA C502. Hydrants shall be equipped with a main valve opening of 5-1/4 inches and a standpipe or barrel diameter of 8-1/2 inches, with drains left unplugged and unobstructed to allow barrel to drain, one 4½-inch National Standard pumper connection, and two 2½ inch National Standard Thread hose connections. Each hydrant shall be equipped with a gate valve on the branch line as specified herein.

2.2.11.2 Hydrants will be marked with an arrow and the word "open" to indicate the direction to turn the stem to open the hydrant. Hydrants shall open right (clockwise).

2.2.11.3 Hydrants shall be traffic models, draining type with a 66-inch depth of bury (bottom of pipe) as indicated on the Drawings. Hydrants shall be American Darling Model B-62-B, with a 6" mechanical joint inlet connection to the main. Hydrants shall have been manufactured no earlier than one year prior to installation.

2.2.11.4 Hydrant tees shall have a rotatable mechanical joint gland on the 6-inch plain end branch to provide positive valve restraint, unless otherwise directed by the Engineer.

2.2.11.5 Valves to be used on hydrant branches shall be connected directly to anchor tees and shall be compatible for use with the anchoring tee.

2.2.11.6 Hydrants shall be thoroughly cleaned and given two shop coats of paint in accordance with AWWA Specification C 502. Paint color shall be the standard hydrant color of the Salem Water Department, **Benjamin Moore Industrial Urethane Alkyd Gloss, Safety yellow, M22-15**. Hydrants shall be touched up with paint as required after installation.

2.2.11.7 Blow-off hydrants shall be Model No. 500-B, as manufactured by Kupferle Foundry, or approved equal

2.2.12 Corporation Stops shall meet the most recent version of the AWWA standard "Threads for Underground Service Line Fittings" (AWWA C800). Corporation stops shall be bronze, ball type, designed for the specified service tubing and shall be suitable for 175 psi test pressure. Inlet threads shall be AWWA (CC) type thread. End connections shall be compression type joint. Stops shall have full keyway. Corporation stops shall be Mueller 110, Model H-15008 as manufactured by Mueller, Inc., or approved equal.

2.2.13 Service Saddles shall be required for corporation stops in accordance with paragraph 3.10 herein. 2-inch taps shall be Smith Blair 317 Double Strap, or equal. Bodies shall be ductile iron, epoxy coated with double stainless steel straps. Units shall be complete with Buna-N gaskets.

2.2.14 Service Pipe: Unless otherwise approved, all pipe for services shall be Type K Annealed (soft) seamless copper tubing for buried service. Tubing shall be manufactured in the United States and shall meet the requirements of Federal Specification WW-T 7996 and will conform to the provisions of ASTM B-88, B-75, and B-68 as they apply to Type K copper tubing. Tubing shall conform to AWWA

800. The name of trademark of the manufacturer and type shall be stamped at intervals along the pipe.

2.2.15 Curb Stops shall meet AWWA 800. Curb stops shall be quarter-turn ball valve type. Curb stops shall have compression type connections suitable for use with copper tubing hereinbefore specified and designed to ensure conductivity through the fitting. No stop and waste ports are permitted. Curb stops shall be Mueller 110, Model 300 B-25209 as manufactured by Mueller, Inc., or approved equal.

2.2.16 Curb Boxes For all 2" or smaller services, curb boxes shall be cast iron Erie Style slide type for 4-1/2 foot to 5-1/2 foot cover. The curb box shall have a plug-type cover and 24" x 5/8" heavy duty stainless steel rod. The cover shall be clearly marked "WATER".

2.2.17 Service Pipe Couplings and Fittings: Unless otherwise approved only compression type fittings manufactured by Mueller Inc. or equal shall be installed. Couplings and adapters required to allow connection to existing services shall be provided by the Contractor as required. The Contractor shall provide all couplings, adapters and fittings necessary to complete all connections, whether or not specifically stated in the Drawings and Specifications.

2.2.18 Temporary Water Main and Fittings shall be as approved by Town of Salem Water Department. The Contractor shall submit in writing a temporary water service plan depicting layout, connection points, sizes, materials, system protections, and any other item as may be required by the Salem Water Department. All materials shall meet the requirements of this specification, manufacturer specification, and the Salem Water Department.

2.2.19 Temporary Service Pipe and Fittings shall be as specified in paragraphs 2.2.10, 2.2.11, 2.2.12, 2.2.13, 2.2.14, and 2.2.15.

2.3 Thrust blocks will be installed at all hydrants, fittings and bends and will be constructed with poured concrete meeting Class B material specification identified in NHDOT Item 520. Location and size of thrust blocking shall be as required by the Town Engineer and in accordance with the plans. In certain circumstances, and subject to prior approval by the Owner, precast concrete thrust blocks may be utilized. The Contractor shall provide no less than (2) 80-lb bags of concrete with 8 mil poly to form a cradle between the precast block and water appurtenance. See Salem typical water details for sizing requirements.

2.3.1 Large rocks or boulders shall not be used as thrust blocks.

2.4 Trench insulation shall be rigid extruded polystyrene 8 feet long, 2 feet wide and 2 inches thick (2.45 m long, 0.6 m wide, 50 mm thick,) having an in-place density of 2.5 pcf, and a "K" factor of 0.14 BTU/in./hr./°F/sq. ft and conforming to ASTM C 578, Type VII, and shall be STYROFOAM HI-60 as manufactured by Dow Corning Chemical Co. or approved equal.

2.4.1 Straight joints between insulated pipe lengths, and the end sections of non-insulated pipe shall be sealed with heat shrinkable wrap-around polyethylene as supplied by the manufacturer and field installed by the Contractor.

2.4.2 Insulation jacket shall be 20-gauge corrugated aluminum pre-formed to be fastened with stainless steel screws and bands. Jacket shall have one layer of one mil polyethylene film with a protective coat of 40-lb. virgin kraft paper to act as a moisture and galvanic corrosion barrier.

2.4.3 Insulation shall be manufactured by Thermal Pipe Systems, Braintree, Massachusetts, Atlas Insulation, Ayer, Massachusetts or Insulated Piping Systems Inc., Canton, Massachusetts, or other approved manufacturer

2.5 Casing Pipe. Casing pipe where used shall be steel and shall be in accordance with AP1 STD.5L, Grade B, X-42, ASTM A 139. Alternate materials may be submitted to the Town of Salem Water Department for approval for use.

2.5.1 Casing Pipe:

Description	150 mm (6") Carrier Pipe
Yield Strength (min)	35,000 psi (241 Mpa)
Type of Joint	Butt Welded
Type of Coating	None

2.5.2 Tolerance - Out-of-round tolerance shall not exceed 0.50 inches (12.5 mm).

2.5.3 Pipe Spacers shall be a two-piece 14-gauge (1.90 mm) T-304 stainless steel assembly with stainless steel bolts. Assembly shall be the restrained positioning type. The runners shall be a ultra high molecular weight polymer with a maximum coefficient of friction 0.12. The assembly shell liner shall be 0.090" (2.3 mm) ribbed PVC with 85-90 durometer. Spacer assembly shall be as manufactured by Cascade Waterworks MFG. Co. or approved equal.

