SPRINGFIELD WATER AND SEWER COMMISSION

GUIDELINES AND POLICIES

Version 4 – November 1, 2020

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Springfield Water and Sewer Commission

Guidelines and Policies

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CHAPTER 1 REVISIONS

1. Version 1 of these Guidelines and Policies was written April 1, 2008.
2. Revisions of these Guidelines and Policies as of June 18, 2008

- 4.1.1 - Crossing Policy added and referenced to new Chapter 16
- 4.2.3 - Paragraph 3 Utility Separation defined and added
- 4.3.2 - Paragraph 1 Utility Separation approval added
- 4.3.5 – Surety Release added
- Section 4.5 - ≥ 4-inch Water Services with Backflow Preventer added
- Section 5.1 - Defines who is required to follow Safety guidelines added, Commission issued hard hats and vests, added, class 2 coats added, competent person shall complete Pre-Job checklist added, safety vests shirts & jackets added, questions directed to Safety, Security and Training Manager added, continue to monitor air quality if atmospheric conditions can change added, plate and/or fence open trenches added, and notify Safety, Security and Training Manager of accidents or cave-ins added
- 6.1.1 Paragraph 1 - Dig Permit Required added
- 6.2.1 - Moved all Air Valve Assembly and Air Corp language to last paragraph at end of Section
- 6.2.6 - Clarified when gate valve and butterfly valves may be used added
- 6.3.3 - Check valve replaced backflow preventer on flushing device added
- 7.5.1 - Install jumper wire before removing 5/8-inch – 2-inch meters added
- 7.5.2 – Meter couplings to seal meters and Plastic Meter Pit installations added
- Section 8.4 - Water Valve Box Top Replace and Adjust and Service Box Top Replace and Adjust added
- Section 10.3 - Acceptance of Back Flow Preventers added
- Section 11.4 - Sewer Manhole minimum diameter clarified
- Section 12.1 - Building Sewer Connections clarified
- Section 12.2 - Building Sewer Connection pipe diameters defined
- 15.1.10 - Application for Crossing Commission Transmission Mains added
- Chapter 16 – Crossing Commission Transmission Main and Property Policy added

- Detail W-02.2: Structural Gravel Aggregate changed to Dense Grade Crushed Stone for road base and all paving Type1-I
- Detail W-02.3: Flow fill for Remainder of trench changed to 12-inches of flow fill for road base and all paving Type1-I
- Detail W-02.4: Structural Gravel Aggregate changed to Dense Grade Crushed Stone for road base and all paving Type1-I
- Detail W-02.5: Temporary Trench Backfilling Method for all Streets in Springfield and Ludlow except for Arterial Streets Detail in Springfield
- Detail W-02.6: Temporary Trench Backfilling Method for Arterial Streets in Springfield Detail
- Detail W-06.7: Socket Clamp Detail minimum bolt size increased for 8-inch and 10-inch
- Detail W-10.0: Changed Hose Connection Vacuum Breaker to Check Valve
- Detail W-11.2: Water Meter Sealing Detail added
- Detail S-02.4 Changed tee to cross and required 6-foot minimum inside diameter
- Detail S-03.0: Clarified section views, minimum distance from edge of trench, and require 4-mil poly between pipe and concrete fill

3. Version 2 of these Guidelines and Policies was written March 1, 2019 and include the following revisions.

- Chapter 3. Added all the definitions from R&R
- Chapter 4. Created a Water Detail for Vertical Datum conversions and ask designers to use New City of Springfield datum. The detail provides info to convert to New City datum.
- Chapter 4. Added minimum fire flow requirements for new water main extensions for residential and commercial/municipal/industrial sites.
- Chapter 4. Created Record Sketch and Water Service Card details and instructions how to enter proper info. Described workflow with E&TS and GIS input.
- Chapter 5. Trench Safety – for SWSC employees 4-foot trench requires shoring. For contractors OSHA requirements – 5-feet requires shoring. Contractors to sign attached Safety Assurance form and Indemnity form
- Chapter 5. Updated PPE language to reflect latest memo from KP

- Chapter 6. Updated Dig Safe requirement per the language on our web page. Added 5 Service Area Maps to help others know where our infrastructure is located. Provide these maps to Jaimye to add to our web page.
- Chapter 6. All ductile iron pipe to be encased on 6-mil polyethylene.
- Chapter 6. Any pipe installed within 200-feet of underground fuel storage tanks need special gaskets
- Chapter 6. Added section on installing insulated pipe underground and overhead
- Chapter 6. Added section on installing temporary bypass including a more descriptive ADA requirement
- Chapter 7. Added section for installing seasonal water services
- Chapter 7. Greater description on how to install 4-inch and larger ductile iron services through the basement wall, into a meter vault, and/or up thru a basement floor
- Chapter 7. Added description on how to install a plastic meter pit for copper tube services
- Chapter 7. Reduced the number of options for large ductile iron meter vaults from four to two: Standard and Oversize
- Chapter 7. Fire Service are required to be in a heated building or enclosure above grade
- Chapter 15. Added Safety Assurance Form. Placed it after the Commission Approved Contractor Form. Moved the Indemnity Form after the Safety Assurance Form so all three are together.
- Chapter 15. Deleted the G&P Acknowledgement Form and Trenching & Safety Form. Safety Assurance Form to replace these.
- Detail W-08.0 Valve Box: Changed backfill material.
- Detail W-08.1 Replace, Raise, or Reset Valve Box: Changed backfill material.
- Detail W-08.2 Raise Valve Box with Riser Detail added
- Detail W-11.0 New Water Service: Added Detail A to include plan view of meter valve types with connections and fittings also added 18-inch from walls and floors.
- Detail W-11.1 Replacement Water Service: Added Detail A to include plan view of meter valve types with connections and fittings also added 18-inch from walls and floors.

- Detail W-11.3 Plastic Meter Pit For 5/8" – 1" Meters detail added
- Detail W-11.4 Plastic Meter Pit For 1-1/2" – 2" Meters detail added
- Detail W-12.0 Typical Service Box Detail in Paved Areas: Changed backfill materials and clarified brick type.
- Detail W-12.1 Typical Service Box Detail in Non-Paved Areas: Changed backfill materials and clarified brick type.
- Detail W-12.2 Replace, Raise, Or Reset Service Box Detail: Changed backfill materials and clarified brick type
- Detail W-12.3 Raise Service Box with Riser: Added Detail
- Detail W-13.0 Meter Vault Piping: Deleted old drawing and added this detail with more explanation to represent correct install.
- Detail W-13.1 Large Meter Installation: Deleted old drawing and added this detail with more explanation to represent correct install. Clearly identified where adapter flange is located after the meter.
- Details W-13.2 and W-13.3 Standard and Oversize Meter Pit for Ductile Iron Water Service Pipe: Deleted the old W-13.2, W-13.3, W-13.4 and W-13.5 Concrete Meter Vaults and simplified selections to these two.
- Detail W-13.4 Typical Ductile Iron Water Service Detail through Foundation Wall: Added Detail.
- Detail W-13.5 Typical Ductile Iron Water Service Detail through Concrete Floor: Added detail.
- Detail W-16.0 Record Sketch Detail: Added detail.
- Detail W-16.1 Water Service Card Detail: Added detail
- Detail W-17.0 Seasonal Water Service Detail: Added detail and changed vacuum pressure breaker requirements to RPZ if highest sprinkler head is 12-inches or greater above.
- Detail W-17.1 Seasonal Water Service Base Detail: added detail and changed clasp detail.
- Detail W-17.2 Seasonal Water Service Cover Detail: Added detail.
- Detail M-01.0 Springfield Water Mains Service Area Map: Added Detail
- Detail M-02.0 Ludlow Water Mains Service Area Map: Added Detail
- Detail M-03.0 Water Transmission Mains Service Area Map Cobble Mountain To Provin Mountain: Added Detail
- Detail M-03.1 Water Transmission Mains Service Area Map Provin Mountain To Springfield: Added Detail

- Detail M-04.0 Springfield Sewer Mains Service Area Map: Added Detail

4. Version 3 of these Guidelines and Policies was written July 1, 2020 and include the following revisions.

    - Chapter 2. Sections 2.1.2 and 2.1.4 inserted "Commission's Health and Safety Plan". Throughout document safety language has been relocated to the Commission's Health and Safety Plan.
    - Chapter 4, Sections 4.1.2, 4.1.3, and 4.1.4 deleted "separate application for each water service and/or sewer connection" to ease application procedure and better match what is accepted at Operation Center.
    - Chapter 4, Section 4.2.3 Minimum Design Standards: Paragraph (m) Added Private Yard Hydrant requirements. Paragraph (n) deleted requirement for 45-degree bends and now allow 90-degree bends. Paragraph (p) looped water services and Fire Service Pipes require check valves.
    - Chapter 4, Section 4.4.1 and 4.6.1 changed contact phone number from 787-6206 to 310-3500.
    - Chapter 5. Deleted most of the original safety language.
    - Chapter 5, Section 5.1, General: All employees and Installers to follow Commission's new Health and Safety Plan as well as local, state, and federal regulations including but not limited to Massachusetts Dept. of Labor and OSHA.
    - Chapter 5, Section 5.2, Trenching Excavation: Commission employees will not enter trenches 4-feet or deeper without shoring in place.
    - Chapter 5, Section 5.3, Underground Utility Location (DIG SAFE) Requirements: Site Massachusetts Law to call DIG SAFE before any excavation. Identify Commission service areas for water and sewer maps.
    - Chapter 6, Section 6.1.2, Valve Operations: Tag Out procedures Paragraph (m) deleted "tag out device" in accordance with Commission's Material Specifications". Because it is repeated in Section 6.1.3.
    - Chapter 6, Section 6.1.3, Valve Lock-out: Paragraph 1. Inserted "and OSHA CFR 1910.147 – Control of Hazardous Energy".
    - Chapter 6, Deleted Section 6.1.7, Underground Utility Location (DIG SAFE) Requirements in its entirety and Inserted Existing Underground Utilities and Structures and inserted Paragraph 1 which references Section 5.3 of these G&P.
    - Chapter 6, Section 6.2.7, Ductile Iron Mechanical Joint fittings: Deleted Paragraph 8. in its entirety. Two 45-degree bends were required in past, but

during review of a project the loss of head through one 90-degree bend was found to be equal or less.

- Chapter 6, Section 6.4.3, Pressure and Leakage Test: Paragraph 2. Deleted "200-PSI or 2x" and replaced with "150-PSI or 1-1/2times" as this is what AWWA suggests.
- Chapter 7, Water Services, Section 7.1.1, General: Inserted Paragraph 5. "Excavate trench to ensure sides of trench are stable. Slope trench walls or provide support in conformance with the CHAPTER 5 Safety of these Guidelines and Policies and the Commission's Health and Safety Policies".
- Chapter 7, Water Services, Section 7.2.3, Copper Tubing: Inserted Paragraph 8. "Copper tubing water services installed with less than 18-inches of tubing beyond the wall or above the floor shall be reinstalled in its entirety by the Installer." This allows for room to work on meters.
- Chapter 7, Water Services, Section 7.2.5, Compression Coupling: Inserted Paragraph 4. "No couplings are allowed before meter valves in building." This reduces chance of leaks and makes sure meter is restrained.
- Chapter 7, Water Services, Section 7.2.6, Service Boxes: Deleted "magnetized and" Inserted "after installation." Magnetized boxes are no longer available or required and SWSC paints new WS boxes blue after installation.
- Chapter 7, Water Services, Section 7.4.1, Replacement of Existing Water Service Pipe, Paragraph 5.: Inserted Paragraphs (a) Installer shall open cut all water services from main to home/building and replace Water Service Pipes in accordance with Section 7.3 of these Guidelines and Policies and (b) Commission Construction Crews or Commission Approved Contractors hired by the Commission to replace water service may pull Water Service Pipes in accordance with this Section of these Guidelines and Policies." This clarifies Installers/Commission Approved Contractors shall open cut and Commission Approved Contractors hired to install Commission CIP projects may install water service pipes by pulling the pipe
- Chapter 7, Water Services, Section 7.4.3, Product Installation – Existing Water Service Pipe, Paragraph 4.: inserted "or replace by open trench". This paragraph directs abandonment in place of replacement by open trench to Section 7.3.
- Chapter 7, Seasonal Water Services, Section 7.5.2, Product Installation – Seasonal Water Services 2-inch and less, Paragraph 7. (g).: Inserted A testable Pressure Vacuum Breaker assembly (PVB) is allowed when the PVB can be installed at least 12 inches or greater above the highest sprinkler head. A PVB is designed to prevent only back-siphonage and is designed for use under static line pressure. A PVB is not allowed where back-pressure is

possible. A Reduced Pressure Zone assembly (RPZ) is required when a PVB does not meet the installation requirements. A single spigot is allowed on the downstream side of a RPZ and on the downstream side of a PVB installed 12 inches below the PVB. (The highest sprinkler head and/or fixture shall be 12-inches or greater below the PVB. If it is less than 12-inches a RPZ is required.)"

- Chapter 7, Water Services, Section 7.4.3, Product Installation – Existing Water Service Pipe, Paragraph 5.: Inserted after service "by pulling the old and new water service pipe shall be allowed as follows:"
- Chapter 11, Deleted Section 11.1.5, Underground Utility Location (DIG SAFE) Requirements in its entirety and Inserted Existing Underground Utilities and Structures and inserted Paragraph 1 which references Section 5.3 of these G&P.
- Detail W-08.0 Valve Box: Clarified type of brick under base.
- Detail W-08.1 Replace, Raise, or Reset Valve Box: Clarified type of brick under base.
- Details W-13.6, W-13.7, W-13.8, W-13.9 and W-13.10 are various approved frames and covers for Meter Vaults: Deleted the old W-13.6 32" x 8" Water Frame and Cover to expand options for SWSC.
- Detail W-15.0 Relation of Vertical Datums To Springfield City Base: Added detail and added conversion to MWRA and Boston City Base.
- Details S-02.51, S-02.52, S-02.53, S-02.54, S-02.55 and S-02.56 are various approved frames for sewer manholes and S-02.61, S-02.62, S-02.63, S-02.64, S-02.65 and S-02.66 are various approved sewer covers: Deleted the old S-02.5, S-02.6, and S-02.7 sewer frame and covers to expand options for SWSC.

5. Version 4 of these Guidelines and Policies was written November 1, 2020 and include the following revisions.

    - Chapter 4. APPPLICATIONS, SUBMITTALS/PLANS, APPROVALS, and INSPECTIONS, Section 4.2.3 Minimum Design Standards, Paragraph 1, (p) 4-inch – 12-inch Water Service, 9th bullet: added OS&Y GV required as a building control valve before BFP or assembly. 10th bullet: Fire Services may have OSY gate valves or B-fly valves with either flange or grooved connections on both sides of the assembly.

The above changes were made to clarify what was acceptable on fire services and the BFP requirements for the same. Grooved (Victaulic) connections will now be allowed along with flanged connections. Butterfly valves will now be allowed along with OS&Y gate valves.

- Chapter 4. APPPLICATIONS, SUBMITTALS/PLANS, APPROVALS, and INSPECTIONS, Section 4.4.2 Commission Responsibilities Prior to Arriving at the Installation, Paragraph 4 was edited to clarify 2 inspections for water service and two inspections for sewer connections. Refunds would be credited to account if all charges were not used. Paragraphs 5 and 6 were deleted as this will no longer apply since SWSC billing software cannot share costs. The intent is to have the contractors ready for inspection so SWSC Inspectors not going to site and installation is not ready.

- Chapter 4. APPPLICATIONS, SUBMITTALS/PLANS, APPROVALS, and INSPECTIONS, Section 4.5 Inspections for 4-inch and Larger Water and Fire Service Installations, 4.5.4 Water or Fire Service into Service, Paragraphs added 1(a), 1(b), and edited 1(c); as follows;

  1(a): Water Services or Fire Services up to 2-inch the Installer shall have the correct meter valve installed before any testing being scheduled.

  1(b): For metered Water Services 4-inch and larger that require a Back Flow Preventer the Installer shall have the correct Outside Spindle and Yoke (OS&Y) gate valve (building control valve) installed along with a temporary blank flange with a 2-inch threaded outlet and 2-inch ball valve onto the first flange into the building for testing. The Installer may then schedule testing.

  1(c): For Fire Services 4-inch and larger the Installer shall have the correct OS&Y gate valve installed along with a temporary blank flange with a 2-inch threaded outlet and 2-inch ball valve The Installer may then schedule testing.

The above additions and edits were made to ensure a correct valve in accordance with SWSC Material Specifications is installed prior to any testing. For Water Services or Fire Services up to 2-inch a meter valve in accordance with SWSC Standard details is required. For 4-inch and larger metered Water Services a F x F OS&Y gate valve is required before any testing or meter installation is scheduled. This is not a change just a clarification. For 4-inch and larger Fire Services a F x F OS&Y gate valve is required before any testing or backflow preventer installation is scheduled. This valve will be referred to as a building control valve. This is new. All installations by the site contractor should be from the main to the first valve (building control valve or meter valve) in the building. Testing will be completed with a temporary companion (blank) flange bolted to the outlet side of the valve flange. The blank flange shall have a 2-inch threaded outlet and a 2-inch ball valve for leak testing, flushing Fire Dept. flushing, and bacteria testing.

- Chapter 7. WATER SERVICES, Section 7.2 Water Service 2-inch and less, 7.2.2 Ball Type Corporation Stops, Paragraphs 2 and 3; Changed 1-inch Direct Taps to none. Reason being SWSC makes the taps and no longer has

equipment to direct tap so all 2-inch and less shall be through a tapping saddle supplied by the Installer.

- Chapter 10. CROSS CONNECTION DEVICES, Section 10.1 General, Paragraphs 2; added Paragraphs (a) and (b) which defined devices as the back flow preventer only and assemblies are from the manufacturer and include two isolation valves with the back flow preventer.
- Chapter 10. CROSS CONNECTION DEVICES, Section 10.1 General, Paragraphs 4; deleted bullet "All facilities listed in Paragraph 3, above shall have two (2) BFP devices installed, unless otherwise approved by the Commission" which was repetitive as Paragraph 3 already defined which type of facilities required a BFP at meter and at point of use in the facility.
- Chapter 10. CROSS CONNECTION DEVICES, Section 10.1 General, Paragraphs 5; added "and assemblies" after Devices and added "in a horizontal position at least" after installed to clarify devices and assemblies must be installed in a horizontal position.
- Chapter 10. CROSS CONNECTION DEVICES, Section 10.1 General, added Paragraphs 7., 8., 9., 10., 11., 12., and 13; These additions and edits were made to ensure a correct valve is installed prior to any testing and the correct device with valves or assembly, connection types, and connection hardware are installed after all successful testing. For Water Services or Fire Services up to 2-inch a meter valve in accordance with SWSC Standard details is required. For 4-inch and larger metered Water Services a F x F OS&Y gate valve is required before any testing or meter installation is scheduled. This is not a change just a clarification. For 4-inch and larger Fire Services an F x F OS&Y gate valve in accoerdance with the SWSC's Material Specifications is required before any testing or backflow preventer installation is scheduled. This valve will be referred to as a building control valve. This is new. All installations by the site contractor should be from the main to the first valve (building control valve or meter valve) in the building. Testing is defined in Section 4.5.4 and will be completed with a temporary companion (blank) flange bolted to the outlet side of the valve flange. The blank flange shall have a 2-inch threaded outlet and a 2-inch ball valve for leak testing, flushing Fire Dept. flushing, and bacteria testing.
- Detail W-11.0 New Water Service: Corrected 12-inch to 18-inch from floors.
- Detail W-11.1 Replacement Water Service: Corrected 12-inch to 18-inch from floors.
- Detail W-13.11 Typical Ductile Iron Fire Service Detail Through Foundation Wall: Added to help clarify fire Service Installations.
- Detail W-13.12 Typical Ductile Iron Fire Service Detail Through Floor: Added to help clarify fire Service Installations.

- Detail W-13.13 Typical Ductile Iron Fire Service Detail in a Hot Box: Added to help clarify fire Service Installations.
- Detail W-13.14 Typical DIP Commercial & Industrial Service Detail Through Foundation Wall: Added to help clarify fire Service Installations.
- Detail W-13.15 Typical DIP Commercial & Industrial Service Detail Through Floor: Added to help clarify fire Service Installations.
- Detail W-11.3 Plastic Meter Pit for 5/8" – 1" Meters: Added 2" hole with automatic meter reading plug for electric reading device.
- Detail W-11.4 Plastic Meter Pit For 1-1/2" – 2" Meters: Added 2" hole with automatic meter reading plug for electric reading device.
- Detail S-04.0 Existing Sewer Main to Building Connection: Removed "long sweeps" as PVC bends are typically installed. Clarified cleanouts required every 100' and upstream of horizontal deflection ≥ 45-degrees.
- Detail S-04.1 New Sewer Main to Building Connection: Removed "long sweeps" as PVC bends are typically installed. Clarified cleanouts required every 100' and upstream of horizontal deflection ≥ 45-degrees.
- Detail S-04.2 Clean Out with Sweep: Clarified cleanouts required every 100' and upstream of horizontal deflection ≥ 45-degrees.

