SPECIAL PROVISIONS
RICE COMPLEX WALKING PATH
WRENTHAM, MA

SCOPE OF WORK

The work under this Contract consists of the construction of 8' wide shared-use and walking paths and a section of 10' wide shared use path within the limits of the Rice Recreation Complex, located in Wrentham, MA. Work associated with the Project consists of HMA sidewalk, HMA shared use path, pedestrian curb ramps, loam & seed side slopes, drainage, and water line relocation.

All work under this Contract shall be done in conformance with the *2023 Standard Specifications for Highways and Bridges*, the *2017 Construction Standard Details*, the *Traffic Management Plans and Detail Drawings*, *MassDOT Work Zone Safety Temporary Traffic Control,* the *1990 Standard Drawings for Signs and Supports*; the 2015 Overhead Signal Structure and Foundation Standard Drawings, the *2009 Manual on Uniform Traffic Control Devices (MUTCD)* with Massachusetts Amendments; the *1968 Standard Drawings for Traffic Signals and Highway Lighting*; *The American Standard for Nursery Stock*; the Plans and these Special Provisions.

The General Conditions, Supplementary Conditions and Special Provisions shall take precedence over the General Requirements of Division I of the Standard Specifications.

WORK SCHEDULE

No work that will disrupt travel on the existing roadways (lane closures, lane shifts, etc.) shall be done from 6:00AM to 9:00AM and from 4:00PM to 6:00PM. No work is allowed the day before or the day after a long weekend that involves a holiday without prior approval by the Engineer. Proposed nighttime work, extended work week and extended hours will be considered but will need to be submitted in writing in advance for approval. Prime Contractor and all Subcontractors shall work on the same shift unless otherwise approved by the Town. Extended work hours may be approved by the Town of Wrentham upon written request from the Contractor.

COOPERATION OF THE CONTRACTOR
(Supplementing Subsections 5.05 and 5.06)

Agents of various public service agencies, municipal and State Departments, and private site contractors may be entering on the work site to remove existing utilities, to construct or place new facilities or to make alterations to existing facilities.

The Contractor shall perform the work in cooperation with the various agencies in a manner which causes the least interference with the operations of the aforementioned agencies and shall have no claim for delay which may be due, or result, from said work of these agents.

CONSTRUCTION STAKING

(Supplementing Subsection 5.07)

The Contractor shall perform all survey required for the work.

PUBLIC SAFETY AND CONVENIENCE
(Supplementing Subsection 7.09)

The Contractor shall provide necessary access for fire apparatus and other emergency vehicles through the work zones to abutting properties at all times.

Sweeping and cleaning of surfaces beyond the limits of the project required to clean up material caused by spillage or vehicular tracking during the various phases of the work shall be considered as incidental to the work being performed under the Contract and there will be no additional compensation.

NOTICE TO OWNERS OF UTILITIES
(Supplementing Subsection 7.13)

Written notice shall be given by the Contractor to all public service corporations or municipal and State officials owning or having charge of publicly or privately owned utilities at least one week in advance of the commencement of operations that will affect the utilities, unless stated otherwise herein. The Contractor shall, at the same time, file a copy of such notice with the Engineer.

The following are the names of owners or representatives of the principal utilities affected, but completeness of this list is not guaranteed by the Department:

TOWN OF WRENTHAM

Wrentham DPW
360 Taunton Street
Wrentham, MA 02093

Chuck Adelsberger
Town Engineer
Phone: (617) 657-0255
Email: ca@envpartners.com

Wrentham Police Department
89 South Street
Wrentham, MA 02093

Chief William R. McGrath
Phone: (508) 384-2121
Email: wmcgrath@police.wrentham.ma.us

Wrentham Fire Department
99 South Street
Wrentham, MA 02093

Chief Antonio Marino
Phone: (508) 384-3131 x 1100
Email: amarino@fire.wrentham.ma.us

SEWER

Wrentham DPW
360 Taunton Street
Wrentham, MA 02093

Brian Antonioli
DPW Director
Phone: (508) 384-5477

Email: bantonioli@wrentham.gov

ELECTRIC

National Grid Electric
40 Sylvan Road
Waltham, MA

Murli Gupta
Program Manager
Phone: (781) 296-6483
Email: Murli.Gupta@nationalgrid.com

OTHER AFFECTED PARTIES ARE:

Vanasse Hangen Brustlin, Inc.
101 Walnut Street
Watertown, MA 02471-9151

Wayne Amico
Project Manager
Phone: (617) 607-1577
Email: wamico@vhb.com

The Contractor shall make his own investigation to assure that no damage to existing structures, sewer lines, utility poles, overhead wires, or any other utilities, occurs as a result of construction operations.

The Contractor shall notify "Mass. DIG SAFE" and procure a DIG SAFE number of each location prior to disturbing ground in any way.

"DIG-SAFE" Call Center: Telephone 1-888-344-7233

PROTECTION OF UTILITIES AND PROPERTY
(Supplementing Subsection 7.13)

The Contractor, in constructing or installing facilities alongside or near sewers, drains, water or gas pipes, electric or telephone conduits, poles, sidewalks, walls, vaults or other structures shall sustain them securely in place. The Contractor shall coordinate with the officers and agents of the various utility companies and municipal departments to assure that the services of these structures are maintained. The Contractor shall also be responsible for the repair or replacement, at no additional cost to the Owner (Town of Wrentham), of any damage to such structures caused by construction operations. The Contractor is responsible to leave them in the same condition as they existed prior to commencement of the work. In case of damage to utilities, the Contractor shall promptly notify the utility owner and shall, if requested by the Engineer, furnish labor and equipment to work temporarily under the utility owner's direction. Pipes or other structures damaged by the operation of the Contractor may be repaired by the Department or by the utility owner which suffers the loss. The cost of such repairs shall be borne by the Contractor, without compensation therefor.

If during construction there is an existing utility and/ or structure found to be in conflict with the proposed work under this Contract, the Contractor shall protect and maintain the services to the utilities and structures. The Engineer will, as soon as possible identify the utilities to be relocated or other such activities deemed suitable for resolution.

If live service connections are to be interrupted by excavations of any kind, the Contractor shall not break the service until new services are provided. Abandoned services shall be plugged off or otherwise made secure.

Full compensation for furnishing all labor, materials, tools, equipment and incidentals for doing all the work involved in protecting or repairing property as specified in this Section, shall be considered included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefor.

COORDINATION WITH UTILITY OWNERS

The contractor shall note that the coordination of work schedules with impacted utility owners is a requirement of this contract. The contractor shall be responsible for scheduling any work required to be performed adjacent to the existing utilities, or work that is required to be completed by the utility owners as early as possible to prevent undue delays to the project.

MATERIAL REMOVED AND STACKED

The Contractor shall carefully remove, transport and stack all material that, in the opinion of the Engineer, is salvageable. The material shall be stacked at a location designated by the Engineer/Owner and/or the Town of Wrentham. The Contractor shall coordinate with the Town of Wrentham, to schedule drop-off time and location. For private site features, such as signs, the Contractor shall coordinate with the site owner to schedule drop-off time and location.

DISPOSAL OF SURPLUS MATERIALS

Surplus materials obtained from any type of excavation, and not needed for further use as determined by the Engineer shall become the property of the Contractor and shall be removed from the site during the construction period and legally disposed of. The removal and disposal of surplus material shall adhere to the regulations and requirements of local authorities governing the disposal of such materials, at no additional compensation.

DRAINAGE

All pipes and structures installed as part of this Contract shall be left in a clean and operable condition at the completion of the work.

All existing pipes to be abandoned shall be plugged with brick masonry not less than 8 inches in thickness in conformance with the Standard Specifications, Section 201.62.

No separate payment will be made for the maintenance of the existing drainage system or for plugging of pipes, but all costs in connection therewith shall be included in the unit prices bid for the various Contract items.

DRAINAGE STRUCTURES

Where new pipe is shown on the drawings to be connected into an existing drainage structure to remain, the existing structure shall be first cleaned to remove all mud, debris and other material. The existing structure wall shall be carefully and neatly cut to provide the minimum size opening required for the insertion of the new pipe. The proposed pipe end shall be set or cut off flush with the inside face of the existing structure wall and the remaining space around the pipe completely filled with cement grout for the full thickness of the structure wall.

Existing shaped inverts shall be reconstructed as necessary to provide a smooth and uniform flow channel from the new pipe through the existing structure.

No separate payment will be made for the cost of connecting new pipes into existing structures, cleaning and necessary alterations of existing structures, but all costs in connection therewith shall be included in the unit prices bid for the various pipe items. Removal and disposal of the drainage structure sediments will be paid for under item 227.3.

SAWCUTS

Existing pavements to remain shall be sawcut at all openings for utility work, for new or reset curb and at all joints with proposed full-depth hot mix asphalt pavement, as shown on the plans and as directed by the Engineer. All sawcuts required will be included in the item for which they are required and not be paid for separately.

PROPERTY BOUNDS

The Contractor shall exercise due care when working around all property bounds which are to remain. Should any damage to a bound result from the actions of the Contractor, the bound shall be replaced and/or realigned by the Contractor as directed by the Engineer at no cost to the Owner.

HAZARDOUS MATERIALS

There are no hazardous materials anticipated within the project limits. However, soil, sediments or groundwater may be considered suspect if they exhibit non-natural discoloration, petroleum or chemical odor, the presence of petroleum liquid or sheening on the ground or surface water or any abnormal gas, debris or materials in the ground. In addition, existing or prior land uses (for example, historic railroad, industrial or commercial uses, etc.) may render the soils, sediments or groundwater as suspect. If hazadous materials are suspected to be encountered, the Contractor shall have a Licensed Site Professional (LSP) evaluate excavated soils, sediment or groundwater by appropriate field screening and/or laboratory analysis in accordance with the Massachusetts Contingency Plan (MCP), available Activity and Use Limitations and environmental documents.

The Contractor's LSP shall review available environmental reports, meet with Town staff and the Engineer, perform additional test pits and soil testing as appropriate and prepare a Soil and Groundwater Management Plan describing the protocol related to the reuse and/or export of material excavated on-site, the handling of groundwater and the import of fill material. The Town of Wrentham and the Engineer will review the protocol and the Contractor's LSP will prepare a draft memorandum.

STORAGE OF CONSTRUCTION VEHICLES, MATERIALS AND EQUIPMENT

The Contractor shall be forbidden from storing construction vehicles, materials and equipment on nearby local roads and side streets during construction, unless written approval is granted from the Town. All equipment, materials and vehicles must be stored on site or on private property owned by those whom the Contractor has entered into specific agreements with.

Storage of construction vehicles, materials and equipment on site shall be coordinated with the National Grid Electric to ensure that adequate access is provided to utility poles and overhead wiring at all times.

ITEM 102.511 TREE PROTECTION – ARMORING & PRUNING EACH

The work under this item shall conform to the relevant provisions of Sections 771 and shall be for furnishing and installing temporary tree trunk protection and for limb pruning to prevent injury to the tree from construction equipment and activities.

Trunk armoring is for instances where construction activity (the use of heavy equipment) comes close enough to potentially damage the tree trunk or limbs. It is to be used where shown on the plans and as directed by the Engineer.

References
If requested, the Contractor shall provide to the Engineer one copy of the latest edition of the American National Standards Institute (ANSI) A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance: Part 1-Pruning and Part 5-Construction Management Standard. Provision of reference shall be incidental to this item.

Materials
Trunk armoring shall be such that it prevents damage to the trunk from construction equipment. Selected material shall be such that installation and removal will not damage the trunk.

Acceptable materials include 2x4 wood cladding with wire or metal strapping, or, for instances when duration of construction activities is less than three months, corrugated plastic pipe mounted with duct tape. Height of cladding shall be from base of tree (including root flare) to the bottom of the first branch or as recommended by the Arborist. Material and methods shall be approved by the Engineer.

Other materials or methods may be acceptable if approved by the Town Tree Warden.

Methods of Work
Prior to construction activities, the Engineer, the Contractor, the Town Tree Warden, and the Arborist, if specified, shall review trees noted on the plans to be protected. Final decision as to trees armored and/or pruned shall be per the Engineer.

Care shall be taken to avoid damage to the bark during installation and removal of armoring. Trunk armoring shall be replaced and maintained such that it is effective for as long as required and shall be removed immediately upon completion of work activities adjacent to trees.

Pruning of limbs shall conform to the techniques and standards of the most recent ANSI A300 standards.

Damages & Penalties
In the event that trees designated for protection under this item are damaged, including root damage from unapproved trespassing onto the root zone, the Contractor shall, at his own expense obtain an Arborist. The Arborist shall be approved by the Town of Wrentham.

ITEM 102.511 (Continued)

If, based on the recommendations of the Arborist, the Engineer determines that damages can be remedied by corrective measures, such as repairing trunk or limb injury, soil compaction remediation, pruning, and/or watering, the damage will be repaired as soon as possible within the appropriate season for such work and according to industry standards.

If the Engineer determines that damages are irreparable, the Contractor shall pay for the damages in the amount of $500.00 per diameter inch at breast height (DBH) per tree.

Additionally, if the Engineer determines that the damages are such that the tree is sufficiently compromised as to pose a future safety hazard, the tree shall be removed. Tree removal will include clean up of all wood parts, grinding of the stump to a depth sufficient to plant a replacement tree or plant, removal of all chips from the stump site, and filling the resulting hole with topsoil.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 102.511 will be measured and paid at the contract unit price per each. This will include full compensation for all labor, equipment, materials, and incidentals for the satisfactory completion of the work and the subsequent removal and satisfactory disposal of the protective materials upon completion of the contract.

In the event of tree damage, cost of Arborist services, of remediation measures, and/or tree removal will be borne by the Contractor.

Payment under this item will be scheduled throughout the length of contract:

- 40% of value shall be paid upon installation of trunk armoring and completion of pruning work, if required.
- 60% shall be paid at the end of construction operations that would damage the tree and after protection materials have been removed and properly disposed of by the Contractor. In the event of repairable damages, payment shall be made after the completion of remediation measures.

In the event of irreparable damage due to lack of proper protective measures being take there will be no compensation in addition to the $500.00 per diameter inch penalty.

ITEM 170. FINE GRADING AND COMPACTING – SUBGRADE AREA SQUARE YARD

The work under this item shall conform to the relevant provisions of Section 170 of the Standard Specifications and the following:

The work shall include the shaping, trimming, compacting and finishing of the subgrade of the proposed sidewalks and shared use paths, as well as the subgrade of the shared use path shoulders.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 170 shall be measured and paid for by the square yard for all subgrade areas to be compacted and graded. Grading and finishing other than subgrade areas will be included in the price of the other respective items of work involved.

ITEM 222.3 FRAME AND GRATE (OR COVER) MUNICIPAL STANDARD EACH

The work performed under this item shall conform to the relevant provisions of Section 201 of the Standard Specifications and the following:

The work under Item 222.3 shall also include the furnishing and placement of these frames and grates to the line and grade as shown on the plans, or as directed by the Engineer.

Frame and grates (or covers) shall conform to Town of Wrentham Standard details or MassDOT standards and as approved by the DPW. Frames and grates (or covers) shall be H20 rated cast iron.

Shop Drawings for frame and grates or covers must be submitted to the Town for approval prior to ordering the casting.

Casting frames shall be set in a full mortar bed with bricks, a maximum of 8 inches thick. All cast shall be set in full concrete collar.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 222.3 Frame and Grate (Or Cover) Municipal Standard shall be measured and paid for at the contract unit price bid per each and will include all labor, materials, tools, equipment and work necessary for the completion of the item.

ITEM 300.1 WATER MAIN RELOCATION LUMP SUM

The work performed under this item shall conform to the relevant provisions of the Wrentham Water Rules and Regulations and the Wrentham Standard Water Requirements (see attached). The contractor shall coordinate with the Wrentham Water Department prior to commencing any water line relocation work.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 300.1 shall be measured and paid for at the contract unit price per Lump Sum. This cost shall include all labor, tools, equipment and incidental costs required to furnish, install, inspect, and coordinate the work for the relocation of the water main as noted in the contract drawings. No separate payment shall be made for the furnishing and installation of Class B Trench Excavation, Gravel Borrow – Type C, ductile iron pipe and fittings, and cement concrete associated with this item.