2.5.4 Carrier Pipe shall be mechanical joint steel. The contractor shall submit a material specification for approval prior to acquisition of pipe. Alternate materials may be submitted to the Town of Salem Water Department for approval for use.

2.5.5 Bulkhead Materials shall be one of the following: (see plan for type)

2.5.5.1 Brick and Mortar. Brick for bulkheads shall be sound, uniformly burned and shall comply with ASTM C 32, Grade SA. Mortar shall consist of one part cement, one-quarter part lime, and two parts sand. Sand shall comply with ASTM C 144; lime shall comply with ASTM C 207, Type S; cement shall comply with ASTM C 150, Type II.

2.5.5.2 Plug. Water mains to be abandoned shall be plugged with appropriate size and type of fitting approved for use by the Town of Salem Water Department.

Construction Requirements

3.1 General. The Contractor shall furnish all water main pipe, fittings, services and related material and appurtenances, labor, tools and equipment, granular material, and concrete; and perform all operations and incidentals necessary for complete excavation, installation, backfill, and testing as outlined herein and on the plans; and maintain service at all times. Additionally, the Contractor shall provide all adapters and fittings, as determined in the field, necessary to complete all connections whether or not specifically stated on the Drawings and in the Specifications

3.1.1 Contractor to coordinate all water service work with Town of Salem Water Department. Contractor shall not operate any water system valves or curb stops without the express permission of

the Owner or Engineer. **Operation (opening/closing) of any water main valve, service shut-off or hydrant that is supplied water by the Salem Municipal Water System, without express written consent of the Utilities Manager shall be considered unauthorized entry to the water system and therefore subject to the rules and fines as specified in Chapter 304, Section 7, Paragraph C of Salem Town Codes and Section 1-4. 4.1 Of the Salem Fire Prevention Code Ordinance of 1996.**

3.1.2 The Contractor shall be responsible for the layout of the work. The temporary and permanent water mains, service connections and appurtenances shall be built at the locations indicated on the plan to facilitate reconstructing other facilities within this area of the project.

3.1.3 The Contractor shall be responsible to field locate all existing water services for the purpose of connecting them to the proposed mains. This may involve exploratory test pits of which payment may be made under NHDOT Item 206.19; as directed by the Engineer.

3.1.4 Location of new water services for all lots throughout the project area as part of the new water line will be as determined by the Owner.

3.1.5 Prior to the start of work the Contractor shall be familiar with all existing conditions regardless of information shown on the plan. Conflict points of know conditions (crossings, services, drainage, sewer, gas, other utilities, etc.) shall be found and resolution be determined. Where work has proceeded without determining potential conflict points and subsequent resolution, the Contractor shall be responsible for any and all necessary re-installation, supplemental fittings or components, and repair without compensation.

3.1.6 Care shall be taken to prevent damage to water system components during handling and installation. All materials shall be carefully inspected for defects in workmanship and materials, all debris and foreign material shall be cleaned out of valve openings, all operating mechanisms shall be operated to check their proper functioning, and all nuts and bolts shall be checked for tightness. Water system components which are damaged, do not operate easily, or are otherwise defective, shall be repaired or replaced to the satisfaction of the Owner and Engineer at no additional cost to the Owner.

3.1.7 The Contractor shall maintain the water system, surrounding property, utilities, roadway, natural resources, etc.. Consequential damages resulting from the Contractor not locating the facilities as shown on the plan are the responsibility of the Contractor and shall be restored or replaced at no cost to the Owner. The Contractor shall immediately notify the Engineer, Owner and utility authority in the event of an emergency water main break.

3.1.8 The Contractor, at the completion of each part of the work, shall furnish the as-built locations of the water main and appurtenances referenced to the Construction Base Line and Bench Marks. The as-built locations shall be to an accuracy of plus or minus 0.10 feet (0.03 m) in plan and elevation. As-built drawings shall include swing ties to services boxes and locations of corporations and any other information required by the Salem Water Department as outlined in Paragraph 1.7.

3.1.9 Any deviations from the locations shown on the plans require the Owner's and the Engineer's approval. Any discrepancies with locations shown on the plans will be brought to the Engineer's attention and subsequently resolved between the Owner, the Engineer and the Contractor.

3.1.10 Salvaged items shall be delivered to the Town of Salem Water Department. No additional compensation shall be granted for delivery of items.

3.1.11 Testing: All testing and disinfection procedures shall be in accordance with paragraphs 3.12 & 3.13 below. Prior to testing and disinfecting the water lines, the Contractor shall submit a plan on the method of flushing, testing and disinfecting for review. The plan will include the name of the qualified third party testing company, which will perform the testing and disinfection and the qualified third party testing company and/or laboratory that will be taking and analyzing samples for bacteriological testing to meet verification requirements.

3.2 Temporary Water System:

3.2.1 Notice. Contractor shall coordinate with Town of Salem water department to provide a forty-eight (48) hour notice to the affected residents for disruptions in service. The Town of Salem will be responsible for contacting all water users regarding any disruption in service related to the installation and removal of by-pass and temporary service piping.

3.2.2 Temporary Main and Service Locations and Size:

3.2.2.1 The temporary main shall be installed as shown on the Drawings or as determined by the Engineer and Owner in the field.

3.2.2.2 Services to be connected to the temporary main shall be identified and coordinated by the Contractor and Engineer prior to the start of work to ensure all users maintain service in the area(s) of the shut down.

3.2.3 Temporary Water Installation:

3.2.3.1 New temporary services shall be connected to existing service piping and installed in accordance with these specifications. Materials shall be as specified herein and shall include piping, saddles, corporation stops, copper tubing and compression couplings.

3.2.3.2 The temporary system shall be pressure and leakage tested and disinfected in accordance with applicable AWWA specifications.

3.3 Trench Excavation:

3.3.1 General. Excavation shall be carried out in such a manner as to eliminate any possibility of undermining or disturbing the foundations of any existing structure or utilities.

3.3.2 The trench shall conform to Town of Salem Typical Water Trench Detail and NHDOT Item 206 - Structure Excavation for pipes and other minor structures. The Contractor shall provide trench shoring and dewatering, as necessary, to provide a stable and dry trench at all times in accordance with standard trenching practices. Where standard trenching practices are not adequate to maintain a dry and stable trench refer to Field Engineering, Section 01050 of the Contract Specifications for Unfavorable Construction Conditions.

3.3.2.1 Excavations shall be kept dry until the pipes and appurtenances to be built therein have been completed to the extent that they will not be damaged. Dewater activities shall maintain a ground water level at least 18-inches below the pipe or structure. Discharge shall be in accordance

to local, state, and federal erosion control and treatment practices. Contractor shall obtain any necessary permits and shall assume full responsibility of his operation and any damage caused by it. Dewatering activities are incidental to applicable unit items.

3.3.2.2 Treatment of Dewatering Operations Discharges: Provide such additional treatment devices as may be required to meet the provisions of the Contract. This may include the construction of sumps and/or settling basins, stone rip-rap, silt fences or other requirements. The treatment devices shall be later removed and/or filled in with acceptable backfill material, and restored to original conditions once they are no longer needed. Unless specifically provided for all work and material associated with treatment of dewatering shall be at no additional cost to the Owner.