CHAPTER 2 GENERAL PROVISIONS

2.1.1 Introduction

1. These Guidelines and Policies will govern all work performed in the Springfield Water and Sewer Commission's (Commission) transmission and distribution systems.
2. The only persons allowed to work on the Commission's water transmission, water distribution systems, and/or sewer collection system are as follows:

   (a) The Commission's own employees (Commission Construction Crew),

   (b) Contractors hired directly by the Commission (Installer),

   (c) Commission Approved Contractors (Installer) hired by an Owner of a property in the Commission's Service Area
3. When there is a conflict between these Guidelines and Policies and other referenced standards then these Guidelines and Policies shall govern.
4. The Guidelines and Policies contained herein are in accordance with Commission's Rules and Regulations.
5. Commission Guidelines and Policies do not supplant the Installer's obligation to comply with the Department of Labor, and Occupational Safety and Health Administration regulations. Construction site safety is the Installer's responsibility.
6. Questions regarding construction or other activities will be directed to the Commission's Authorized Field Representative or in accordance with Section 2.1.8 of these Guidelines and Policies.
7. All Installers hired by Owners shall become Commission Approved Contractors to perform work in the Commission's Service Area.
8. Failure of any Commission employee to comply with these Guidelines and Policies may result in disciplinary action and possible termination.
9. Failure of a Commission Approved Contractor or Installer to meet the requirements of these Guidelines and Policies may result in removal of the Commission Approved Contractor's name from the approved list.
10. Failure of a Commission employee, Commission Approved Contractor, or Installer to meet the requirements of these Guidelines and Policies may

additionally result in fines in accordance with the Commission's Rules and Regulations.

11. The Commission reserves the right to remove anyone from the Commission Approved Contractors list for any reason. If a Commission Approved Contractor is removed from the list, that contractor shall not be allowed to perform any work in the Commission's Service Area.

2.1.2 Review of these Guidelines and Policies

These Guidelines and Policies will be reviewed annually and revised as necessary. In addition, if a near miss or incident occurs, CHAPTER 5 SAFETY of these Guidelines and Policies and the Commission's Health and Safety Policies, will immediately be reviewed and revised if necessary.

2.1.3 Maintenance of these Guidelines and Policies

1. These Guidelines and Policies will be revised and updated by the Commission's Engineering and Technical Services.

2. At a minimum, the Version Number of these Guidelines and Policies, the Chapter and Section, and the date of last Revision shall be recorded in CHAPTER 1 of these Guidelines and Policies.

2.1.4 Acknowledgement of Safety Assurance Form

Commission Approved Contractors and Contractors hired by the Commission shall read CHAPTER 5 SAFETY of these Guidelines and Policies and the Commission's Health and Safety Policies, and sign the attached Safety Assurance Form in CHAPTER 15 of these Guidelines and Policies,

2.1.5 General Installer Responsibilities

1. The Installer proposing to perform construction in the Commission's Transmission and/or Distribution System and who executes the appropriate paperwork with the Commission, to allow the same, shall conform to the following:

   (a) Furnish all water pipe, hydrant, assemblies, valves and valve boxes, fittings, couplings, backfill materials, concrete thrust blocking, labor, tools, and equipment necessary to lay and joint all pipe in accordance with the Commission's Specifications and these Guidelines and Policies.

   (b) All construction shall conform to the design provided by the Commission's Engineering and Technical Services (E&TS), the design provided by the

Owner and approved by the Commission, or the Commission's Authorized Field Representative.

(c) All contracts, deposits, applications, and easements will be finalized before the Commission E&TS will schedule inspection.

(d) Prior to job start, all main and service materials and area of land to be developed will be subject to inspection by an Authorized Field Representative of the Commission.

(e) All work related to services and inspections provided by Commission will be subject to fees and will be the responsibility of the Owner.

(f) The Owner is responsible for obtaining and using the most recent Material Specifications of the Commission.

(g) The Owner is responsible for obtaining and using the most recent copy of these Guidelines and Policies.

2. The most recent versions are available on www.springfieldwaterandsewer.org.

3. The Commission shall be notified one week prior to the start of a project to schedule inspection.

2.1.6 General Commission Construction Crew Responsibilities

1. The Commission Construction Crew performing construction in the Commission's Transmission and/or Distribution System shall conform to the following:

(a) Furnish all water pipe, hydrant, assemblies, valves and valve boxes, fittings, couplings, backfill materials, concrete thrust blocking, labor, tools, and equipment necessary to lay and joint all pipe in accordance with the Commission's Specifications and these Guidelines and Policies.

(b) All construction shall conform to the design provided by the Commission's Engineering and Technical Services (E&TS), the design provided by the Owner and approved by the Commission, or the Commission's Authorized Field Representative.

(c) Prior to job start, all main and service materials and area of land to be developed will be subject to inspection by an Authorized Field Representative of the Commission.

(d) All work related to services and inspections provided by Commission will be subject to fees and will be the responsibility of the Owner.

(e) The Commission Construction Crew is responsible for obtaining and using the most recent Material Specifications of the Commission.

(f) The Commission Construction Crew is responsible for obtaining and using the most recent copy these Guidelines and Policies.

2. The most recent versions are available on www.springfieldwaterandsewer.org.

3. The Commission shall be notified one week prior to the start of a project to schedule inspection.

2.1.7 Material Approval

1. All materials shall meet to the Commission's Material Specification and/or the Commission's Authorized Field Representative's approval.

2. At an minimum all the components and chemicals that will come in contact with drinking water shall meet the requirements of the following:

   (a) American Water Works Association

   (b) Massachusetts Department of Environmental Protection

   (c) NSF/ANSI Standards 60 (Drinking Water Treatment Chemicals)

   (d) NSF/ANSI Standards 61 (Drinking Water Components).

3. When the quality of any material is questioned, it will be the Commission's Construction Crew's or the Installer's responsibility to prove to the Commission's Authorized Field Representative's satisfaction that the materials in question comply with the Commission Material Specifications.

4. Materials that, in the Commission's Authorized Field Representative's opinion, are damaged, mishandled, or defective shall be rejected from use on the job.

5. Materials that have been rejected from use by the Commission's Authorized Field Representative shall be immediately removed from the construction site.

2.1.8 Clarification of Issues – Who to Call with Questions

1. For general questions relating to the Springfield Water and Sewer Commission call the Commission's Field Services Office @ 413-310-3500.

2. For questions relating to filling, flushing, and disinfecting water mains, and other water quality related issues call the Water Quality Manager @ 413-310-3500

3. For questions relating to scheduling, valve operations, water & sewer main installations or repairs, water & sewer service installations or repairs, hydrant flow tests, hydrant meter rentals, facilities mark out, Commission Approved Contractor, and other construction related issues call the Commission's Field Services Office @ 413-310-3500.
4. Questions relating directly to these Guidelines and Policies or Material Specifications call Engineering and Technical Services @ 413-452-1300.
5. Questions relating to **main extensions only** call the Commission's Construction Inspectors Group @ 413-452-1300.

2.1.9 Reference to Guidelines & Policies

These guidelines and policies may be referred to as the Commission's Guidelines and Policies.

2.1.10 Severability

The provisions of these Guidelines and Policies are severable. If any provision of these Guidelines and Policies or any specific application to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications, which can be given effect in the absence of the invalid provision or application.

2.1.11 Applicable Regulations

Every user of the public water system, private water mains, public sewer system, or private sewer mains shall be subject to regulations of the Commission, as they apply, and to any charges, rates, fees and assessments which are or may be established by the Commission. Any user of the public water system, private water mains, public sewer system, or private sewer mains shall also be subject to applicable Local, State, and Federal regulations.

2.1.12 Reference Standards

Where reference is made to one of the below standards, the revision in effect at the time is applicable.

1. American Concrete Institute (ACI)
2. American Iron and Steel Institute (AISI)
3. American National Standards Institute (ANSI)
4. American Society of Testing and Materials (ASTM)
5. American Water Works Association (AWWA)

6. American Welding Society (AWS)
7. Ductile Iron Pipe Research Association (DIPRA)
8. Manufacturing Standardization Society of the Valve and Fittings (MSS)
9. National Fire Protection Association (NFTA)
10. NSF International (NSF)

CHAPTER 3 DEFINITIONS

Unless the context specifically indicates otherwise, the meaning of terms used in these Guidelines and Policies shall be as follows:

1. Abutter means one who holds titles to real property within the limits of a Sewer Improvement Area and his/her successors in title.
2. Additional Meter shall mean a meter for the purpose of determining sub-divisions of supply through master meters and are owned and maintained by the Owner.
3. Applicant shall mean any Owner or duly authorized Owner's agent applying for any services provided by the Commission.
4. Application Fee shall mean the fee charged to apply for any Water Facility, Fire Flow Test, and/or Sewer Facility, in accordance with the Commission's Rules and Regulations. A single Application Fee will be charged for both water and sewer main extensions provided they are applied for at the same time. New Water Service Pipes, Fire Service Pipes, and Building Sewer Connections Application Fees shall be separate and in addition to any main extensions.
5. Application Fee to Review Crossing Commission Property shall mean the fee charged to review plans, specifications, and easements and inspect the crossing of Commission owned property.
6. Appurtenances shall mean any piece of water and/or sewer infrastructure that is not a water or sewer main, service pipe, or hydrant, such as: a check valve, pump, meter, storage tank, dam, and/or other water or sewer treatment facility.
7. As-Built Plan Fee shall mean the Fee charged for as-built plans. The Commission will return the Fee upon receipt of completed as-built plans. The as-built plans shall be provided to the Commission within 120 days after the final acceptance of a water and/or sewer main installation and /or a water and or sewer service installation.
8. Authorized Field Representative shall mean any Commission employee or Person hired by the Commission to oversee an activity on the Commission's water transmission system, water distribution system, or waste water collection system.
9. Automatic Meter Reading Device (AMR) shall mean a device(s) used for reading a water meter without having to enter a premise.
10. Auxiliary Meter shall mean a meter for the purpose of determining water use for lawn sprinklers or other approved process use and are owned and maintained by the Commission. Auxiliary Meters in Ludlow shall be owned and maintained by

the Owner and are subject to Commission inspection in accordance with the Commission's Rules and Regulations.

11. Backflow Prevention Device (BFP) shall mean an approved mechanical device designed to prevent Backflow.

12. Backflow shall mean the flow of water or other fluids, mixtures or substances into the distribution pipes of a potable supply of water from any source or sources other than its intended source.

13. Best Management Practices (BMP) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to implement the prohibitions as listed in the Commission's Rules and Regulations. BMP include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw materials storage.

14. Building Drain means that part of the lowest horizontal piping of a drainage system which receives the discharge from soil, waste, and/or other stacks inside the building and terminates ten (10) feet outside the inner face of the building wall. The Owner owns and shall operate and maintain the Building Drain from the building to the Building Sewer.

15. Building Sewer means sanitary sewer and that part of the horizontal piping, which begins ten (10) feet outside the inner face of the building wall and extends to a Public Sewer, Private Sewer or other place of Wastewater disposal. The Owner owns and shall operate and maintain the Building Sewer from the Building Drain to the main.

16. Building shall mean any roofed and walled structure.

17. Categorical Industrial User shall refer to industrial users subjected to EPA categorical pretreatment standards.

18. Charges means all fees, rates, rents, assessments, or liens for water, sewer, drainage or other services, facilities and commodities which are furnished or supplied by the Commission and for which it is authorized under MGL 40-N to assess.

19. City shall mean the City of Springfield, Massachusetts.

20. Combined Service shall mean a service pipe that is used to provide both Water Service and private fire protection service.

21. Combined Sewer means a Sewer receiving and conveying both sanitary Wastewater and surface runoff from storms.

22. Commercial shall mean a classification of Water Users and/or Wastewater Users that are engaged in providing products or services, whether to the general public or to its members, which includes all retail and wholesale establishments, businesses, and offices, including but not limited to office buildings, retail and wholesale outlets, service agencies, agents, brokers, professional offices, stores, cafes, theaters, bakeries, bus terminals, warehouses, store-houses, hotels, motels, restaurants, rooming-houses, trailer parks, funeral parlors, garages, farming, gas stations, newspapers, churches, private schools and colleges, Medical Facilities, libraries, museums, cemeteries, not-for-profits, homes for aged and children, State buildings, State facilities, builder's use- metered and un-metered, water tankers. Property, which contains both Residential and Commercial Water Users, shall be classified as Commercial.

23. Commission Approved Contractor Application Fee shall mean the fee charged to review the qualifications and experience of the Persons seeking to become Commission Approved Contractors. The Fee is non-refundable. This Fee is for review of the Application Form and for the term of the approval period. The approval period shall be for a term of three (3) years. Each approval period shall begin immediately after the previous approval period ends. Applications and Fees can be submitted any time before or during the approval period, but shall be for the existing approval period and must be resubmitted for each approval period.

24. Commission Approved Contractor Application Renewal Fee shall mean the fee charged to review the qualifications and experience of the Persons seeking to renew their Commission Approved Contractors status at the end of the previous approval period. All other provision of the approval process shall remain the same.

25. Commission Approved Contractor shall mean any Contractor approved by the Executive Director in accordance with the Commission's Guidelines and Policies to provide a construction service for an Owner. All approved contractors shall have appropriate bonding, insurance, and experience with references to perform work on the Commission's water distribution system, sewer collection system, and water and/or sewer services on behalf of the Owner.

26. Commission Construction Crew shall mean construction personnel regularly employed by the Commission to install, maintain, repair, and replace water and sewer infrastructure in accordance with the Commission's Rules and Regulations, these Guidelines and Policies.

27. Commission means the Springfield Water and Sewer Commission, an independent body politic and corporate and political subdivision of the Commonwealth of Massachusetts created under MGL 40-N as adopted by the City of Springfield on March 28, 1996, the powers of which are exercised by a board of three members

appointed in accordance with the MGL 40-N, and includes without limitation all its departments, divisions and Sections or pertaining or belonging to said Commission.

28. Commissioners refers to a board of three appointed members who shall govern the Commission as set forth in MGL 40-N.

29. Critical Valves shall mean any valve 20-inch or larger or as determined by Engineering and Technical Services that has the ability to severely impact the SWSC's transmission system, storage system, distribution system, pump stations, and/or significant customers; such as Wholesale (Towns) Customers, Medical Facilities, and/or Industrial/Commercial/Institutional Customers

30. Cross Connection shall mean any actual or potential connection between a distribution pipe of potable water supplied by the public water system and any waste pipe, soil pipe, sewer, drain or any other unapproved source. Without limiting the generality of the foregoing, the term "cross connection" shall also include any bypass arrangement, jumper connection, removal section, swivel or changeover connection and any other temporary or permanent connection through which Backflow can or may occur.

31. Customer means a Person or entity listed on the records of the Commission as the party of record responsible for payment of Bills for Charges for water and Sewer services to the Premise/Property.

32. Customer Water Service shall be defined as the entire water service excluding any corporation stop and/or valves directly associated with the water main. The Customer will be assessed for any repairs, replacements, or other services rendered to the Customer Water Service.

33. Developed Property means property that generates wastewater.

34. Discontinuance shall mean a temporary cessation of Water Service at the Premise at the request a Customer for reasons other than ordinary repair or maintenance.

35. Domestic Wastewater means the liquid Wastes and liquid borne Wastes discharged from the sanitary conveniences such as toilets, washrooms, urinals, sinks, showers, drinking fountains, laundry rooms, kitchens, cafeterias and floor drains essentially free of industrial Wastes or toxic materials.

36. Drain For the meaning of “Drain,” see “Storm Drain.”

37. Dry Industry shall mean a classification of Wastewater Users which includes all industries which do not use water for processes, do not use large volumes of water

for cleaning, or for which total annual wastewater production is less than one hundred thousand (100,000) cubic feet.

38. Easement shall mean an acquired legal right for the specific use of land owned and maintained by others, whether recorded or by prescription.

39. EPA means United States Environmental Protection Agency.

40. Executive Director means the Executive Director of the Commission or his/her Authorized Field Representatives.

41. Facilities include structures, conduits, pumping stations, treatment and disposal works, and other appurtenances for the purpose of collecting, treating and disposal of domestic and/or Industrial Wastewater.

42. Fire Department Permit to shut off sprinkler system shall mean the completed permit approved by the Fire Department and submitted to the Commission by the Owner or by the Owner's agent prior to demolition of any building having water or fire suppression system connections to the Commission's water system.

43. Fire Flow Test shall mean a standard flow test performed as specified in Section 6.5 of these Guidelines and Policies with at least two (2) hydrants to determine static and residual pressures and flow producing capabilities at a specific location within the Commission's water distribution system. The results of such testing shall provide data on how much water is available to fight fires, but may also indicate the general condition of the Commission's distribution system.

44. Fire Service Pipe shall mean the private water piping and associated valves, control valves, and Appurtenances installed solely to furnish water for extinguishing fires that extend from a Water Service connection into a Premise. The Customer owns the Fire Service Pipe.

45. Guidelines and Policies shall mean, but not limited to, these standards for access, design, operation, maintenance, construction, rehabilitation and / or use of the public water and sewer systems used by the Commission.

46. Hydrant shall mean a device connected to a Public Water Main or private water service for the purpose of extinguishing fires or other authorized purpose.

47. Industrial shall mean a classification of Water Users that are primarily engaged in applying skill and labor to giving of new shapes, qualities or new combinations to matter as material products, or to the assembly or processing of manufactured or natural products.

48. Industrial User means an Industry discharging Industrial Wastewater to a Public Sewer.

49. Industrial Wastewater means the liquid Wastes from industrial manufacturing processes, laboratories, trades or businesses which predominate as distinct from Domestic Wastewaters.

50. Industry shall mean an establishment with facilities for manufacturing, processing, fabricating, finishing, assembly, testing, or packaging goods including materials, chemicals byproducts, and finished and unfinished products. The Industry may be classified as a Wet Industry or Dry Industry.

51. Institutional shall mean a classification of Wastewater User including public or private schools, churches, State or Federal governmental buildings and offices, religious organizations, and similar facilities both profit and nonprofit.

52. Interceptor Sewer means a Sewer, located in public and/or private property, which collects the entire flow from a number of Public and/or Private Sewers, conveys the flow to a suitable collection point for final discharge to a place of Wastewater treatment and is entirely controlled by the municipality.

53. Leak shall mean an escape of water from the Commission's water mains, hydrants, or in the Owner's Water Service Pipe, Fire Service Pipe, or a Combined Service.

54. License Agreement shall mean a form prescribed by the Commission that provides for the construction of Public Water Mains and Public Sewers and other Water and Sewer Facilities and permission for limited use with respect to Commission property, easements, and other Water and Sewer Facilities.

55. Lot means real property, which is described by deed, or filed subdivision plan, as a single entity and cannot be the further subdivided.

56. Main Extension Application shall mean the form provided by the Commission and completed by the Owner or by an Owner's authorized agent and submitted to the Commission prior to construction, reconstruction, repair or modification of a Public Water Main. A completed application includes verification that the Premise address listed therein is correct.

57. Master Meter shall mean the primary water meter used for billing purposes serving a building, group of buildings, or Premises / Property. There may be more than one (1) meter serving a building, group of buildings, or Premises / Property.

58. Material Specifications shall mean the Commission supplied description of materials to be used for construction and rehabilitation of the Public Water and Sewer Systems.

59. MDEP shall mean the Massachusetts Department of Environmental Protection.

60. Meter Pit shall mean an underground vault enclosing a Meter.

61. Meter shall mean an instrument or device, including any appurtenances thereto, for measuring the flow of water.

62. MGL 40-N means the Chapter 40-N of the Massachusetts General Laws, as amended.

63. Municipal shall mean a classification for Water User and/or Wastewater User facilities that are owned and operated by the City of Springfield and/or the Town of Ludlow solely for the purposes of providing the following municipal services: Administrative; Public Works; Police; Fire and Safety; Educational; Parks and Recreational facilities; Libraries. This does not include Wastewater services provided by the Town of Ludlow.

64. Owner shall mean a Person(s) who alone or jointly or severally with others, has the legal title to any Premises.

65. Parcel means real property consisting of one (1) Lot, or two (2) or more contiguous Lots, under one (1) ownership.

66. Person(s) shall mean any individual, any agency of the federal government, any agency or political subdivision of the Commonwealth, any public or private corporation or authority, any corporation trust, firm, joint stock company, partnership or association, or other entity, or any group thereof, and any officer, employee, or agent of such person, and any group of persons.

67. Plumber shall mean a person with a current and valid license as a plumber by the Commonwealth of Massachusetts.

68. Potable Water shall mean water fit for human consumption in conformance with the regulations of the MDEP.

69. Premise / Property shall mean a parcel of real estate or portion thereof, including any improvements thereon, which are determined by the Commission to be a single user for purposes of receiving, using and paying for Water Service and/or Sewer Service.

70. Private Drain means any Drain located on private property and not under the full care and control of the Commission or the City of Springfield.

71. Private Fire Protection shall mean private water mains, Fire Service Pipes and other appurtenances installed for the purpose of fire protection and suppression at a particular Premise.

72. Private Hydrant shall mean a hydrant installed and maintained by an Owner for the purpose of private fire protection/suppression at a particular Premise.

73. Private Sewer means any Sewer located on private property that collects and conveys Wastewater from two (2) or more Building Sewers, discharges into a Public Sewer, and is not under the full care and control of the Commission.

74. Private Water Main shall mean a water main that is not owned by the Commission.

75. Public Drain means a Drain located in a public, private way, or easement in which all owners of abutting properties have equal rights and is under the full care and control of the City of Springfield.