ITEM 697.1 **SILT SACK** **EACH**

The work under this item includes the furnishing, construction, maintenance and removal of a fabric sack to be installed in drainage structures for the protection of wetlands and other resource areas during construction.

Silt sacks shall be designed to intercept all water, silt and debris entering the catch basin Silt sacks shall be installed at all catch basins designated by the Engineer.

The silt sack shall be as manufactured with material meeting M9.50.0 for Subsurface Drainage or a fabric approved by the Engineer.

The silt sacks shall be inspected during after each rainstorm and cleaned as required to remove accumulated debris as required. Silt sacks, which become damaged during construction operations, shall be repaired or replaced immediately at no additional cost. Silt Sacks shall be removed from the site at the end of the project.

Silt sacks shall remain in place until the placement of the pavement overlay or binder course and the graded areas have become permanently stabilized by vegetative growth. All materials used for the filter fabric will become the property of the Contractor and shall be removed from the site when no longer required.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Silt Sacks will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment, maintenance and incidental costs required to complete the work.

ITEM 698.3 GEOTEXTILE FABRIC FOR SEPARATION SQUARE YARD

The work under these items shall conform to the requirements of Section M9.50.0 of the Standard Specifications and the following:

The work under this item includes the furnishing and installation of geotextile fabric under the proposed stone pads at swale outlets.

At locations of fabric installation, the subgrade shall first be graded and compacted. All rocks, vegetation, and other obstructions shall be removed before placement of fabric. The fabric shall be installed and fastened in place in conformance with the manufacturers recommendations for each type of condition listed above.

Fabric shall be conform to the requirements of AASHTO M288-Class 3 for Separation.

Measurement and Payment

Geotextile fabric for separation will be measured for payment per square yard, complete in place; any overlaps shall be measured as a single layer of cloth.

Geotextile fabric for separation will be paid for at the Contract unit price per square yard, which price shall include all labor, tools, material, equipment and incidental costs required to complete the work.

ITEM 999. **AS-BUILT PLANS** **LUMP SUM**

The Contractor shall furnish CADD and Mylar "AS-BUILT" plans of the completed project to the Engineer. These "AS-BUILT" plans shall be furnished prior to the date of final acceptance. Full compensation for these plans shall be included in the prices bid for the various Contract items of work and no additional compensation will be allowed therefore.

The Engineer will make the original drawings available to the Contractor for use in preparing the as-built drawings. However, the Contractor may request a CADD version of the contract drawings as an alternative method for preparing the "AS-BUILT" plans. In either case, final "AS BUILT" plans shall contain all information shown on the contract drawings (sheets 1-10) and shall clearly indicate areas where changes were made during construction.

The "AS-BUILT" plans shall be titled "AS-BUILT" and stamped and dated by a Professional Engineer registered in the Commonwealth of Massachusetts. The Professional Engineer's stamp is required to certify any changes made to the contract drawings and shall not dictate responsibility for the original design drawings.

The "AS-BUILT" plans will provide a record of constructed improvements for future reference; therefore partial plan sets will not be accepted. The Contractor may elect to use a combination of reproducible duplicates of the design drawings and revised CAD drawings to provide a complete set of "AS-BUILT" plans.

Measurement and Payment

As-built plans will be measured and paid for at the contract unit price per lump sum.

Commonwealth of Massachusetts
Town of Wrentham
Department of Public Works
360 Taunton Street, P.O. Box 658
Wrentham, MA 02093
TEL: (508) 384-5477 FAX: (508) 384-5481

MICHAEL T. LAVIN, JR.
Director of Public Works

BRIAN ANTONIOLI
Assistant Director
of Public Works

STANDARD WATER SYSTEM REQUIREMENTS

PART 1: - GENERAL

1.01 – General Requirements

A. Attention is directed to the Rules and Regulations of the Wrentham Water Division and is hereby made a part of these Specifications.

B. The Contractor shall be responsible for a working knowledge of the requirements and Rules and Regulations of the Division prior to beginning any work.

C. All applications and fees to the Division shall have been completed and submitted to and approved by the Division prior to beginning any work. A properly prepared, up-to date scaled drawing of the proposed work shall be submitted to the Division for review and comment.

D. It shall be the responsibility of the Contractor to contact DIG SAFE and the Division and all other applicable utilities at least 72 hours in advance of the beginning of construction.

E. It shall be the responsibility of the Applicant / Contractor to obtain and comply with all the requirements of the applicable road opening permits.

F. All work shall be completed in accordance with these specifications and standard industry practices and methods. All materials to be used as part of the water distribution system or connections thereto, shall meet the requirements of the applicable American Water Works Association (AWWA) Standards.

G. No work shall be backfilled without being inspected by the Division.

H. Any materials damaged during unloading, storage or installation shall be immediately removed from the site and replaced at the Applicant / Contractor's expense.

I. All surface restoration of disturbed areas shall be the responsibility of the Applicant and authorized agent there of (Contractor). Upon completion of the work, all surfaces and surface features, (including pavements, walks, drives, fences, walls, lights, lawns, landscaping, etc.) shall be left in a condition that is at least equal to or better than that which existed prior to construction. All pavements within the Town of Wrentham or State Right of Way shall be restored in accordance with the applicable road opening permit and or established standards.

J. No water main or service will be accepted by the Division and or activated until such time as the Division has received all outstanding documentation (shop drawings, as-built drawings, etc.) and fees and outstanding charges).

K. The Division reserves the right to periodically modify these standards without notice and to waive parts or requirements thereof should it be in the best interest of the Division to do so.

L. No person other than Division personnel shall operate any valve, hydrant or other components of the Divisions water distribution system.

1.02 – Submittals Requirements

A. The decision of the equality of materials, products, assembly or system, other than those named or described in these specifications shall be made by the Division based upon the information provided by the applicant. All costs relating to providing said information (samples, testing, etc.) shall be the responsibility of the applicant or authorized agent thereof (i.e. Contractor).

B. The Contractor shall submit the following products (if used) to the Wrentham Water Division or its Engineer for approval:

- Pipes
- Fittings
- Valves
- Hydrants
- Service Materials
- Road Boxes
- Etc.

C. An accurate, scaled "As-Built" drawing shall be prepared by the Contactor using measurements and dimensions taken by the Contractor during installation of the water system components. Distances from permanent surface features (building corners, utility poles, edge of curbs, etc.) to buried valves, pipe bends and fittings etc. shall be shown on the drawings as well as any other pertinent information such as pipe size and material, depth of bury and clearances between the water lines and other crossing utilities such as gas, electrical, sewer and drain.

PART 2: - PRODUCTS

2.1– Submittals Requirements

A. The following information pertaining to products is included for the Contractor's information.

B. The Contractor shall install all ductile-iron pressure pipe, fittings (including special castings), service connections and appurtenant materials and equipment, as herein specified and in accordance with the submitted plans.

C. Wherever a pressure classification (e.g. Class 150) is indicated or specified, it shall mean that working pressure for ANS A21.50-1971 laying condition B under five (5) feet of cover as defined by the applicable standard specification for the type of pipe to which it permits.

D. Joints in buried exterior pipelines shall be push-on joints. Buried valves and fittings shall be mechanical joint. Joints, valves and fittings in exposed pipelines shall be flanged joints. Joints in service connections shall be compression type.

2.3 – Ductile-Iron Pipe

A. All ductile-iron pipes shall be designed in accordance with AWWA C150 and shall be manufactured in accordance with AWWA C151.

B. Unless otherwise indicated or specified, double thickness, cement lines ductile-iron pipe shall be at least thickness Class 52.

C. Prior to delivery to the site, each piece of ductile-iron pipe shall be individually tested to insure 100 percent ductility by the ball impression test or an approved equal.

D. Buried joints (pipe to pipe) shall be of the push-on type.

E. All pipes and fittings shall have no less than five (5) and no more than six (6) feet of cover unless otherwise approved by the Division. No pipe shall be laid in the same trench with gas pipes, sewer pipes, or any other facility of a public service company, nor within five (5) feet of any open excavation or vault, nor within ten (10) feet of any septic structure or leaching field.

2.4 – Fittings

A. Fittings shall conform to the requirements ANSI/AWWA C110 or AWWA C153 and be North American made and shall be of a pressure classification at least equal to that of the pipe with which they are used.

B. All buried fittings shall be mechanical joint.

C. Fittings must be ductile iron and North American made.

D. Fittings shall be cement lined in accordance with ANSI/AWWA C104/A21.4-90.

E. Tapping sleeves, if used, shall be the full mechanical joint type ductile iron sleeve, or others approved through the Division. Sleeves "O" ring type seal ring <u>will not</u> be allowed.

F. Sleeve type couplings shall only be used with the prior approval of the Division. If allowed, sleeves shall be of the solid type ductile iron with mechanical joint ends.

G. The use of "Dresser" style ductile couplings shall only be used with the approval of the Division.

2.5 – Types of Joints

A. Joints for push-on and mechanical joint pipe shall conform to AWWA C111.

B. The plain end of push-on pipe shall be factory machined to a true circle and chamfered to facilitate fitting the gasket.

C. The plain ends of field cut pipe shall be chamfered to prevent damage to the gasket.

D. Push-on and mechanical joint pipe and fittings shall be provided with sufficient quantities of accessories conforming to AWWA C111 and be North American made.

E. Flanges for flanged pipe shall conform to ANSI B16.1, except that special drilling or tapping shall be a necessary to insure correct alignment and bolting. Flanged

pipe shall use long-hub flanges which shall be screwed on tight at the foundry by machine before they are faced and drilled.

F. Gaskets shall be of a composition suitable for exposure to the liquid with the pipe.

2.6 – Lining and Coating

A. All pipe and fittings shall be lined and coated as specified below.

B. The inside of pipe and fittings carrying potable water shall be given a double thickness cement lining and bituminous seal coat in accordance with AWWA C104.

C. The outside of pipe and fittings shall be given the standard bituminous coating. Also the appropriate AWWA Standard Specification for pipe and fittings.

D. Machined surfaces shall be cleaned and coated with a suitable rust preventative coating at the shop immediately after being machined.

2.7 – Water Service Materials

A. Water service pipe shall be at least 1 (one) inch diameter polyethylene (CTS) (PE) Class 3408, 200 psi, color blue or 1 (one) inch Type K Copper Tubing. Water service pipe over 2 (two) inch diameter shall be ductile iron. All non-metallic water service lines shall have a locate wire attached and shall be no less than 12 gauge (minimum), single strand UF rated (Direct burial) copper wire with 30 mil. (minimum) insulation. The outside color of the wire shall be blue. Also stainless steel insert stiffeners shall be used at all fittings.

B. Stainless steel inserts within the PE tubing shall be used at all compression connections.

C. Water service tubing between the corporation and the curb stop shall be one (1) piece.

D. Water service tubing between the curb stop and the house / meter setup shall be one (1) piece. Unless otherwise authorized by the Division. Water services over 150’ in length require the water meter to be installed in an approved meter pit just past the curb stop.

E. The locating wire will be one piece from water main to curb stop. The wire on the service tubing between the corporation and curb stop shall be stripped at both ends, connected to the corporation and curb stop stainless steel screws and attached to the tubing.

F. Also the locating wire will be one piece from curb stop to into the house foundation to meter setup, unless otherwise authorized by the Division. The wire on the service tubing between the curb stop and the house foundation to meter setup shall be stripped at both ends, connected to the curb stop and meter setup stainless steel screws and attached to the tubing.

G. Corporation stops for all water main service pipe connections shall be of solid brass or bronze construction suitable for compression type connections for the indicated service pipe. The corporation stops shall have AWWA (tapered) thread on the inlet side of the stop. The size of the corporation shall be matched to the size of the service pipe or tubing. Service clamps shall be installed with all corporation stops 2 inch and larger in size. Corporations shall be as manufactured by Ford FB1000-4 1"CC x 1"PJCTS Ball type w/ Pac joint or McDonald 4133-163 1"CC x 1" PJCTS Ball type w/ Mac Pac Nut or comparable brand.

H. All curb stops for service pipe connections shall be of solid brass or bronze material and open left. The inlet and outlet shall be as required to suit the types of pipe or tubing connected. The curb stops shall have a drain. Curb stops shall be as manufactured by Ford B44-444 SW 1"PJCTS x 1"PJCTS Ball type w/ Pac joint stop & waste or McDonald 4131-270 1" PJCTS x 1" PJCTS Ball type w/ Mac Pack Nut stop & waste or comparable brand.

I. 2 ½" Buffalo style service curb box slide type, lock type cover fits flush with top of service box, and has a brass pentagon nut to lock cover, North American made. Cover – 2 ½", Top – 2 ½" x 24" Service box top slide, Base – 2 ½" x 47" Service box base slide. Curb box shall be centered over curb stop operating valve and be plumb.

J. All adapters and miscellaneous fittings to connect to existing or proposed water service materials shall provide an adequate seal at the working pressure of the water main and be approved by the Water Division.

K. The installation of an approved back flow device shall be installed immediately after the meter.

L. The water service must enter the basement within one (1) foot of the inside of the foundation wall. The meter shall be set between twelve (12) inches and eighteen (18) inches from the floor and between three (3) inches and twelve (12) inches from the wall. The meter fittings shall be anchored to either the cement floor or the cement wall. The meter shall be set in a protected area to prevent any type of damage and in a location to allow easy accessibility at all times for reading and repairs. The location of the meter within a confined space is prohibited. The Division reserves the right to determine the final meter location.

M. The curb stop shall be installed at the property line running adjacent to the Town owned roadway in front of the house. The service line, from the main to the curb stop, shall be installed at a right angle perpendicular to the water main and located in front of the house. Nothing within 5' of the curb box. The Division must inspect the service tap, in the street main, and the entire service installation, prior to back filling. All service pipes and fittings shall have no less than five (5) and no more than six (6) feet of cover unless otherwise approved by the Division. The service pipes and fittings shall have a suitable bed of sand and a minimum of one (1) foot of sand above and below covering the pipe and fittings. No service pipe shall be laid in the same trench with gas pipes, sewer pipes, or any other facility of a public service company, nor within five (5) feet of any open excavation or vault, nor within ten (10) feet of any septic structure or leaching field. All water service lines shall have an approved metal detectable tape, clearly printed with the word "water", placed at two (2) feet below the finished grade.

N. For an old water service repair, no couplings or repairs shall be made within 10' of the meter and/or foundation wall. All repairs shall be outside of the foundation wall at least 10' away. The Division must inspect all work before backfill.

2.8 – Valves

A. Valves three (3) to ten (10) inches in size, inclusive, shall be designed for a working water pressure of 250 psi. North American made.

B. All valves shall <u>open left</u> in accordance with the Division Standards.

C. The valves shall be designed so that parts subject to wear may be easily replaced and shall be constructed to wear-resistant material.

D. Valves shall be ductile iron, non-rising stem resilient seated, wedge type gate valves conforming to the most recent edition of AWWA C509 or AWWA C515. Valves shall meet current AWWA turn count standards. The valves shall, in addition, meet the following requirements:

i. The valve waterway shall be smooth and unobstructed without depression or cavities where foreign material can accumulate.

ii. All interior and exterior ferrous parts shall be coated with fusion-bonded epoxy. Said coating shall be non-toxic, impart no taste to water and shall conform to AWWA C550 and NSF 61, the latest revisions.

iii. The gate shall be totally encapsulated with rubber coating that utilizes a rubber seating edge at the bottom, which will eliminate the possibility of entrapment of foreign material.

iv. The valve shall utilize a rubber encapsulated disk. The valve shall close bubble tight.

v. The valve shall be designed so no metal fasteners or screws other than the stem and stem nut are exposed to water.

vi. The stem shall be bronze with an integral thrust flange, O-rings and anti-friction devices to reduce operating torque.

vii. When used as a tapping valve, the valve shall be constructed to permit the use of standard full size cutters.

viii. Buried valves shall have mechanical joint ends and a 2-inch square operating nut.

ix. Buried valves (Post Indicator Valve) controlling water supplies for fire protection system shall carry the UL/FM rating as appropriate and be supervised per applicable codes.

x. Bonnet bolts / nuts shall be stainless steel.

xi. Valve stuffing box shall utilize multiple o-ring seals.

xii. Valve shall be installed plumb.