3.3.2.3 Trenching support practices shall be in accordance with all OSHA requirements.

3.3.3 The Contractor shall not be compensated for any additional work involved if a utility line, water line, sewer line or underground structure is in the trench line above or below the water main, except where specifically identified on the Drawings as a pay item or as approved by the Engineer. All other work adjacent to utilities shall be subsidiary. Any damage to the same shall be repaired to the owning entity's satisfaction at no cost to the Owner.

3.3.4 Over-Excavation. If, in the opinion of the Engineer together with the Owner, the material at or below the depth of the trench is unsuitable for foundation, it shall be removed to such depths as directed by the Owner and Engineer and shall be replaced with Granular Backfill (sand), conforming to NHDOT paragraph 209.2.1.1 and placed as provided in NHDOT Item 209.3. See Typical Water Trench Detail on Design Drawings.

3.3.5 If the bottom of the excavation is deeper than the depth shown on the drawings by error of the Contractor, the condition shall be corrected by refilling to the proper grade with compacted Granular Backfill (sand), conforming to NHDOT paragraph 209.2.1.1. All costs shall be borne by the Contractor.

3.3.6 Rock and Boulder Excavation. Rock and boulder excavation shall be in accordance with NHDOT "Section 206, Structure Excavation for Pipes and Other Minor Structures." Pay items for rock and boulder excavation shall be as identified on contract drawings and bid. Where no item exists for Rock Structure Excavation, NHDOT Item 206.2, then it shall be paid under Rock Excavation, NHDOT Item 203.2.

3.3.7 Excess and Unsuitable Excavation. Excess excavation that will not be used for backfill and unsuitable excavation shall be removed from the site and disposed of by the Contractor in accordance with local, state or federal regulations and as identified in respective unit items.

3.4 Trench Backfill:

3.4.1 General. After the pipe has been placed and has been inspected by the Owner together with the Engineer, backfilling shall be performed without delay.

3.4.2 Bedding. Bedding shall meet the requirements of paragraph 2.1.2 and shall extend the full width of the trench from 6 inches below the pipe to 12 inches above the pipe crown. Compact the bedding material to 95% modified proctor (in accordance with ASTM D 157 and ASTM D 2922) in 6-inch lifts or less with approved hand-operated devices. Bedding shall be carried up evenly on both sides of the pipe, so as not to disturb the pipe.

3.4.3 Backfill. Trench shall be backfilled with common backfill defined in paragraph 2.1.1 as approved by the Engineer from the top of the bedding to the underside of the pavement select material profile, or to the underside of loam and grassed areas.

3.4.3.1 Backfill shall be placed and compacted in layers of 6 inches or less. Compact the backfill material to 95% modified proctor (in accordance with ASTM D 157 and ASTM D 2922). Compaction shall be by hand-operated compactors or other approved method.

3.4.3.2 Tamping and compacting of trenches with excavating machines, including plate compactor attachments, is prohibited.

3.4.4.3 Trench areas improperly backfilled or having excessive settlement, as determined by the Engineer, shall be reopened to the required grade, backfilled using proper techniques, and repaved as necessary. The Contractor shall receive no additional compensation for repair of trenches, inclusive of necessary surface treatment, constructed under this Contract.

3.5 Pipe Installation:

3.5.1 Installation. Installation of all buried piping, fittings, and adapters shall be in accordance with Town of Salem, product manufacturer, and AWWA Standard for installation of ductile iron water mains and their appurtenances, AWWA C 600, Sections 9b and 9c, latest edition.

3.5.2 Pipe and fittings shall be thoroughly cleaned before they are placed. All lumps, blisters, and excess coal tar coating shall be removed from the spigot and from the interior of the bell, and these surfaces shall be wire-brushed, wiped clean and dry, and be free from oil and grease before the pipe is laid. Any component not kept clean and clear of foreign material may be rejected by the Owner or Engineer.

3.5.3 All pipes and appurtenances laid in open trench excavation shall be bedded and uniformly supported over their full-length on bedding of the types specified herein and shown on the drawings. Pipe and fittings shall be laid accurately to the line and grades. The Contractor shall furnish and install all supports necessary to hold the piping and appurtenances in a firm, substantial manner. All work shall be performed in a dry trench.

3.5.4 At all times when pipe laying is not actually in progress, the open ends of pipe in the trench shall be closed by temporary water-tight plugs or by other approved means. If water is in the trench when work is resumed, the plug **shall not be removed** until all danger of water and foreign material entering the pipe has passed. The plug shall remain in place until all excavation and bedding has been completed and may only be removed when the next section of pipe (or component) is ready for installation. Contaminated pipe sections shall be appropriately cleaned and disinfected to the satisfaction of the Salem Water Department.

3.5.5 Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, the amount of deflection allowed shall not exceed the manufacturer recommendation required for making a satisfactory joint and shall be subject to the approval of the Owner and Engineer.

3.5.6 When pipe is cut in the field, the cut end shall be tapered back approximately 1/8" (3 mm) at an angle of 30 degrees with the centerline of the pipe with a coarse file or grinder to remove any rough edges which might injure the gasket.

3.5.7 For mechanical joints, the spigot shall be centrally located in the bell, and adequate anchorage shall be provided at abrupt changes in direction and at dead-ends. All surfaces in contact with the rubber gaskets shall be brushed thoroughly with a wire brush immediately prior to assembly. The contact surfaces and gasket shall then be brushed with manufacturer's recommended lubricant prior to slipping the gasket over the spigot and into the bell. Restraining bolts and flange bolts shall be tightened in accordance with manufacturer recommendations following these general guidelines. The Contractor shall use wrenches as recommended by the manufacturer. When tightening bolts, it is essential that the gland be drawn toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. Bolts shall be tightened in an alternating star type pattern. Tighten restraining bolts with appropriate hand wrenches or socket wrenches until they shear (Mega-Lug or Uni-flanged joint restraint). Impact wrenches/drivers shall not be used to shear bolt heads.

3.5.8 For push-on joints, all foreign matter in the gasket seat in the socket shall be removed and the gasket wiped clean and flexed before placing in its seat. A thin film of lubricant shall be applied to the inside surface of the gasket. The plain end of the next pipe, after wiping clean, shall be aligned and carefully entered into the socket until it just makes contact with the gasket. Joint assembly shall be completed by forcing the end of the pipe past the gasket until it makes contact with the bottom of the socket. Install brass wedges in joints. See Paragraph 2.2.3 for use of brass wedges. Brass wedges shall be subsidiary to the pipe item.

3.5.9 Restraint: Restrained push-on joints shall be installed with specified joint restraints. Restraints shall be installed in full accordance with the manufacturers written instructions. Fittings and valves equipped with restrained joints as herein specified will not require thrust blocks unless otherwise indicated on the Drawings or directed by the Engineer.

3.5.10 Thrust Blocking: Bends, tees, and other fittings in pipe lines buried in the ground shall be backed up with thrust restraint Class B concrete, 1/2 cubic yard minimum, against undisturbed earth (bearing area as shown on the drawings). Poured concrete thrust blocks shall be placed with wooden side forms. 8 mil polyethylene sheeting shall be placed between water system component and the poured concrete. See Paragraph 2.3 and 2.3.1 for additional thrust block requirements.