76. Public Fire Protection shall mean the Public Water mains, Hydrants, and Appurtenances installed for the purpose of fire protection in a public way, Commission owned Easement, whether recorded or by prescription or private way open to public travel.

77. Public Sewer means any Sewer owned or maintained by the Commission and any Sewer situated outside the City of Springfield that is owned or maintained by a city, town, or district that discharges into Commission's Wastewater Treatment Works.

78. Public Water Main shall mean the piping and associated valves, hydrants and appurtenances owned by the Commission installed in a public way, publicly-owned easements whether recorded or by prescription, or private way open to public travel, for the purpose of supplying water to one or more customers or for public fire protection.

79. Public Water Supply shall mean the water and/or ground water that is provided to the public for human consumption.

80. Public Water System shall mean a system for the provision to the public of piped water for human consumption. The Commission is a Public Water System.

81. Remote Meter Device means an instrument for reading a Water Meter, located at a distance from the meter, generally outside the building being metered.

82. Requirements for Site Plans shall mean the document that describes the information that must be included in site plans submitted to the Commission. A Site Plan is required by the Commission for review and approval by the Executive Director of a proposed connection or reconstruction, repair or modification of a Water Service Pipe or Fire Service Pipe or appurtenance, which connects, to the Commission's water distribution system. The document also includes requirements for connections to the Commission's sanitary and combined sewers systems.

83. Residential shall mean a classification of Water Users that use or engage in providing housing facilities which include all dwellings, tenements, apartments, trailer houses (single), and other forms of housing.

84. Sanitary Sewer means a Sewer, which carries domestic, and/or Industrial Wastewaters and to which surface runoff from storms and groundwater is not intentionally admitted.

85. Service Application shall mean the form provided by the Commission and completed by the property Owner or by an Owner's agent and submitted to the Commission prior to construction, reconstruction, repair or modification of a Water Service Pipe or a Fire Service Pipe from a Public Water Main. A completed application includes verification that the premise address listed therein is correct.

86. Service Area shall mean the geographic area that is or can be serviced by the Commission's existing water and/or Sewer systems.

87. Sewer means a pipe or conduit for carrying Wastewater.

88. Sewer Facilities include structures, conduits, pumping stations, treatment and disposal works, and other appurtenances for the purpose of collecting, treating and disposal of domestic and/or Industrial Wastewater.

89. Shut Off shall mean to temporarily stop Water Service or to terminate Water Service, in accordance with the Commission's Rules and Regulations.

90. Storm Drain means a pipe or conduit for conveying rainwater, groundwater, subsurface water, condensate, cooling water, or other similar discharge.

91. Surety Required shall mean the bond, letter of credit, or other Commission approved financial guarantee to be posted as surety by an Owner to extend a Public Water Main, Sewer Main, and /or build a water and/or sewer pump station. Bonds Required shall also mean the bond, letter of credit, or other Commission approved financial guarantee to be posted as surety by a Commission Approved Contractor to work on the Commission's Water Distribution System or Sewer Collection System for an approval period.

92. Tapping Main Charge (Basic) shall mean the cost charged for connecting to existing water mains for new mains, main extensions, and service connections. The Commission shall provide labor and equipment to tap the existing main. The following items are not included in this charge and are provided by the Applicant: permits, paving, location work, excavation, backfill, and compaction, police, traffic control, tapping sleeve, tapping valve, pipe installation, appurtenances, flowable fill, rock excavation, frost excavation, concrete removal, and hauling in suitable fill. This charge shall be paid when application is submitted.

93. Tapping Main Charge (Complete) shall mean the cost charged for connecting to existing water mains for new mains, main extensions, and service connections. The Commission provides excavation, materials, installation, and backfill. The following items are not included in this charge: permits, paving, flowable fill, rock excavation, frost excavation, pipe installation, police, traffic control, concrete removal, and hauling in suitable fill. This charge shall be paid when application is submitted.

94. Turn-On shall mean initiate or restore Water Service in accordance with the Commission's Rules and Regulations. No Turn-on will occur for any account with an overdue balance.

95. Undeveloped Property means property that is void of any buildings, does not have Wastewater facilities, and does not require a connection to the Public Sewer.

96. User shall mean a Person who receives water and/or Sewer service(s) from the Commission within the Commission's Service Area.

97. Wastes mean substances in liquid, solid or gaseous form that can be carried in water.

98. Wastewater means the spent water of the municipality and may be a combination of the liquid and liquid borne wastes from residences, Commercial buildings, industrial plants, and institutions, together with any groundwater and surface water that may be present.

99. Wastewater Works or Wastewater Treatment Works means any arrangement of devices and all structures, equipment and processes for collecting, pumping, treating and disposing of Wastewater and associated residuals.

100. Water / Sewer Pipe Inspection shall mean the cost charged to inspect the layout, installation, repair, water quality test, retest or re-inspection of a scheduled Backflow Prevention Device of a Commission Water Facility, Public Sewer, Public Drain, Sewer, or Drain on a per day or per inspection basis. This charge shall be paid as a deposit when application is submitted based on an estimated number of days and/or inspections required in accordance with Section 3.10.1 of these Rules and Regulations. A final invoice shall be sent to the Customer that includes the actual number of days.

101. Water and Sewer Service shall include but not be limited to water, sewer and other services, facilities and commodities furnished or supplied by the Commission pursuant to MGL 40-N.

102. Water Facilities will mean Meters, Backflow Prevention Devices, water valves, water mains, Water Service Pipes, Fire Service Pipes, and water hydrants.

103. Water Meter means any device for measuring and recording the water consumption at a building or property, installed by or at the order of the Commission, which may be used for billing by the Commission.

104. Water Service Connection shall mean the connection and the associated valves and appurtenances at the water main for the purpose of turning Water Service on and off for the purpose of supplying water and for fire protection and suppression. The Commission owns the Water Service Connection.

105. Water Service Pipe shall mean the piping and associated valves and appurtenances that extend from a Water Service Connection to the Commission's Meter for the purpose of supplying water, other than for fire protection and suppression. The Customer owns the Water Service Pipe. A new Water Service Pipe is installed by a Commission Approved Contractor. A replacement Water Service Pipe is installed by the Commission.

106. Water Service shall mean the readiness to supply or actual supplying of water to Premises in which a Water Service Pipe or Fire Service Pipe has been installed.

107. Water Users or Water Consumers shall mean all public and private users of the Commission's water system, irrespective of any person's responsibility for billing purposes for water used at any particular facility.

108. Watershed lands, Reservoir lands, Roads and Trails, and Waterways shall include boulevards, roadways, driveways, trails, bridges, buildings, structures, land, beaches, ponds, lakes, rivers and other waters under the care and control of the Springfield Water and Sewer Commission.

109. Well shall mean any dug, driven or drilled hole, with a depth greater than its largest surface diameter, developed to supply water intended and/or used for human consumption, irrigation, or industry and not subject to regulation by 310 CMR 22.00.

110. Wet Industry means a classification of Users which includes all industries which produce large volumes of Wastewater; or which produces a Wastewater of greater strength than residential Wastewater (or contains constituents which require pretreatment in accordance with Chapter 1) shall be classified as Wet Industry for purposes of this chapter.

CHAPTER 4 APPLICATIONS, SUBMITTALS/PLANS, APPROVALS, and INSPECTIONS

Section 4.1 Applications

4.1.1 General

1. An application is required for, but not limited to, the following:

   (a) Water Service

   (b) Water Main Extension

   (c) Sewer Service

   (d) Sewer Main Extension

   (e) Commission Approved Contractor

   (f) Cross Commission Transmission Mains, Easements, or Property

   (g) Fire Flow Test

2. All applications except Application to Cross Commission Transmission Mains, Easements, or Property, can be made at the Commission's Customer Field Service office at 71 Colton Street, Springfield, MA. Applications to Cross Commission Transmission Mains, Easements, or Property can be made at the Commission's Engineering and Technical Services office at 250-M Street Extension, Agawam, MA 01001.

   (a) Fill out an application form(s) according to Section 4.1 of these Guidelines and Policies;

   (b) Pay application fees as set forth in the Commission's Schedule of Rates Fees and Charges in its Rules and Regulations;

   (c) Submit Proposed Site Plan(s) according to Section 4.2 of these Guidelines and Policies;

   (d) Submit information on Fire Suppression System Plan according to Section 4.2 of these Guidelines and Policies;

   (e) Submit information on Backflow Prevention Devices according to Section 4.2 of these Guidelines and Policies and;

(f) Submit information on Grease Interceptors for FOG control, according to Section 4.2 of these Guidelines and Policies.

(g) Application procedures, submittals and all other requirements to Cross Commission Transmission Mains, Easements, or Property shall be in accordance with 15.1.9 of these Guidelines and Policies.

3. An Applicant shall be the Owner or the Owner's authorized representative. The Owner's authorized representative shall have a letter signed by the Owner of the property to be serviced authorizing the Owner's authorized representative to apply for service. The letter shall include the Owner's name, billable address, and phone number.

4. An Application fee is required at the time of application and at rates as set forth in the Commission's Schedule of Rates Fees and Charges in its Rules and Regulations. The fee includes the cost of the site plan review.

5. Typically, one (1) service application is required for each billing account and may include both water service and sewer connections with the appropriate Application Fees and Plan Submittals.

4.1.2 Application Procedure for Residential Water/Sewer Service Pipe:

1. An Applicant shall submit a separate Residential Water/Sewer Service Application for each water service pipe requested entering a Property. A Building Sewer Connection for the same Property may be included on the Application.

2. An Applicant shall submit a Proposed Site Plan for review. See Section 4.2 for plan submittals.

4.1.3 Application Procedure for Commercial/Industrial Water Service Pipe or Fire Service Pipe:

1. An Applicant shall submit a Water Service Application for the water service pipe(s) requested entering a Property.

   (a) A Fire Service Pipe Application for the same Property may be included on the Application.

   (b) A Building Sewer Connection Application for the same Property may be included on the Application.

2. An Applicant shall submit a Proposed Site Plan for review. See Section 4.2 for plan submittals.

3. If applicable, an Applicant shall submit fire suppression system plans for review. See Section 4.2 for plan submittals.

4. If applicable, an Applicant shall submit backflow prevention plans for review. See Section 4.2 for plan submittals.

4.1.4 Application Procedure for Residential Building Sewer Connection:

1. An Applicant shall submit a separate Building Sewer Connection Application for each building sewer connection requested. A Water Service Pipe for the same Property may be included on the Application.

2. An Applicant shall submit a Proposed Site Plan for review. See Section 4.2 for plan submittals.

4.1.5 Application Procedure for Non-Residential Building Sewer Connection:

1. An Applicant shall submit a separate Building Sewer Connection Application for each building sewer connection requested. A Water Service Pipe for the same Property may be included on the Application.

2. An Applicant shall submit a Proposed Site Plan for review. See Section 4.2 for plan submittals.

3. An Applicant shall submit a Proposed Plumbing Plan for review. See Section 4.2 for plan submittals.

4. An Applicant shall submit a Proposed Fats, Oils, and Grease (FOG) design, sizing and construction plan for review. See Section 4.2 for plan submittals.

5. An Applicant shall submit an FOG Maintenance Plan for review. See Section 4.2 for plan submittals.

4.1.6 Application Procedure for New Water Main, Water Main Extension, or Replacement:

1. An Applicant shall submit a separate Water Main Extension Application for each new water main, water main extension, and/or water main replacement requested.

2. An Applicant shall submit a separate Water and Sewer Application for each type of service requested in addition to the Water Main Extension Application. See the above Water Service and Building Connection Applications.

3. An Applicant shall submit a Proposed Site Plan when applying for a New Water Main, Water Main Extension, or Replacement. See Section 4.2 for plan submittals.

4. The Applicant shall also submit the Proposed Site Plan to the local Department of Publics Works and local Fire Department that have jurisdiction.

5. The Applicant may also be required submit the Proposed Site Plan to the local Planning Department, local Fire Department, and/or local Conservation Commission that have jurisdiction as determined by the Commission.

6. The Applicant shall submit the block plan or Assessor's Plan. See Section 4.2 for plan submittals.

7. The New Water Main Installation/Extension Charge at rates as set forth in the Commission's Rules and Regulations.

4.1.7 Application Procedure for Subdivisions

1. Subdivisions require a single application for the water main and sewer main extension.

2. Each house requires a single application for both the water service and sewer connection.

4.1.8 Application Procedure for Commission Approved Contractor

1. The Installer is required to have completed the approval process to perform work on projects relating to the Commission's Public Water Mains and/or Public Sewers.

2. This policy will evaluate Installers to determine if the Installer has the qualifications and experience to perform work on projects relating to the Commission's Public Water Mains and/or Public Sewers.

3. The scope of work for projects relating to the Commission's Public Water Mains and/or Public Sewers is limited to small to medium sized projects. Examples of this work are:

   (a) Water mains — installation, repair

   (b) Hydrants — installation, repair

   (c) Valves and other appurtenances — installation, repair

   (d) Bypass piping – installation, maintain

   (e) Services — new installations, replacements, and cut offs

   (f) Sewer Mains – installation, repair, cleaning, jetting

(g) Manholes – installation, repair, rehabilitation

(h) Repairs to sewer service

(i) Video inspection and analysis of sewer mains

(j) Excavation, backfilling, compaction, and/or surface restoration

4. Installers shall provide Required Bonding, as set forth in the Commission's Rules and Regulations, at the time of application.

5. At the time of Application Installers shall provide proof of Required Insurance as defined below:

   (a) Workmen's Compensation, Employer's Liability Insurance, and Occupational Disease Insurance: The INSTALLER shall, before commencing the Work, provide by insurance for the payment of compensation and the furnishing of other benefits under MGL Chapter 152 (Ter. Ed.) to all persons employed under the contract and the INSTALLER shall continue such insurance in force and effect during the term thereof.

   (b) Comprehensive General Liability Insurance: The INSTALLER shall, before commencing the Work, carry Public Liability Insurance and Property Damage Insurance, including coverage for contractual liability, and (if sub-contractors are involved) INSTALLER's Protection Liability Insurance, satisfactory to the COMMISSION so as to save the COMMISSION harmless from any and all claims for damages arising out of bodily injury to, accidental death, or destruction of property caused by accident resulting from the use of implements, equipment, or labor used in the performance of the contract or from any neglect, default, or omission or want of proper care, or misconduct on the part of the INSTALLER or anyone in the INSTALLER's employ during the execution of the Work.

   (c) Limits in the amounts of not less than $250,000.00 for bodily injury insurance and accidental death insurance for each occurrence and not less than $100,000.00 for property damage insurance.

   (d) When any motor vehicles are used in connection with the Work to be performed, Automobile Public Liability Insurance with limits of not less than $250,000.00 for bodily injury insurance and accidental death insurance for each occurrence and not less than $100,000.00 for property damage insurance.

6. The approval period will be 3 years.

7. The method of approval is as follows:

(a) The Installer must complete the Commission Approved Contractor Application Form, attached in Section 15.1.1, sign and date the Safety Assurance Form, attached in Section 15.1.2, and sign and date the Indemnity Form, attached in Section 15.1.3 of these Guidelines and Policies. The completed application must be submitted to the Commission at the Commission's Customer Field Service Office at 71 Colton Street, Springfield, MA.

(b) The Installer shall have at least one (1) responsible supervisor with a cellular phone number for immediate contact at any job site.

(c) The Installer's history shall indicate the Installer's company has been in business a minimum of five (5) years installing and repairing Public Water Systems and/or Public Sewer.

(d) The Installer's procedure and equipment for pressure testing water and sewer mains shall indicate the Installer's company has the proper equipment and method of work to successfully pressure test said mains in projects work as defined in Paragraph 3 above.

- Hiring of a subcontractor to perform the pressure test is allowed provided specific information about the subcontractor, such as Name, Company, Company's core business, address, phone number, name of responsible supervisor is submitted.

(e) The Installer's procedure and equipment for disinfecting water mains and services shall indicate the Installer's company has the proper equipment and methods to successfully disinfect and put into service the water mains and services.

- Hiring of a subcontractor to perform the disinfection procedure is allowed provided specific information about the subcontractor, such as Name, Company, Company's core business, address, phone number, name of responsible supervisor is submitted.

(f) Any person licensed by the Commonwealth of Massachusetts as a Master or Journeyman Plumber shall be deemed qualified to make connections to sewers, but still must obtain a Commission Approved Contractor Card for such activities.

(g) Any person licensed by the Commonwealth of Massachusetts as a Drinking Water Operator – Distribution 2 or higher shall be deemed qualified to install or repair water mains, water services, and/or other water appurtenances, but still must obtain a Commission Approved Contractor Card for such activities.

(h) Provide proof of the Required Bonding as defined on the Application Form, attached in Section 15.1.1 of these Guidelines and Policies.

(i) Provide proof of Required Insurance as defined in Paragraph 5 above.

(j) The Installer shall provide references, on request, which shall list a minimum of five (5) Municipal projects that the Installer performed on water and/or sewer work, in the last five (5) years. The listing is to include:

- Name of Municipal project
- Description of services provided
- Date the work was performed and date the work was completed
- Point of contact with address and a desk top phone number whom the Commission has authorization to contact regarding the project

8. The Commission shall evaluate all Application Forms submitted by the Installer, interview the Installer, and make a recommendation to the Executive Director for approval or denial.

9. Installers, who have their request denied, may appeal the decision, in writing to the Executive Director of the Commission.

4.1.9 Application and Scheduling Procedure for Fire Flow Testing

1. An Applicant shall submit a separate Fire Flow Test Application, Fee, and Deposit for each Fire Flow Test requested in accordance with the Commission's Rules and Regulations.

2. The Applicant is be required to submit a plan or Commission distribution map showing the hydrants to be used during the Fire Flow Testing.

3. The Commission shall schedule to have all valves in the Fire Flow Test area operated to ensure the valves are in the open position. The valves will be operated within 14-days of the Applicant submitting the Application, Fee, and Deposit.

4. The Applicant shall schedule a day, after the valve(s) position have been operated, to perform the Fire Flow Test through Customer Service or if unable to schedule at time of application call the Commission's Inspection office at 413-787-6069. Weather conditions may require the Fire Flow Test(s) to be rescheduled. No Fire Flow Test(s) shall be scheduled when temperatures are below freezing, unless special arrangements are approved by E&TS.

5. The Applicant shall demonstrate experience in the art of performing Fire Flow Tests and shall demonstrate the experience to the satisfaction of the Commission.

6. Fire Flow Testing shall be performed in accordance with Section 6.5 of these Guidelines and Policies.

Section 4.2 Submittals, As-Built Plans, Record Sketches, and Service Cards

4.2.1 General

1. The Applicant for any new water and/or sewer service must submit a Proposed Site Plan(s) Backflow Prevention Plan(s), Fire Suppression Plan(s), Plumbing Plan(s) and/or Fats Oils and Grease Interceptor Plan(s) for review, comments, and potential approval by the Commission.
2. The Commission reviews Proposed Site Plan(s) and other plan(s), as appropriate to determine compliance with Commission Rules and Regulations, the Guidelines and Policies, and the Commission's Material Specifications.
3. The Applicant's engineer may contact the Commission for copies of records of existing water and sewer mains and services.
4. The Commission needs one (1) Proposed Site Plan for draft review and comment and after the draft is approved, five (5) Final Site Plans shall be submitted.
5. A License Agreement(s), according to the Commission's Rules and Regulations and Section 4.3.2 of these Guidelines and Policies, for all Water and Sewer Main Extensions shall be submitted after the Final Site Plan has been approved and before construction can begin. The License Agreement Form is attached in Section 15.1.4 of these Guidelines and Policies.
6. Surety Required, according to the Commission's Rules and Regulations, in a form approved by the Commission for all Water and Sewer Main Extensions, shall be submitted after the Final Site Plan has been approved and before construction can begin.
7. The Commission, at its discretion, may require additional design requirements based on site conditions, capacity issues, existing infrastructure materials, and/or other unknown conditions.

4.2.2 Proposed Site Plans

1. Proposed Site Plans for New Water Main Extensions and New Sewer Main Extensions shall include the following;

   (a) A narrative letter briefly describing the proposed project, type of establishment and anticipated average daily and peak water demand and sewer discharge is required;

(b) at a minimum may be submitted on 24-inches X 36-inches;

(c) MA Professional Engineer stamp;

(d) a Title Block that includes Street Name, sewer or water main extension, extents of extension, such cross street to cross street, date for submittal and latest revision, vertical datum and horizontal datum (if applicable), and scale of plan;

(e) a Block Plan or Geographical Information System (GIS) map from the City of Springfield Department of Public Works-Engineering or an Assessor's Plan from the Town of Ludlow Assessor's office at Town Hall showing the lot and/or parcel to be serviced and an intersecting street may also be required;

(f) new water and/or sewer main and/or service locations and existing water and/or sewer main and/or service locations, shall be shown on the Proposed Site Plan;

(g) existing and proposed water and/or sewer main structures, fittings and appurtenances to be connected;

(h) existing and proposed lots or parcels, right of way layout, labels of lots, and any existing street addresses of the project site;

(i) existing and proposed utilities particularly underground for the project area;

(j) proposed easements through which water and or sewer services are proposed;

(k) widths of proposed easements are to be determined by the Commission and;

2. There are several options for overall project sanitary service. In addition to Paragraph 1 above, the Proposed Site Plans for **Sewer Main Extensions** shall also include the following, in order of preference by the Commission;

(a) Gravity sanitary flows to other existing gravity sewers.