E. Valves 12 inches and larger shall be the butterfly type, Class 250, ductile iron with mechanical joint ends and a 2 inch square operating nut and comply with the most recent edition of AWWA C504 for butterfly valves. Valves shall meet current AWWA turn count standards North American made.

i. The butterfly valve shall be designed for a working pressure of 250 psi unless otherwise indicated.

ii. The valve seat shall have a constant uninterrupted 360 degree seating.

iii. The valve operator shall be designed for 450 foot-pounds of torque.

iv. The valve shall have a fusion bonded epoxy coating inside and out.

v. Valves disks shall seat at an angle of 90 degrees to the axis of the pipe.

vi. Valve shall be installed plumb.

vii. Butterfly Valves shall have ductile iron bodies and 630 stainless steel shafts

viii. All valves shall open left in accordance with the Division Standards.

2.9 – Tie rods, Clamps, Thrust Restraint

A. The contractor shall furnish and install Tie-rods, clamps, couplings, concrete and accessories to prevent the movement of branch valves and/or fittings.

B. The claims and Tie-rods shall be of the size, materials and shall be constructed as indicated by the latest edition of the National Fire Protection Association's National Fire Codes, Publication: NFPA 24.

C. The use of lug style retainer glands is allowed as an alternative to rods provided the gland used meets the following:

i. The restraining devices shall not damage the pipe wall or lining, and should provide 360 degrees of restraint around the pipe.

ii. A device to indicate proper tightening of setscrews shall be used; torque screws should twist off @ 80-90 ft. lbs.

iii. Retainer glands shall be "Mega lug" style or equal.

iv. North American made.

2.10 – Valve Boxes

A. Unless otherwise specified or required, each buried valve shall be provided with a valve box. Valve boxes shall be cast-iron and of the adjustable, slip, heavy-pattern type and be North American made. They shall be so designed and constructed as to prevent the direct transmission of traffic loads to the pipe or valve.

B. The upper or sliding section of the box shall be provided with a flange having sufficient bearing area to prevent undue settlement. The lower section of the box shall be designed to enclose the operating nut and stuffing box of the valve and fit over the valve bonnet. The boxes shall be adjustable through at least six (6) inches vertically without reduction of the lap between sections to less than eight (8) inches. Valve box shall be centered over operating nut and be plumb.

C. The inside diameter of the boxes shall be at least 5 ¼" and the lengths shall be as necessary for the depth of the valves with which the boxes are to be used. Top section shall be 26" valve box top. Bottom section at no time shall be less than 48" valve box base – belled.

D. Covers shall be close fitting and substantially dirt-tight. The top of the cover shall be flush with the top of the box rim. The word "Water" shall be cast in the top of the cover. Cover should be heavy-duty weighing at least 10 lbs.

E. Castings for the valve boxes shall be strong, tough even grained, and without defects. Valve boxes shall be North American made.

2.11 – Hydrants

A. Hydrants shall be manufactured in accordance with the most recent edition of AWWA Specification C502, designed for 250 pounds working pressure, and tested to a minimum of 500 pounds hydrostatic pressure and shall open left. Hydrant shall be U/L listed & FM approved.

B. The hydrant shall be center stem compression type.

C. An automatic, drain is to be provided to permit draining the hydrant barrel.

D. Hydrants shall be designed with the following features.

i. Permit removal of all working parts through the top of the hydrant. All working parts shall be bronze and interchangeable, with similar parts of same size and type.

ii. In the event of accident, damage or breaking of hydrant, the main valve will remain closed by mechanical means.

iii. The direction of the nozzles can be changed 360 degrees by rotating the hydrant without digging up the hydrant.

iv. Extensions may be added without the necessity of closing off the water or digging up the fire hydrant.

E. Hydrants will have a valve opening of 5 ¼ inches.

F. Inlet connection shall be six (6) inches and mechanical type joint.

G. Hydrants shall have two (2) 2 ½" hose nozzles and one (1) 4 ½" pumper nozzle. Nozzle threads to be National Standard. Operating nuts shall be National

Standard, pentagon shape, 1 ½ inch point to flat. Hydrants shall be suitable for installation with a minimum of five (5) and no more than six (6) foot depth of cover at the inlet connection without the hydrant being significantly higher or lower than as indicated on the drawings.

H. Hydrants manufactured for a greater depth of bury shall be provided where depth of coverage over the water main is greater than the standard five (5) and no more than six (6) foot of cover. Said hydrant shall be prominently marked with the depth of bury.

I. Hydrants shall be furnished with a frangible break flange at the ground line and a cast-iron or stainless steel break coupling on the stem at the ground line, which shall be so designed so that in case of breakage, only the flange and coupling need be replaced to affect complete repair.

J. Hydrants shall be painted according to specifications of the Wrentham D.P.W., Water Division. If needed, (rough up any existing paint surfaces with sandpaper. Thoroughly clean hydrant with mineral spirit soaked rag. Apply rust converter on all areas. The hydrant must be scraped and primed). Two coats of rust inhibitive safety yellow paint shall be applied to the barrel, down to the ground level. Two coats of rust inhibitive white paint shall be applied to the bonnet and caps. Apply Never Seize to all nipple threads.

K. Each hydrant will also have installed a "Heavy-Duty Fiberglass Hydrant Marker w/Optional Mini Flag" resilient 3/8" Diameter white laminar fiberglass shaft is 57" (5') and is attached to a heavy duty MIL Spec FT3482 plated carbon steel spring. Red and white reflective bands on shaft. Mini flag 4" high X 5" wide white PVC exterior grade UV ray resistant material, with red reflective striping.

L. For the purpose of standardization, hydrants shall be either the A.F.C. American Darling B-62-B hydrant or the Kennedy Guardian K-81D hydrant. Hydrants shall be 5 ¼" V.O. Hydrants shall open left, have 2 - 2 ½" side nozzles NST tread and 1 - 4 ½" Steamer nozzle NST tread. Hydrants shall come from the factory with upper barrel color being primed yellow, bonnet & caps color being white and no chains or bands on nozzles and barrel. Hydrant shall open left. Pentagon operating nut on caps and operating nut and measure one and one half inches from flat to point.

M. With the exception of the hydrant at the end of the line, hydrants shall be installed using 8-in. x 6-in. hydrant anchoring tees, six (6) inch valves and six (6) inch ductile iron stubs. For hydrants at the end of the line, hydrants shall be installed using an 8-in. x 6-in. decreaser, a six (6) inch valve and a six (6) inch CLDI hydrant stub with the hydrant being located at the direct end of the line and in the planting strip. Restraining rods or other restraining devices must be used between the six (6) inch valves and the hydrants. (The hydrant placement in the grass strip shall allow for

a minimum of twenty four (24) inches between the face of the curb and the hydrant steamer cap at its furthest extremity). The grade of the hydrant shall be set so that there is three (3) inches from the finished grade to the break flange. Hydrants shall be set plumb. Broken stone shall be placed around the base of the hydrant at the location of the drain hole, and backfill around hydrant shall be thoroughly compacted to the grade line.

N. Hydrants installed at locations which, in the opinion of the Division, may be subject to possible damage from vehicles, said hydrant shall be protected by a minimum of two (2) 6" diameter concrete filled steel bollards placed to facilitate full unrestricted access to the hydrant. Hydrants cannot be located within 10' of any driveway or road opening. Nothing can be planted or built within 10' of hydrants.

O. Hydrant thrust blocks: Concrete for the thrust blocks securing hydrants shall be sized and installed to provide adequate thrust restraint for the soil type encountered.

2.12 – Backflow Prevention Devices

A. In accordance with Massachusetts Department of Environmental Protection Cross Connection Regulations 310-CMR-22.22, no person shall maintain, upon premises which they own or occupy, a cross connection between the distribution system of the public water supply, the water of which is being used for drinking, domestic, or culinary purposes and the distribution system of any unapproved water source, unless the installation has been approved by the appropriate reviewing authority and permits have been issued.

B. Backflow prevention devices shall be provided by the customer on all services. Said approved devices shall be installed on the customer side of the meter and shall be installed per DEP requirements by a qualified individual in a suitable location where it is convenient for testing and will not compromise the décor or operation of the business. During the required periodic testing of said devices, it is required to interrupt the water supply to the building for a period. If said interruptions of service during normal business hours can not be tolerated, it is required that an additional device be installed in parallel that would allow one backflow preventer to be taken off line at a time for testing while the other remains in service.

C. Any owner of a facility were cross connections are maintained, without required backflow prevention devices which have been approved by the reviewing authority, will receive a notice of non-compliance with corrective action taken. Failure to take corrective action within thirty (30) days of issuance of notice will

result in a penalty as specified in the Wrentham water rules, regulations and fees, Schedule of Charges, Item 8, per calendar day for each violation for as long as the violation(s) continue. Compliance will not be considered until all assessed penalties have been paid.

D. The Division reserves the right to terminate any water service connection to any facility where cross connections are maintained without the required backflow prevention devices which have been approved by the reviewing authority.

PART 3: - EXECUTION

3.1 – Water Distribution Main

A. The Contractor's attention is directed to the fact that the cement pipe lining is relatively brittle. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe or lining, scratching or marring machined surfaces, and abrasion of the pipe coating or lining.

Any filling or pipe showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work site.

In any pipe showing a distinct crack and in which it is believed there is no incipient fracture beyond the limits of the visible crack, the cracked portion, if so approved by the Division, may be cut off by and at the expense of the Contractor before the pipe is laid so that the pipe used is perfectly sound. The cut shall be made in the sound barrel at a point at least twelve (12) inches from the visible limits of the crack.

Unless otherwise approved, all cutting of ductile iron pipe shall be done with an approved power operated cutter. Hammer and chisel shall not be used to cut pipe. All ends shall be examined for possible cracks caused by cutting and chamfered to prevent damage to the gasket.

Pipe shall be installed as to maintain the required minimum earth cover of five (5) foot vertically over and horizontally from the sides of the pipe. With approval from the Division only, piping not having the necessary vertical or horizontal cover shall be restrained against movement and protected from freezing.

B. Before any length of pipe is lowered into the trench it shall be inspected for damage and the inside of the pipe shall be cleared of any loose dust and foreign objects. No defective pipe or fittings shall be laid or placed in the piping, and any

piece discovered to be defective after having been laid shall be removed and replaced by a sound and satisfactory piece at the Contractor's expense.

Each pipe and fitting shall carefully cleared of all debris, dirt, etc., before being laid and shall be kept clean until accepted in the complete work.

Pipe Location. All pipes and fittings shall have no less than five (5) and no more than six (6) feet of cover unless otherwise approved by the Division. Exterior pipelines will be located substantially as indicated on the approved drawings, but the right is reserved to the Division, to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings, etc., are noted on the approved drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different additional or different fittings, where required, without additional compensation. (Care shall be taken to ensure a good alignment both horizontally and vertically, and, in the case of buried lines, to give the pipe a firm bearing along its entire length).

When mechanical joint pipe or similar pipe is laid, the bell of the pipe shall be cleaned of excess tar or other debris and wiped out before the cleaned and prepared end of the next pipe is inserted into it. The new pipe shall be set and held firmly in place until properly seated and held securely until the joint has been completed.

C. Before any section of pipe is joined with another with a push on type joint, it shall be inspected for damage and the inside of the pipe shall be wiped clean and clear of any debris. Surfaces against which the gaskets will come into contact shall be thoroughly wire brushed and washed with clean water, care being taken that no sand or grit be allowed to remain on these surfaces. The gasket shall then be cleaned and inserted in the groove provided in the bell of the previously laid pipe, making sure the gasket is inserted in the proper manner and securely seated. The gasket and the plain pipe end shall be lubricated with an approved lubricant in accordance with the pipe manufacturer's literature. The ends of cut pipe should be checked before assembly to ensure that they have been chamfered to facilitate assembly and prevent tearing of the gasket.

Special care must be given by the Contractor to use the proper gaskets designed and manufactured for the brand of pipe being installed or connected to. Avoid mixing different gaskets together.

The plain end of the pipe shall then be aligned to be in line with the previously set length of pipe and inserted into the gasket, and pushed through the gasket until seated in the bell. If the joint cannot be assembled with a reasonable amount of force, the plain end shall be removed from the bell and the gasket shall be checked

for proper positioning before reassembly. If an effective seal is not obtained at the joint, the joint shall be disassembled, cleaned, and reassembled, utilizing a new gasket.

Pipe shall be deflected after the plain end has been fully seated within the bell. The amount of deflection shall not exceed the maximum allowable deflection indicated by the pipe manufacturer and accepted standards.

D. Before any section of pipe is joined with another with a mechanical type joint, it shall be inspected for damage and the inside of the pipe shall be wiped clean. Any excess coating in the bell section shall be removed to prevent an improper fit.

The plain end, bell socket, and gasket shall be wiped clean, and washed with a soap solution to improve seating of the gasket and provide lubrication. The gland shall be placed on the plain end with the lip extension towards the plain end of the pipe followed by the gasket with the narrow edge towards the plain end of the pipe.

The plain end of the pipe shall then be centered and pushed into the bell socket and the gasket pressed firmly and evenly around the socket. The gland shall be pushed up to the bell and centered with the gland bolts being inserted and evenly tightened until “finger tight”.

The tightening of the bolts shall be completed with diametrically opposite bolts being tightened in sequence so as to keep the gland square with the socket and produce even bolt stresses.

The correct range of torque to be obtained is shown below, preferably by means of a torque wrench:

Bolt Size (Inches)	Range of Torque (Ft. Lbs.)
5/8	45-60
3/4	75-90
1	85-100

If an effective seal is not obtained at the joint at the maximum torque indicated above, the joint shall be disassembled, thoroughly cleaned and reassembled with a new gasket. Bolts shall not be over-torqued to tighten leaking joints.

E. Flanged ductile iron pipe and fittings shall be assembled in accordance with the manufacturer’s literature.

F. In laying ductile iron pipe, the following deflections, which reflect the manufacturer's allowable recommended maximum deflection, shall not be exceeded.

Nominal Size of Pipe - Inches	Deflection – Inches / Pipe Radius (ft) For 18 Foot Pipe Length PUSH ON JOINT	MECHANICAL JOINT
4	19" / 205'	31" / 125'
6	19" / 205'	27" / 145'
8	19" / 205'	20" / 195'
10	19" / 205'	20" / 195'
12	19" / 205'	20" / 195'
16	11" / 340'	13.5" / 285'

Deflections shall be made after the joint is made. For mechanical joint pipe, the bolts shall be partially tightened before the length of pipe is deflected.

G. At all times when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight 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 entering the pipe is eliminated. In the event that pipe is installed by transporting the underwater section as a unit through the water, the ends of the pipe shall be closed with suitable temporary plugs.

H. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of eight inches. Soapy water may be used as a gasket lubricant. A follower and gasket in that order shall be slipped over each pipe to a distance of about six inches from the end, and the middle ring shall be placed on the previously laid pipe end until it reaches the pipe stop or is properly centered over the joint. The other pipe end shall be inserted into the middle ring and brought to proper position against the pipe stop or in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares. After the bolts have been inserted and all nuts have been made up finger tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, by the use of a torque wrench of the appropriate size and torque for the bolts.

I. All valves, fittings, and appurtenances installed shall be set and jointed by the Contractor as indicated on the Drawings.