3.5.10.1 Where the soil does not provide firm support bridle rods, clamps, etc. shall be provided to brace the fittings properly. All accessories shall be seal-coated thoroughly and heavily with an approved material per AWWA C 104 after assembly and shall be subsidiary to the ductile iron fitting unit price.

3.5.11 Insulation: Use of insulation shall be determined by the Salem water department but, generally insulation shall be installed over water mains having less than 5-feet of cover and as shown on the drawings. Limits of insulation shall be as shown on the drawings or as directed by the Engineer. Insulated pipe **with jacket** where used shall be approved by and coordinated with the Salem Water Department. Insulation and jacket shall extend a minimum of 10 feet beyond the outside edge of all open structures.

3.5.12 Tracer Wire: Where plastic pipe is authorized for installation by the Salem Water Department, tracer wire shall be installed immediately above the pipe. Material shall conform as described in paragraph 2.2.2.4.1 above. Tracer wire shall be subsidiary to the pipe item.

3.5.13 Work Adjacent to Sewer

3.5.13.1 There shall be no physical connection between a public or private potable water supply system and a sewer, or sewer appurtenance which would permit the passage of any sewage or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer manhole. Locate the new water main with a 10-foot horizontal separation between it and the existing or proposed sewer main. Sewer lines damaged or broken during construction shall be repaired immediately by the Contractor. All necessary repairs shall be made prior to the continuation of any water main work. The Engineer, Owner and utility authority shall be immediately notified of any breaks in the sewer lines.

3.5.13.2 With Owner approval, a deviation from the separation requirements of paragraph 3.5.12.1 above may be allowed where necessary to avoid conflict with subsurface structures, utility chambers and building foundations, provided that the sewer is constructed as follows:

3.5.13.3 Sewer pipe shall be Class 52 ductile iron.

3.5.13.4 Joints shall be pressure tested with zero leakage at 25 psi for gravity sewers, and at 1-1/2 times working pressure for force mains.

3.5.13.5 Sewer Crossings: Whenever sewers must cross water mains, pipes shall cross as close to 90-degrees as possible and joints shall be located at least nine feet horizontally from the water main. Vertical separation of the sewer and water main shall be not less than 18 inches. Sewer lines shall be under water lines unless specifically approved by the Owner and Engineer.

3.5.14 Work Adjacent to Gas Main: Ductile iron pipe installed within 5-feet of cathodically protected gas lines shall be fully encased with polyethylene material. Polyethylene encasement for pipe and fittings shall be 8-mils thick and shall comply with AWWA C105.

3.5.15 Abandon Existing pipe in place.

3.5.15.1 Upon receipt of successful testing and chlorination results and after transfer of existing services to the new main, Contractor shall cut and cap existing mains to be abandoned in place as shown on the Drawings and as directed by the Engineer.

3.5.15.2 Contractor shall close all valves on abandoned mains and lines, and remove existing valve boxes prior to final paving.

3.5.15.3 Contractor shall remove existing hydrants on abandoned water mains, cap all hydrant branches and provide thrust restraint.

3.5.15.4 Contractor shall remove and dispose of any thrust blocks and/or any restraints on existing water mains at connections to the new water main.

3.5.15.5 All as-build information associated with the abandonment of water main shall be shown on the Record Drawings as required by Paragraph 1.7 and 1.7.1.

3.6 Casing Installation:

3.6.1 Casing pipe shall be installed by open cut with bedding and cover material as shown on the drawings.

3.6.2 Casing pipe ends shall be beveled with a single V-groove for field welding. Pipe joints shall be butt welded and shall be a full penetration on the outside circumference of the pipe. The single V-groove butt weld shall conform to the latest AWS Welding Code. All joints of the casing pipe shall be butt welded by a welder certified by the State of New Hampshire for the specific application.

3.6.3 If alternate casing pipe materials are used then connections, jointing and fittings shall be in accordance with the Town of Salem Water Department requirements and per manufacturer specifications.

3.7 Carrier Pipe Installation:

3.7.1 After casing pipe has been installed and cleaned of dirt and debris, pipe spacers shall be attached to carrier pipe as shown on the Drawings. As carrier pipe is jointed, it shall be pushed into position inside the casing pipe.

3.7.2 After the carrier pipe has been tested for leakage, bulkheads shall be constructed at each end of the casing pipe. On brick bulkheads, a "one brick" opening shall be left in the bulkhead at the top of the casing pipe at each end and covered with polyethylene to prevent entry of backfilling materials. The portion of the carrier pipe passing through the brick bulkhead shall be wrapped with three layers of fifteen pound asphalt-impregnated felt before the bulkhead is constructed.

3.8 Valve Installation. Valves and boxes shall be set with the stem vertical and box vertically centered over operating nut. Valves shall be set on a firm foundation and supported by tamping selected excavated material under and at the sides of the valve. The gate box shall be supported during backfilling and maintained in vertical alignment with the top flush with finish grade. Concrete collars shall be poured for all gate boxes. Collars shall be 18-inches minimum in diameter and 6-inches thick set flush with binder grade.

3.8.1 Mainline valves shall be installed within 2 feet of tees at water main interconnection locations.

3.8.2 Tapping Sleeve and valve.

3.8.2.1 Contractor shall confirm the pipe size on which tapping sleeves are to be installed prior to ordering the sleeve.

3.8.2.2 Pipe upon which a tapping sleeve is to be installed, shall be thoroughly cleaned of all foreign matter with scraping tools and wire brushes to a minimum of 6 inches beyond each side of the sleeve. This area shall be washed with a 5% hypochlorite solution. The interior of tapping valve shall also be washed with hypochlorite solution.

3.8.2.3 Clean the flanged surface of the sleeve with a wire brush to remove any excess bituminous coating or burrs. The two sections of the sleeve shall be properly aligned to ensure that they are positioned in the same manner as received from the manufacturer.

3.8.2.4 Sufficient pressure treated blocking and wedges shall be used to secure the sleeve once it has been leveled and positioned.

3.8.2.5 Sleeve bolts shall be alternately tightened from the extreme end on one side to the extreme end of the opposite side with approved torque wrenches until all are securely tightened.

3.8.2.6 Flange bolts shall be tightened in a similar manner, with care being taken not to disturb the gasket.

3.8.2.7 Care shall be taken to ensure that the tapping machine is kept in leveled horizontal position and securely supported so as not to transmit any additional weight to the tapping valve.

3.8.2.8 Blocking shall be left in place after completing the tap.

3.9 Hydrants. Hydrants will be installed in conformance with AWWA C600, Section 11, latest revision and manufacturer instruction, using barrel blocks, tie rods and anchored joints. Hydrants shall be set at the locations shown and bedded on a firm foundation. Each hydrant shall be set in true vertical alignment and properly braced.

3.9.1 Hydrants shall be mechanically restrained per paragraph 2.2.5 by either GripRing or Megalug type joint restraint systems.

3.9.2 Height adjustments shall be made to the hydrants so that the bottom flange of the hydrant is 3 inches above finish grade. Height adjustments shall be made with an extension as manufactured by the hydrant supplied and approved by the Salem Water Department. All hydrant extensions shall be considered subsidiary to the hydrant bid item. Adjacent grading intent in the road shoulder and side slopes shall not exceed 4:1 horizontal to vertical.