(b) Gravity flows to an existing sanitary pump station. Capacity availability at the pump station and in existing sanitary mains must be determined based upon proposed peak design flows for this project and other potential building lots outside of this project area but served by proposed sewers.

(c) In some cases an existing sanitary pump station is in the area. If available capacity of an existing sanitary Pump Station, force main, or gravity sewers is not adequate to serve the proposed project, the developer must fund the analysis, design, and construction of Commission infrastructure upgrades such that there is adequate capacity. The Commission would participate in the analysis of existing capacity of structures.

(d) Design and construction of new private pumping facilities for project flows to existing public gravity sewers. The Commission currently has a moratorium on new public pump stations. Any proposed new pump station must be approved by the Commission Executive Director.

(e) Engineers will explore each alternative in order before proposing new private sanitary pump stations.

3. Proposed Site Plans for **Subdivisions** shall include the following;

4. Comply with the Water Main Extensions and Sewer Main Extensions requirements in Paragraphs 1 and 2, above;

(a) if the subdivision is to be built in phases then the phases shall be defined so that proper appurtenances for water and sewer can be installed at the end of each phase, so that the next phase can be started without adverse effect on existing customers;

(b) any local Planning Board requirements must also be met by the Applicant's engineer, including, but not limited to, Preliminary Plan submission as defined by the State of Massachusetts and Definitive Plan submission as defined by the State of Massachusetts;

(c) any local Fire Department requirements must also be met by the Applicant's engineer;

(d) any local Department of Publics Works requirements must also be met by the Applicant's engineer;

(e) A coordination meeting(s) may be required to achieve this.

5. Proposed Site Plans for **Residential Water and Sewer Service** shall include the following;

(a) At a minimum may be submitted on 8.5-inches X 11-inches;

(b) a mortgage survey is acceptable for a Residential Proposed Site Plan;

(c) a Title Block that includes Service address, type of service(s) the plan is for, date for submittal and latest revision, vertical datum and horizontal datum (if applicable), and scale of plan;

(d) a Block Plan or Geographical Information System (GIS) map from the City of Springfield Department of Public Works-Engineering or an Assessor's Plan from the Town of Ludlow Assessor's office at Town Hall showing the lot and/or parcel to be serviced and an intersecting street may also be required;

(e) a street address and a lot or parcel number must be obtained from the Department of Public Works, that has jurisdiction;

(f) the proposed building(s) footprint;

(g) new water and/or sewer service locations, existing water and/or sewer service locations, and any water and/or sewer service locations to be discontinued and;

(h) may require MA Professional Engineer's stamp for unusual layouts and/or easements though adjacent properties of other Owners.

6. Proposed Site Plans for Commercial/Industrial and Multi-family Residential (3-family or more) Water and Sewer Service shall include the following;

(a) A narrative letter briefly describing the proposed project, type of establishment and anticipated average daily and peak water demand and sewer discharge is required;

(b) at a minimum may be submitted on 24-inches X 36-inches;

(c) MA Professional Engineer stamp;

(d) a Title Block that includes Service address, type of service(s) the plan is for, date for submittal and latest revision, vertical datum and horizontal datum (if applicable), and scale of plan;

(e) a Block Plan or Geographical Information System (GIS) map from the City of Springfield Department of Public Works-Engineering or an Assessor's Plan from the Town of Ludlow Assessor's office at Town Hall showing the lot and/or parcel to be serviced and an intersecting street may also be required;

(f) a street address and a lot or parcel number must be obtained from the Department of Public Works, that has jurisdiction;

(g) the proposed building(s) footprint;

(h) new water and/or sewer service locations, existing water and/or sewer service locations, and any water and/or sewer service locations to be discontinued;

(i) existing and proposed water and/or sewer main structures, fittings and appurtenances within the site and within any right of way which contains mains serving the project site;

(j) existing and proposed lots or parcels, right of way layout, labels of lots, and any existing street addresses of the project site;

(k) existing and proposed utilities particularly underground for the project area;

(l) proposed easements through which water and or sewer services are proposed and;

(m)widths of proposed easements are to be determined by the Commission.

7. When applicable, a Demolition Plan showing the Discontinuance of Existing water and sewer services will also be submitted at this time. Discontinuance submittals include the following:

   (a) Location of service to be discontinued;

   (b) Method that the Installer or Owner will be used to discontinue the service.

8. When applicable, a plan showing any Cross Connection will also be submitted at this time. Any Cross Connection must be separated from the public water supply by a Backflow Prevention Device (BFP) for certain water uses according to CHAPTER 10 of these Guidelines and Policies.

9. **Backflow Prevention Device** submittals include the following:

   (a) Plumbing plan showing location of backflow prevention device (BFP) according to Section 10.1, Paragraph 6 of these Guidelines and Policies;

   (b) the type of BFP to be installed and;

   (c) the specifications of BFP to be installed.

10. When applicable, a plan showing a Fire Suppression System will also be submitted at this time. All fire suppression systems are a Cross Connection and must be separated from the public water supply by a Backflow Prevention Device (BFP) for certain water uses according to CHAPTER 10 of these Guidelines and Policies.

11. **Fire Suppression System** submittals include the following;

    (a) Comply with the BFP requirements in Paragraph 9, above;

(b) The fire suppression system design is the responsibility of the Applicant's engineer;

(c) a proposed site plan and plumbing plans of fire suppression system which is separate from the domestic water system to the public water main;

(d) Fire Flow Testing may be required - Fire Flow Test results only represent the conditions of the public water system at the time of the test. Public water system functioning may vary from day to day and hour to hour within the parameters of DEP requirements. The Commission does not review or approve fire suppression systems for adequacy of flow or pressure;

(e) all public and private hydrants existing and proposed;

(f) the location of the External Fire Department Connections (FDC) (typically the FDC must be located within 100 feet of a public hydrant) on the exterior of building

(g) any Fire Department requirements must also be met by the Applicant's engineer and;

(h) a coordination meeting(s) may be required to achieve this.

12. When applicable a plan showing any internal and/or external Fats, Oils, and Grease (FOG) Interceptor will also be submitted at this time according to the Commission's Rules and Regulations.

13. **Fats, Oils, and Grease Interceptor** submittals include the following:

(a) Grease interceptor equipment design and sizing and construction details.

(b) Plumbing plan and/or site plan showing location of installation.

(c) FOG Maintenance Plan.

14. **Industrial Pretreatment Sanitary Survey** – Certain industries require pretreatment of sanitary flows before being discharged to the public sewer system. Contact the Commission's Industrial Pretreatment Program for specific requirements at 787-6207 x 213.

4.2.3 Minimum Design Standards

1. New Water Mains and Appurtenances shall be shown and designed on Proposed Site Plan(s) according to CHAPTER 6 of these Guidelines and Policies and these minimum design standards as follows;

(a) The Commission reserves the right to change any of the below requirements at its discretion during the review process.

(b) When horizontal or vertical control is required the Massachusetts State Plane Coordinate System in feet using the North American Datum 1983 (NAD83) (NAD83 is a horizontal datum) shall be utilized, unless otherwise approved by the Commission. Vertical Datum should be provided in New City of Springfield Base which may be converted in accordance with Relation of Vertical Datums to Springfield City Base Detail (W-15.0), unless otherwise approved by the Commission. Please note that the Relation of Vertical Datums to Springfield City Base Detail (W-15.0) provided is a reference and a guide. If vertical control is critical to a project than a survey by a professional surveyor is required.

(c) The minimum pressure in all new public water mains shall be twenty (20) pounds per square inch (PSI) under any and all flow conditions including peak hourly flow and maximum day demand with a fire.

(d) The minimum required fire flow from all new public hydrants shall be as follows:

- Residential zoned areas shall be designed to provide 500 gallons per minute (GPM) or as required by the local Fire Department having jurisdiction, whichever is greater, or
- Commercial, Industrial, or Municipal areas shall be designed to provide 1500 gallons per minute (GPM) or as required by the local Fire Department having jurisdiction, whichever is greater, and
- A signed letter from the local Fire Department having jurisdiction stating that the minimum required fire flow requirements have been met is required before an application can be processed.

(e) Water mains shall be a minimum of 8-inch diameter, ductile iron, thickness class 52, and cement lined. Pipes with 6-inch diameter may be allowed with the Commission's approval.

(f) Water mains shall be designed to loop or have dual connections to the Commission's existing distribution system. When this cannot be achieved water mains shall be installed in accordance with the next paragraph.

(g) Water mains in a cul-de-sacs or dead ends that cannot be extended or looped may be 6-inch diameter with Commission approval and the following conditions are met;

- Up to six (6) homes may be provided water services, unless otherwise approved by the Commission.
- Hydrants shall be placed according to paragraph (k) of this Section and shall have one (1) length of pipe placed after the hydrant tee, unless otherwise approved by the Commission.
- The majority of the water services shall be connected after the last hydrant on one length of pipe.

(h) The water mains will be installed on the north or east side of the street.

(i) Typically, water mains in streets shall be located at least 7-feet from sewer mains and water services shall be located at least 10-feet from sewer services and 4-feet from other utilities, unless otherwise approved by the Commission.

- On 40-foot wide streets the pipe will be located 13-feet from the appropriate street line.
- On 50-foot wide streets the pipe will be located 18-feet from the appropriate street line.
- On 60-foot wide streets the pipe will be located 23-feet from the appropriate street line.
- On street widths not defined above the Applicant's engineer shall contact the Commission's Engineering and Technical Services group to determine the location of the water main.

(j) Valves:

- Three (3) Isolation valves shall be installed on each side of three-way intersections at each street line.
- Four (4) Isolation valves shall be installed on each side of four-way intersections at each street line.
- Isolation valves shall be installed every 500-feet on straight runs of water main.
- Isolation valves shall be the same size as the water main being installed.
- Isolation valves shall be gate valves up 12-inch in diameter. Isolation valves 16-inch may be butterfly valves but require Commission approval prior to installation. Isolation valves larger than 16-inch shall be approved by the Commission prior to installation.

(k) Public Hydrants:

- Public Hydrants shall be located approximately every 300-feet to 400-feet, on the same side of the street as the water main, on a property line, and as approved by the local Fire Department.
- Public Hydrants are not to be placed at the end of the main in a cul-de-sac, but rather at or before the point of curvature (PC).
- Public Hydrants are connected directly to public water mains.
- Public water mains are only found in street right of ways or easements given to the Commission by the property owner.
- Public Hydrants used to supply water to private fire protection systems shall be in street right of ways or easements given to the Commission by the property owner.
- The Applicant's engineer must provide information to the Commission and local Fire Department with flow and demand requirements and available flow.

(l) Private Hydrants:

- Private Hydrants within a site shall be installed so as to protect the public water supply per DEP requirements, Commission requirements and the local Fire Department requirements.
- The Applicant's engineer will contact the Commission's Engineering and Technical Services for each such installation.
- Private Hydrants shall not be connected to the Public Water main.
- Private Hydrants shall be installed after a meter and/or back flow preventer.
- Private Hydrants shall conform to the Commission's Material Specification except they shall NOT be provided with a pumper connection.
- Private Hydrants are owned, operated, and maintained by the property owner. It is encouraged to work with the local Fire Department having jurisdiction for any private hydrants to be part of the hydrant certification process, if applicable.

(m) Private Yard Hydrants

- Private Yard Hydrants within a site shall be installed so as to protect the public water supply per DEP requirements, Commission requirements and the local Fire Department requirements.
- The Applicant's engineer will contact the Commission's Engineering and Technical Services for each such installation.
- Private Yard Hydrants shall not be connected to the Public Water main.

- Private Yard Hydrants shall be installed after a meter in accordance with the **Typical Yard Hydrant Detail (W-11.5)**.
- Private yard Hydrants shall have a back flow preventer installed on the threaded outlet or as required by the Commission.
- Private Yard Hydrants shall conform to the Commission's Material Specification except they shall NOT be provided with a pumper connection.
- Private Yard Hydrants are owned, operated, and maintained by the property owner. The Owner is encouraged to work with the local Fire Department having jurisdiction for any private hydrants to be part of the hydrant certification process, if applicable.

(n) Fittings:

- All fittings shall be mechanically restrained, unless otherwise approved by the Commission.

(o) 1-inch through 2-inch Water Service, new replacement and/or seasonal:

- All material shall be in accordance with the Commission's Material Specifications and installed in accordance with these Guidelines and Policies, unless otherwise approved by the Commission.
- Typically, Ball Type Corporation Stops (corporation) shall be installed horizontally at the water main for connecting all services to the new mains. A Ball Type Curb Stop (curb stop) shall be installed at the property line for connecting copper tube from the main to copper tube from the building. A Straight or Angle Ball Meter Valves (meter valve) shall be installed at the building for connecting copper tube from the curb stop to the building. Finally, copper tubing shall be used to make connections between new corporations, new curb stops, and new meter valves.

(p) 4-inch through 12-inch Water Service:

- All material shall be in accordance with the Commission's Material Specifications and installed in accordance with these Guidelines and Policies, unless otherwise approved by the Commission.
- All shut-off valves at the water main shall be 6-inch or larger. If a 4-inch ductile iron water service is required, the Installer shall provide a 6-inch connection and 6-inch shut-off valve and then reduce to 4-inch.
- A stainless steel (SS) or ductile iron (DI) tapping sleeve, or a mechanical joint (MJ) tee is required on the main in front of the property to be served, unless otherwise approved by E&TS.

- A 6-inch or larger tapping by MJ or MJ by MJ gate valve is required, unless otherwise approved by E&TS.
- Any Water Service or Fire Service Pipe that is looped to the Commission's Public Water Main(s) requires check valves at each meter and/or back flow preventer.
- All tees, bends, crosses, and other fittings shall be ductile iron mechanical joint unless otherwise approved by the Commission. If a reducer is required it shall be DI MJ by MJ.
- All pipe shall be DI, thickness class 52, cement lined, and push-on joints. The final 20-feet shall be fully restrained from the flange (F) connection(s) for the outside, spindle and yoke (OS&Y) gate valve(s).
- A companion flange(s) shall be temporarily bolted onto the flanged OS&Y gate valve(s). The companion flange(s) shall have a 2-inch threaded outlet. The threaded outlet shall be utilized for flushing, leak testing, and disinfection.
- When the water service pipe through the wall or floor is to be utilized for a fire service pipe only an OS&Y gate valve in accordance with the Commission's Material Specifications is required as a building control valve. A temporary companion flange with a 2-inch threaded outlet and 2-inch ball valve may be installed on the building control valve for leak testing, flushing and bacteria testing..
- Fire Services may install either OS&Y gate valves or butterfly valves on both sides of the backflow preventer assemblies. Flanged or grooved connections are allowed. The building control valve does not take the place of the assembly valves.
- All joints outside/underground shall be MJ or push-on.
- All joints inside/above grade shall be flanged.

(q) Special Conditions and Requirements:

- New or replacement water mains and/or water services installed within 200-feet of a Fuel Storage Tank and/or if a potable water line is to traverse an area saturated with low molecular weight petroleum products shall be installed with fluorocarbon gaskets, in accordance with the Commission's Material Specifications, for 100-feet on each side of the fuel storage tank or as required by the Commission.

2. Sewer Mains and Appurtenances shall be shown on Proposed Site Plan(s) according to CHAPTER 11 of these Guidelines and Policies and the minimum standards as follows;

(a) The Commission reserves the right to change any of the below requirements at its discretion during the review process.

(b) Sewer mains shall be a minimum of 8-inch diameter, PVC SDR 35, or RCP, or Ductile Iron thickness class 52, epoxy lined.

(c) Sewer mains shall be installed in the center of the street.

(d) Sewer mains shall be a minimum of 4-feet deep.

(e) 8-inch Sewer mains shall be sloped at 0.4% (4.8-inch/100-feet).

(f) Manholes shall be at no more than 300-feet apart and at all changes in diameter, material, slope, and direction.

3. All installations of utilities adjacent to Commission water and sewer mains must be a minimum of 4-feet from the existing water and/or sewer main, edge to edge of pipe. Adjacent utilities may include but not be limited to underground conduits for cable, electric, fiber optic, gas, and telephone.

4.2.4 As-Built Plans

1. An As-Built plan of all water and sewer mains and any other appurtenances, which have been constructed as part of the main extension construction shall be provided to the Commission. It is recommended that the engineer of record submit an initial paper draft for Commission review before submitting a mylar.

2. As-Built plans shall be submitted 60-days after the water and/or sewer main has been put into service.

3. For each new or relocated utility installed, including those installed or relocated by others during the main extension, the engineer of record shall perform an as-built location survey by coordinates prior to backfilling the excavation.

    - The survey data shall be obtained by Global Positioning Survey (GPS) and certified by a Professional Land Surveyor registered in Massachusetts.

4. The following information shall be included on any As-Built Plan of water and sewer main extensions and/or Subdivisions to be submitted to the Springfield Water and Sewer Commission.

    (a) At a minimum, the description and location of sanitary structures includes size, material, and slope of mains, rim elevation, invert elevation of manholes, cleanouts, chimneys, and building sewer connections.

    (b) At a minimum, the description and location of water structures must include size, material, of all mains, hydrants, fittings, bends, and water services.

(c) Any other information required for a full description of the infrastructure to be turned over to the Commission shall be included. The location and description of all other utilities, which have been constructed within the new or existing right of way will be included as practicable.

(d) The location and description of all easements, which are pre-existing and were created as part of the main extensions or the subdivision process, within the project area, shall be included.

(e) A full description of the layout of the newly established or existing street right of way and/or easements to be deeded to the Commission shall include the location, metes and bounds description of all monumentation.

(f) The lots, which have been established, and are pre-existing, within the project area shall be labeled with lot numbers and street addresses as appropriate.

5. The plan shall be stamped and signed by the main extension's design engineer, who shall be a Professional Engineer in the Commonwealth of Massachusetts, certifying that the information shown on the plan reflects a field investigation of the water and sewer mains and appurtenances which were constructed.

6. The quality of the plan and its material must be such that it can be recorded in the Hampden County Registry of Deeds. This includes but is not limited to a plan on mylar with original Professional Engineer's stamp and signature.

7. A complete digital base plan shall be provided in AutoCAD DWG format Release 2000i or later on a Compact Disk (CD), properly referenced to the Massachusetts State Plane Coordinate System in feet using the North American Datum 1983 (NAD83) (NAD83 is a horizontal datum) unless otherwise approved by the Commission. Vertical Datum should be provided in New City of Springfield Base which may be converted in accordance with **Relation of Vertical Datums to Springfield City Base Detail (W-15.0).**, unless otherwise approved by the Commission. Please note that the **Relation of Vertical Datums to Springfield City Base Detail (W-15.0)** provided is a reference and a guide. If vertical control is critical to a project than a survey by a professional surveyor is required. The following standards shall be applicable:

   (a) All text shall be drawn using a STYLE of "L100-XX" (where XX refers to the plotted scale) and a font file of "SIMPLEX" as provided in the AutoCAD. The style shall be defined as a "fixed height" style and have a height of 0.10 times the drawing plotted scale. (i.e. 4.0 for 40 scale plan, 2.0 for 20 scale etc.).

   (b) Precision and Accuracy shall be as indicated below:

   - Horizontal survey:

- Precision: Horizontal control and surveyed points shall maintain a minimum precision of 1:10,000.
- Accuracy: No more than 10% of the survey points shall be in error by more than 1/100 inch or 0.25 mm when viewed at the requested scale.
- Vertical survey:
- Precision: Vertical Control shall have a maximum error of closure no greater than .075 feet or .02 meters.
- Accuracy: No more than 10% of elevations when interpolated from a Surface shall be in error of more than 1/2 a contour interval.
- Surface Data:
- The data format shall conform to Autodesk Land Development Desktop Project files. If the Contractor uses a different software product to create a surface, then the surface must be represented as a TIN (Triangulated Irregular Network) of 3D lines on a separate, distinct layer within the AutoCAD drawing file. 3D faces or 2 dimensional lines are NOT acceptable.

4.2.5 Record Sketches

1. Record Sketches by Commission Inspectors shall be in accordance with the **Record Sketch Detail (W-16.0)** and include the following information:

   (a) Street name, City or Town, limits of sketch, and page number starting in upper right hand corner.

   - Identify which water main, if more than one main in street, by size and/or which side of street (N, S, E, or W).
   - Identify "Easement" in street name when water main is installed in an easement.

   (b) Pipe diameter, material, pressure class or pipe class, lining, manufacturer, section length, joint type, installed by, and install date at top of page

   (c) The sketch should show a North arrow, street lines, all fittings, valves, hydrants, air corps and air valve assemblies, and 4-inch and larger water services with distances in feet and inches from center of each component. A distance from street line to center of pipe should be shown. Dates and by whom of any cut-in or tapped components should be shown.

   (d) Totals of each main extension installation should be tabulated at bottom of page.

   (e) A note should be provided to describe the repair, replacement, new cut-in or removed fitting or valve.

- Deductions for abandoned or replaced pipe should be noted on bottom of page.
- Abandoned mains are mains that are disconnected and left in place.
- Replaced mains are water mains that are removed and another main is installed in its place.
- Date, type of pipe, and who did work should be noted next to totals.