J. The Contractor shall furnish and install all supports necessary to hold the piping and appurtenances in a firm, substantial manner at the lines and grades indicated on the Drawings or specified. Unless approved otherwise, all bends, tees, dead-end plugs/caps, and other fittings in ductile iron pipelines buried in the ground

shall be restrained to resist thrust with concrete placed in an approved manner against undisturbed earth where firm support can be obtained. If the soil does not provide firm support, then suitable bridle rods, clamps, and accessories to brace the fitting properly shall be provided. Such bridle rods, etc., shall be coated thoroughly and heavily with an approved bituminous paint after assembly or, if necessary, before assembly.

K. All backfill around installed pipe and appurtenances shall be clean, dry material free of frozen material, mud, organics, bituminous concrete, debris, etc. All pipes and fittings shall have no less than five (5) and no more than six (6) feet of cover unless otherwise approved by the Division. No stone larger than 3 inches shall be placed within 12 inches of the installed pipe. The remaining backfill shall not contain any rock, stone or pieces larger than 6 inches. Proper compaction shall be performed with vibratory compactors in lifts not exceeding one foot. Compaction shall be at least 90% under non-paved areas and 95% under pavements.

L. The ductile iron pipe shall be given pressure and leakage tests in sections of approved lengths. For these tests, the Contractor shall furnish all labor and materials including an approved pump, tanks, hoses, meters and pressure gauges. The Contractor shall furnish, install and remove (after testing) suitable temporary testing taps, plugs or caps for testing the pipeline; and other similar equipment; and all labor required all without additional compensation. The meter and gauges shall be installed by the Contractor in such a manner that all water entering the section under test will be measured and the pressure in the section indicated, and they shall be kept in use during both tests.

The scheduling of pressure and leakage tests shall be as allowed by the Division.

Unless it has already been done, the section of pipe to be tested shall be slowly filled with water of approved quality, and all air shall be expelled from the pipe by flushing and the test section of pipe be allowed to stabilize preferably for 24 hours. If hydrants or blow-offs are not available at high points for releasing air or for isolating sections of the mains to be tested, the Contractor shall be responsible to make the necessary excavations, backfilling, compaction, and the necessary taps at such points and shall remove the taps and plug said holes with brass or bronze plugs after completion of the test and to restore the surface.

For the pressure test, the Contractor shall, by pumping, raise the water pressure (based on the elevation of the section under test and corrected to the gauge location) to a minimum of 150 pounds per square inch or to a pressure equal to 150% of the normal static pressure, at the highest point of the section being tested, whichever is larger*. If the Contractor cannot achieve the specific pressure and maintain it for a period of one (1) hour, the section under tests shall be considered as having failed to pass the pressure test.

**Higher test pressures may be required by the Division, but not to exceed the rated pressure ratings of the valves or hydrants.*

Only upon completion of a successful pressure test, the Contractor shall make a leakage test by metering the flow of water into the pipe while maintaining in the section being tested a pressure within 5± psi of the pressure to which the pipe will be subjected under the pressure test for at least one hour. This shall be done by placing the section under pressure by pumping. No pipe installation will be accepted if the leakage is greater than that determined by the formula:

$$L = \frac{SD\,(P)\,0.5}{133{,}320}$$

For mechanical joints and push-on joints, in which **L** is the allowable leakage, in gallons per hour; **S** is the length of pipeline tested in feet; **D** is the nominal diameter of the pipe, in inches; and **P** is the average test pressure during the leakage test, in pounds per square inch gauge.

ALLOWABLE LEAKAGE (GALS. PER HOUR) PER 1,000 FT. OF PIPELINE

	NOMINAL PIPE DIAMETER							
Avg. Test Pressure (psi)	**3**	**4**	**6**	**8**	**10**	**12**	**14**	**16**
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47
125	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34
100	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20

Note:

If testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal. /hour per inch of nominal valve size shall be allowed for the leakage test only.

At the specified system pressure, no leakage will be allowed at flanged joints.

If the section shall fail to pass the pressure test, the leakage test, or both, the Contractor shall do everything necessary to locate, uncover, (even to the extent of uncovering the entire section), isolation of pipe sections by capping or installing

valves, and repair or replace the defective pipe, fitting, or joint, all at his own expense and without extension of time for completion of the work.

If in the judgment of the Division, it is impracticable to follow the foregoing procedure exactly for any reason, modifications in the procedure shall be made as required or approved, but in any event the Contractor shall be responsible for the ultimate tightness of the line within the above leakage requirements.

M. All water mains, after passing the leakage and pressure tests shall be flushed, disinfected, and flushed again as follows, prior to being put into service. The Contractor shall furnish the necessary labor and pumps, hoses, barrels, taps for proper chlorine distribution, and chlorine test kits for the disinfection procedure.

All water mains shall be thoroughly flushed to clear the pipe of debris and sediment prior to disinfection. The flushing rate shall be at least 2.5 fps for mains smaller than twenty (20) inches in diameter. The flushing velocity in pipes greater than twenty (20) inches in diameter may be at a lower rate, as approved. The following table lists the required opening to flush pipelines to obtain a velocity of 2.5fps and is taken from AWWA Standard C651.

REQUIRED OPENINGS TO FLUSH PIPELINES*
TO PRODUCE 2.5 FPS VELOCITY

PIPE SIZE (IN)	REQ'D FLUSHING RATE (GPM)	ORIFICE SIZE	HYDRANT OUTLETS REQUIRED TO BE OPENED (INCH)	(NUMBER)	(SIZE)
4	100		15/16	1	2-1/2
6	220		1-3/8	1	2-1/2
8	390		1-7/8	1	2-1/2
10	610		2-5/16	1	2-1/2
12	880		2-13/16	1	2-1/2
14	1,200		3-1/4	2	2-1/2
16	1,565		3-5/8	2	2-1/2
18	1,980		4-3/16	2	2-1/2

*With 40 psi residual pressure, a 2-1/2 in. hydrant outlet nozzle will discharge approximately 1,000 gpm and a 4-1/2 in. hydrant nozzle will discharge approximately 2,500 gpm.

The disinfection of water mains shall be accomplished in accordance with latest edition AWWA Standard for Disinfecting Water Mains, C651, and/or the DEP Water Supply Guidelines for Public Water Systems, whichever of the two (2) is more stringent. The following descriptions may be used as a guide:

i. Disinfection of mains should be accomplished only by workmen who have had experience with chlorine or other disinfecting agents. Liquid chlorine (gas at atmospheric and sodium hypochlorite solutions are the most common disinfectants used). Chlorine gas and water solutions are fed into the main being disinfected to a concentration of at least 50 parts per million available chlorine. To insure that the required concentration is maintained, chlorine residuals are obtained. This chlorinated water solution should remain in the pipe for at least 24 hours, at the end of which period the chlorine concentration should be at least 25 parts per million. If this is achieved, final flushing can be accomplished and chlorine residuals checked to determine that the heavily chlorinated water has been removed from the pipeline. Said chlorinated water shall be disposed of in a safe, proper and legal manner.

CHLORINE REQUIRED TO PRODUCE 50 mg/1
CONCENTRATION IN 100 FT. OF PIPE – BY DIAMETER

Pipe Size in.	100 percent Chlorine lb.	1 percent Chlorine Solutions gal.
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88

ii. The Slug Method of Chlorination, which is used for large diameter water mains consists of moving a column of highly concentrated chlorine water solution (at least 300 ppm) along the interior of the pipe with a contact time of at least three hours with the pipe wall. (See AWWA Standard C651 Section 7.2 for further information).

N. After the applicable retention period, the heavily chlorinated water shall be disposed of or neutralized and the main flushed until the chlorine concentration in the water leaving the main is equal or less than that of the prevailing system or less than 1 mg/l.

O. After final flushing and before the water main is placed in service, a sample or samples shall be collected from the water main after 24 hours at locations approved by the Division and tested for bacteriological quality. Samples shall be

analyzed for the presence of Coliform bacteria and heterotrophic plate count (HPC) bacteria. Samples shall show an absence of coliform bacteria and heterotrophic plate count (HPC) bacteria are less than 100 colony forming units per milliliter (cfu/ml). In the case of extremely long mains several samples shall be collected along its length, as well as the end. The Contractor shall obtain suitable sample containers, take samples under the direction of the Division, submit samples to a Department of Environmental Protection certified laboratory for analysis, and see that analysis reports are sent to the Division. The Contractor shall bear the costs for said sampling, delivery and tests. Two sets of samples are to be collected 24 hours apart. Contractor will supply the Division with all pressure & bacteria test results along with plugging all chlorination/test taps before main is placed in service for public use.

If the initial disinfection fails to produce satisfactory samples, the disinfection process shall be repeated at the Contractors expense.

P. The Contractor shall submit a program for the construction and putting into service of the new works subject to the approval of the Division. All work involving cutting into and connecting to the existing work shall be planned so as to interfere with operation of the existing facilities for the shortest possible time and when the demands on the system best permit such interference even to the extent of working outside the normal working hours to meet these requirements. **For all proposed interruptions of water supplies or work to be performed on any component of the existing water distribution system, the Division shall be notified forty-eight (48) hours (weekends and holidays excluded) in advance.**

The Contractor shall have all possible preparatory work done and shall provide all labor, tools, materials, and equipment required to do the work in one continuous operation. Disinfection of affected mains shall be done as part of this operation, in accordance with procedures specified elsewhere.

The Contractor shall have no claim, by reason of delay or inconvenience, for adapting his operations to the needs of the Division.

Q. The contractor shall make joint connections similar to those on the existing pipe or adaptable to such pipe unless specifically otherwise shown on the Drawings or directed. These joints shall be made as specified under the appropriate headings.

R. Existing pipeline(s), other utilities, and surface features (pavements, lawns, fences, walls, etc.) damaged by the contractor shall be replaced by him at his own expense in a manner approved by the Division and the owner of said damaged items. All replication shall result in the restored work being of a condition equal to or better than that has existed before construction.

S. Contractor shall apply for and refer to "Regulations for Street Excavations, Wrentham Public Works Department" for all fees and requirements concerning any road openings.

T. The Contractor shall be responsible for all disturbed lawn areas and shall be restored with a minimum of 4 inches of good quality loam, limed, fertilized and seeded with a lawn seed mixture.

3.2 – Water Services

A. The Contractor shall furnish and install all services to the new main as indicated on the Drawings. All work shall be performed by craftsman experienced in the installation of water services. The Contractor shall have the option of installing service wet or dry.

B. Curb stops should be installed within the road right of way as close to the property line as possible. Curb stops shall be located in front of the house. Curb stops shall be provided with a box as specified and shall be set plumb and be supported and protected during backfill. Prior to acceptance of the work, the Contractor shall demonstrate that all buried valves are accessible and fully operable with standard valve wrenches and clean out.

C. All openings in foundations for water service piping shall be patched on both the interior and exterior of the foundation.

D. Services shall be located to facilitate the ease of installation and maintenance of meter and appurtenances and approved by the Division.

E. Surface restoration shall be a described under Section 3.1 Para. R through T.

3.3 – Buried Valves and Appurtenances

A. All valves shall be carefully erected and set plumb and supported in their respective positions and free from all distortion and strain. Care shall be taken to prevent damage or injury to the valve or appurtenances during handling and installation. Valves, valve boxes and valve box covers shall be installed in such a manner as to insure that the cover is parallel to the ground surface and that the operating wrench will fit squarely on the operating nut. Equipment which does not operate easily or is otherwise defective shall be repaired or replaced at the Contractor's own expense. Special care shall be taken not to displace the valve box during backfilling, compaction and surface restoration. Contractor shall demonstrate that all buried valves are accessible and fully operable with standard valve wrenches and clean out.

B. The Contractor shall furnish and install tie rods, clamps, couplings, concrete thrust blocks and accessories to prevent the movement of branch valves, as indicated on the Drawings or as directed. All valves at tees shall be restrained back to tee with retainer glands or asphalt coated rods.

C. All buried valves controlling water services should be installed within the road right of way as close to the property line as possible. All buried valves shall be provided with a box as specified and shall be set plumb and be supported and protected during backfill. Prior to acceptance of the work, the Contractor shall demonstrate that all buried valves are accessible fully operable with standard valve wrenches and clean out.

3.4 – Hydrants

A. The exact field location of each hydrant shall be determined by the Division and the Wrentham Fire Department prior to excavation for hydrant installation. The hydrant shall be installed as indicated on the Drawings and as per manufacturers' recommendations for the proper installation of the hydrant. The hydrant shall be set as to not bury the traffic flange to facilitate repairs without having to excavate around the hydrant. The area around the hydrant shall be graded to permit a 10 foot wide level area all around the hydrant and to provide adequate cover and support on all sides.

The Contractor shall furnish hydrants manufactured for the depth of cover over the mains at the hydrant connection and the actual ground elevation at the hydrant location. A minimum of 5 and no more than 6 feet of cover at the inlet connection to the hydrant shall be maintained at all locations.

B. Hydrants to be set above any potential groundwater table shall include an automatic drain feature. This shall include the necessary drain ring, seat and valve mechanism to automatically allow drainage of the hydrant barrel when the hydrant valve is fully closed. The drain ports shall be automatically closed when the operating rod is turned no more than two full turns.

The installation of those hydrants with an automatic drain feature shall include approximately 1/3 cu. Yd. of clean crushed stone placed around the hydrant base to a level several inches above the drain openings.

C. There shall be twenty four (24) inches between the face of the curb and the hydrant steamer cap at its furthest extremity. The steamer nozzle shall face the street unless otherwise directed by the Division. Hydrants shall be connected to water mains by six (6) inch ductile iron pipe. Hydrant can not be located within 15' of a driveway or road opening. Each hydrant installation shall include buried gate

valve between the hydrant and its supply main to permit isolation of the hydrant for maintenance purposes. The auxiliary valve shall be connected to the anchoring tee unless directed otherwise by the Division. The distance between the auxiliary valve and the hydrant body varies for each installation. All connections at hydrant installations shall be mechanical joint connections with plain rubber gaskets. All joints between and including the anchoring tee on the distribution main and the hydrant shall be restrained by retainer glands or rods.

The hydrant shall be set upon a slab of concrete not less than four (4) inches thick and fifteen (15) inches square. Each hydrant shall be thrust blocked against the undisturbed vertical face of the trench with a concrete thrust block as indicated on the Drawings.

Should soil and/or trench conditions preclude the use of a concrete thrust block, additional tie rods, installed as indicated on the Drawings may be used. Tie rods shall be of the number and orientation, size, material and construction as specified by the National Fire Protection Association Codes. All the rods and accessories shall be field coated with a asphalt type material prior to backfilling.

The Contractor shall take special care to insure that all hydrants are set plumb. When hydrant installation has been completed, including surface restoration of the area immediately surrounding the hydrant, Hydrants shall be painted according to specifications of the Wrentham D.P.W., Water Division. Rough up any existing paint surfaces with sandpaper. Thoroughly clean hydrant with mineral spirit soaked rag. Apply rust converter on all areas. The hydrant must be scraped and primed. Two coats of rust inhibitive safety yellow paint shall be applied to the barrel, down to the ground level. Two coats of rust inhibitive white paint shall be applied to the bonnet and caps. Apply Never Seize to all nipple threads. Each hydrant will also have installed a “Heavy-Duty Fiberglass Hydrant Marker w/Optional Mini Flag” resilient 3/8” Diameter white laminar fiberglass shaft is 57” (5’) and is attached to a heavy duty MIL Spec FT3482 plated carbon steel spring. Red and white reflective bands on shaft. Mini flag 4” high X 5” wide white PVC exterior grade UV ray resistant material, with red reflective striping.

D. Per Town of Wrentham, Rules and Regulations Governing the Subdivision of Land. Section 5.32, there shall be a hydrant at a maximum of 500 foot intervals except in Commercial and Industrial zones, where there shall be a hydrant at a maximum of 300 foot intervals. Each hydrant shall be served directly from the water main through a 6-inch lateral connection. It shall be gated with a 6-inch gate valve attached to the T branch and shall have two 2-1/2 inch hose outlets and one 4-1/2 inch pump outlet. All hydrant threads are to be N.S.H.T. The 4-1/2 in. pump outlet shall be at least 18" above the finish grade. Flange of the hydrant shall be level with the finished sidewalk surface. Section 7.63, All hydrants shall be installed a minimum of twenty-four (24) inches back of the face of the curb.