3.9.3 Wherever a hydrant is set in **soil that is pervious**, a drainage pit 2 ft in diameter and 1 ft deep shall be excavated below each hydrant and filled with coarse gravel or crushed stone mixed with coarse sand, under and around the elbow of the hydrant and to a level of 12-inches above the waste opening and then covered with soil separation fabric. Depth of drainage pit shall increase to 3-feet in **clay or other impervious soil.** Compaction shall be in accordance with NHDOT paragraph 304.3.7.

3.9.4 Hydrants shall be set on a concrete base or other materials approved by the Engineer and shall be well braced and anchored by depositing concrete behind the hydrants on undisturbed earth at the end of the trench, or by wedging granite block in place of concrete.

3.9.5 All newly installed hydrants shall be bagged until they are in service.

3.9.6 Hydrants and hydrant branches shall be pressure tested, flushed and chlorinated. Refer to paragraphs 3.12 and 3.13 for pressure and leakage testing and chlorinating and flushing requirements

3.9.7 Hydrant Removal: When hydrants are to be removed the existing isolation valve shall be removed and hydrant piping shall be removed at the tee and plugged. Place a 0.33 cy concrete thrust block against the cap.

3.10 Service Installation. After successful testing and chlorination of the main, water services shall be installed as wet taps as shown on the Drawings, as herein specified and as directed by the

Engineer. All services and associated components shall be completed in full accordance with manufacturer's written instructions, applicable plumbing codes, and Town of Salem Water Department requirements.

3.10.1 Install corporation stops on the new water main. The tapping machine shall be rigidly fastened to the pipe halfway between the horizontal and vertical position (rotated approximately 35-degrees to 55-degrees to the vertical). The length of travel of the tap should be established so that when the stop is inserted and tightened with a 14-inch wrench, not more than one to three threads shall be exposed on the outside. When a wet tapping machine is used, the corporation stop shall be inserted with the machine while it is in place. Stops shall be tightened only sufficiently to give water-tightness, and care must be constantly exercised not to over-tighten them.

3.10.2 Service saddles shall be required as indicated by the following chart:

Pipe Size	Saddle Requirements for Class 52 D.I. Pipe
4-inch	Taps > 3/4 inch
6-inch	Taps > 1 inch
8-inch	Taps > 1 inch
10-inch & over	Taps > 1 inch

3.10.2.1 Service saddle requirements are determined by ANSI A212.51 with respect to a minimum of three threads of the corporation fully embedded in the pipe sidewall. Where three threads are not able to be embedded in the pipe wall then a saddle will be required.

3.10.3 Install copper tubing continuously without joints from the corporation stop to the curb stop, in a trench with a depth of at least 5-feet. Care shall be exercised in the placing and laying of copper tubing to be sure that the pipe does not have kinks, impacts, compressions, or abrasions. Joint ends shall be kept clean of any foreign material. Maintain a straight alignment. Tubing size shall be as required on the drawings but, in no case smaller than that of the existing service.

3.10.3.1 Refer to paragraphs 3.3 & 3.4 above for trenching. Alternate methods of trenchless installation shall be reviewed and approved by the Salem Water Department prior to implementation.

3.10.4 Install curb stops and curb boxes at the approximate property line, or as indicated on the drawings. Place concrete block or flat stone beneath curb stop. Install curb box vertically centered over the operating key, with the elevation of the top adjusted to conform to the finished grade. Prior to backfilling, the Contractor shall ensure corporation stops are in the open position and curb stops are fully shut. Adequately support the box during backfilling to maintain vertical alignment. Care must be taken to ensure that the curb box does not rest on the curb stop.

3.10.4.1 Curb box top section shall be cut to length so that the bottom of it sits in the middle of the sleeve on the curb box lower section. After cutting the top section to length the bottom of it shall be flared to prevent turning when the curb stop is operated. Refer to Salem typical details for additional information.

3.10.5 Service Connections shall be flushed prior to connecting to existing service. The Contractor shall also flush existing services and water meters if sediment or debris from existing mains and Contractor operations plugs piping or meters as a result of the work completed under this Contract.

3.10.6 Make connections of new copper services to existing services as directed by the Engineer. Connection shall be made using suitable couplings. Services to properties with no existing service shall be properly capped at the curb stop and the curb stop left closed.

3.10.7 All service lines shall be placed under system pressure with couplings and fittings exposed. This inspection shall be completed in the presence of the Owner and Engineer. Should leakage occur in the service lines or connections, the Contractor shall immediately locate the leak or leaks and repair same at no additional cost to the Owner.

3.10.8 Note: Administrative protocol and service connections shall also be in accordance with the "Salem Water Department – Rules & Procedures for ¾" and 1" Residential Water Services".

3.11 Inspection. It shall be the Contractor's obligation to install the water main accurately and correctly. Each section of installed water main will be visually inspected by the Owner and Engineer. The pipe shall be true to both line and grade, shall contain no broken pipe, shall show no leaks, and shall contain no debris or other deposits of which shall in any way reduce the full cross-sectional area of the pipe.

3.11.1 Work shall not be considered complete until the satisfactory installation, inspection and testing of all pipelines and appurtenances has been completed.

3.11.2 Any section of water pipe which does not comply with these inspection criteria, as determined by the Owner and Engineer, shall be promptly corrected, replaced, or repaired by the Contractor at no cost to the Owner. Methods employed for corrective action shall be approved by the Owner.

3.12 Pressure and Leakage Testing. The Contractor shall sub-contract an independent third party to conduct pressure and leak testing. The testing sub-contractor shall furnish all necessary equipment and labor for, and perform, pressure testing and leakage tests on the pipeline in accordance with AWWA C 600 Specifications (latest revision). All testing of pipelines shall be witnessed by the Engineer and Owner and shall be subject to their review and acceptance of the results. The Contractor shall be responsible for coordinating all testing activities with the Engineer and Owner.

3.12.1 The Contractor shall make any taps and furnish all necessary caps, plugs, etc., as required in conjunction with testing, and also furnish water (subsidiary), small supply tank, a test pump, gauges, and any other equipment required in conjunction with carrying out the hydrostatic tests. Supply tank shall be sufficient to satisfactorily measure volumes pumped into the line. **The Contractor shall at all times protect the new water mains and the existing water mains against the entrance of polluting material.**

3.12.2 Equipment shall be accurately calibrated to NH weights and measures standards, and have a current calibration sticker affixed.

3.12.3 Prior to pressure testing, the entire pipeline shall be water jetted to remove any rocks or debris which may have entered the pipe during construction.

3.12.4 Testing shall be done in valved off sections of approximately 1000-feet maximum test length of the main.

3.12.5 Testing Requirements:

Hydrostatic or Pressure Test:

1. Test duration: Two (2) hours, minimum.
2. Test pressure (pipe & valves): Fill pipe section at normal pressure and remove all entrapped air from the line. Then raise pressure to one hundred and fifty percent (150%) of maximum operating pressure as determined by the Engineer or 200 psi whichever is higher.
3. Allowable pressure loss: Pressure shall not vary more than 5 psi (34 kPa) for the duration of the pressure test.