(f) Each Record Sketch page should show what is installed on each page. Overlap should be avoided. The totals of pipe installed on each page are the information that will be used to create the Geographical Information System (GIS) database.

2. Cut-in valve(s), fitting(s), service(s), hydrant(s) or other infrastructure/repair should be measured to another existing valve(s), fitting(s), service(s), hydrant(s) or other infrastructure/repair in order to locate it along the main.

3. All measurements should be with measuring tape (steel or cloth).

4. Record Sketch drafts shall be reviewed and entered into SWSC data systems as follows:

   (a) Capital Projects shall be reviewed by the Project Manager

   (b) Repairs, replacements, and main, valve, and hydrant installs by SWSC shall be reviewed by Senior Inspector

5. If there are no corrections or missing information the data will be entered into the Asset Management System.

6. Capital Projects, repairs, replacements, and main, valve, and hydrant installs by SWSC and/or Installers shall be scanned by the Inspection Group and entered into the Commission's Asset Management System.

   (a) Scanned documents should include Record Sketch copies with written valve numbers, Valve Forms, Hydrant Forms, and Foreman's Work Order documents.

   After entry into the Asset Management System the scanned documents should be submitted to the Commission's GIS group for review and entry into the GIS database. Submission shall be by attaching the documents to the GIS Review work order in the Commission's Asset Management System.

7. If corrections or missing information are found during any of the reviews steps the Record Sketch shall be returned to the Commission Inspectors and the needed information shall be added to the record sketch and resubmitted to the reviewer.

8. Always remember more information is better than not enough information when trying to locate Commission facilities.

4.2.6 Water Service Card

1. Water Service Card by Commission Inspectors shall be in accordance with the **Water Service Card Detail (W-16.1)** and include the following information on the front of the card:

   (a) Address number, street name and community, Owner, and a Service Record number at the top of the card.

   (b) Date and Work done should be in the middle of the card.

   (c) Ties to the primary shut-off valve should be in the bottom of the card and should begin with the type of valve box located in street or treebelt and over the primary shut-off valve, a minimum of four (4) ties with two (2) from either side of the main structure and one (1) out from the main structure and one (1) additional tie to another structure or permanent facility should be provided. Ties from street line and intersecting street lines are acceptable alternative or additional ties.

   (d) Distances to the valve(s) buried in street should be provided.

   (e) If the ball IK is made onto an existing or new ball corporation it should be noted in the tie. If there is no IK it should be noted that a ball corporation is tapped into the main.

2. Water Service Card by Commission Inspectors shall be in accordance with the **Water Service Card Detail (W-16.1)** and include the following information on the back of the card:

   (a) Water Service size, length, material, date installed, and who installed it should be at the top of the card.

   (b) The sketch should show street lines, water main(s) with diameter that the water service is connected to, structure, such as building or meter pit, the water service enters with address number if applicable, a second structure, or permanent facility, such as a hydrant or gate marker.

   (c) Ties to the primary shut-off valve should include a minimum of four (4) ties with two (2) from either side of the main structure and one (1) out from the

main structure and one (1) additional tie to another structure or permanent facility should be provided. Ties from street line and intersecting street lines are acceptable alternative or additional ties. Distances in feet and inches from center of each component.

(d) North arrow should be provided.

(e) Distances along the water service pipe to other or buried valves, copper to coppers, repairs, or other underground structures or crossings should be provided.

3. All measurements should be with measuring tape (steel or cloth).

4. Always remember more information is better than not enough information when trying to locate Commission facilities.

Section 4.3 Approvals

4.3.1 Site Plan Approval

1. A Status Memo that defines the status of project for all associated water and sewer mains, services, and appurtenances is written by ET&S.

2. The Status Memo is attached to the Final Site Plan(s) once the Proposed Site Plan(s) has met all Commission requirements.

3. The Applicant and/or Applicant's engineer is notified, by phone or email, once the Status Memo and final design plans are complete and available for pick-up at the Commission's Customer Field Services Office located at 71 Colton St., Springfield, MA.

4. The Applicant must pick up the Status Memo and Final Site Plan(s) and pay all required fees as described in the memo. Those fees may include, but not be limited to:

(a) remaining application fees,

(b) connection fees,

(c) tapping main fees,

(d) main shut down / turn on fees,

(e) service discontinuance fees,

(f) inspection fees, other construction related fees.

5. All Commission fees as set forth in the Commission's Schedule of Rates, Fees, and Charges in its Rules and Regulations are also available on line at http://www.waterandsewer.org/

6. It is highly recommended that the Installer receive the Contractor's copies of the Status Memo and Final Site Plan(s), as there are important records and instructions included.

7. The Status Memo, Final Site Plan(s), and any other attachments are also distributed to the Commission's Inspectors, Customer Service, Customer/Owner/Developer, Billing office, and the record file in E&TS's office.

4.3.2 Utility Installation Approvals

1. All installations of utilities adjacent to Commission water and sewer mains must be a minimum of 4-feet from the existing water and/or sewer main, edge to edge of pipe. Adjacent utilities may include but not be limited to underground conduits for cable, electric, fiber optic, gas, and telephone.

2. **Standard Details** - Standard offsets of utilities from Commission water and sewer mains shall be in accordance with the **Utility Separation Detail (W-01.0)** and Springfield DPW Street Typical Section for Utilities, unless otherwise approved as described below.

3. **Alternative Locations Approva**l - To obtain Commission approval for alternative locations and offsets, plans shall be submitted for review and approval to the local DPW having jurisdiction and the Commission's Engineering and Technical Services Office in accordance with these Guidelines and Policies. This review and approval must be complete before the beginning of construction.

4. **Inspections and Enforcement** – Commission Inspectors will perform periodic inspections of utility installations for compliance with this policy. If encroachments are noted, the local DPW having jurisdiction will be notified for enforcement of their street occupancy permit requirements.

5. **Failure to comply** with this Policy due to encroachment into the offsets to water and/or sewer mains as described above may be cause for the removal of said conduits, pipes, and other property located within the encroachment area by the Commission. It may also result in the Commission or their agents relocating said conduits, pipes, and other property at cost to the encroaching utility, and possible removal of the contractor from the Commission Approved Contractor's List.

4.3.3 License Agreement Approval

1. One (1) draft License Agreement Form, attached in Section 15.1.4 of these Guidelines and Policies, will be submitted to the Commission's Engineering and

Technical Services (E&TS) for review and approval prior to the Status Memo, Final Site Plans, and any other attachments are distributed.

- A draft form of Surety, according to Section 4.3.4 of these Guidelines and Policies, will be submitted at this time as it is a requirement of the License Agreement.

2. E&TS and the Commission's legal Council will review the License Agreement. E&TS will contact the Applicant with any changes or corrections prior to the Applicant submitting the signed originals.
3. Two (2) original License Agreements shall be submitted and signed by the Applicant.
4. The Commission's Engineering and Technical Services (E&TS) will review the License Agreements and submit them to the Executive Director for Signature.
5. The Executive Director (or his/her designee) will sign the License Agreements.
6. One (1) original License Agreement will be attached to the Applicant's Status Memo.
7. One (1) original License Agreement will be filed at the Commission in the E&TS's Record Vault and one (1) copy will be filed in the street file in E&TS's office.

4.3.4 Surety Approval

1. One (1) draft form of a Surety document(s) will be submitted with the draft License Agreement to the Commission's Engineering and Technical Services (E&TS) for review and approval prior to the Status Memo, Final Site Plans, and any other attachments are distributed.

   (a) The Surety document(s) will be in the form of a Bond. Other forms of surety may be submitted in place of a Bond but must be approved prior to submittal.

   - Performance / Payment Bond shall be for the construction period until all water and sewer mains have been approved. The construction period shall be considered over on the date the final bacteria test for the water main and the pressure test for the sewer main have passed.
   - Maintenance Bond shall be after the construction period from time of all main approvals until end of warranty period, typically one (1) year minimum, but may be longer at the Commission's discretion. The warranty period shall be considered over after one (1) year, all installation issues including, but not limited to raising water and sewer structures, pavement (as it relates to the water and sewer installation), and the approval of the Town or City having jurisdiction of said paving have been addressed to the satisfaction of the

Commission, and an As-Built drawing, according to Section 4.2.4 of these Guidelines and Policies has been submitted and approved by the Commission.

- Originals of Sureties shall be attached as part of the License Agreement for the Commission

(b) The Surety document(s) shall be made out to the Springfield Water and Sewer Commission.

(c) The Surety document(s) shall not have an expiration date.

(d) The Surety document(s) shall be made out for the project.

2. E&TS and the Commission's legal Council will review the Surety document(s). E&TS will contact the Applicant with any changes or corrections prior to the Applicant submitting the signed original(s).
3. One (1) original Surety document(s) shall be submitted and signed by the Applicant.
4. The Commission's Engineering and Technical Services (E&TS) will review the Surety document(s).
5. One (1) original Surety document(s) will be filed at the Commission in the Billing Office, one (1) copy will be filed in the E&TS's Record Vault, and one (1) copy will be filed in the street file in E&TS's office.

4.3.5 Surety Release

1. The Commission's Billing Office will notify E&TS when any Surety Document is to expire.
2. E&TS will determine when the surety will be released and send notification to the Surety provider and Applicant. Copies of the release will be kept in each file.
3. Surety shall be released one (1) year from the date of water main acceptance for service, which will be the day that the final bacteria test passes and/or one year from the date of sewer main acceptance, which will be the day that the television inspection was completed and reviewed by the SWSC's Inspectors.
4. No surety shall be released if the Applicant has not completed the above and submitted an approved As-Built drawings on mylars to the Commission's E&TS.

Section 4.4 Inspections for 1-inch to 2-inch Water Service (by Installers)

4.4.1 Installer Responsibilities at the Installation

1. The Owner or Installer shall have all Fees paid online at VASF@waterandsewer.org, before a Commission Work Order will be issued to have an installation inspected. Typically, single-family homes will require two (2) site visits for inspections. The Commission's Inspectors must have a Work Order issued by the Customer Service Office to perform an inspection.

2. The Owner or Installer shall call the Commission's Customer Service Office at 71 Colton Street, at 413-310-3500 to schedule the next available inspection appointment. A minimum 48-hours advance notice is required. The Customer Service Office at 71 Colton Street will schedule time slots during Regular Hours, at the Commission's discretion, and the water main installation shall be ready for inspection.

3. A responsible supervisor, as defined in Section 6.1.6 these Guidelines and Policies, of the Installer shall be on site at all times during an installation.

4. The responsible supervisor of the Installer shall have all the Commission issued paperwork including, but not limited to, receipts, plans, and memoranda, at the site at all times during an installation.

5. The Owner or Installer shall provide OSHA compliant safe access, including trench shoring and safe ladders if necessary, to all trenches. The Owner or Installer shall provide OSHA compliant safe access, including safe ladders to all foundations. Other areas that require inspection by the Commission Inspectors shall also be required to provide safe access as determined by the Inspectors.

6. The Owner or Installer shall have all work completed prior to when the Inspector arrives. If the work is not completed when the Commission Inspector arrives, the Owner or Installer must make additional repairs and schedule an additional inspection, at rates as set forth in the Commission's Rules and Regulations, by calling the Commission's Customer Service Office.

7. Inspection from water main to tree belt:

   (a) The tap at the main must be completed by the Commission in accordance with the 2-inch and less Water Service Installation Section of these Guidelines and Policies.

   (b) The copper tube shall be laid by the Installer from the shut-off valve at the main to the shut-off valve in the tree-belt prior to the Commission Inspectors arriving at the site.

(c) The Commission Inspectors must witness the water service pipe being flushed, the valve at the tree-belt being turned off, and the water service pipe, including all copper tube, fittings, and valves not having any water leaks at static line pressure.

- If leaks are observed by the Commission's Inspector, the Installer will be allowed to make minor repairs to stop the leak at this time. If the leak continues or the repair is not acceptable to the Commission Inspector, the Owner or Installer must make additional repairs and schedule an additional inspection at rates as set forth in the Commission's Rules and Regulations by calling the Commission's Customer Service Office.

(d) No work shall be backfilled before the water service installation is inspected and approved by the Commission's Inspectors.

8. Inspection from water main to house:

(a) The tap at the main must be completed by the Commission in accordance with the 2-inch and less Water Service Installation Section of these Guidelines and Policies.

(b) The copper tube shall be laid by the Installer from the shut-off valve at the main to the shut-off valve in the tree-belt and from the shut-off valve in the tree-belt to the meter valve in the building prior to the Commission Inspectors arriving at the site.

(c) The Commission Inspectors must witness the water service pipe being flushed, the meter valve in the building being turned off, and the water service pipe, including all copper tube, fittings, and valves not having any water leaks at static line pressure.

- If leaks are observed by the Commission's Inspector, the Installer will be allowed to make minor repairs to stop the leak at this time. If the leak continues or the repair is not acceptable to the Commission Inspector, the Owner or Installer must make additional repairs and schedule an additional inspection at rates as set forth in the Commission's Rules and Regulations by calling the Commission's Customer Service Office.

(d) No work shall be backfilled before the water service pipe is inspected by the Commission's Inspectors.

9. Inspections for complete Water Services from the main to the building that cannot be completed in a single day:

(a) Inspection of water service from shut-off valve at the main to the shut-off valve in the tree-belt shall be as described in Paragraph 8 of this Section, so that the Installer can backfill the trench in the street.

- No open trench shall be allowed in the street or right of way over night.

(b) Inspection of water service from the shut-off valve in the tree-belt to the end of the copper tube shall be left open until it is inspected and approved by the Commission's Inspectors.

(c) The Installer may backfill after each installation has been inspected and approved by the Commission's Inspector. The Installer shall not backfill over any connection, joints, and/or valves until the water service pipe is installed into the building and tested and approved.

(d) Inspection of water service from the shut-off valve in the tree-belt to the meter valve in the building, including all connections, joints, and/or valves shall be as described in Paragraph 8 of this Section, so that the Commission Inspectors can witness proper depth of cover and no leakage at joints.

4.4.2 Commission Responsibilities Prior to Arriving at the Installation

1. The Commission's Engineering and Technical Services Department will provide the Commission's Customer Service Office and Inspectors with copies of all reviewed plans, memoranda, and details associated with each installation.

2. The Commission's Customer Service Office will issue a work order to the Commission's Inspectors after the Owner or Installer has paid all fees and the time slot(s) that the installation will be inspected is scheduled.

3. The Commission's Inspectors will arrive at the installation during the time slot.

4. Typically, single-family homes will require inspections for the Water Service and Building Sewer Connection in accordance with Section 4.4.1 of these Guidelines and Policies. The Commission will allow up to two site visits for the Water Service Connection and up to two site visits for the Building Sewer Connection. The Owner or Installer shall pay for one Inspection Charge for the Water Service and one Inspection Charge for the Building Sewer.

   (a) The first inspection for the Water Service or Building Connection shall be from the main to the treebelt for each.

   (b) The second inspection for the Water Service or Building Connection shall be from the treebelt to the building for each.

(c) The trench and pipe(s) shall be safe and ready for inspection in accordance with Section 4.4.1 of these Guidelines and Policies.

4.4.3 Inspectors Responsibilities at the Installation

1. The Commission's Inspectors will visually inspect the job site and installation for unsafe conditions and/or inaccessible areas to be inspected.
2. The Commission's Inspectors will enter the Installer's OSHA compliant safe trench, confirm that all fittings are no-lead brass, and meet the Commission's Specifications.
3. The Commission's Inspectors will confirm shut-off in the tree-belt is closed.
4. The Commission's Inspectors will open shut-off valve at main and the Installer will partially open the shut-off valve in the treebelt to fill the Water Service Pipe with water.
5. The Commission's Inspectors check for leaks from main to shut-off valve in tree-belt.
6. The Commission's Inspectors will check backfill material. Common borrow/fill, as specified in the Commission's Specifications, shall be placed around the copper pipe.
7. The Commission's Inspectors will enter the building to open the meter valve, so the water service pipe is ready to be flushed.
8. The Commission's Inspectors will open shut off valve in tree-belt so that the water service pipe may be flushed. The Inspector will wait for the water to run clear before shutting the meter valve
9. The Commission's Inspectors will close the meter valve and perform visual leak test. The copper tube service line and valves shall not have any water leaks at static line pressure. The Owner or Installer may be allowed to make minor repairs during inspection so that any leaking joints may be tightened.
10. If any of the above items is not ready for inspection at the scheduled time slot or fails inspection, then the Commission Inspector shall notify the Owner or Installer that the inspection must be rescheduled. The Owner or Installer must schedule an additional inspection at rates as set forth in the Commission's Rules and Regulations by calling the Commission's Customer Service Office. The Commission's Customer Service Office will schedule the next available time slot during which the installation shall be ready for inspection.

11. The Commission's Inspectors will attach a completed meter valve tag to the meter valve inside the building after the inspection is complete and the meter is ready to be installed.

12. The Commission's Inspectors will close the shut-off valve in the tree-belt before leaving the site.

13. The Commission's Inspectors will leave the shut-off valve at the main open unless conditions exist that will not allow, such as leaks, improper installation, unapproved material, and/or other conditions as determined by the Commission's Inspector.

14. The Commission's Inspectors will take pictures, measurements, and ties including depths as defined in Section 4.4.4 of these Guidelines and Policies.

15. The Commission's Inspectors may remain on-site until the Owner or Installer has backfilled the water service pipe with a minimum of 8-inch of clean Common Borrow/Fill.

16. The Commission's Inspectors will send the Work Order back to Customer Service Office stamped "Complete" and signed by Inspector. This completed Work Order will be considered the Inspection Certificate, as defined in the Commission's Rules and Regulations. The completed Work Order will be filed at Customer Service Office.

4.4.4 Commission Record Requirements for 1-inch through 2-inch Water Service Installations

1. After each water service is installed, the Commission's Inspectors will inspect the installation, as defined in Section 4.4.3 of these Guidelines and Policies, prior to backfilling to record location and ensure proper depth and quality of workmanship.

2. The Commission Inspectors will take pictures of the installation. The Commission's Inspectors will keep the picture records for at least one (1) year.

3. The Commission's Inspectors will take location ties to all water service pipe valves by measuring and tying the location of each water box.

   (a) Measurements will be taken and recorded by the Commission's Inspectors when final paving is complete. Temporary ties may be required prior to finish paving.

   (b) Buried valves shall have at least three (3) ties to a permanent structure.

   (c) Temporary ties shall have at least three (3) ties to a permanent structure.

(d) Valves installed with a gate box or water service box shall have ties taken as follows:

- When possible, measure at least three ties from a permanent structure such as a building, including two from each end of the structure and one tie will be taken one out from the structure.
- Monuments will be installed when a permanent structure is not available to take ties from. Monuments are Commission Gate Markers, property line pins or stone bounds, hydrants, or other permanent structure that is not a building.
- At least one other tie will be taken from another permanent structure such as another building, monument, or a hydrant.
- Also, a tie will be taken from street line, property line or edge of easement.

4. The Commission's Inspectors will measure locations along the length of the water service pipe to each bend, coupling, tee, cross, and/or any other type of fitting.

5. The Commission's Inspectors will measure the depth of water service pipe and location from street line, property line and/or edge of easement, if needed. Typically, the depth of pipe is needed if the pipe is not installed with five (5) feet of cover.

6. The Commission's Inspectors will include on the record sketch the size and type of water main, the street name, any side streets abutting the building property, and any unusual installation details.

7. The Commission's Inspectors will create a finished record sketch of the finished installation that is not to scale. The finished record sketch will be sent to Customer Service Office where it will be permanently filed.

Section 4.5 Inspections for 4-inch and Larger Water and Fire Service Installations

4.5.1 Installer Responsibilities

1. The Owner or Installer shall have all Fees paid online at VASF@waterandsewer.org, before a Commission Work Order will be issued to have a water or fire service installation inspected. Typically, the Commission will estimate the number of site visits required at about 100-feet per site visit. The Commission's Inspectors must have a Work Order to perform an inspection.

2. The Owner or Installer shall call the Commission's Customer Service Office at 71 Colton Street, at 413-310-3500 to schedule the next available inspection appointment. A minimum 48-hours advance notice is required. The Customer Service Office at 71 Colton Street will schedule time slots during Regular Hours,

at the Commission's discretion, and the water main installation shall be ready for inspection.

3. A responsible supervisor (as defined in the Control of Work Section below) of the Installer shall be on site at all times during an installation.

4. The responsible supervisor of the Installer shall have all the Commission issued paperwork including, but not limited to, receipts, plans, and memoranda, at the site at all times during an installation.

5. The Owner or Installer shall layout the new water or fire service installation according to the approved plan.

6. The Owner or Installer shall provide OSHA compliant safe access, including trench shoring and safe ladders if necessary, to all trenches.

7. The Owner or Installer shall provide OSHA compliant safe access, including safe ladders to all foundations.

8. The Owner or Installer shall have all work completed prior to when the Inspector arrives. If the work is not completed when the Commission Inspector arrives, the Owner or Installer must schedule an additional inspection, at rates as set forth in the Commission's Rules and Regulations, by calling the Commission's Customer Service Office.

9. Installation of water or fire service shall be as follows:

   (a) New water or fire service connection may be either by tapping an existing main or shutting an existing main and installing a mechanical joint tee, gate valve(s), and other fittings as required and shall be as follows:

   - The tap at the main must be completed by the Commission in accordance with the Tapping sleeve and Mechanical Joint Valve Section of these Guidelines and Policies.
   - The of shutting an existing main or water service(s) must be by the Commission and installing a mechanical joint tee, gate valve(s), and other fittings as required by the Installer in accordance with the Ductile Iron Fitting and Mechanical Joint Valve Sections of these Guidelines and Policies.