3.5 – Temporary By-Pass Piping (if required)

A. The Contractor shall provide temporary by pass piping in such a manner that adequate pressure shall be available to all affected residences should his work require that the water service to customer be interrupted for more than a 4 hour period. The determination of the need for temporary piping and the size of the piping and service connections is the responsibility of the Division. The Contractor shall submit his plan to the Division for approval.

Revised 2020

WATER RULES, REGULATIONS AND FEES
OF THE
TOWN OF WRENTHAM
DEPARTMENT OF PUBLIC WORKS

THE WATER RULES, REGULATIONS AND FEES OF THE TOWN OF WRENTHAM DEPARTMENT OF PUBLIC WORKS SHALL BE CONSIDERED A PART OF THE CONTRACT WITH EVERY PROPERTY OWNER SUPPLIED WITH WATER FROM THE WRENTHAM D.P.W. AND EVERY SUCH PERSON TAKING WATER SHALL BE CONSIDERED AS HAVING EXPRESSED THEIR CONSENT TO BE BOUND THEREBY. THIS SHALL BE FURTHER CONFIRMED BY THE PROPERTY OWNER FILLING OUT, SIGNING AND RETURNING TO THE DEPARTMENT EITHER A "WATER SERVICE APPLICATION AND CONTRACT FOR NEW TAKERS" OR A "TRANSFER OF PROPERTY OWNER" FORM, DEPENDING ON WHETHER THE WATER SERVICE IS NEW OR PRE-EXISTING.

THE BOARD OF SELECTMEN RESERVES THE RIGHT TO CHANGE AT ANY TIME, THE WATER RATES AND FEES ESTABLISHED WITHIN THE SCHEDULE OF WATER RATES AND CHARGES WHICH SHALL BE INCORPORATED HEREIN, AND TO ESTABLISH SPECIAL RATES AND TO CHANGE OR AMEND THE FOREGOING RULES, REGULATIONS, AND FEES WITHOUT NOTICE.

ARTICLE 1
SERVICE APPLICATION AND CONTRACT

1.1 All applications for new water service connections must be made in writing on a form provided by the Town, bearing the signature of the owner (or authorized agent) of the premises; and state fully the purposes for which the water is to be used. A new taker and application fee, as specified in the Schedule of Charges Item 1, must accompany every application for a new water service connection. The fee shall cover services connected and completed within one year of the application approval. After the one year period, a new fee shall be due before a service can be added. ***The new taker and application fee does not apply to transfer of property owner on an existing service.***

1.2 The accepted application by the Department of Public Works, shall constitute a contract between the Town and the applicant, obligating the applicant to pay to the Town its rates, as established from time to time, and to comply with the rules and regulations. The applicant or property owner shall be hereafter referred to, in the following rules and regulations, as the Water Customer.

1.3 Applications for service installations will be accepted subject to the existence of a public main, abutting the premises to be served; within a public way; a way shown on a plan approved under the subdivision control law; or a private way within which the Town has an easement for the purpose of maintaining a public water main.

1.4 The Water Customer shall be responsible for the payment of all service until the time service is actually disconnected or until five (5) business days have elapsed after actual receipt of notice to discontinue, whichever shall first occur.

ARTICLE 2
SYSTEM DEMAND FEE

2.1 As of December 1, 1992, a System Demand Fee shall be imposed on all new water service connections to the water distribution system. The fee shall be in addition to the current costs charged by the Department of Public Works, Water Division, for tying in a new water service. Those charges currently made are to cover the work of attaching the new service to the system. The System Demand Fee covers the impact on and additional capital costs which will be necessary to allow the Town to be able to meet the demand of additional users. The fees collected will accumulate in a special fund to be used solely for the purpose of funding capital expansion and improvements to the water system.

2.2 A minimum System Demand Fee, as specified in the scheduled of charges Item 2, will be imposed on all new water services beginning December 1, 1992. The System Demand Fee is based on diametrical inch of service.

2.3 The service line size, for consideration of the System Demand Fee, is the size of water line which services the building and which is intended for domestic, sanitary or process water exclusive of fire protection requirements.

2.4 The System Demand Fee shall be paid at the time water connection is made to a home/building. (Revised 10/17/95 B.O.S.) The water will not be turned on until the System Demand Fee has been paid.

2.5 All water services installed prior to December 1, 1992 but are incomplete due to lack of a meter are subject to a System Demand Fee.

ARTICLE 3
SERVICE INSTALLATION

3.1 All service pipes, to be installed in Town ways, will be installed by the Department of Public Works from the street main to the water service shut off valve (curb stop). The curb stop shall be installed by the Department as near as possible to the property line running adjacent to the Town owned roadway. The Water Customer will be charged a tapping fee, as specified in the Schedule of Charges Item 3, plus all costs of the service connection including labor, materials, excavating, backfilling, road repairs, police detail for traffic control, if required and other necessary costs, including estimated cost of permanent patching of the road surface, after trench settlement.

3.2 A private contractor may install a service pipe in a Town way only with permission of the Department of Public Works, an approved street excavation permit and submission of a certificate of liability insurance. Materials, approved by the Department, shall be furnished by the contractor or owner. Any materials and/or labor furnished by the Department of Public Works shall be charged to the customer. The Department of Public Works **must** inspect installation prior to back filling.

3.3 The Water Customer must install, or cause to be installed, the remainder of the water service pipe, from the curb stop into the house. Materials and labor, approved by the Department, to be furnished by the Water Customer. All fittings supplied by the Department shall be billed to the Water Customer. The Department of Public Works must inspect installation prior to back filling.

3.4 The service pipe, from the curb stop to the building (or all pipe beyond the Town property line), is the property of the Water Customer.

3.5 All service pipes, to the building to be served thereby, shall have a minimum cover of at least five (5) feet.

3.6 No service pipes shall be laid in the same trench with gas pipes, sewer pipes or any other facility of a public service company, nor within five feet of any open excavation or vault, nor within ten (10) feet of any septic structure or leaching field.

3.7 All non-metallic water service lines and all non-metallic main extensions shall have an approved metal detectable tape, clearly printed with the word "WATER", placed at two (2) feet below the finished grade.

3.8 In no case will the main be tapped more than once for the same premises except by special permission of the Board of Public Works, and then only when the entire expense is borne by the Water Customer.

3.9 No water service shall be installed, by the Town, between December 15 and March 1. Application for water service must be received before December 1 for a service to be installed before December 15, provided that no unforeseen circumstances prevent the Department from doing so.

3.10 No water service shall cross an adjacent property in its travel from the street main to the Water Customer's premises without the permission of the adjacent property owner and the Department of Public Works and only when there is a deeded utility easement on the property that is being crossed.

ARTICLE 4
TEMPORARY CONSTRUCTION SERVICES

4.1 Temporary services for construction purposes will be granted only upon signing a Department contract and paying New Takers and Application Fee and Service Installation Fees, in addition to a fee, as specified in the Schedule of Charges Item 4, for a temporary service connection.

ARTICLE 5
METERS AND METER FITTINGS

5.1 Before final inspection is made and a building to be served by Town water is occupied, the Water Customer must purchase a water meter and have the same installed by the Department of Public Works, at the expense of the owner and pay all outstanding bills.

5.2 The meter shall be purchased by the Water Customer, from the Department of Public Works. The Department reserves the right to stipulate the size, type and make of meter to be used, as well as the location of the setting.

5.3 The original cost of the meter shall cover any future replacement costs, including price of a replacement meter and labor involved, for all meters 1" and under. For all meters over 1", the replacement cost shall be charged to the customer. When possible, the meter will be set just inside the basement wall, in a convenient place to control the entire supply. Where this is impossible or impractical, it may be set at the property line or some other location designated by the Department. All expense in connection with the property housing shall be borne by the Water Customer. The owner shall furnish a safe and convenient location for the meter and shall keep it accessible for reading at all times. Furthermore, the Department may require relocation of an existing meter, at the Water Customer's expense, if the Department deems it's present location inaccessible. The Water Customer shall protect the meter from freezing and other damage and shall be responsible for damage caused by his failure to do so.

5.4 An individual meter shall be required for each separate service connection. Furthermore, all newly constructed condominiums and apartments will be metered individually.

5.5 All water passing through a meter shall be charge for, unless otherwise stated.

5.6 The Water Customer shall permit no one, except an employee of the Department of Public Works or the Department's authorized agents, to inspect, repair or remove the meter or other fixtures adjacent to the meter, including meter valve and meter connection, that were installed by the Department on their premises. The Water Customer shall be charged for all parts and labor for any repairs made by the Department to fixtures adjacent to the meter. The Water Customer shall notify the Department as soon as it comes to his knowledge of any injury to or leakage of the meter or adjacent fixtures or any cessation in registration of the meter.

5.7 Any meter damaged through the negligence of the Water Customer, either from falling objects, freezing, hot water or otherwise shall be repaired or replaced by the Department of Public Works, at the expense of the Water Customer.

5.8 If a meter gets out of order and fails to register, the Water Customer shall be charged at the average daily rate of consumption as determined from meter readings when the meter was in order.

5.9 The Department of Public Works reserves the right to remove and to test any meter at any time, and to substitute another meter in its place. In the case of a disputed account involving the question as to the accuracy of the meter, such meter will be tested by the Department upon request of the applicant. A fee, as specified in the Schedule of Charges Item 5, for testing such meter will be required for meters one inch and smaller, payable in advance of the test. In the event that the meter so tested is found to have an error in registration in excess of 2% at any rate of flow within normal test flow limits, to the detriment of the Water Customer, the fee advanced for testing will be refunded and the current bill, based on the last reading of such meter, shall be corrected accordingly.

5.10 Meters larger than 1" shall be tested and repaired by the meter manufacturer and all costs therefore shall be paid for by the respective Water Customer. Unless otherwise approved by the Superintendent of the Department of Public Works, the meter manufacturer shall be engaged by the Town to do testing and repairing meters.

5.11 Meters larger than 2" may, at the Superintendent's discretion, be equipped with a bypass to eliminate the need of shutting off water service, provided that seals installed by the Department insure that water is bypassed only during testing and repair.

5.12 An approved stop valve shall be installed near the outlet of the meter by the Water Customer, at their expense, to permit removal of the meter without back flow from the house pipes.

5.13 If, in the opinion of the Department of Public Works, the installation of an approved check-valve on the property, side of a meter, of any Water Customer, is considered necessary for the safety of the water system, such approved check valve shall be immediately installed, at the expense of the Water Customer, after due notice, in writing, has been given to the Water Customer by said Department of Public Works.

ARTICLE 6
SERVICE DISCONTINUATION

6.1 Service may be discontinued for any one of the following reasons:

A. Use of water for purposes other than described in the application.
B. Misrepresentation in application.
C. Molesting Town property or seals on appliances.
D. Willful waste of water.
E. For vacancy.
F. Non-payment of bills when due.
G. For cross-connecting the Town service pipe with any other supply source without permission and an approved back flow preventor.
H. Refusal of reasonable access to property.
I. When the Department considers a service is in danger of freezing.

ARTICLE 7
CONDITIONS OF SERVICE AND LIABILITY

7.1 The Department of Public Works does not guarantee constant pressure nor uninterrupted service, nor does it assure the customer either a full volume of water or the required pressure per square inch necessary to effectively operate hydraulic elevators, sprinkler systems or other appliances, the same being subject to all the variable conditions that may take place in the use of water from the Town mains.

7.2 No Water Customer shall be entitled to damages, or to have payment refunded, for any interruption of supply occasioned either by accident to any portion of the works, or by shutting off for the purpose of additions or repairs to the works, or by the stoppage or shortage of supply due to causes beyond the control of the Department, such as excessive drought, excessive use of and waste of water by other customers, or by leaks or defects in the pipes or appliances owned by him or other customers.

7.3 The Department of Public Works reserves the right to shut off the supply of water without notice in case of accident or to make repairs, and in cases of severe drought or short supply to restrict the use of water or shut the water off from all places when in their judgment the supply for the time being can be suspended. Persons having boilers or other appliances on their premises depending on the pressure to the pipes to keep them supplied with water are hereby cautioned against the danger from the sources and are required to provide, at their own expense, suitable safety appliances to protect themselves against such danger. The Town will not be liable for damages to any person or premises resulting from the shutting off of the water from any main or service, even in cases when no notice is given, and no deduction from the water rates will be made in consequence.

7.4 When it becomes necessary to shut off the water from any section of the Town, because of an accident or for the purpose of making changes or repairs, the Department will endeavor to give timely notice to as many of the customers affected thereby as time and the character of the repairs or the accident will permit, and will, so far as practical, use it's best efforts to prevent inconvenience and damage arising from any such cause but failure to give such notice will not render the Town responsible or liable for any damages that may result from the shutting off of the water or any coincident conditions.

7.5 The Town of Wrentham, Department of Public Works, assumes no liability for conditions, which exist in customer's pipes and cause trouble coincident, or following the repairs of any main pipe, meter or other appliance previously installed by the Department.

7.6 The Town of Wrentham, Department of Public Works, will not be responsible for damages caused by dirty water or poor water quality.

7.7 The Superintendent of the Department of Public Works or his designee shall have the right to enter the premises of Water Customers to inspect the pipes and fixtures; set, repair and exchange meter and ascertain the quantity of water use.

ARTICLE 8
SUMMER SERVICES

8.1 Summer services are defined as water services that serve seasonal homes, where the service and/or meter are in danger of freezing. On due notice to the Department of Public Works, water will be turned on to seasonal homes in the spring, but not before April 1st and shut off in the fall, no later than October 30th. Turning on the service and installing the meter or turning off the service and removing the meter shall be at the expense of the owner in accordance with the Schedule of Water Rates and Charges. (Amended 9/30/03 Board of Selectmen)

ARTICLE 9
FROZEN WATER SERVICES

9.1 The Department of Public Works shall not be responsible for water service freeze-ups on private property. It is up to the Water Customer to thaw frozen pipes, under the supervision of the Department of Public Works. Any materials and/or labor furnished by the Department shall be charged to the Water Customer. Should a customer's pipes freeze, he is to notify the Department immediately upon discovery. Those customers whose pipes have frozen and are subsequently thawed out are required to leave a faucet running after the pipes have thawed, until such time as there is no further danger of freezing.

ARTICLE 10
SERVICE PIPE LEAKS

10.1 Any suspected leakage from service pipes must be reported promptly to the Department of Public Works, upon discovery by the Water Customer. The Department will investigate the leakage report. All leaks, from the street main to the curb stop (Town property) will be repaired by the Department at no expense to the Water Customer. Should the Department determine that there is leakage in the service pipe between the curb stop and the building (private property) the Department will notify the Water Customer of the customer's responsibility to repair the leak, at his own expense. The Department will allow a reasonable amount of time for the leak to be repaired, before discontinuance of service, if the leak is not too severe. Any repair work done must be inspected by the Department of Public Works.

ARTICLE 11
AIR CONDITIONING UNITS

11.1 Air conditioning units with water cooling devices or systems shall be prohibited unless such units are equipped or operated with recirculating water cooling systems or devices.

ARTICLE 12
BOOSTER PUMPS

12.1 Booster pumps are permitted in residences, but must be purchased, installed and maintained by the Water Customer.

12.2 No building or structure shall be connected to the Town water distribution system if the ground elevation is above 360 feet USGS seal level datum, unless a booster pump and tank are installed.

12.3 No building or structure shall be connected to the Town water distribution system if the ground elevation is above 410 feet USGS sea level datum.