Leakage Test:

1. Test Duration: One (1) hour, minimum.
2. The leakage test may be conducted concurrently with the pressure test during the second hour to allow for the seating of gaskets, the absorption of trapped air or the settling of any conditions that may affect the results of the leakage test.
3. At the start of the leakage test an exact reading of the pressure gauge will be recorded along with the start time. **During the one hour of the leakage test, the test section is to remain isolated with all connections closed. No pumping to maintain pressure is allowed.**
4. At the end of the hour, the exact reading of the pressure gauge will be recorded along with the stop time. The test section will then be pumped back up to start pressure. The line will then be bled down to stop pressure, with all the expelled water collected in a vessel calibrated in increments no larger than one ounce. The amount of water drained to lower the test section back to stop pressure will be recorded as the loss or leakage of that section.
5. Allowable leakage: **No pipe installation will be accepted if the leakage is greater than the calculated value for a given length of pipe.** Allowable leakage for ductile iron pipe shall be determined by the following formula:

ENGLISH	METRIC
$L = \frac{SD(P)^{0.5}}{133200}$	$L = \frac{SD(P)^{0.5}}{715317}$
L = allowable leakage, in gallons per hour. S = length of pipe tested, in feet. D = nominal pipe diameter, in inches. P = average test pressure, in psi (gauge).	L = allowable leakage, in liters per hour. S = length of pipe tested, in meters. D = nominal pipe diameter, in mm. P = average test pressure, in kPa.

NOTE: Alternate formulas for alternate materials are required to determine leakage

6. Acceptance of installation shall be determined on the basis of allowable leakage. If any test of pipe laid discloses leakage greater than that specified, the Contractor shall, at his own expense, locate and make repairs as necessary until the leakage is within the specified allowance. **Approval does not absolve the Contractor from his responsibility**

if leaks develop within the new main or water service connections (to curb stops) later within the period of warranty.

3.13 Disinfection. Before being placed in service, all new and temporary water pipelines shall be chlorinated by an independent third party testing agency subcontracted by the Contractor in accordance with the requirements of AWWA C 651-99.

1. Section 4.1, Forms of Chlorine for Disinfection
2. Section 4.2, Basic Disinfection Procedure
3. Section 4.3, Preventive and Corrective Measures During Construction
4. Section 4.4, Methods of Chlorination, subsections; General 4.4.1, Preflushing 4.4.1.1, filling and Contact 4.4.2.3, and Continuous-Feed Method 4.4.3 (except 4.4.3.1).
5. Section 4.5, Final Flushing

The testing procedure shall be discussed with the Owner and Engineer prior to proceeding with the work. **Only after acceptance of the pressure and leakage tests may the pipe be disinfected. No chlorine of any type is to be placed in the pipe during installation.**

3.13.1 The general procedure for chlorination shall be first to flush all dirty or discolored water from the lines, and then introduce chlorine in approved dosages through a tap at one end, while water is being withdrawn at the other end of the line. The chlorine solution shall remain in the pipeline for a minimum of 24 hours. The Contractor shall be responsible for complying with all federal, state and local regulations with regards to the disposal of chlorinated water, and shall obtain all necessary permits. The water samples shall be taken and tested once the line has been refilled with new water from the system.

3.13.1.1Chlorine Tap: a chlorination Tap shall be installed within ten feet of the point of connection to the existing infrastructure at top dead center of the main. All chlorine for disinfection shall be injected from that location. Upon completion of chlorination and bacterial testing the tap must be removed and a brass plug placed in the pipe.

3.13.1.2Flushing: Prior to chlorination the mains shall be properly flushed by the Contractor under the direction of the Salem Water Department. In general, flushing shall be performed at a flow rate required to achieve a minimum velocity of 2.5 feet per second. Flushing shall be performed for a sufficient period of time to allow for a minimum of 3 volume changes of water in the main (approximately 20 minutes per 1000-foot of main).

3.13.2 Discharge of chlorinated water: Following the chlorination period, all treated water shall be flushed from the lines at their extremities, and replaced with water from the distribution system. The Contractor shall be responsible for complying with all federal, state and local regulations with regards to the disposal of chlorinated water, and shall obtain all necessary permits. The Contractor shall notify the Engineer and Owner of the specific location where chlorinated water will be discharged at least three (3) days in advance of proposed discharge.

3.13.2.1 Water with high concentrations of chlorine (residual greater than 2 mg/l) shall be dechlorinated to a level of 2 PPM or less prior to its discharge. Dechlorination shall be conducted by use of a line purge dechlorinator. Dechlorination shall be in accordance with the manufacturer's instructions and AWWA C651, paragraph 4.5.

3.13.3 Water samples Bacteriological sampling and analysis of the replacement water shall then be made after the replacement water has occupied the chlorinated pipeline for a minimum of 16 hours. Bacteriological analysis shall be completed by a state-certified laboratory in full accordance with AWWA C 651. Water samples will be taken from corporation stops along the length of the water main as designated by the Engineer. A minimum of two (2) samples will be taken per 3000 feet of pipe or on each street, whichever is lesser, each in duplicate, in sterile bottles and sent to a State approved private laboratory for analysis. The Contractor will perform all necessary work including delivery of samples to a certified laboratory.

3.13.3.1 Testing Results: The results of the tests on these samples will determine the acceptance of the work and allow these new mains to be connected to the Town's system. The failure of any sample to pass the laboratory tests will require the contractor to re-flush and re-chlorinate the mains and resample and test the water until acceptable results are obtained, all at no additional cost to the Owner

3.13.4 Special disinfection procedures, such as soaking or swabbing approved by the Engineer, shall be used in connections to existing mains and where the method outlined above is not practical.

3.14 Spare Parts. The Contractor may be required to have on-site, at all times, various fittings and components for system improvements.

Method of Measurement

4.1 Pipe of the kind, type and size specified will be measured by the linear foot to the nearest 0.1 foot of pipe furnished and installed. Measurements will be taken along the centerline of the pipe, end to end. Deductions will be made for any valves and fittings.

4.2 Water main bridge crossing, including pipe of the kind, type and size specified, shall be measured by the linear foot to the nearest 0.1 foot of pipe from the back wall of abutment A to the back wall of abutment B furnished and installed. Measurements will be taken along the centerline of the pipe, end to end. Deductions will be made any valves and fittings.

4.3 Water main casing pipe, including carrier pipe of the kind, type and size specified, will be measured by the linear foot to the nearest 0.1 foot of pipe installed.

4.4 Valves, valve boxes, fittings, chlorine injection taps, water services, corporation stops, curb stops, and curb boxes will be measured by the each for the number of units furnished and installed.

4.4.1 Where pay items for "water services" are used, the item shall include all necessary components including corporation stop, curb stop, pipe, fittings, couplings, curb box, and items necessary to connect to the existing line from the structure.

4.4.2 Where chlorine injection taps and all necessary components for testing are not specifically identified for payment they shall be considered incidental and subsidiary to the contract.

4.5 Hydrants including hydrant, valve, pipe fittings and any other incidental work, will be measured by the number of units furnished and installed. Valve boxes shall be measured separately.

4.6 Relocating/Adjusting Hydrants under this project shall be measured per each for each hydrant adjusted or relocated.

4.7 Adjusting valve boxes shall be measured for each existing valve box adjusted.

4.8 Hydrants removed and salvaged including valve, stub pipe, thrust blocking, capping service, etc., under this project shall be measured per each for each hydrant removed and salvaged unless provided for otherwise in the contract.