   (b) The ductile iron water or fire service shall be laid by the Installer from the new connection in accordance with the Ductile Iron Water Main Section of these Guidelines and Policies, prior to the Commission Inspectors arriving at the site.

   (c) No work shall be backfilled before the water or fire service installation is inspected by the Commission's Inspectors.

(d) The Springfield Fire Department must witness the fire service being flushed by the Installer.

(e) The Installer is responsible to schedule the fire department flush along with the Commission leak test, disinfection, and bacteria testing. The fire department flush shall be before the Commission pressure test and bacteria test.

(f) The Commission Inspectors must witness the water or fire service being leak tested by the Installer.

(g) The water or fire service shall not be Turned-on or put into service until the backflow preventer has been inspected by the Commission's Cross Connection Inspector.

4.5.2 Layout

1. The Owner or Installer shall have the road or easement to sub-grade, lot pins, and easement boundaries installed before any layout begins.
2. The Owner or Installer shall have the project laid-out according to plan, memo, and any attachments.
3. After a Work Order is received by the Inspectors from Customer Service then the layout can be field checked by the Commission's Inspectors.
4. The Commission's Inspectors will check the lay out of the project to confirm that it has been performed according to the plan, memo, and any attachments.

   (a) It shall remain the Owner's responsibility that the layout has been performed according to the plan, memo, and any attachments.

   (b) Construction cannot begin until the layout has been field checked by the Commission.

5. All questions to the Commission's Engineering and Technical Services.
6. Layout, at a minimum, includes:

   (a) Location of connection to existing facilities;

   (b) Location of new main, valves, hydrants, air valve assemblies, and other appurtenances on the plan;

   (c) Provide center line of water and/or sewer main;

   (d) Provide offset stakes that will not get damaged during construction and;

(e) Provide line stakes at end of main.

4.5.3 Inspection of Water or Fire Service Installation

1. Inspectors must inspect the installations daily prior to backfilling
2. Inspection includes that the pipe is installed and located according to the plan and at the proper depth.
3. Use the Ductile Iron Pipe Research Association (DIPRA) Installation Guide for Ductile Iron Pipe as a guide to inspect for properly installed water pipe.
4. Measure location along the length of the pipe to each bends, couplings, tees, crosses, and any other type of fittings.
   (a) Start at the beginning of the new work.
   (b) These measurements shall be taken prior to back filling.
   (c) Measure depth of pipe and location from street line, property line or edge of easement.
5. Take pictures of installation
6. Backfilling can begin.

4.5.4 Water or Fire Service into Service

1. After water or fire service and all other appurtenances are installed then the Inspectors will contact the water quality group to operate the valves to allow the main to fill and air bled out of the main.
   (a) For Water Services or Fire Services up to 2-inch the Installer shall have the correct meter valve installed before any testing being scheduled.
   (b) For metered Water Services 4-inch and larger that require a Back Flow Preventer the Installer shall have the correct Outside Spindle and Yoke (OS&Y) gate valve (building control valve) that is in accordance with the Commission's Material Specifications installed along with a temporary blank flange with a 2-inch threaded outlet and 2-inch ball valve onto the building control valve into the building for testing. The Installer may then schedule testing.
   (c) For Fire Services 4-inch and larger the Installer shall have the correct OS&Y gate valve (building control valve) that is in accordance with the Commission's Material Specifications installed along with a temporary blank flange with a 2-inch threaded outlet and 2-inch ball valve. The Installer may then schedule testing.

(d) Inspector will inform supervisor or call Water Quality Group.

(e) The customer/owner/developer will supply all material to fill and bleed air out of water main such as hoses, diffusers, erosion control, etc.

2. The Springfield Fire Department must witness the fire service being flushed by the Installer.

   (a) The Installer is responsible to schedule the fire department flush along with the Commission leak test, disinfection, and bacteria testing.

   (b) The fire department flush shall be before the Commission leak test, disinfection, and bacteria test.

3. The Commission Inspectors must witness the water or fire service being leak tested by the Installer.

4. After leak test passes, Inspectors will contact the water quality group to operate the valves to flush water main and begin disinfection procedures according to Section 6.3 of these Guidelines and Policies.

   (a) Inspector will inform supervisor or call Water Quality Group.

   (b) The customer/owner/developer will supply all material to fill and bleed air out of water mains such as hoses, diffusers, erosion control, etc.

5. The Water Quality Group will sample for Cl2 residual, pH, and turbidity.

6. The Water Quality Group will call the lab to take bacteria samples.

7. The Lab will report to all Commission groups the bacteria results.

8. After two (2) consecutive bacteria tests passing the Water Quality Group will put the new water or fire service in service by:

   (a) Shutting all flush and sample sites.

   (b) Allow the Installer/owner/developer to remove all flushing equipment.

   (c) For water services with meter only the service shall not be Turned-on or put into service until the correct fittings and shut off valves are installed and has been inspected by the Commission's Inspector.

   (d) For water or fire services that require a backflow preventer the service shall not be Turned-on or put into service until the backflow preventer has been installed by the Installer and inspected by the Commission's Cross Connection Inspector.

(e) Open all water valves and notify all other Commission groups that the water or fire service is in service.

9. Paving may begin.

10. Location ties shall be taken to all valves, hydrants, and other operable appurtenances by measuring the location of each water box.

    (a) Start at the beginning of the new work.

    (b) These measurements shall be taken when final paving is complete. Temporary ties may be required prior to finish paving.

    (c) When possible, measure at least three ties from a permanent structure such as a building, including two from each end of the structure and one out from the structure and at least one other tie from another permanent structure such as another building or a hydrant. In addition, a tie from street line, property line or edge of easement will be taken.

Section 4.6 Inspections for Water Main Installation (by Installers)

4.6.1 Installer Responsibilities

1. The Owner or Installer shall have all Fees paid online at VASF@waterandsewer.org, before a Commission Work Order will be issued to have a water main installation inspected. Typically, the Commission will estimate the number of site visits required at about 100-feet per site visit. The Commission's Inspectors must have a Work Order to perform an inspection.

2. The Owner or Installer shall call the Commission's Customer Service Office at 71 Colton Street, at 413-310-3500 to schedule the next available inspection appointment. A minimum 48-hours advance notice is required. The Customer Service Office at 71 Colton Street will schedule time slots during Regular Hours, at the Commission's discretion, and the water main installation shall be ready for inspection.

3. A responsible supervisor (as defined in the Control of Work Section below) of the Installer shall be on site at all times during an installation.

4. The responsible supervisor of the Installer shall have all the Commission issued paperwork including, but not limited to, receipts, plans, and memoranda, at the site at all times during an installation.

5. The Owner or Installer shall layout the new water main installation according to the approved plan.

6. The Owner or Installer shall provide OSHA compliant safe access, including trench shoring and safe ladders if necessary, to all trenches. The Owner or Installer shall provide OSHA compliant safe access, including safe ladders to all foundations.

7. The Owner or Installer shall have all work completed prior to when the Inspector arrives. If the work is not completed when the Commission Inspector arrives, the Owner or Installer must schedule an additional inspection, at rates as set forth in the Commission's Rules and Regulations, by calling the Commission's Customer Service Office.

8. Installation of water main shall be as follows:

   (a) New water main connection may be either by tapping an existing main or shutting an existing main and installing either a valve, solid sleeve, or coupling shall be as follows:

   - The tap at the main must be completed by the Commission in accordance with the Tapping sleeve and Mechanical Joint Valve Section of these Guidelines and Policies.
   - The of shutting an existing main must be by the Commission and installing either a valve, solid sleeve, or coupling must be by the Installer in accordance with the Ductile Iron Valve and Mechanical Joint Valve Sections of these Guidelines and Policies.

   (b) The ductile iron water main shall be laid by the Installer from the new connection in accordance with the Ductile Iron Water Main Section of these Guidelines and Policies, prior to the Commission Inspectors arriving at the site.

   (c) The Commission Inspectors must witness the water main being pressure tested by the Installer.

   (d) No work shall be backfilled before the water main installation is inspected by the Commission's Inspectors.

4.6.2 Layout

1. The Owner or Installer shall have the road or easement to sub-grade, lot pins, and easement boundaries installed before any layout begins.

2. The Owner or Installer shall have the project laid-out according to plan, memo, and any attachments.

3. After a Work Order is received by the Inspectors from Customer Service then the layout can be field checked by the Commission's Inspectors.

4. The Commission's Inspectors will check the lay out of the project to confirm that it has been performed according to the plan, memo, and any attachments.

   (a) It shall remain the Owner's responsibility that the layout has been performed according to the plan, memo, and any attachments.

   (b) Construction cannot begin until the layout has been field checked by the Commission.

5. All questions to the Commission's Engineering and Technical Services.

6. Layout, at a minimum, includes:

   (a) Location of connection to existing facilities;

   (b) Location of new main, valves, hydrants, air valve assemblies, and other appurtenances on the plan;

   (c) Provide center line of water and/or sewer main;

   (d) Provide offset stakes that will not get damaged during construction and;

   (e) Provide line stakes at end of main.

4.6.3 Inspection of Water Main Installation

1. Inspectors must inspect the installations daily prior to backfilling

2. Inspection includes that the pipe is installed and located according to the plan and at the proper depth.

3. Use the Ductile Iron Pipe Research Association (DIPRA) Installation Guide for Ductile Iron Pipe as a guide to inspect for properly installed water pipe.

4. Measure location along the length of the pipe to each bends, couplings, tees, crosses, and any other type of fittings.

   (a) Start at the beginning of the new work.

   (b) These measurements shall be taken prior to back filling.

   (c) Measure depth of pipe and location from street line, property line or edge of easement.

5. Take pictures of installation

6. Backfilling can begin.

4.6.4 Water Main into Service

1. After water main and all other appurtenances are installed then the Inspectors will contact the water quality group to operate the valves to allow the main to fill and air bled out of the main.

   (a) Inspector will inform supervisor or call Water Quality Group.

   (b) The customer/owner/developer will supply all material to fill and bleed air out of water main such as hoses, diffusers, erosion control, etc.

2. Inspectors must witness pressure tests.

3. After pressure test passes, Inspectors will contact the water quality group to operate the valves to flush water main and begin disinfection procedures according to Section 6.3 of these Guidelines and Policies.

   (a) Inspector will inform supervisor or call Water Quality Group.

   (b) The customer/owner/developer will supply all material to fill and bleed air out of water main such as hoses, diffusers, erosion control, etc.

4. The Water Quality Group will sample for Cl2 residual, pH, and turbidity.

5. The Water Quality Group will call the lab to take bacteria samples.

6. The Lab will report to all Commission groups the bacteria results.

7. After two (2) consecutive bacteria tests passing the Water Quality Group will put the new water main in service by:

   (a) Shutting all flush and sample sites.

   (b) Allow the Installer/owner/developer to remove all flushing equipment.

   (c) Open all water valves and notify all other Commission groups that the water main is in service.

8. Paving may begin.

9. Location ties shall be taken to all valves, hydrants, and other operable appurtenances by measuring the location of each water box.

   (a) Start at the beginning of the new work.

   (b) These measurements shall be taken when final paving is complete. Temporary ties may be required prior to finish paving.

(c) When possible, measure at least three ties from a permanent structure such as a building, including two from each end of the structure and one out from the structure and at least one other tie from another permanent structure such as another building or a hydrant. In addition, a tie from street line, property line or edge of easement will be taken.

10. After water main is put into service and the Inspectors and Customer Service are notified by the Water Quality Group, the Commission's Construction Crew and/or the Installer will begin to install individual water services to each home.

Section 4.7 Inspections for Water Main Installation (by Commission)

4.7.1 Layout

1. After a Work Order is received by the Inspectors from Customer Service then the layout can begin.
2. Inspectors shall lay out the center-line of the trench in the roadway and/or easement, and all other appurtenances, such as, but not limited to; water mains, valves, hydrants, air valves and/or air corps, and water services according to plan, memo, and any attachments.
3. The Commission's Construction Crew supervisor shall have the trench marked out after the centerline and other appurtenances are laid out by the Inspectors.
4. Construction cannot begin until the layout has been completed.
5. All questions to the Commission's Engineering and Technical Services.
6. Require sub grade and lot pins before any layout begins.
7. Layout, at a minimum, includes:

(a) Location of connection to existing facilities;

(b) Location of new main, valves, hydrants, air valve assemblies, and other appurtenances on the plan;

(c) Provide center line of water and/or sewer main;

(d) Provide offset stakes that will not get damaged during construction and;

(e) Provide line stakes at end of main.

4.7.2 Inspection of Water Main Installation

1. Inspectors must inspect the installations daily prior to backfilling

2. Inspection includes that the pipe is installed and located according to the plan and at the proper depth.
3. Use Ductile Iron Pipe Research Association (DIPRA) Installation Guide for Ductile Iron Pipe as a guide to inspect for properly install water pipe.
4. Measure location along the length of the pipe to each bends, couplings, tees, crosses, and any other type of fittings.
   (a) Start at the beginning of the new work.
   (b) These measurements shall be taken prior to back filling.
   (c) Measure depth of pipe and location from street line, property line or edge of easement.
5. Take pictures of installation
6. Backfilling can begin.

4.7.3 Water Main into Service

1. After water main and all other appurtenances are installed then the Inspectors will contact the water quality group to operate the valves to allow the main to fill and air bled out of the main.
   (a) Inspector will inform supervisor or call Water Quality Group.
   (b) The customer/owner/developer will supply all material to fill and bleed air out of water main such as hoses, diffusers, erosion control, etc.
2. Inspectors must witness pressure tests.
3. After pressure test passes, Inspectors will contact the water quality group to operate the valves to flush water main and begin disinfection procedures according to Section 6.3 of these Guidelines and Policies.
   (a) Inspector will inform supervisor or call Water Quality Group.
   (b) The customer/owner/developer shall supply all material to fill and bleed air out of water main such as hoses, diffusers, erosion control, etc.
4. The Water Quality Group will sample for Cl2 residual, pH, and turbidity.
5. The Water Quality Group will call the lab to take bacteria samples.
6. The Lab will report to all Commission groups the bacteria results.

7. After two (2) consecutive bacteria tests passing the Water Quality Group will put the new water main in service by:

   (a) Shutting all flush and sample sites.

   (b) Allow the Installer/owner/developer to remove all flushing equipment.

   (c) Open all water valves and notify all other Commission groups that the water main is in service.

8. Paving may begin.

9. Location ties shall be taken to all valves, hydrants, and other operable appurtenances by measuring the location of each water box.

   (a) Start at the beginning of the new work.

   (b) These measurements shall be taken when final paving is complete. Temporary ties may be required prior to finish paving.

   (c) When possible, measure at least three ties from a permanent structure such as a building, including two from each end of the structure and one out from the structure and at least one other tie from another permanent structure such as another building or a hydrant. In addition, a tie from street line, property line or edge of easement will be taken.

10. After water main is put into service and the Inspectors and Customer Service are notified by the Water Quality Group, the Commission's Construction Crew and/or the Installer will begin to install individual water services to each home.

CHAPTER 5 SAFETY

Section 5.1 General

1. All Commission employees, interns, contractors hired by the Commission, and visitors approved by the Commission are required to follow all applicable Commission Health and Safety policies, as well as, local, state and federal regulations, including but not limited to the Massachusetts Department of Labor Standards and Occupational Safety and Health Administration.
2. The Commission Guidelines and Policies do not supplant the Installer's obligation to comply with all applicable local, state, and federal regulations, including but not limited to, the Department of Labor Standards and Occupational Safety and Health Administration.
3. Construction site safety and compliance with applicable regulations is the responsibility of the Owner and Installer.

Section 5.2 Trenching/Excavation - Additional Requirements

1. In addition to OSHA CFR 1926 Subpart P and MA 520 CMR 14 (Jackie's Law), employees of the Springfield Water and Sewer Commission will not enter any trench or excavation greater than four feet without acceptable cave-in prevention system.
2. Should a contractor, Installer or Owner require the assistance of an SWSC employee inside a trench or excavation, the cave-in prevention system must meet Commission's four foot requirement.

Section 5.3 Underground Utility Location (DIG SAFE) Requirements:

1. Massachusetts state law requires anyone who digs to notify utility companies before starting to excavate. Digging can be dangerous and costly without knowing where underground facilities are located.
2. Before making any cuts or excavating below ground begins, the Commission Construction Crew, Installer or any other Person(s) excavating in the Commission's Service Area shall notify all utility companies by contacting DIG SAFE at 1-888-DIG SAFE and any Non-member utilities, in accordance with the Massachusetts Dig Safe Law, MGL Chapter 82, Sec. 40A – 40E, and 220 CMR 99.00.

3. The Commission's Service Area is shown on the applicable Service Area Maps: Springfield Water Mains Service Area Map (M-1.0), Ludlow Water Mains Service Area Map (M-2.0), Water Transmission Mains Service Area Map (M-3.0 & 3.1), or Springfield Sewer Mains Service Area Map (M-4.0).

4. The following, but not limited to, list of utilities are not part of DIG SAFE, are in the Commission's Service Area, and must be notified separately for any construction activity in the Commission's Service Area:

   (a) Springfield Fire Department – Alarm Division: 413-787-6410

   (b) Springfield Park Department: 413-787-6440

   (c) Ludlow Department of Public Works: 413-583-5625

CHAPTER 6 WATER MAINS AND APPURTANANCES

Section 6.1 Control of Work

6.1.1 General

1. No work may begin without a Street Occupancy Permit from the Springfield Department of Public Works, a Dig Permit from the Town of Ludlow Department of Public Works, or the Publics Works Department having jurisdiction at the site to be excavated.

2. The Commission's Cross Connection Control requirements, as set forth in the Commission's Rules and Regulations, and in accordance with CHAPTER 10 of these Guidelines and Policies, and the Commission's Material Specifications must be followed at all times.

3. At all times, it is the responsibility of the Commission's Construction Crew or Installer to guarantee the sanitary and clean internal condition of all pipe and fittings and lubricants and materials that will come in contact with the drinking water. Contaminated materials may be rejected for use by the Commission. The use of temporary plugs while laying water mains is mandatory.

4. Failure to meet the requirements for cleanliness or the Material Specifications for materials may result in removal of the pipe or other components from the construction site and the rejection of its use by the Commission.

5. Distribution system pipe shall be at least 8-inches in diameter, thickness class 52 ductile iron pipe, cement lined, and asphaltic coated per AWWA Standards, unless otherwise approve by the Commission. 6-inch diameter may be allowed with the Commission's approval in accordance with Section 4.2.3 of these Guidelines and Policies. The pipe shall be in accordance with the Commission's Material Specifications unless otherwise approved by the Commission.

6. Pipe used for hydrant branches shall be at least 6-inches in diameter, shall be thickness class 52 ductile iron pipe, cement lined, and asphaltic coated per AWWA and shall be restrained the entire length of the branch. Pipe used for sprinkler lines shall be at least 6-inches in diameter, unless it can be documented that a different size line will meet design specifications and shall meet the above specifications.

7. When a conflict exists between the new or proposed water main and a sewer main or other utility requiring protection than the sewer main or other utility shall be encased in concrete and installed in accordance with the **Concrete Encasement Detail (S-03.0),** unless otherwise approved by the Commission.

6.1.2 Valve Operation

1. Prohibition of Valve Operations

   (a) No existing transmission or distribution valves or hydrants may be operated by the Installer. It is a serious offense to tamper with the drinking water system and any violation will result in penalties as defined in the Commission's Rules and Regulations and removal from the Commission Approved Contractors list.

   (b) Only Commission employees or the Commission's designee may operate any valves connected to the Commission's transmission or distribution system.

2. General

   (a) The Commission's Construction Crew shall locate and operate all valves as needed for any type of work involving the operation of valves.

   (b) Prior to operating valves customers in vicinity of job shall be notified to avoid service disruption and customer complaints.

   (c) The Commission's Construction Crew shall note all valves operated and report this information to the Commission's Customer Service office. At a minimum this information shall include the following:

   - Person's name doing the job.
   - The location/project name.
   - Date and time.
   - The valve/hydrant location(s) and number(s) being worked on.
   - The position (open or closed) of the valve(s) found, also note if the valve is inoperable.
   - Number of turns to open and to close the valve.
   - The final position (open or closed) of the valve(s) at the end of the job.

   (d) When the job is complete, all valves shall be returned to their normal position and this information shall be reported to the Commission's Customer Service office and properly recorded on the Foreman's Return and work order system.

3. Scheduled shutdowns, other than routine work including, but not limited to capital improvement projects, swabbing, flushing, water main replacement, valve repair and/or replacement require review and approval of the Executive Director, Chief Engineer, Director of Field Services, and/or Deputy Director of Field Service prior to any valves being operated. At a minimum the following shall be submitted:

(a) Reason for the scheduled shutdown.

(b) Estimated length of time the shutdown will take.

(c) Valve numbers and locations.

(d) A distribution or transmission map with the valves highlighted.

(e) Number of customers affected.

(f) Existing closed valves in the vicinity of the proposed scheduled shut down.

4. Valves shall be operated as follows:

(a) Check for any potential hazards, i.e., traffic, pedestrians, construction, etc., and take the necessary safety precautions.