ARTICLE 13
FIRE HYDRANT

13.1 Water from fire hydrants or other fire protection systems shall be used only for fire protection purposes, except that water from public fire hydrants may be used in a reasonable amount and at such time as the Town may permit for the purpose of testing water flows for fire fighting, testing hydrants and testing fire-fighting apparatus. Such tests to be conducted only by the properly authorized agents or employees of the municipality served and after the consent of

the Department of Public Works has been obtained. A fee, as specified in the Schedule of Charges Item 6, will be charged for each fire flow test. Water from fire hydrants may be used for special purposes, such as filling swimming pools. Permission must be obtained from the Department of Public Works and will be granted at its discretion and only when a meter has been installed on the fire hydrant, by the Department, prior to the removal of any water.

13.2 Damage to fire hydrants shall be billed to the party causing the damage.

13.3 When hydrants are open in case of fire, and water is turned off for accidents, notice must be sent immediately to the Superintendent of the Department of Public Works.

13.4 In accordance with Massachusetts General Laws, Chapter 148, section 27B, a fine as shown in the Schedule of Charges Item 7, shall be imposed on any individual willfully burying a fire hydrant with snow.

ARTICLE 14
NEW WATER MAIN INSTALLATION

14.1 Owners of new developments, approved by the Town of Wrentham Planning Board, shall bear the entire cost of installing new mains or extending existing mains in private ways in said development. The size of all mains installed by the subdivider or developer shall be determined by the Town and installed under the supervision of the Department of Public Works. In no case shall the size of the main, installed by the developer, be less than eight inches in diameter. The developer will cause the necessary trenches to be dug in accordance with the requirements of the Superintendent of the Department of Public Works. All work must be inspected before backfilled. The owner shall bear all expense of pressure testing and chlorination before the main when the subdivision is accepted as a Town way under Town Meeting approval. When a developer extends a water main on a public way, the Town maintains immediate ownership, upon installation of the main. However, the developer is still required to bear all costs of installation, pressure testing and chlorination. The developer must acquire a street excavation permit from the Department of Public Works and submit to the Department a certificate of liability insurance before the commencement of any work. Furthermore, developers must abide by additional rules and regulations entitled "TOWN OF WRENTHAM WATER RULES AND REGULATIONS FOR NEW SUBDIVISIONS".

ARTICLE 15
CROSS CONNECTIONS

15.1 In accordance with Massachusetts Department of Environmental Protection Cross Connection Regulations 310-CMR-22.22, no person shall maintain, upon premises which they own or occupy, a cross connection between the distribution system of the public water supply, the water of which is being used for drinking, domestic, or culinary purposes and the distribution

system of any unapproved water source, unless the installation has been approved by the appropriate reviewing authority and permits have been issued.

15.2 Any owner of a facility where cross connections are maintained, without required backflow prevention devices which have been approved by the reviewing authority, will receive a notice of non-compliance with corrective action to be taken. Failure to take corrective action within thirty (30) days of issuance of a second notice will result in a penalty as specified in the Schedule of Charges Item 8, per calendar day for each violation for as long as the violation(s) continue. Compliance will not be considered until all assessed penalties have been paid.

15.3 The Department of Public Works reserves the right to terminate any water service connection to any facility where cross connections are maintained without the required backflow prevention devices which have been approved by the reviewing authority.

ARTICLE 16
WATER RATES AND CHARGES

16.1 Water meters shall be read bi-annually at six-month intervals. Customers shall be billed after each meter reading for water used during that six-month meter reading period.

16.2 All billing of out-of-town users should be billed through the Town in which the water is used.

16.3 If a meter is not read during a regular 6-month reading period, an estimated bill will be mailed to the Water Customer, based on a previous 6-month reading. Adjustments of the bill will be made only after an actual meter reading has been taken.

16.4 Bills for service will be rendered only to property owners of record and they will be responsible for the payment of the bill when due. Water Customers must notify the Department of Public Works five (5) days prior to sale of their properties so that the meter can be read and a final bill prepared. A fee, as specified in the Schedule of Charges Item 9, shall be charged for a final meter reading.

16.5 All claims for adjustments of water bills shall be made within sixty (60) days, in the case of semi-annual bills, and within thirty (30) days on monthly or quarterly bills.

16.6 All monies due the Department of Public Works shall be payable to the Town of Wrentham, and be collected by the Town Collector.

16.7 In accordance with the provisions of General Laws, Chapter 40, Sections 42A through 42F, a water charge is a lien on the Real Estate.

ARTICLE 17
PENALTIES

17.1 Whoever opens a hydrant or removes the caps there from, tampers with a gate valve or valve boxes, removes or tampers with a meter, makes any connection with the main or service pipes, or turns off, or on, the water without permission of the Department of Public Works, except in cases of accidents or fires, shall be liable to penalty as provided by law.

17.2 Any person who shall violate any provisions of these Rules and Regulations shall be liable to a penalty as specified in the Schedule of Charges Item 10.

Revised 1-2006, 7-2006, 8-2006, 12-2009, 2-2012, 3-2013

STANDARD WATER SYSTEM REQUIREMENTS

PART 1: - GENERAL

1.01 – General Requirements

A. Attention is directed to the Rules and Regulations of the Wrentham Water Division and are hereby made a part of these Specifications.

B. The Contractor shall be responsible for a working knowledge of the requirements and Rules and Regulations of the Division prior to beginning any work.

C. All applications and fees to the Division shall have been completed and submitted to and approved by the Division prior to beginning any work. A properly prepared, up-to date scaled drawing of the proposed work shall be submitted to the Division for review and comment.

D. It shall be the responsibility of the Contractor to contact DIG SAFE and the Division and all other applicable utilities at least 72 hours in advance of the beginning of construction.

E. It shall be the responsibility of the Applicant / Contractor to obtain and comply with all the requirements of the applicable road opening permits.

F. All work shall be completed in accordance with these specifications and standard industry practices and methods. All materials to be used as part of the water distribution system or connections thereto, shall meet the requirements of the applicable American Water Works Association (AWWA) Standards.

G. No work shall be backfilled without being inspected by the Division.

H. Any materials damaged during unloading, storage or installation shall be immediately removed from the site and replaced at the Applicant / Contractor's expense.

I. All surface restoration of disturbed areas shall be the responsibility of the Applicant and authorized agent there of (Contractor). Upon completion of the work, all surfaces and surface features, (including pavements, walks, drives, fences, walls, lights, lawns, landscaping, etc.) shall be left in a condition that is at least equal to or better than that which existed prior to construction. All pavements within the Town of Wrentham or State Right of Way shall be restored in accordance with the applicable road opening permit and or established standards.

J. No water main or service will be accepted by the Division and or activated until such time as the Division has received all outstanding documentation (shop drawings, as-built drawings, etc.) and fees and outstanding charges).

K. The Division reserves the right to periodically modify these standards and to waive parts or requirements thereof should it be in the best interest of the Division to do so.

L. No person other than Division personnel shall operate any valve, hydrant or other components of the Divisions water distribution system.

1.02 – Submittals Requirements

A. The decision of the equality of materials, products, assembly or system, other than those named or described in these specifications shall be made by the Division based upon the information provided by the applicant. All costs relating to providing said information (samples, testing, etc.) shall be the responsibility of the applicant or authorized agent thereof (i.e. Contractor).

B. The Contractor shall submit the following products (if used) to the Wrentham Water Division or its Engineer for approval:

- Pipes
- Fittings
- Valves
- Hydrants
- Service Materials
- Road Boxes
- Etc.

C. An accurate, scaled "As-Built" drawing shall be prepared by the Contactor using measurements and dimensions taken by the Contractor during installation of the water system components. Distances from permanent surface features (building corners, utility poles, edge of curbs, etc.) to buried valves, pipe bends and fittings etc. shall be shown on the drawings as well as any other pertinent information such as pipe size and material, depth of bury and clearances between the water lines and other crossing utilities such as gas, electrical, sewer and drain.

PART 2: - PRODUCTS

2.1– Submittals Requirements

A. The following information pertaining to products is included for the Contractor's information.

B. The Contractor shall install all ductile-iron pressure pipe, fittings (including special castings), service connections and appurtenant materials and equipment, as herein specified and in accordance with the submitted plans.

C. Wherever a pressure classification (e.g. Class 150) is indicated or specified, it shall mean that working pressure for ANS A21.50-1971 laying condition B under five (5) feet of cover as defined by the applicable standard specification for the type of pipe to which it permits.

D. Joints in buried exterior pipelines shall be push-on joints. Buried valves and fittings shall be mechanical joint. Joints, valves and fittings in exposed pipelines shall be flanged joints. Joints in service connections shall be compression type.

2.3 – Ductile-Iron Pipe

A. All ductile-iron pipes shall be designed in accordance with AWWA C150 and shall be manufactured in accordance with AWWA C151.

B. Unless otherwise indicated or specified, double thickness, cement lines ductile-iron pipe shall be at least thickness Class 52.

C. Prior to delivery to the site, each piece of ductile-iron pipe shall be individually tested to insure 100 percent ductility by the ball impression test or an approved equal.

D. Buried joints (pipe to pipe) shall be of the push-on type.

E. All pipes and fittings shall have no less than five (5) and no more than six (6) feet of cover unless otherwise approved by the Division. No pipe shall be laid in the same trench with gas pipes, sewer pipes, or any other facility of a public service company, nor within five (5) feet of any open excavation or vault, nor within ten (10) feet of any septic structure or leaching field.

2.4 – Fittings

A. Fittings shall conform to the requirements ANSI/AWWA C110 or AWWA C153 and be North American made and shall be of a pressure classification at least equal to that of the pipe with which they are used.

B. All buried fittings shall be mechanical joint.

C. Fittings must be ductile iron and North American made.

D. Fittings shall be cement lined in accordance with ANSI/AWWA C104/A21.4-90.

E. Tapping sleeves, if used, shall be the full mechanical joint type ductile iron sleeve, or others approved through the Division. Sleeves "O" ring type seal ring will not be allowed.

F. Sleeve type couplings shall only be used with the prior approval of the Division. If allowed, sleeves shall be of the solid type ductile iron with mechanical joint ends.

G. The use of "Dresser" style ductile couplings shall only be used with the approval of the Division.

2.5 – Types of Joints

A. Joints for push-on and mechanical joint pipe shall conform to AWWA C111.

B. The plain end of push-on pipe shall be factory machined to a true circle and chamfered to facilitate fitting the gasket.

C. The plain ends of field cut pipe shall be chamfered to prevent damage to the gasket.

D. Push-on and mechanical joint pipe and fittings shall be provided with sufficient quantities of accessories conforming to AWWA C111 and be North American made.

E. Flanges for flanged pipe shall conform to ANSI B16.1, except that special drilling or tapping shall be a necessary to insure correct alignment and bolting. Flanged pipe shall use long-hub flanges which shall be screwed on tight at the foundry by machine before they are faced and drilled.

F. Gaskets shall be of a composition suitable for exposure to the liquid with the pipe.

2.6 – Lining and Coating

A. All pipe and fittings shall be lined and coated as specified below.

B. The inside of pipe and fittings carrying potable water shall be given a double thickness cement lining and bituminous seal coat in accordance with AWWA C104.

C. The outside of pipe and fittings shall be given the standard bituminous coating. Also the appropriate AWWA Standard Specification for pipe and fittings.

D. Machined surfaces shall be cleaned and coated with a suitable rust preventative coating at the shop immediately after being machined.

2.7 – Water Service Materials

A. Water service pipe shall be at least 1 (one) inch diameter polyethylene (CTS) (PE) Class 3408, 200 psi, color blue or 1 (one) inch Type K Copper Tubing. Water service pipe over 2 (two) inch diameter shall be ductile iron. All non-metallic water service lines shall have a locate wire attached and shall be no less than 14 gauge (minimum), single strand UF rated (Direct burial) copper wire with 30 mil. (minimum) insulation. The outside color of the wire shall be either black or blue. Also stainless steel insert stiffeners shall be used at all fittings.

B. Stainless steel inserts within the PE tubing shall be used at all compression connections.

C. Water service tubing between the corporation and the curb stop shall be one (1) piece.

D. Water service tubing between the curb stop and the house / meter setup shall be one (1) piece. Unless otherwise authorized by the Division.

E. The locating wire will be one piece from water main to curb stop. The wire on the service tubing between the corporation and curb stop shall be stripped at both ends, connected to the corporation and curb stop stainless steel screws and attached to the tubing.

F. Also the locating wire will be one piece from curb stop to into the house foundation to meter setup, unless otherwise authorized by the Division. The wire on the service tubing between the curb stop and the house foundation to meter setup shall be stripped at both ends, connected to the curb stop and meter setup stainless steel screws and attached to the tubing.

G. Corporation stops for all water main service pipe connections shall be of solid brass or bronze construction suitable for compression type connections for the indicated service pipe. The corporation stops shall have AWWA (tapered) thread on the inlet side of the stop. The size of the corporation shall be matched to the size of the service pipe or tubing. Service clamps shall be installed with all corporation stops 2 inch and larger in size. Corporations shall be as manufactured by Ford FB1000-4 1"CC x 1"PJCTS Ball type w/ Pac joint or McDonald 4133-163 1"CC x 1" PJCTS Ball type w/ Mac Pac Nut or comparable brand.

H. All curb stops for service pipe connections shall be of solid brass or bronze material and open left. The inlet and outlet shall be as required to suit the types of pipe or tubing connected. The curb stops shall have a drain. Curb stops shall be as manufactured by Ford B44-444 SW 1"PJCTS x 1"PJCTS Ball type w/ Pac joint stop & waste or McDonald 4131-270 1" PJCTS x 1" PJCTS Ball type w/ Mac Pack Nut stop & waste or comparable brand.

I. 2 ½" Buffalo style service curb box slide type, lock type cover fits flush with top of service box, and has a brass pentagon nut to lock cover, North American made. Cover – 2 ½", Top – 2 ½" x 24" Service box top slide, Base – 2 ½" x 47" Service box base slide. Curb box shall be centered over curb stop operating valve and be plumb.

J. All adapters and miscellaneous fittings to connect to existing or proposed water service materials shall provide an adequate seal at the working pressure of the water main and be approved by the Water Division.

K. The installation of an approved back flow device shall be installed immediately after the meter.

L. The water service must enter the basement within one (1) foot of the inside of the foundation wall. The meter shall be set between twelve (12) inches and eighteen (18) inches from the floor and between three (3) inches and twelve (12) inches from the wall. The meter fittings shall be anchored to either the cement floor or the cement wall. The meter shall be set in a protected area to prevent any type of damage and in a location to allow easy accessibility at all times for reading and repairs. The location of the meter within a confined space is prohibited. The Division reserves the right to determine the final meter location.

M. The curb stop shall be installed at the property line running adjacent to the Town owned roadway. The service line, from the main to the curb stop, shall be installed at a right angle perpendicular to the water main. The Division must inspect the service tap, in the street main, and the entire service installation, prior to back filling. All service pipes and fittings shall have no less than five (5) and no more than six (6) feet of cover unless otherwise approved by the Division. The service pipes and fittings shall have a suitable bed of sand and a minimum of one (1) foot of sand above and below covering the pipe and fittings. No service pipe shall be laid in the same trench with gas pipes, sewer pipes, or any other facility of a public service company, nor within five (5) feet of any open excavation or vault, nor within ten (10) feet of any septic structure or leaching field. All water service lines shall have an approved metal detectable tape, clearly printed with the word "water", placed at two (2) feet below the finished grade.

2.8 – Valves

A. Valves three (3) to ten (10) inches in size, inclusive, shall be designed for a working water pressure of 250 psi.

B. All valves shall <u>open left</u> in accordance with the Division Standards.

C. The valves shall be designed so that parts subject to wear may be easily replaced and shall be constructed to wear-resistant material.