4.9 Pipe removed and salvaged or discarded shall be measured on a linear foot basis.

4.9.1 All fittings, valves, and any other component in a section of pipe to be removed or salvaged shall not be measured for payment.

4.10 Water main insulation shall be measured per square yard

4.11 Temporary water system shall be considered a lump sum item.

Basis of Payment

5.1 The accepted quantity of ductile iron and copper pipe will be paid for at the contract unit price per linear foot of the kind, type, and size specified complete in place as shown on the plan and specified herein, and shall include all necessary excavation and backfill, bedding, components, pipe, labor, testing, and equipment with the following stipulations:

5.1.1 Common structure excavation required for the removal of unsuitable material below the typical trench section will be paid for as provided in NHDOT Item 206. Replacement of unsuitable material within the typical trench section with suitable backfill shall not be measured for payment but shall be subsidiary.

5.1.2 All rock structure excavation, any common structure excavation exploratory and any common structure excavation below the depth specified in NHDOT paragraph 206.4.1.1 shall be paid as provided in NHDOT Item 206. Where the contract does not provide for rock structure excavation the bid item for rock excavation (NHDOT Item 203.2) shall be used for measurement and payment.

5.1.3 Granular backfill (sand), to replace material excavated under paragraph 5.1.1 only, will be paid as provided in NHDOT Item 209.

5.2 The accepted quantity of water main casing pipe, including carrier pipe, will be paid at the contract price per linear foot complete in place as shown on the plan and specified herein, and shall include furnishing and installing casing pipe, assembly of casing pipe, excavation, bedding, blanket, backfill, furnishing and installing carrier pipe, pipe spacers, bulkheads and appurtenances, and all other work required for or incidental to the completion of this item, except as noted below.

5.3 The accepted quantity of water main bridge crossing, including pipe shall be paid at the contract price per linear foot complete in place as shown on the plans and specified herein, and shall

include furnishing and installing pipe, insulation, hangers, insulation protection shield, rollers and fittings, expansion joints and all other work required for or incidental to the completion of this item.

5.4 The accepted quantity of water services, valves, valve boxes, fittings, chlorine injection taps, corporation stops, and curb stops will be paid for at the contract unit price of each of the kind, type, and size specified complete in place including all necessary excavation and backfill, bedding, materials, concrete, components, pipe, labor, testing, and equipment.

5.5 The accepted quantity of hydrants installed, removed or relocated will be paid for at the contract unit price for each complete in place or removed including all necessary excavation and backfill, bedding, materials, components, pipe, labor, testing, and equipment.

5.5.1 Payment will be made for Hydrants Removed and Salvaged required under this contract on a per each basis. The price bid for Hydrants Removed and Salvaged includes all labor, materials and equipment necessary for or incidental to the completion of the work to the satisfaction of the Engineer. Any materials damaged by the Contractor shall be replaced at no expense to the Owner.

5.6 The accepted quantity of valve boxes new or adjusted will be paid for at the contract unit price for each complete in place including all necessary excavation, backfill, bedding, materials, concrete, labor, and equipment. Intermediate adjustments for the convenience of the Contractor shall not be paid. Intermediate adjustments directed by the plans or the Engineer shall be complete inclusive of all items defined in this paragraph; otherwise, shall not be payable.

5.7 The accepted quantity pipe removed will be paid for at the contract unit price per linear foot removed including all necessary excavation, labor, materials, backfill and equipment.

5.7.1 All valves, fittings, thrust blocking, and appurtenances removed and salvaged required under this contract shall be subsidiary to pipe and hydrant removal items.

5.7.2 Existing pipe & fittings removed in conjunction with installation of new pipe shall be subsidiary to the new pipe & fitting unit item except where specifically identified as a pay item.

5.7.3 Payment will be made for Gate Valves Removed and Salvaged required under this contract on a per each basis. The price bid for Gate Valves Removed and Salvaged includes all labor, materials and equipment necessary for or incidental to the completion of the work to the satisfaction of the Engineer. Any materials damaged by the Contractor shall be replaced at no expense to the Owner.

5.8 In addition to specifically mentioned items for each classification of work the following shall also be considered subsidiary to water system work which is necessary for a complete and operational system: concrete thrust blocks, thrust restraining systems, restoration of existing service connections, MJ glands, abandonment of existing water pipe, connections to existing water mains.

5.9 Water main insulation installed shall include all necessary backfill, excavation, labor, materials and equipment.

5.10 Payment for temporary water main required for the project shall be inclusive of all components, installation, excavation, labor, equipment, testing, chlorination, maintenance and repair.

5.10.1 Temporary water main service shall include decommissioning and removal of components once water system improvements have been completed.

Pay items and units (ENGLISH):

611.05206	6" CEMENT LINED DUCTILE IRON WATER PIPE, CL. 52	LF
611.05208	8" CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	LF
611.05210	10" CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	LF
611.05212	12" CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	LF
611.05214	14" CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	LF
611.05216	16" CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	LF
611.05220	20" CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	LF
611.05306	6" CEMENT LINED DUCTILE IRON WATER PIPE, CL. 53	LF
611.05308	8" CEMENT LINED DUCTILE IRON WATER PIPE, CL 53	LF
611.22206	6" CEMENT LINED CAST IRON WATER PIPE, CL. 22	LF
611.22208	8" CEMENT LINED CAST IRON WATER PIPE, CL. 22	LF
611.22210	10" CEMENT LINED CAST IRON WATER PIPE, CL. 22	LF
611.22212	12" CEMENT LINED CAST IRON WATER PIPE, CL. 22	LF
611.22310	10" CEMENT LINED CAST IRON WATER PIPE, CL. 23	LF
611.35224	24" CASING PIPE WITH 6" DIA. CL 52 D.I. M.J. CARRIER PIPE	LF
611.50003	3/4" WATER SERVICE CONNECTION	EA
611.5001	1" WATER SERVICE CONNECTION	EA
611.50015	1-1/2" WATER SERVICE CONNECTION	EA
611.5002	2" WATER SERVICE CONNECTION	EA
611.50107	3/4" COPPER WATER PIPE	LF
611.5011	1" COPPER WATER PIPE	LF
611.51007	3/4" CORPORATION STOP	EA
611.5101	1" CORPORATION STOP	EA
611.51015	1-1/2" CORPORATION STOP	EA
611.5102	2" CORPORATION STOP	EA
611.52007	3/4" CURB STOP	EA
611.5201	1" CURB STOP	EA
611.52015	1-1/2" CURB STOP	EA
611.5202	2" CURB STOP	EA
611.6001	1" PLASTIC WATER PIPE (TEMP. SERVICE ONLY)	LF
611.60015	1-1/2" PLASTIC WATER PIPE (TEMP. SERVICE ONLY)	LF
611.6002	2" PLASTIC WATER PIPE (TEMP. SERVICE ONLY)	LF
611.6106	6" PLASTIC PRESSURE WATER PIPE (TEMP. SERVICE ONLY)	LF
611.6903	LAYING 3" PVC PLASTIC WATER PIPE (TEMP. SERVICE ONLY)	EA
611.70006	6" FITTING	EA
611.70008	8" FITTING	EA
611.70010	10" FITTING	EA
611.70012	12" FITTING	EA
611.70014	14" FITTING	EA
611.70016	16" FITTING	EA
611.71006	6" GATE VALVE	EA
611.71008	8" GATE VALVE	EA
611.71010	10" GATE VALVE	EA
611.71012	12" GATE VALVE	EA