(b) Locate the valve using the Commission's Distribution Book and Commission valve ties. If the valve box is not visible use a metal locator to find the valve box.

- ***Caution:*** Check the Distribution Book to verify that the valve can be operated safely, not shut off any customers, and not cause damage to any roadbeds, pavement, landscaping, etc. The valve could be an Air Valve Assembly, a drain valve, supply a dead-end water main, and/or supply a critical customer.

(c) Remove the valve box cover by lifting or prying it up with a pry-bar(s), or pick, and, if necessary, strike the lid with a hammer.

(d) Inspect the box to see if the box is in good condition and free of debris.

(e) If debris is found clean out the debris so the operating nut can be accessed.

(f) Visually inspect the grade of the valve box as compared to the surface grade. Make note of any adjustments that may be required on the Foremen's Return, or if possible, adjust valve box to match the surface grade.

(g) If possible, open a fire hydrant closest to the valve so that discolored water caused by operating valves is allowed discharge. Direct the discharged water flow towards a catch basin or in the downhill direction. Make sure the discharged water is not causing property damage or flooding.

(h) Lower the valve key onto the valve nut.

(i) Turn the key clockwise to the right (on most valves) to find out the position of the valve. If you can't turn the key any further to the right, the valve should be open.

- ***Note:*** Some valves may be counter-clockwise to the left to open.
- Check with Customer Service, check the Vueworks Data Base and/or the old Gate Card, or contact Supervisor for guidance.

(j) Operate the valve to the "closed" position, by turning the valve nut counter-clockwise (to the left) in most areas***. Close the valve slowly.*** Count the number of turns obtained and compare to the current Commission Valve Data Base, and/or the Gate Card. If the correct number of turns is not achieved, repeat the operation until the correct number is achieved or investigate to ensure the current Commission Valve Data Base, and/or the Gate Card is correct.

(k) Place a Sonophone on the valve key and check for any hissing noise (indicating leaks at the valve seat).

(l) A maximum leakage at any shut down should not exceed 100-gallons per minute (gpm). The Commission Construction Crew and/or Installer shall have pumps or other approved means of dewatering available to control leakage of 100-gpm.

(m) Install a Tag-out device in the valve box. If the valve is to remain closed for construction or energy reduction purposes then the valve shall be Locked-out in accordance with Section 6.1.3 of these Guidelines and Policies.

(n) When the valve is to be opened, remove the Tag-out device then the valve shall be slowly and fully opened by turning the valve nut clockwise (to the right), and then turn the valve counter-clockwise (to the left) one-half turn from the open position to relieve pressure from the stem, bonnet and packing.

(o) Again, place the Sonophone on the valve key and check for any hissing noise (indicating leaks at the stuffing box or valve body).

(p) If the valve was found closed, check the current Commission Valve Data Base, and/or the Gate Card, then check with a Supervisor to determine the position the valve should be left in. If the valve is to be opened check with Water Quality to determine if flushing is required prior to the valve being opened.

6.1.3 Valve Lock-out

1. All valves that remain in the closed position for construction or energy reduction purposes shall be locked out with a Lock-out/Tag-out device in accordance with OSHA CFR 1910.147 – Control of Hazardous Energy.
2. The Lock-out/Tag-out device shall have, at a minimum the work order number and Commission employee and phone number responsible for the valve being closed.

3. The Lock-out/Tag-out shall not be removed unless the Commission employee or their supervisor responsible for the valve being closed approves the Lock-out/Tag-out device being removed, and the valve being opened.

6.1.4 Labor, Materials, and Equipment

1. The Installer shall furnish labor, materials, and equipment that is appropriate to accomplish quality work in an efficient and timely manner. Sufficient resources must be committed to the work to ensure a rate of progress that will enable completion within established timelines.
2. All equipment requiring special licenses shall be operated only by persons who possesses a current, valid license for that piece of equipment

6.1.5 Private Land

1. When the Commission Construction Crew or Installer have to enter private land and private residences in order to accomplish the work. The Commission Construction Crew or Installer shall plan the work to ensure the Owner or the Owner's authorized representative is on site to permit the Commission Construction Crew or Installer and his/her employee's access to the Premises.
2. The Commission Construction Crew or Installer must ensure that Premises are left neat and clean after job completion.
3. In all homes and businesses, the Commission Construction Crew or Installer shall take all necessary precautions to ensure that theft or damage does not occur during work activities.

6.1.6 Supervision

1. The Installer shall have, on site, at all times during the work activities, a full time competent Foreman who shall be in charge of the project. This Foreman shall be the agent for the Installer on site, and shall coordinate inspections, record keeping, future work, and other issues with the Field Inspector assigned by the Commission to inspect the work.
2. The Installer shall notify the Commission in writing whenever there is a change in Foremen.

6.1.7 Existing Underground Utilities and Structures

1. The Commission Construction Crew or Installer shall refer to Section 5.3 of these Guidelines and Policies for more information concerning DIG SAFE.

2. The Commission Construction Crew or Installer shall determine the location or absence of all underground utilities, and plan and conduct his work operations to ensure that those utilities shall not be damaged.

3. The Commission Construction Crew or Installer shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, and services to buildings, mail boxes, utilities, gas pipes, water pipes, hydrants, sewers, drains, and cables, whether on private or public property.

4. Any damage resulting from the Installer's operations shall be repaired at the Installer's expense.

6.1.8 Delivery, Storage, and Handling

1. New pipe, fittings, valves, hydrants, and other appurtenances shall be delivered to the construction site as close in time to installation as possible.

2. All pipe shall be shipped with lifts separated by work separators such that, pipe to pipe contact is prevented during the transit and/or storage of the pipe.

3. Care shall be taken during the loading, trucking, unloading and handling of all pipe, fittings, and other appurtenances so as not to damage the materials or surrounding area.

   (a) Pipe, fittings, and other appurtenances shall not be dropped directly from the truck to the ground.

   (b) The Commission's Construction Crew or Installer is responsible for any pipe, fittings, and other appurtenances damaged during delivery, handling or storage.

   (c) A pipe clamp with protective coating is a preferred means to handle pipe, but forks may be used during the unloading process provided care is taken not to damage the pipe. Forks shall not be used in the interior of the pipe to handle pipe.

   (d) All damaged materials will be removed from the site immediately.

4. All pipe, fittings, and other appurtenances shall be stored in a manner that prevents water on the ground (run-off or puddles), debris, and/or animals from entering the material and prevent damage to the material and/or others' property.

   (a) Pipe may not be strung along the line of work unless approved by a Commission representative.

(b) Materials must be stored in such a manner that it does not obstruct driveways, sidewalks, etc.

(c) The Installer shall contact the Department of Public Works having jurisdiction to determine if it is permitted to string materials along the roadway of the work.

(d) Materials that have had water, debris, and/or animals will be removed from the site.

5. All pipe and fittings shall be carefully lowered into the trench piece by piece by means of a boom, straps, or other suitable tools or equipment, in such a manner as to prevent damage to materials and protective coatings or linings.

   (a) Under no circumstances shall chains be used, or material be dropped or dumped into trench.

   (b) Use of forks to handle pipe at construction sites is not allowed. Unless approved by the Commission.

Section 6.2 Product Installation

6.2.1 Ductile Iron Water Main

1. The new or proposed water main shall be located in the street in accordance with **Utility Separation Detail (W-01.0)**.
2. Ductile iron water main shall be bedded and installed in accordance with the applicable **Trench Detail (W-02.0, W-02.1, W-02.2, W-02.3, or W-02.4)**.
3. All water mains shall be installed in accordance with DIPRA Installation Guide for Ductile Iron Pipe and these Guidelines and Policies.
4. All pipe, fittings, valves and appurtenances shall be wrapped in 8-mil Polyethylene Encasement (PE) and shall be installed as required by the Commission and in accordance with DIPRA Installation Guide for Ductile Iron Pipe and Section 6.2.2 these Guidelines and Policies.
5. Excavate trench to ensure sides of trench are stable. Slope trench walls or provide support in conformance with the CHAPTER 5 Safety of these Guidelines and Policies and the Commission's Health and Safety Policies.
6. Trenches must be kept free of excessive water during installation of pipe and fittings.
7. A visual inspection of the interior of each pipe length and fitting must be made before the pipe is installed. Any entry of contaminants, such as water and / or soil,

into a pipe or fitting while in the trench must be reported to the Commission's Authorized Field Representative and an approved corrective action taken. All pipe and fittings with internal coatings will be thoroughly cured, not tacky to the touch, before installation.

8. Thoroughly clean the groove and bell socket and insert the gasket, making sure that it faces the proper direction and that it is correctly seated.

9. If pipe or fittings become contaminated by environmental water, trench water or soil, backfill material, trash or the like, the pipe or fittings shall not be used until the Commission Representative is notified and a reasonable technique for cleaning is approved. This could involve onsite use of hydraulically propelled foam pigs or swabs, followed by chlorination. The Commission reserves the right to reject contaminated pipe and fittings from use.

10. All cut-in pipe and fittings must be swabbed or sprayed with 1-5% or greater bleach solution immediately before installation but after inspection for internal cleanliness. The installed couplings, pipe, and/or fittings shall be disinfected according to Section 6.4.5 of these Guidelines and Policies.

11. All components to be cut-in to an existing water main shall be coated with petrolatum based primer and wrapped with prefabricated petrolatum coating in tape form designed to protect wet or dry irregularly shaped metal surfaces according to Section 6.2.28 of these Guidelines and Policies and the Commission's Material Specifications.

12. New or replacement water mains and/or water services installed within 200-feet of a Fuel Storage Tank (FST) and/or if the water main and/or water service is to traverse an area saturated with low molecular weight petroleum products (contaminated soils) it shall be installed with fluorocarbon gaskets, in accordance with the Commission's Material Specifications, and as follows:.

    (a) Fluorocarbon gaskets are required within the 200-foot radius from the FST or as required by the Commission.

    (b) Fluorocarbon gaskets are required through the contaminated soil and 100-feet beyond the contaminated soil, on each side or as required by the Commission.

13. Only lubricants that meet the Commission's Material Specifications may be used in the installation of the pipe. Clean, disposable applicators shall be used for the application of the lubricant to the gaskets. Used lubricant shall be discarded after every job.

14. Packing materials and gaskets and lubricants shall be kept clean at all times.

15. After cleaning dirt or foreign material from the plain end, apply lubricant supplied by the pipe manufacturer in accordance with their recommendations. The lubricant is supplied in sterile cans and every effort shall be made to keep it sterile.

16. Plain end must be beveled; square or sharp edges may damage or dislodge the gasket and cause a leak. The plain end of field cut pipe must be beveled approximately a ¼-inch and at a 30-degree angle with a heavy file, grinder or pipe saw to remove all sharp edges. Recoat all cut ends with bitumastic when used for push-on joint.

17. Push the plain end into the bell of the pipe. Keep the pipe straight while pushing. Make deflection after the joint is assembled.

18. Pipe can be pushed into the bell socket with a long bar, a pipe jack, lever puller or backhoe. The pipe supplier may provide a pipe jack or lever puller on a rental basis. A timber header will be used between the pipe and jack or backhoe bucket to avoid damage to the pipe.

19. Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing, or other material (or people) shall be placed in the pipe at any time.

20. All pipe and fittings in trenches will be protected from contamination entering the internal parts upon any length of delay of construction, at the end of every working day, and upon the threat of water in the trench. The open ends of all pipe and fittings must be plugged with a watertight seal at the end of every working day.

21. Temporary pipe plugs. At times when work is not in progress, the open end of the pipes shall be closed by means of a watertight plug or other means acceptable to Commission. When practical, the plug shall remain in place until the trench is pumped completely dry. Care must be taken to prevent pipe floatation should the trench fill with water.

22. Pipe placement. As each length of pipe is placed in the trench, the joint shall be assembled, and the pipe brought to correct line and grade. The pipe shall be placed on raised common fill about 18-inch behind the bell or the bedding shall be excavated 2-inches to 6-inches at the bell prior to backfilling, in accordance with the applicable **Trench Detail (W-02.0, W-02.1, W-02.2, W-02.3, or W-02.4)**.

23. When rock excavation is necessary, the rock shall be removed to provide at least 6-inches of clearance below and on each side of the pipe, valves, and fittings for pipe sizes 24-inch or smaller. For larger pipes, the clearance shall be at least 9-inches.

(a) When excavation is complete, a layer of appropriate backfill material, in accordance with the applicable **Trench Detail (W-02.0, W-02.1, W-02.2, W-02.3, or W-02.4),** shall be placed on the bottom of the trench and compacted and leveled to provide proper depth of cover.

(b) These clearances eliminate potential creation of stress points that could cause pipe failure.

24. Direction of bells: It is common practice to lay pipe with the bells facing the direction in which work is progressing.

25. Maximum cumulative (horizontal and vertical planes) pipe deflection is listed below:

Pipe Size (Diameter in inches)	Deflection Angle (in degrees)	Maximum Allowable Offset (in inches) *
3 – 12	4	15
14 & 16	3.2	12
18+	2.4	9

* For 18-foot pipe lengths, measured at the end of the pipe.

26. Any deviation in joint deflection in excess of the above stated amount must be approved by the Commission representative.

27. All water mains shall be installed with a minimum cover of 5-feet. Any installation with less than 5-feet of cover shall require approval by the Commission representative. If insulation is required it shall be installed in accordance with Section 6.2.2 of these Guidelines and Policies.

28. When crossing other utilities, the Commission Construction Crew or Installer shall install the water main in accordance with **Utility Crossing Detail (S-03.0**), unless otherwise approved by the Commission.

29. The installed pipe shall be disinfected according to Section 6.3 of these Guidelines and Policies.

30. Backfill to be installed in accordance with the applicable **Trench Detail (W-02.0, W-02.1, W-02.2, W-02.3, or W-02.4)**, and the following:

(a) The pipe embedment material shall be placed in 6-inch layers above top of pipe and hand compact to a point 12-inches, minimum, above the top of pipe.

(b) Materials placed in the trench from the pipe embedment materials shall be Common Borrow Fill, according to the Commission's Material Specifications and shall be mechanically compacted. Common Borrow Fill shall be free from large clods, rocks and cinders.

(c) Backfill shall be graded with the placement of suitable soil material, as determined by the Commission Representative, in 12-inch (maximum) layers compacted to 95% of the maximum density of the soil as determined by the Standard Proctor Test, AASHTO Designation T-99.

(d) Any backfill area that does not conform to the above to the compaction requirement shall be replaced and tests performed again.

31. Commission construction Crews and Installers shall restore or install pavement in accordance with CHAPTER 8 of these Guidelines and Policies, unless otherwise approved by the Commission.

32. Commission Construction Crews shall notify the Commission Construction Crew responsible for pavement restoration the amount of pavement to be installed at the end of each week.

33. Air Valve Assemblies and Air Corporations shall be installed at the following locations and as described, unless otherwise approved by the Commission's Engineering and Technical Services:

    (a) When required by the Commission's E&TS, a 1-inch air valve assembly or 1-inch air corporation shall be installed at the beginning of the water main installation to allow for disinfection of the water main. The air valve assembly shall be installed in accordance with **Air Valve Assembly Detail (W-03.0, W-03.1, or W-03.2)** in accordance with Section 6.2.2 of these Guidelines and Policies, unless otherwise approved by the Commission.

    (b) An air valve assembly shall be installed at the end of each dead end main, unless otherwise approved by the Commission's E&TS. The size of the air valve assembly shall be a 2-inch corporation and 2-inch drilled IK with 2-inch brass pipe or as specified by the Commission representative. The air valve assembly shall be installed in accordance with **Air Valve Assembly Detail (W-03.0, W-03.1, or W-03.2)** and in accordance with Section 6.2.2 of these Guidelines and Policies, unless otherwise approved by the Commission. The dead end main shall be installed in accordance with **End of Main Detail (W-04.0 or W-04.1)**.

(c) An air valve assembly shall be installed at all high points on the pipeline and/or other locations approved by the Commission's E&TS. If a high point is created by the Commission's Construction Crew or Installer at a point other than those designated on the plans, the Commission's Construction Crew or Installer shall install a release valve at said high point. The air valve assembly shall be installed in accordance with **Air Valve Assembly Detail (W-03.0, W-03.1, or W-03.2)** and in accordance with Section 6.2.2 of these Guidelines and Policies, unless otherwise approved by the Commission.

(d) At a minimum, a 1-inch air corporation shall be installed on each side of newly installed valves. After the water main is in service the Air Corporations shall be left shut, capped with a brass cap, and buried. The air corporation shall be installed in accordance Section 6.2.6 of these Guidelines and Policies, unless otherwise approved by the Commission.

6.2.2 Polyethylene Encasement

1. Install polyethylene (PE) encasement around ductile iron pipe in accordance with pipe manufacturer's recommendations, ANSI/ AWWA C105/A21.5, Method 'A' in section 2.15 of DIPRA's Installation Guide for Ductile Iron Pipe, and the following, unless otherwise approved by the Commission:
2. Method A requires one length of PE tube to be used for each length of pipe and is overlapped at each joint.
3. When lifting polyethylene-encased pipe, use a fabric-type sling or a suitably padded cable or chain to prevent damage to the polyethylene. Be careful not to damage the polyethylene when handling or jointing the pipe.
4. The section of PE tube shall be cut to length to overlap each joint by approximately 2-feet.
5. The pipe shall be clean of all foreign material such as dirt, clay, mud, or other materials. In wet, sloppy trench conditions, the pipe should be completely covered by the polyethylene tube before it is lowered into the trench.
6. Slip the PE tube around the spigot end of the pipe and bunch the PE tube in accordion fashion near the spigot end. Make sure to pull the PE tube back so that it clears the spigot end.
7. Lower the pipe in the trench. Make sure there is a shallow hole in the trench bottom at the joint location to ensure overlapping the PE encasement. Install the spigot end of the pipe into the bell of the already installed pipe.

8. Move the cable to the bell end of the pipe to spread the tube over the entire barrel of the pipe. Push back both ends of the tube until they clear both pipe ends. Make sure the tube is centered on the pipe to provide a one-foot overlap at each end.

9. Overlap the tube end of the new pie with the tube end of the installed pipe. Secure the new tube end in place with tape.

10. Take up slack in the tube to make a snug, but not tight, fit. Circumferential wraps of tape or plastic tie straps should be placed at 2-foot intervals along the barrel of the pipe to help minimize the space between the polyethylene and the pipe. Wrap a piece of tape or plastic tie strap completely around the pipe at each end to seal the polyethylene, leaving ends free to overlap the adjoining sections of pipe. Seal ends of overlap by wrapping tape or plastic tie straps completely around the pipe at each end

11. A fabric type or padded sling shall be used when handling polyethylene encased pipe to prevent damage to the polyethylene encasement.

12. All seams in the polyethylene encasement shall be sealed completely with approved 2-inch wide plastic adhesive tape.

13. Extreme care shall be taken to ensure that all rips or tears in the polyethylene encasement are properly repaired with additional tape and film as described in ANSI/AWWA C105/A21.5

14. Extreme care shall be taken when backfilling to avoid damaging the polyethylene encasement.

15. Appurtenances:

    (a) Pipe-shaped appurtenances such as bends, reducers, offsets, and other pipe-shaped appurtenances shall be covered in the same manner as the pipe.

    (b) Odd-shaped appurtenances such as valves, tees, and crosses shall be covered with a flat sheet or split length of polyethylene tube by passing the sheet under and then over the appurtenance and bringing it together around the body of the appurtenance. Make seams by bringing the edges of the polyethylene together, folding over twice, and taping them down.

    (c) Joints of pipe-shaped and odd-shaped appurtenances shall be overlapped as in the pipe installation above; then tape the polyethylene securely in place at valve stems and other penetrations. When bolted-type joints are used, care should always be taken to prevent bolts or other sharp edges of the joint configuration from penetrating the wrap.

(d) Water services, air corps, and air valve assemblies shall be tapped through the polyethylene-encasement of the Ductile Iron pipe, unless otherwise approved by the Commission. Tapping through the PE encasement involves wrapping two or three layers of polyethylene adhesive tape completely around the pipe to cover the area where the tapping machine and chain will be mounted. Then install the corporation stop directly through the tape and polyethylene. After the tap is made inspect the entire circumferential area for damage and make any necessary repairs. When tapping through the PE encasement is not possible an X-shaped cut in the polyethylene shall be made and the PE shall be temporarily folded back. After installing the appurtenance, tape the slack securely to the appurtenance and repair the cut and any other damaged areas in the polyethylene with tape.

6.2.3 Pre- Insulated Pipe

1. Pre-insulated Pipe Insulation for Water Main or Water Service Pipe installed with less than 5-feet of cover and shall be as follows, unless otherwise approved by the Commission's E&TS:

   (a) Pre-insulated pipe, in accordance with the Commission's Material Specifications shall be provided when pipes are to be installed with less than 5-feet of cover. The insulated pipe system shall be installed wherever the depth of water pipe has less than 5'-0" of cover and above grade or across the bridge span.

   (b) Insulated ductile iron water pipe shall be installed in accordance with the requirements of Section 6.2.1 and the following additional requirements.

   (c) All insulated water pipe shall be handled with additional care to prevent damage to the protective jacket. Damaged jackets and insulation will be replaced at the Installers expense.

   (d) Installation shall not take place when temperatures are below -30º F (-34º C).