D. Valves shall be ductile iron, non-rising stem resilient seated, wedge type gate valves conforming to the most recent edition of AWWA C509 or AWWA C515. Valves shall meet current AWWA turn count standards. The valves shall, in addition, meet the following requirements:

i. The valve waterway shall be smooth and unobstructed without depression or cavities where foreign material can accumulate.

ii. All interior and exterior ferrous parts shall be coated with fusion-bonded epoxy. Said coating shall be non-toxic, impart no taste to water and shall conform to AWWA C550 and NSF 61, the latest revisions.

iii. The gate shall be totally encapsulated with rubber coating that utilizes a rubber seating edge at the bottom, which will eliminate the possibility of entrapment of foreign material.

iv. The valve shall utilize a rubber encapsulated disk. The valve shall close bubble tight.

v. The valve shall be designed so no metal fasteners or screws other than the stem and stem nut are exposed to water.

vi. The stem shall be bronze with an integral thrust flange, o-rings and anti-friction devices to reduce operating torque.

vii. When used as a tapping valve, the valve shall be constructed to permit the use of standard full size cutters.

viii. Buried valves shall have mechanical joint ends and a 2-inch square operating nut.

ix. Buried valves (Post Indicator Valve) controlling water supplies for fire protection system shall carry the UL/FM rating as appropriate and be supervised per applicable codes.

x. Bonnet bolts / nuts shall be stainless steel.

xi. Valve stuffing box shall utilize multiple o-ring seals.

xii. Valve shall be installed plumb.

E. Valves 12 inches and larger shall be the butterfly type, Class 250, ductile iron with mechanical joint ends and a 2 inch square operating nut and comply with the most recent edition of AWWA C504 for butterfly valves. Valves shall meet current AWWA turn count standards.

i. The butterfly valve shall be designed for a working pressure of 250 psi unless otherwise indicated.

ii. The valve seat shall have a constant uninterrupted 360 degree seating.

iii. The valve operator shall be designed for 450 foot-pounds of torque.

iv. The valve shall have a fusion bonded epoxy coating inside and out.

v. Valves disks shall seat at an angle of 90 degrees to the axis of the pipe.

vi. Valve shall be installed plumb.

vii. Butterfly Valves shall have ductile iron bodies and 630 stainless steel shafts

viii. All valves shall open left in accordance with the Division Standards.

2.9 – Tie rods, Clamps, Thrust Restraint

A. The contractor shall furnish and install Tie-rods, clamps, couplings, concrete and accessories to prevent the movement of branch valves and/or fittings.

B. The claims and Tie-rods shall be of the size, materials and shall be constructed as indicated by the latest edition of the National Fire Protection Association's National Fire Codes, Publication: NFPA 24.

C. The use of lug style retainer glands is allowed as an alternative to rods provided the gland used meets the following:

i. The restraining devices shall not damage the pipe wall or lining, and should provide 360 degrees of restraint around the pipe.

ii. A device to indicate proper tightening of setscrews shall be used; torque screws should twist off @ 80-90 ft. lbs.

iii. Retainer glands shall be "Mega lug" style or equal.

iv. North American made.

2.10 – Valve Boxes

A. Unless otherwise specified or required, each buried valve shall be provided with a valve box. Valve boxes shall be cast-iron and of the adjustable, slip, heavy-pattern type and be North American made. They shall be so designed and constructed as to prevent the direct transmission of traffic loads to the pipe or valve.

B. The upper or sliding section of the box shall be provided with a flange having sufficient bearing area to prevent undue settlement. The lower section of the box shall be designed to enclose the operating nut and stuffing box of the valve and fit over the valve bonnet. The boxes shall be adjustable through at least six (6) inches vertically without reduction of the lap between sections to less than eight (8) inches. Valve box shall be centered over operating nut and be plumb.

C. The inside diameter of the boxes shall be at least 5 ¼" and the lengths shall be as necessary for the depth of the valves with which the boxes are to be used. Top section shall be 26" valve box top. Bottom section at no time shall be less than 48" valve box base – belled.

D. Covers shall be close fitting and substantially dirt-tight. The top of the cover shall be flush with the top of the box rim. The word "Water" shall be cast in the top of the cover. Cover should be heavy-duty weighing at least 10 lbs.

E. Castings for the valve boxes shall be strong, tough even grained, and without defects. Valve boxes shall be North American made.

2.11 – Hydrants

A. Hydrants shall be manufactured in accordance with the most recent edition of AWWA Specification C502, designed for a minimum of 250 pounds working pressure, and tested to a minimum of 500 pounds hydrostatic pressure and shall open left. Hydrant shall be U/L listed & FM approved.

B. The hydrant shall be center stem compression type.

C. An automatic, drain is to be provided to permit draining the hydrant barrel.

D. Hydrants shall be designed with the following features.

i. Permit removal of all working parts through the top without the use of any special tools or wrenches. All working parts shall be bronze and interchangeable, with similar parts of same size and type.

ii. In the event of accident, damage or breaking of hydrant, the main valve will remain closed by mechanical means.

iii. The direction of the nozzles can be changed 360 degrees by rotating the hydrant without digging up the hydrant.

iv. Extensions may be added without the necessity of closing off the water or digging up the fire hydrant.

E. Hydrants will have a valve opening of 5 ¼ inches.

F. Inlet connection shall be six (6) inches and mechanical type joint.

G. Hydrants shall have two (2) 2 ½" hose nozzles and one (1) 4 ½" pumper nozzle. Nozzle threads to be National Standard. Operating nuts shall be National Standard, pentagon shape, 1 ½ inch point to flat. Hydrants shall be suitable for installation with a minimum of five (5) and no more than six (6) foot depth of cover at the inlet connection without the hydrant being significantly higher or lower than as indicated on the drawings.

H. Hydrants manufactured for a greater depth of bury shall be provided where depth of coverage over the water main is greater than the standard five (5) and no more than six (6) foot of cover. Said hydrant shall be prominently marked with the depth of bury.

I. Hydrants shall be furnished with a frangible break flange at the ground line and a cast-iron or stainless steel break coupling on the stem at the ground line, which shall be so designed so that in case of breakage, only the flange and coupling need be replaced to affect complete repair.

J. Hydrants shall be painted according to specifications of the Wrentham D.P.W., Water Division. If needed, (rough up any existing paint surfaces with sandpaper. Thoroughly clean hydrant with mineral spirit soaked rag. Apply rust converter on all areas. The hydrant must be scraped and primed). Two coats of rust inhibitive safety yellow paint shall be applied to the barrel, down to the ground level. Two coats of rust inhibitive white paint shall be applied to the bonnet and caps. Apply Never Seize to all nipple threads.

K. Each hydrant will also have installed a "Heavy-Duty Fiberglass Hydrant Marker w/Optional Mini Flag" resilient 3/8" Diameter white laminar fiberglass shaft is 57" (5') and is attached to a heavy duty MIL Spec FT3482 plated carbon steel spring. Red and white reflective bands on shaft. Mini flag 4" high X 5" wide white PVC exterior grade UV ray resistant material, with red reflective striping.

L. For the purpose of standardization, hydrants shall be either the A.F.C. American Darling B-62-B hydrant or the Kennedy Guardian K-81D hydrant. Hydrants shall be 5 ¼" V.O. Hydrants shall open left, have 2 - 2 ½" side nozzles NST tread and 1 - 4 ½" Steamer nozzle NST tread. Hydrants shall come from the factory with upper barrel color being primed yellow and no chains or bands on nozzles and barrel. Hydrant shall open left. Pentagon operating nut on caps and operating nut and measure one and one half inches from flat to point.

M. With the exception of the hydrant at the end of the line, hydrants shall be installed using 8-in. x 6-in. hydrant anchoring tees, six (6) inch valves and six (6) inch ductile iron stubs. For hydrants at the end of the line, hydrants shall be installed using an 8-in. x 6-in. decreaser, a six (6) inch valve and a six (6) inch CLDI hydrant stub with the hydrant being located at the direct end of the line and in the planting strip. Restraining rods or other restraining devices must be used between the six (6) inch valves and the hydrants. (The hydrant placement in the grass strip shall allow for a minimum of twenty four (24) inches between the face of the curb and the hydrant steamer cap at its furthest extremity). The grade of the hydrant shall be set so that there is three (3) inches from the finished grade to the break flange. Hydrants shall be set plumb. Broken stone shall be placed around the base of the hydrant at the location of the drain hole, and backfill around hydrant shall be thoroughly compacted to the grade line.

N. Hydrants installed at locations which, in the opinion of the Division, may be subject to possible damage from vehicles, said hydrant shall be protected by a minimum of two (2) 6" diameter concrete filled steel bollards placed to facilitate full unrestricted access to the hydrant.

O. Hydrant thrust blocks: Concrete for the thrust blocks securing hydrants shall be sized and installed to provide adequate thrust restraint for the soil type encountered.

2.12 – Backflow Prevention Devices

A. In accordance with Massachusetts Department of Environmental Protection Cross Connection Regulations 310-CMR-22.22, no person shall maintain, upon premises which they own or occupy, a cross connection between the distribution system of the public water supply, the water of which is being used for drinking, domestic, or culinary purposes and the distribution system of any unapproved water source, unless the installation has been approved by the appropriate reviewing authority and permits have been issued.

B. Backflow prevention devices shall be provided by the customer on all services. Said approved devices shall be installed on the customer side of the meter and shall be installed per DEP requirements by a qualified individual in a suitable location where it is convenient for testing and will not compromise the décor or operation of the business. During the required periodic testing of said devices, it is required to interrupt the water supply to the building for a period. If said interruptions of service during normal business hours can not be tolerated, it is required that an additional device be installed in parallel that would allow one backflow preventer to be taken off line at a time for testing while the other remains in service.

C. Any owner of a facility were cross connections are maintained, without required backflow prevention devices which have been approved by the reviewing authority, will receive a notice of non-compliance with corrective action taken. Failure to take corrective action within thirty (30) days of issuance of notice will result in a penalty as specified in the Wrentham water rules, regulations and fees, Schedule of Charges, Item 8, per calendar day for each violation for as long as the violation(s) continue. Compliance will not be considered until all assessed penalties have been paid.

D. The Division reserves the right to terminate any water service connection to any facility where cross connections are maintained without the required backflow prevention devices which have been approved by the reviewing authority.

PART 3: - EXECUTION

3.1 – Water Distribution Main

A. The Contractor's attention is directed to the fact that the cement pipe lining is relatively brittle. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe or lining, scratching or marring machined surfaces, and abrasion of the pipe coating or lining.

Any filling or pipe showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work site.

In any pipe showing a distinct crack and in which it is believed there is no incipient fracture beyond the limits of the visible crack, the cracked portion, if so approved by the Division, may be cut off by and at the expense of the Contractor before the pipe is laid so that the pipe used is perfectly sound. The cut shall be made in the sound barrel at a point at least twelve (12) inches from the visible limits of the crack.

Unless otherwise approved, all cutting of ductile iron pipe shall be done with an approved power operated cutter. Hammer and chisel shall not be used to cut pipe. All ends shall be examined for possible cracks caused by cutting and chamfered to prevent damage to the gasket.

Pipe shall be installed as to maintain the required minimum earth cover of five (5) foot vertically over and horizontally from the sides of the pipe. With approval from the Division only, piping not having the necessary vertical or horizontal cover shall be restrained against movement and protected from freezing.

B. Before any length of pipe is lowered into the trench it shall be inspected for damage and the inside of the pipe shall be cleared of any loose dust and foreign objects. No defective pipe or fittings shall be laid or placed in the piping, and any piece discovered to be defective after having been laid shall be removed and replaced by a sound and satisfactory piece at the Contractor's expense.

Each pipe and fitting shall carefully cleared of all debris, dirt, etc., before being laid and shall be kept clean until accepted in the complete work.

Pipe Location. All pipes and fittings shall have no less than five (5) and no more than six (6) feet of cover unless otherwise approved by the Division. Exterior pipelines will be located substantially as indicated on the approved drawings, but the right is reserved to the Division, to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings, etc., are noted on the approved drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different additional or different fittings, where required, without additional compensation. (Care shall be taken to ensure a good alignment both horizontally and vertically, and, in the case of buried lines, to give the pipe a firm bearing along its entire length).

When mechanical joint pipe or similar pipe is laid, the bell of the pipe shall be cleaned of excess tar or other debris and wiped out before the cleaned and prepared end of the next pipe is inserted into it. The new pipe shall be set and held firmly in place until properly seated and held securely until the joint has been completed.

C. Before any section of pipe is joined with another with a push on type joint, it shall be inspected for damage and the inside of the pipe shall be wiped clean and clear of any debris. Surfaces against which the gaskets will come into contact shall be thoroughly wire brushed and washed with clean water, care being taken that no sand or grit be allowed to remain on these surfaces. The gasket shall then be cleaned and inserted in the groove provided in the bell of the previously laid pipe, making sure the gasket is inserted in the proper manner and securely seated. The gasket and the plain pipe end shall be lubricated with an approved lubricant in accordance with the pipe manufacturer's literature. The ends of cut pipe should be checked before assembly to ensure that they have been chamfered to facilitate assembly and prevent tearing of the gasket.

Special care must be given by the Contractor to use the proper gaskets designed and manufactured for the brand of pipe being installed or connected to. Avoid mixing different gaskets together.

The plain end of the pipe shall then be aligned to be in line with the previously set length of pipe and inserted into the gasket, and pushed through the gasket until seated in the bell. If the joint cannot be assembled with a reasonable amount of force, the plain end shall be removed from the bell and the gasket shall be checked for proper positioning before reassembly. If an effective seal is not obtained at the joint, the joint shall be disassembled, cleaned, and reassembled, utilizing a new gasket.

Pipe shall be deflected after the plain end has been fully seated within the bell. The amount of deflection shall not exceed the maximum allowable deflection indicated by the pipe manufacturer and accepted standards.

D. Before any section of pipe is joined with another with a mechanical type joint, it shall be inspected for damage and the inside of the pipe shall be wiped clean. Any excess coating in the bell section shall be removed to prevent an improper fit.

The plain end, bell socket, and gasket shall be wiped clean, and washed with a soap solution to improve seating of the gasket and provide lubrication. The gland shall be placed on the plain end with the lip extension towards the plain end of the pipe followed by the gasket with the narrow edge towards the plain end of the pipe.

The plain end of the pipe shall then be centered and pushed into the bell socket and the gasket pressed firmly and evenly around the socket. The gland shall be pushed up to the bell and centered with the gland bolts being inserted and evenly tightened until "finger tight".

The tightening of the bolts shall be completed with diametrically opposite bolts being tightened in sequence so as to keep the gland square with the socket and produce even bolt stresses.

The correct range of torque to be obtained is shown below, preferably by means of a torque wrench:

Bolt Size (Inches)	Range of Torque (Ft. Lbs.)
5/8	45-60
3/4	75-90
1	85-100

If an effective seal is not obtained at the joint at the maximum torque indicated above, the joint shall be disassembled, thoroughly cleaned and reassembled with a new gasket. Bolts shall not be over-torqued to tighten leaking joints.

E. Flanged ductile iron pipe and fittings shall be assembled in accordance with the manufacturer's literature.

F. In laying ductile iron pipe, the following deflections, which reflect the manufacturer's allowable recommended maximum deflection, shall not be exceeded.

	Deflection – Inches / Pipe Radius (ft) For 18 Foot Pipe Length	
Nominal Size of Pipe - Inches	PUSH ON JOINT	MECHANICAL JOINT
4	19" / 205'	31" / 125'
6	19" / 205'	27" / 145'
8	19" / 205'	20" / 195'
10	19" / 205'	20" / 195'
12	19" / 205'	20" / 195'
16	11" / 340'	13.5" / 285'

Deflections shall be made after the joint is made. For mechanical joint pipe, the bolts shall be partially tightened before the length of pipe is deflected.

G. At all times when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight 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 entering the pipe is eliminated. In the event that pipe is installed by transporting the underwater section as a unit through the water, the ends of the pipe shall be closed with suitable temporary plugs.

H. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of eight inches. Soapy water may be used as a gasket lubricant. A follower and gasket in that order shall be slipped over each pipe to a distance of about six inches from the end, and the middle ring shall be placed on the previously laid pipe end until it reaches the pipe stop or is properly centered over the joint. The other pipe end shall be inserted into the middle ring and brought to proper position against the pipe stop or in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares. After the bolts have been inserted and all nuts have been made up finger tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, by the use of a torque wrench of the appropriate size and torque for the bolts.