611.71014	14" GATE VALVE	EA
611.71016	16" GATE VALVE	EA
611.72018	18" BUTTERFLY VALVE	EA
611.74	CHLORINE INJECTION TAP	EA
611.81	HYDRANTS	EA
611.811	ADJUSTING/ RELOCATING HYDRANTS	EA
611.812	INSTALLING DRY HYDRANT SYSTEM	U
611.813	RELOCATING DRY HYDRANT SYSTEM	U
611.814	REMOVING HYDRANT	U
611.9	WATER REGULATOR CHAMBER IRON WATER PIPE	U
611.90001	ADJUSTING WATER GATES AND SHUT OFFS	EA
611.91	REMOVING AND RELAYING WATER PIPE	LF
611.951	WATER MAIN INSULATION	SY
611.99	TEMPORARY WATER MAIN AND APPURTENANCES	LUMP
611.815	REMOVE AND SALVAGE HYDRANT	EA
611.90001	ADJUSTING WATER GATES AND SHUTOFFS SET BY OTHERS	EA
611.92	REMOVE AND SALVAGE GATE VALVE	EA

Quantity Breakdown by Street

Note: Quantites herein are provided solely to give the bidder an indication of how work is divided by road. The quantities and locations, however, are not necessarily intended to represent the final amounts to be utilized on each road.

SECTION 1 - BASE BID							
ITEM	DESCRIPTION	EST. QTY. total	UNIT	Cornwell Ct	Windward Ter	Car-Mar Ln	Walter Palmer Ln
201.02	Grubbing	600	SY	150		220	230
201.21	Remove Small Tree (5"-23")	15	EA			15	
201.22	Remove Large Tree (over 24")	5	EA		1	2	2
201.321	Tree Trimming and Pruning	1	LUMP		0.5	0.5	
201.4	Removal of Stumps	4	EA			4	
202.31	Fill and Abandon pipe	3	CY	3			
202.41	Removal of Pipe (0-24")	38	LF			38	
202.5	Removal of CB	1	EA			1	
203.1	Common Excavation for driveways	495	CY	140	130	150	75
203.11	Common Excavation (F)	1,070	CY	450	140	300	180
203.2	Rock Structure Excavation	50 *	CY		10	25	15
203.4	Excavation of Unsuitable Material	65 *	CY	65			
203.6	Embankment in Place	260	CY	100	75	85	
206.19	Exploratory Excavation (test pits)	20	CY		10	10	
214	Fine Grading	1	UNIT	0.25	0.25	0.25	0.25
304.2	Gravel	286	CY	95	66	125	
304.4	Crushed Stone Fine for Driveways	340	CY	100	90	100	50
306.108	Reclaimed Stabilized Base In-Place (8" Deep)	7,061	SY		3785	1859	1417
306.110	Reclaimed Stabilized Base In-Place (10" Deep)	1,657	SY	1,657			
306.208	Reclaim, Remove and Rehandle Recl Stab Base (8" Deep)	4,072	SY	2,629		543	900
306.360	1.5" Stone for Reclaimed stabilized base	240	TONS		65	100	75
403.11	2 1/2" HBP Permanent Base Pavement	1,907	TONS	600	570	390	347
403.11	1-1/2" HBP Wearing Course	1,144	TONS	360	342	234	208
403.12	HBP Hand Method	340	TONS	100	90	100	50
417	Cold Planing (at intersections)	100	SY	25	50	25	

572.1	R&R Stone Wall	155	LF			135	20
585.3	Class C Stone Fill	20	CY	15			5
603.00412	12" RCP Drain Pipe	24	LF			24	
603.83212	12" HDPE Drain Pipe	684	LF		21	479	184
603.83215	15" HDPE Drain Pipe	214	LF	214			
604.0007	Polyethylene Liner	14	EA	4	2	5	3
604.12	Catch Basin	7	EA		1	3	3
604.22	Drop Inlet	1	EA			1	
604.32	Drain Manhole	3	EA	1		2	
604.4	Reconstructing/Remodel Catch Basins	5	EA	4		1	
604.45	Adjust Catch Basin Grates & Frames	1	EA		1		
604.51	Adjust Sewer Manhole	6	EA	6			
604.72	New Frame & Grate, Type B	5	EA	4		1	
605.506	6" HDPE Underdrain (Unspecified)	400	LF	400			
608.131	3" Bituminous Sidwalke	10	SY	10			
608.26	6" Concrete Sidwalk for H.C. ramps	5	SY	5			
608.54	Detectable Warning Panels	2	SY	2			
609.5	Reset Granite Curb	20	LF	20			
609.813	Bituminous Curb	450	LF			450	
611	Adjust water services	4	EA	1	1		2
611.90001	Adjust valve boxes	4	EA	2	1	1	
612.43015	15" Ductile Iron Pipe, CL50	40	LF	40			
615.032	Traffic Sign, Type C w/Break away post	55	SF	15.0	20	10	10
618	Uniformed Police for Traffic Control	ALLOWANCE					
619.1	Maintenance of Traffic	1	LUMP	0.25	0.25	0.25	0.25
621.331	Delineator	4	EA	4			
622.55	Reset Monuments	13	EA	7		5	1
628.2	Sawed Bituminous Pavement	1,300	LF	300	500	300	200
632.3118	Retroreflective Thermoplastic Pavment (18" Stop)	75	LF	15	30	30	
645.2	Erosion Control Blanket	120	SY	120			
645.441	Sediment Filter Logs	25	EA	5	5	10	5
645.51	Hay Bales	40	EA	20		20	

645.531	Silt Fence	175	LF	125			50
645.533	Inlet Filter Baskets	14	EA	4	2	5	3
645.71	Monitoring SWPPP and Erosion & Sediment Controls	50	HR	20	10	10	10
646.512	Turf Establishment w/ Mulch, Tackifiers, & Loam	7,127	SY	2,069	2005	1767	1286
651.001	Evergreen Tree - 6'-8' height	4	EA		2	2	
652.001	Deciduous Tree - 2-1/2"-3" Caliper	4	EA		2	2	
670.0662	Relocate mailbox	87	EA	20	23	31	13
692	Mobilization	1	LUMP	0	0.25	0.25	0.25
900	15" Precast headwall	3	EA	2			1
912	Landscape (remove and reset)	1	LUMP	0.25	0.25	0.25	0.25
1010.2	Asphalt Cement Adjustment	ALLOWANCE					

* items are of indeterminant quantity

SECTION 2 - BASE BID

ITEM	DESCRIPTION	EST. QTY. total	UNIT				
611.05206	6" Cement Lined Ductile Iron Pipe, CL 52	40	LF	40			
611.05208	8" Cement Lined Ductile Iron Pipe, CL 52	10	LF	10			
611.5001	1" Water Service (complete)	5	EA				5
611.70008	8" Fitting	3	EA	3			
611.71006	6" Gate Valve	1	EA	1			
611.8111	Install Hydrant (Hydrant supplied by Owner)	4	EA	2	1		1