I. All valves, fittings, and appurtenances installed shall be set and jointed by the Contractor as indicated on the Drawings.

J. The Contractor shall furnish and install all supports necessary to hold the piping and appurtenances in a firm, substantial manner at the lines and grades indicated on the Drawings or specified. Unless approved otherwise, all bends, tees, dead-end plugs/caps, and other fittings in ductile iron pipelines buried in the ground shall be restrained to resist thrust with concrete placed in an approved manner against undisturbed earth where firm support can be obtained. If the soil does not provide firm support, then suitable bridle rods, clamps, and accessories to brace the fitting properly shall be provided. Such bridle rods, etc., shall be coated thoroughly and heavily with an approved bituminous paint after assembly or, if necessary, before assembly.

K. All backfill around installed pipe and appurtenances shall be clean, dry material free of frozen material, mud, organics, bituminous concrete, debris, etc. All pipes and fittings shall have no less than five (5) and no more than six (6) feet of cover unless otherwise approved by the Division. No stone larger than 3 inches shall be placed within 12 inches of the installed pipe. The remaining backfill shall not contain any rock, stone or pieces larger than 6 inches. Proper compaction shall be performed with vibratory compactors in lifts not exceeding one foot. Compaction shall be at least 90% under non-paved areas and 95% under pavements.

L. The ductile iron pipe shall be given pressure and leakage tests in sections of approved lengths. For these tests, the Contractor shall furnish all labor and materials including an approved pump, tanks, hoses, meters and pressure gauges. The Contractor shall furnish, install and remove (after testing) suitable temporary testing taps, plugs or caps for testing the pipeline; and other similar equipment; and all labor required all without additional compensation. The meter and gauges shall be installed by the Contractor in such a manner that all water entering the section under test will be measured and the pressure in the section indicated, and they shall be kept in use during both tests.

The scheduling of pressure and leakage tests shall be as allowed by the Division.

Unless it has already been done, the section of pipe to be tested shall be slowly filled with water of approved quality, and all air shall be expelled from the pipe by flushing and the test section of pipe be allowed to stabilize preferably for 24 hours. If hydrants or blow-offs are not available at high points for releasing air or for isolating sections of the mains to be tested, the Contractor shall be responsible to make the necessary excavations, backfilling, compaction, and the necessary taps at such points and shall remove the taps and plug said holes with brass or bronze plugs after completion of the test and to restore the surface.

For the pressure test, the Contractor shall, by pumping, raise the water pressure (based on the elevation of the section under test and corrected to the gauge location) to a minimum of 150 pounds per square inch or to a pressure equal to 150% of the normal static pressure, at the highest point of the section being tested, whichever is larger*. If the Contractor cannot achieve the specific pressure and maintain it for a period of one (1) hour, the section under tests shall be considered as having failed to pass the pressure test.

**Higher test pressures may be required by the Division, but not to exceed the rated pressure ratings of the valves or hydrants.*

Only upon completion of a successful pressure test, the Contractor shall make a leakage test by metering the flow of water into the pipe while maintaining in the section being tested a pressure within 5± psi of the pressure to which the pipe will be subjected under the pressure test for at least one hour. This shall be done by placing the section under pressure by pumping. No pipe installation will be accepted if the leakage is greater than that determined by the formula:

$$L = \frac{SD\,(P)\,0.5}{133{,}320}$$

For mechanical joints and push-on joints, in which **L** is the allowable leakage, in gallons per hour; **S** is the length of pipeline tested in feet; **D** is the nominal diameter of the pipe, in inches; and **P** is the average test pressure during the leakage test, in pounds per square inch gauge.

ALLOWABLE LEAKAGE (GALS. PER HOUR) PER 1,000 FT. OF PIPELINE

	NOMINAL PIPE DIAMETER							
Avg. Test Pressure (psi)	**3**	**4**	**6**	**8**	**10**	**12**	**14**	**16**
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47
125	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34
100	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20

Note:

If testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal. /hour per inch of nominal valve size shall be allowed for the leakage test only.

At the specified system pressure, no leakage will be allowed at flanged joints.

If the section shall fail to pass the pressure test, the leakage test, or both, the Contractor shall do everything necessary to locate, uncover, (even to the extent of uncovering the entire section), isolation of pipe sections by capping or installing valves, and repair or replace the defective pipe, fitting, or joint, all at his own expense and without extension of time for completion of the work.

If in the judgment of the Division, it is impracticable to follow the foregoing procedure exactly for any reason, modifications in the procedure shall be made as required or approved, but in any event the Contractor shall be responsible for the ultimate tightness of the line within the above leakage requirements.

M. All water mains, after passing the leakage and pressure tests shall be flushed, disinfected, and flushed again as follows, prior to being put into service. The Contractor shall furnish the necessary labor and pumps, hoses, barrels, taps for proper chlorine distribution, and chlorine test kits for the disinfection procedure.

All water mains shall be thoroughly flushed to clear the pipe of debris and sediment prior to disinfection. The flushing rate shall be at least 2.5 fps for mains smaller than twenty (20) inches in diameter. The flushing velocity in pipes greater than twenty (20) inches in diameter may be at a lower rate, as approved. The following table lists the required opening to flush pipelines to obtain a velocity of 2.5fps and is taken from AWWA Standard C651.

REQUIRED OPENINGS TO FLUSH PIPELINES*
TO PRODUCE 2.5 FPS VELOCITY

PIPE SIZE (IN)	REQ'D FLUSHING RATE (GPM)	ORIFICE SIZE	HYDRANT OUTLETS REQUIRED TO BE OPENED		
			(INCH)	(NUMBER)	(SIZE)
4	100		15/16	1	2-1/2
6	220		1-3/8	1	2-1/2
8	390		1-7/8	1	2-1/2
10	610		2-5/16	1	2-1/2
12	880		2-13/16	1	2-1/2
14	1,200		3-1/4	2	2-1/2
16	1,565		3-5/8	2	2-1/2
18	1,980		4-3/16	2	2-1/2

*With 40 psi residual pressure, a 2-1/2 in. hydrant outlet nozzle will discharge approximately 1,000 gpm and a 4-1/2 in. hydrant nozzle will discharge approximately 2,500 gpm.

The disinfection of water mains shall be accomplished in accordance with latest edition AWWA Standard for Disinfecting Water Mains, C651, and/or the DEP Water Supply Guidelines for Public Water Systems, whichever of the two (2) is more stringent. The following descriptions may be used as a guide:

i. Disinfection of mains should be accomplished only by workmen who have had experience with chlorine or other disinfecting agents. Liquid chlorine (gas at atmospheric and sodium hypochlorite solutions are the most common disinfectants used). Chlorine gas and water solutions are fed into the main being disinfected to a concentration of at least 50 parts per million available chlorine. To insure that the required concentration is maintained, chlorine residuals are obtained. This chlorinated water solution should remain in the pipe for at least 24 hours, at the end of which period the chlorine concentration should be at least 25 parts per million. If this is achieved, final flushing can be accomplished and chlorine residuals checked to determine that the heavily chlorinated water has been removed from the pipeline. Said chlorinated water shall be disposed of in a safe, proper and legal manner.

CHLORINE REQUIRED TO PRODUCE 50 mg/1
CONCENTRATION IN 100 FT. OF PIPE – BY DIAMETER

Pipe Size in.	100 percent Chlorine lb.	1 percent Chlorine Solutions gal.
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88

ii. The Slug Method of Chlorination, which is used for large diameter water mains consists of moving a column of highly concentrated chlorine water solution (at least 300 ppm) along the interior of the pipe with a contact time of at least three hours with the pipe wall. (See AWWA Standard C651 Section 7.2 for further information).

N. After the applicable retention period, the heavily chlorinated water shall be disposed of or neutralized and the main flushed until the chlorine concentration in the water leaving the main is equal or less than that of the prevailing system or less than 1 mg/l.

O. After final flushing and before the water main is placed in service, a sample or samples shall be collected from the water main at locations approved by the Division and tested for bacteriological quality. Samples shall be analyzed for the presence of Coliform bacteria and heterotrophic plate count (HPC) bacteria. Samples shall show an absence of coliform bacteria and heterotrophic plate count (HPC) bacteria are less than 500 colony forming units per milliliter (cfu/ml). In the case of extremely long mains several samples shall be collected along its length, as well as the end. The Contractor shall obtain suitable sample containers, take samples under the direction of the Division, submit samples to a Department of Environmental Protection certified laboratory for analysis, and see that analysis reports are sent to the Division. The Contractor shall bare the costs for said sampling, delivery and tests.

If the initial disinfection fails to produce satisfactory samples, the disinfection process shall be repeated at the Contractors expense.

P. The Contractor shall submit a program for the construction and putting into service of the new works subject to the approval of the Division. All work involving cutting into and connecting to the existing work shall be planned so as to interfere with operation of the existing facilities for the shortest possible time and when the demands on the system best permit such interference even to the extent of working outside the normal working hours to meet these requirements. **For all proposed interruptions of water supplies or work to be performed on any component of the existing water distribution system, the Division shall be notified forty-eight (48) hours (weekends and holidays excluded) in advance.**

The Contractor shall have all possible preparatory work done and shall provide all labor, tools, materials, and equipment required to do the work in one continuous operation. Disinfection of affected mains shall be done as part of this operation, in accordance with procedures specified elsewhere.

The Contractor shall have no claim, by reason of delay or inconvenience, for adapting his operations to the needs of the Division.

Q. The contractor shall make joint connections similar to those on the existing pipe or adaptable to such pipe unless specifically otherwise shown on the Drawings or directed. These joints shall be made as specified under the appropriate headings.

R. Existing pipeline(s), other utilities, and surface features (pavements, lawns, fences, walls, etc.) damaged by the contractor shall be replaced by him at his own expense in a manner approved by the Division and the owner of said damaged items. All replication shall result in the restored work being of a condition equal to or better than that has existed before construction.

S. Contractor shall apply for and refer to "Regulations for Street Excavations, Wrentham Public Works Department" for all fees and requirements concerning any road openings.

T. The Contractor shall be responsible for all disturbed lawn areas and shall be restored with a minimum of 4 inches of good quality loam, limed, fertilized and seeded with a lawn seed mixture.

3.2 – Water Services

A. The Contractor shall furnish and install all services to the new main as indicated on the Drawings. All work shall be performed by craftsman experienced in the installation of water services. The Contractor shall have the option of installing service wet or dry.

B. Curb stops should be installed within the road right of way as close to the property line as possible. Curb stops shall be provided with a box as specified and shall be set plumb and be supported and protected during backfill. Prior to acceptance of the work, the Contractor shall demonstrate that all buried valves are accessible and fully operable with standard valve wrenches and clean out.

C. All openings in foundations for water service piping shall be patched on both the interior and exterior of the foundation.

D. Services shall be located to facilitate the ease of installation and maintenance of meter and appurtenances and approved by the Division.

E. Surface restoration shall be a described under Section 3.1 Para. R through T.

3.3 – Buried Valves and Appurtenances

A. All valves shall be carefully erected and set plumb and supported in their respective positions and free from all distortion and strain. Care shall be taken to prevent damage or injury to the valve or appurtenances during handling and installation. Valves, valve boxes and valve box covers shall be installed in such a manner as to insure that the cover is parallel to the ground surface and that the operating wrench will fit squarely on the operating nut. Equipment which does not operate easily or is otherwise defective shall be repaired or replaced at the Contractor's own expense. Special care shall be taken not to displace the valve box during backfilling, compaction and surface restoration. Contractor shall demonstrate that all buried valves are accessible and fully operable with standard valve wrenches and clean out.

B. The Contractor shall furnish and install tie rods, clamps, couplings, concrete thrust blocks and accessories to prevent the movement of branch valves, as indicated on the Drawings or as directed. All valves at tees shall be restrained back to tee with retainer glands or asphalt coated rods.

C. All buried valves controlling water services should be installed within the road right of way as close to the property line as possible. All buried valves shall be provided with a box as specified and shall be set plumb and be supported and protected during backfill. Prior to acceptance of the work, the Contractor shall demonstrate that all buried valves are accessible fully operable with standard valve wrenches and clean out.

3.4 – Hydrants

A. The exact field location of each hydrant shall be determined by the Division and the Wrentham Fire Department prior to excavation for hydrant installation. The hydrant shall be installed as indicated on the Drawings and as per manufacturers' recommendations for the proper installation of the hydrant. The hydrant shall be set as to not bury the traffic flange to facilitate repairs without having to excavate around the hydrant. The area around the hydrant shall be graded to permit a 3 foot wide level area all around the hydrant and to provide adequate cover and support on all sides.

The Contractor shall furnish hydrants manufactured for the depth of cover over the mains at the hydrant connection and the actual ground elevation at the hydrant location. A minimum of 5 and no more than 6 feet of cover at the inlet connection to the hydrant shall be maintained at all locations.

B. Hydrants to be set above any potential groundwater table shall include an automatic drain feature. This shall include the necessary drain ring, seat and valve mechanism to automatically allow drainage of the hydrant barrel when the hydrant valve is fully closed. The drain ports shall be automatically closed when the operating rod is turned no more than two full turns.

The installation of those hydrants with an automatic drain feature shall include approximately 1/3 cu. Yd. of clean crushed stone placed around the hydrant base to a level several inches above the drain openings.

C. There shall be twenty four (24) inches between the face of the curb and the hydrant steamer cap at it's furthest extremity. The steamer nozzle, shall face the street unless otherwise directed by the Division. Hydrants shall be connected to water mains by six (6) inch ductile iron pipe. Each hydrant installation shall include buried gate valve between the hydrant and its supply main to permit isolation of the hydrant for maintenance purposes. The auxiliary valve shall be connected to the anchoring tee unless directed otherwise by the Division. The distance between the auxiliary valve and the hydrant body varies for each installation. All connections at hydrant installations shall be mechanical joint connections with plain rubber gaskets. All joints between and including the anchoring tee on the distribution main and the hydrant shall be restrained by retainer glands or rods.

The hydrant shall be set upon a slab of concrete not less than four (4) inches thick and fifteen (15) inches square. Each hydrant shall be thrust blocked against the undisturbed vertical face of the trench with a concrete thrust block as indicated on the Drawings.

Should soil and/or trench conditions preclude the use of a concrete thrust block, additional tie rods, installed as indicated on the Drawings may be used. Tie rods shall be of the number and orientation, size, material and construction as specified by the National Fire Protection Association Codes. All the rods and accessories shall be field coated with a asphalt type material prior to backfilling.

The Contractor shall take special care to insure that all hydrants are set plumb. When hydrant installation has been completed, including surface restoration of the area immediately surrounding the hydrant, Hydrants shall be painted according to specifications of the Wrentham D.P.W., Water Division. Rough up any existing paint surfaces with sandpaper. Thoroughly clean hydrant with mineral spirit soaked rag. Apply rust converter on all areas. The hydrant must be scraped and primed. Two coats of rust inhibitive safety yellow paint shall be applied to the barrel, down to the ground level. Two coats of rust inhibitive white paint shall be applied to the bonnet and caps. Apply Never Seize to all nipple threads. Each hydrant will also have installed a "Heavy-Duty Fiberglass Hydrant Marker w/Optional Mini Flag" resilient 3/8" Diameter white laminar fiberglass shaft is 57" (5') and is attached to a heavy duty MIL Spec FT3482 plated carbon steel spring. Red and white reflective bands on shaft. Mini flag 4" high X 5" wide white PVC exterior grade UV ray resistant material, with red reflective striping.

3.5 – Temporary By-Pass Piping (if required)

A. The Contractor shall provide temporary by pass piping in such a manner that adequate pressure shall be available to all affected residences should his work require that the water service to customer be interrupted for more than a 4 hour period. The determination of the need for temporary piping and the size of the piping and service connections is the responsibility of the Division. The Contractor shall submit his plan to the Division for approval.