   (e) Bell and spigot joints shall be sealed using a single turn of 6-inch (150mm) wide butyl mastic tape or heat shrink wrap/closure seal in accordance with the Commission's Material Specifications.

   (f) Insulation kits shall be used for the mechanical joints in accordance with the Commission's Material Specifications.

6.2.4 Field Applied Insulation for Pipe

1. Field Applied Insulation for Water Main or Water Service Pipe installed with less than 5-feet of cover and above grade or across bridge span(s) is typically a three

part system that includes the insulation sections, an insulation jacket, and the seals and/or bands and shall be installed as follows, unless otherwise approved by the Commission's E&TS:

2. Field Applied Insulation for above grade and below grade pipes with less than 5-feet of cover shall be supplied in accordance with the Commission's Material Specifications.

3. Field Applied Insulation for above grade pipes shall be aluminum jacketed unless otherwise approved by the Commission.

4. Field Applied Insulation for pipes with less than 5-feet of cover shall be composite cold insulation wrap (CI Wrap) unless otherwise approved by the Commission.

5. The Field Applied Insulation system shall be installed wherever the depth of water pipe has less than 5'-0" of cover and above grade or across bridge span(s).

6. The insulation sections shall be installed as follows:

   (a) Field Applied Insulation shall be applied in half sections of 3-foot lengths. The half sections are applied on an 18-inch stagger from top to bottom.

   (b) Top and bottom halves are held onto pipe using ½-inch wide filament tape wrapped one and a half times around the circumference of insulation 9-inches on center.

7. The aluminum jacketing for above grade installations shall be installed as follows:

   (a) Aluminum jacketing is applied to the insulation sections by wrapping pre-cut aluminum jacket around circumference of insulation so as to have overlap of jacket facing downward, creating a watershed and insuring water does not drain into the insulation.

   (b) Stagger the circumferential seams so they do not fall in the same place as the insulation seams. The horizontal seams shall be placed at 2-o'clock and 4-o'clock so that they do not fall in the same place as the insulation seams add shed water.

   (c) Each additional piece of jacket is then overlapped onto the proceeding pipe covering by a minimum of 2 inches.

   (d) All seams on the aluminum jacket shall be sealed with self-adhesive CI Wrap.

   (e) This jacketing is then held in place by fastening pre-cut stainless steel strapping and wing seals 12" on center, fastening with a tensioning tool. The tension shall be equally applied to each strap so as not to cause any seam separation.

8. The CI Wrap jacketing for below grade installations shall be installed as follows:

   (a) The insulation shall be free from any dust, dirt, or moisture to ensure adhesion of the CI Wrap.

   (b) CI Wrap shall be cut to length. The desired length shall allow at least a 2-inch overlap on each end. All longitudinal and circumferential overlaps shall be a minimum of 2-inches.

   (c) CI Wrap jacketing is applied to the insulation sections with a "cigarette wrap" which is wrapped longitudinally instead of spirally around the circumference of insulation so as to have overlap of jacket facing downward, creating a watershed and insuring water does not drain into the insulation.

   (d) Place the CI Wrap such that the finished overlap will allow the water to drain off the Wrap and not into the insulation. Peel back 6-inch to 12-inches of the release liner taking care not to allow any of the adhesive to touch itself. Firmly press exposed edge of sheet into place and continue removing release liner and smoothing CI Wrap. Avoid wrinkles.

   (e) Ensure complete contact at the laps and to insulation using a roller or firm pressure throughout installation. Stagger the laps of subsequent pieces.

   (f) A 4-inch Butt-Strip shall be applied at each circumferential joint with 2-inches of overlap on each side of joint.

   (g) At fittings, 4-inch CI Wrap shall be applied in a spiral wrap. All seams shall be overlapped by 50% (approximately 2-inches).

   (h) Any damaged CI Wrap may be repaired with the Commission's E&TS's approval.

   (i) Damaged CI Wrap shall be cut out and removed. A new piece of CI Wrap shall be cut with at least 2-inches of overlap on all four sides.

   (j) CI Wrap cannot be exposed to sunlight longer than 14-days.

9. Styro-board may be allowed with prior E&TS approval

   (a) Styro-board (blue), minimum R-value of 7 per inch thick, as used in normal construction of buildings, shall be placed 6 to 10 inches over the pipe with 8-inches being the preferred separation.

   (b) For each additional foot of cover required 1-inch of insulation is required with a minimum of 2 inches. For a 5-foot desired bury and the pipe at 3-feet, 2-inches of insulation would be required.

(c) For 2-inch or less copper tube water service pipe, 2-foot wide insulation board shall be used.

(d) For 6-inch or greater ductile iron water pipe, 4-foot wide insulation board shall be used.

6.2.5 Air Valve Assembly

1. Air Valve Assemblies shall be either one-inch or two-inch. The size and location required shall be determined by the Commission.
2. Tapered inlet ball type corporations, either one-inch or two-inch, with one-inch or two-inch CC thread on the inlet side and one-inch or two-inch female IP thread on the outlet side, shall be installed before the standard or one-piece air valve assembly is installed, unless otherwise approved by the Commission.
3. When tapping water mains with corporations tapping saddles shall be required.
4. The one-inch and two-inch corporations shall be tapped on top of the water main.
5. The standard air valve assembly acceptable to the Commission shall be installed as follows:

   (a) One-inch or Two-inch 90-degree elbows: shall be female on both ends with One-inch or Two-inch IP thread. Three are required with two laid vertically and horizontally before the curb stop and one laid vertically after the curb stop.

   (b) One-inch or Two-inch Ball Valve Curb Stop and Waste: shall be ball valve type with One-inch or Two-inch female IP thread on both ends. The One-inch or Two-inch Curb with a stop and waste hole shall be set on a concrete brick. The stop & waste hole shall be on the downstream side (away from water main).

   (c) One-inch and/or Two-inch Nip: shall be male on both ends with One-inch or Two-inch IP thread. Minimum length shall be six-inches and maximum length shall be twelve-inches, unless otherwise approved by the Commission.

   (d) One-inch or Two-inch Riser pipe: shall be male on both ends with One-inch or Two-inch IP thread. The length shall be from the last 90-degree elbow to four-to-six-inches below finished roadway. The riser pipe shall be set in a Valve Box top and cover and a bottom is not required.

   (e) One-inch or Two-inch cap: shall be One-inch or Two-inch female IP thread. The caps shall be installed with Teflon tape and shall be hand tightened on to the One-inch or Two-inch Riser pipe.

(f) The standard air valve assembly components shall be installed in the following order after the Tapered inlet ball type corporation: 1) Nip, 2) 90-degree elbow (vertically), 3) Nip, 4) 90-degree elbow (horizontally), 5) Nip, 6) Ball Valve Curb Stop and Waste, 7) Nip, 8) 90-degree elbow (vertically), 9) Riser pipe, and 10) cap.

(g) The air release valve shall be installed in accordance with **Air Valve Assembly Detail (W-03.0).**

(h) Boxes for Standard Air Valve Assemblies shall be installed as follows:

- Boxes for 1-inch air valves curb stops shall be the Commission's standard two-piece Buffalo style service box and shall be installed on concrete block or other Commission approved support.
- Boxes for 2-inch air valves curb stops shall be the Commission's standard two-piece gate box and shall be installed on concrete block or other Commission approved support.
- Boxes for 1-inch and 2-inch air valves brass riser pipe shall be the Commission's standard gate box top, only, and shall be set to finish grade in paved areas and set 2-inches below grade in non-paved areas.
- Install valve box and cover in accordance with **Air Valve Assembly Detail (W-03.0)**

6. One-Piece Air Valve Assembly may be used with the Commission's approval.

(a) The one-piece air valve assembly shall be installed onto the one-inch or two-inch corporations.

- The one-inch or two-inch corporations shall be brass 85-5-5-5, tapered inlet ball corporation, with one-inch or two-inch CC thread on the inlet side and one-inch or two-inch **male** IP thread on the outlet side. One is required for each assembly.

(b) The one-piece air valve assembly shall be installed vertically plumb.

(c) The air release valve shall be installed in accordance with **Air Valve Assembly Detail (W-03.1, or W-03.2)**

7. Boxes for One-Piece Air Valve Assemblies shall be installed as follows:

(a) Boxes for 1-inch air valves shall be the Commission's standard two-piece gate box and shall be installed on concrete block or other Commission approved support.

(b) Boxes for 2-inch air valves shall be the Commission's standard three-piece gate box and shall be installed on concrete block or other Commission approved support.

(c) Install valve box and cover in accordance with **Air Valve Assembly Detail (W-03.2)**

6.2.6 Air Corporation

1. Air corporations shall be one-inch and in accordance with the Commission's Material Specifications.
2. Tapered inlet ball type corporations shall be with one-inch CC thread on the inlet side and one-inch male IP thread on the outlet side and in accordance with the Commission's Material Specifications.
3. The one-inch corporations shall be tapped on top of the water main.
4. After the water main or water service pipe is in service and the air corporation is no longer needed it shall be left shut and capped with a 1-inch female IP threaded cap.

6.2.7 Ductile Iron Mechanical Joint Fittings

1. All tees, bends, crosses, and other fittings shall be ductile iron mechanical joint unless otherwise approved by the Commission.
2. All fittings shall be inspected prior to installation to ensure the gasket seats are free of excess coating. Excess coating, if present, shall be manually removed so as to ensure proper seal of gasket, however, all bare metallic surfaces created as the result of removing the excess coating shall be re-coated with similar material to prohibit corrosion.
3. All fittings shall be installed with retainer glands as in accordance with Mechanical Joint Restraint for Ductile Iron Fittings Section 6.2.21 of these Guidelines and Policies, unless otherwise approved by the Commission.
4. All fittings shall be placed, supported, and installed in strict accordance with the manufacturer's instructions and as directed by Commission.
5. All joint bolts shall be torqued using a calibrated torque wrench in accordance with the manufacturer's specifications. If manufacturer's specifications are not available tighten the bolts in accordance with Paragraph 6 of this Section.
6. Back up bends, tees, end caps, and other fittings in pipelines buried in ground with Class A concrete thrust blocks placed against undisturbed earth unless otherwise

specified. A layer of 4 mil poly shall be placed between the concrete and the fitting. The concrete thrust block shall be installed in accordance with the End of Main Details (W-04.0 or W-04.1), Tee Detail (W-05.0 – 05.1), Thrust Block Behind Fitting Detail (W-14.0), and/or Hydrant Details (W-07.0, W-07.1, or W-07.2).

7. Unless otherwise specified, all mechanical joints fittings shall be installed with restrained joints as specified in the Commission's Specifications. Grip rings will only be allowed with Commission approval.

8. Maximum cumulative (horizontal and vertical planes) deflection per joint shall not exceed the angles listed below:

Joint Size (in inches)	Deflection Angle (in degrees)
3 – 4	6.4
6	5.6
8 – 12	4.0
16	2.8
20	2.4
24	1.6

9. Any deviation in joint deflection in excess of the above stated amount must be approved by Commission.

10. The installed fittings shall be disinfected according to Disinfection Section of these Guidelines and Policies.

6.2.8 Ductile Iron Mechanical Joint Hydrant Anchoring Tees

1. Ductile iron mechanical joint hydrant anchoring tees shall be used to install all hydrants in the Commission's distribution system unless otherwise approved by the Commission.

2. Ductile iron mechanical joint hydrant anchoring tees shall be installed with retainer glands in accordance with Section 6.2.7 Mechanical Joint Restraint for

Ductile Iron Fittings of these Guidelines and Policies, unless otherwise approved by the Commission.

3. Mechanical joint gate valves shall be installed directly onto ductile iron mechanical joint hydrant anchoring tee.

4. Mechanical joint gate valves shall be installed in accordance with Section 6.2.9 Mechanical Joint Resilient Wedge Gate and Butterfly Valves of these Guidelines and Policies, unless otherwise approved by the Commission.

6.2.9 Mechanical Joint Resilient Wedge Gates and Butterfly Valves

1. All valves installed on water mains up to and including 12-inch diameter shall be resilient seat gate valves. All water mains larger than 16-inch diameter water mains may have either resilient seat gate valves or butterfly valves. Butterfly valves must be approved by the Commission.

    - Butterfly valves shall be installed with the operating nut on the short side of the street unless otherwise approved by the Commission.

2. Pressure class 250 valves are required for all installations and shall be in accordance with the Commission's Material Specifications, unless otherwise approved by the Commission.

3. Typically, valves are to be located at each intersection, in each direction on street line, and approximately every 500-feet on an un-interrupted length of water main, unless otherwise approved by the Commission.

    (a) Three (3) Isolation valves shall be installed on each side of three-way intersections at each street line.

    (b) Four (4) Isolation valves shall be installed on each side of four-way intersections at each street line.

    (c) Isolation valves shall be installed every 500-feet on straight runs of water main.

    (d) Isolation valves shall be the same size as the water main being installed.

    (e) Isolation valves shall be gate valves up 12-inch in diameter. Isolation valves 16-inch and larger may be butterfly valves but require Commission approval prior to installation.

4. The valve body shall be set level such that the operator is plumb with the vertical plane which is perpendicular to the ground surface.

    (a) Typically, valves are placed on oak blocking and oak wedges are used to adjust height of valve. Wedges are placed on each side of the valve and hammered

under the valve to adjust the height. Care shall be taken not to damage the valve.

(b) When needed due to poor soil conditions concrete blocks may be required by the Commission.

1. The valve joints shall be assembled with retainer glands in accordance with Section 6.2.7 Mechanical Joint Restraint for Ductile Iron Fittings of these Guidelines and Policies, unless otherwise approved by the Commission.
2. After bolts are inserted and made finger tight, the nuts shall be tightened diametrically opposite, progressively, and uniformly around the coupling with a properly calibrated torque wrench. All bolts shall be tightened to the correct torque value using a calibrated torque wrench in accordance with the manufacturer's specifications.
3. Care shall be taken to ensure that the fusion-bonded epoxy coated exterior is not damaged. Any damaged areas shall be repaired by the Commission's Construction Crew or Installer in accordance with the manufacturer's recommendation at the sole expense of the Installer.
4. All valves shall be restrained on both sides by use of restrained joints in accordance with Tee Detail (W-05.0).
5. All valves shall be installed complete with valve box and cover. Install valve box and cover in accordance with Valve Box Detail (W-08.0).
6. The installed valves shall be disinfected according to Disinfection Section of these Guidelines and Policies.

6.2.10 Couplings

1. Pipe installations shall conform to, but not limited to, these Guidelines and Policies, and/or AWWA C219.
2. Standard range couplings, wide range couplings, and large diameter wide range couplings typically, shall be used to repair pipe that would connect new pipe to old pipe in accordance with the **Repair Pipe Detail (W-06.0)** or as otherwise approved by the Commission's Engineering and Technical Services.
3. Standard range couplings shall be installed only when connecting standard outside diameter pipe to standard outside diameter pipe in main line or service line repair.
4. Wide range couplings may be allowed only when connecting standard outside diameter pipe to oversize or pit cast pipe in main line or service line repair.

5. Two bolt wide range couplings may be allowed only when connecting standard outside diameter pipe to oversize or pit cast pipe in main line or service line repair in emergencies and in installations where clearance is an issue.

6. Clean pipe ends for distance of 12-inch each side.

7. Use soapy water or non-toxic, NSF approved gasket lubricant on pipe.

8. The installed couplings shall be disinfected according to Section 6.4.5 of these Guidelines and Policies. All cut-in pipe and fittings must be swabbed or sprayed with 1-5% or greater bleach solution immediately before installation but after inspection for internal cleanliness.

9. Slip follower and gasket over each pipe to distance of 6 inches from end, place middle ring on pipe end until centered over joint. Use reference marks to determine exact center location.

10. Insert other pipe end into middle ring and bring the ring to the proper position in relation to pipe laid.

11. Press gaskets and followers into middle ring flares.

12. To prevent galling nuts shall be coated, inside and out, and bolts shall be coated along the full length of threads with an anti-seizing material such as provided by Henkel Technologies, Rocky Hill, Connecticut - product name: Loctite Nickel Anti-Seize Lubricant; Chesterton Technical Products, Stoneham, Massachusetts – product name: Chesterton 772 Premium Nickel Anti-Seize Compound; Permatex Inc. Hartford, Connecticut – product name: Permatex Nickel Anti-Seize Lubricant or equal product of another manufacturer. See the Commission's Material Specifications for a full specification.

13. After bolts are inserted and made finger tight, the nuts may be tightened with an air wrench set on the lowest speed to prevent galling. The nuts shall be tightened diametrically opposite, progressively, and uniformly around the coupling. Final tightening shall be with a properly calibrated torque wrench. All coupling bolts shall be tightened to the correct torque value using a calibrated torque wrench in accordance with the manufacturer's specifications.

6.2.11 Bell Joint Clamps

1. Bell Joint Clamps designed for sealing joints on cast iron and ductile iron pipes and in accordance with the Commission's Material Specifications shall be used to seal leaking joints or as a preventative measure to help ensure joints do not leak in the future or as otherwise approved by the Commission's Engineering and Technical Services.

2. Bell joint clamps shall be installed according to the manufactures provided instructions and/or the following
3. Excavate to each joint and expose the full circumference of the joint.
4. The pipe surface adjacent to the joint shall be cleaned and the surface on the joint where the gasket will be in contact.
5. Check the pipe diameter to ensure the BJC is the proper size for the installation.
6. If applicable lubricate the gasket and wrap the gasket around the pipe. Seam of gasket should be at top of pipe.
7. Assemble the face plate or pipe half around the pipe.
8. Assemble back plate or bell ring around the back of the bell.
9. Push the assembled plates or ring together and hand tighten bolts. Make sure gasket is properly seated. Casting joints should be located at 3-o'clock and 9-o'clock.
10. Tighten bolts at joint halves first. Then tighten the bolts in 20 to 30-ft-lbs increments to the manufactures specified maximum – not to exceed 70-ft-lbs. Re-torque 15-minutes after to ensure the BJC is properly tightened.

6.2.12 Friction Clamps

1. Friction Clamps designed for restraint and in accordance with the Commission's Material Specifications shall be used to restrain pipe that would connect new pipe to old pipe in accordance with the **Installation or Cutting-In of Valve or Fitting Details (W-06.1, W-06.2, W-06.3, W-06.4, W-06.5 or W06.6)** or as otherwise approved by the Commission's Engineering and Technical Services.
2. Friction Clamps designed for restraint may be either a four-bolt socket clamp or a fabricated steel harness each used with threaded rods, nuts, and washers per the Commission's Material Specifications and in accordance with **Threaded Rod Detail (W-06.7) and Thrust Restraint to Mechanical Joint Detail (W-06.8)**.
3. Friction Clamps designed for restraint shall be installed only when restraint cannot be achieved by other means in main line or service line installation or repair.
4. Depending on the installation the number of socket clamps or fabricated steel harnesses, diameter and number of threaded rods required will vary.

   (a) 4-bolt Socket Clamps require the following number and diameter of threaded rod and shall be according to the Commission's Material Specifications:

- 6-inch – 10inch diameter pipe requires two (2) ¾-inch threaded rods
- 12-inch diameter pipe requires two (2) 1-inch threaded rods
- 16-inch diameter pipe requires four (4) 1-inch threaded rods
- Larger than 16-inch shall be approved the Commission's Engineering and Technical Services.

(b) Fabricated steel harnesses shall be provided and installed according to the Manufacturer's directions and the Commission's Material Specifications:

5. Clean the pipe surface and make sure it is free from scale and irregularities for distance of 12-inches on each side of location of friction clamp. Ensure nothing will prevent the inside of the friction clamp from attaining full contact with the pipe.

6. Using the threaded rod as a positioning guide, place the friction clamp on the pipe with the lug side or washer side positioned opposite the direction of the joint to be restrained.

   (a) Typically, the friction clamp will be installed about 2-feet to 4-feet away from fitting, valve, or coupling, unless otherwise approved by the Commission

   (b) Threaded couplings may be used to connect threaded rod when longer lengths of rod or varying lengths of rod are required for difficult installations.

7. Position the friction clamp so that a minimum of 1-inch of the restraint rod will protrude past the lug or washer when installation is complete.

8. Make sure the lugs or washers and the bent eyebolts and washers from each end of the restraint are properly aligned so that the restraint rods run straight with the pipe.

9. After clamping bolts and nuts are inserted and made finger tight, the nuts shall be tightened evenly on each side of the friction clamp with a properly calibrated torque wrench to the following values:

   (a) 4-bolt socket clamps shall be evenly tightened to the following torque amounts:

   - 5/8-inch bolts shall be tightened to 65-foot-pounds
   - ¾-inch and larger bolts shall be tightened to 75-foot-pounds.

   (b) Fabricated steel harnesses shall be tightened according to the manufacturer's recommendations.

10. Keep the spacing at the clamping pads equal between the mating friction clamp sections. Alternate between bolts until all bolts reach the recommended torque.
11. Install the restraint rods through the lugs or washers and the bent eyebolts and washers.
12. Rods shall be used in pairs.
13. Rods shall not be bent or formed.
14. Both rod nuts shall be hand tightened plus one-half revolution each.
15. Recheck clamping bolt torque on friction clamps prior to application of protective coatings and backfilling and re-tighten if necessary.
16. All components to be cut-in to an existing water main shall be coated with petrolatum based primer and wrapped with prefabricated petrolatum coating in tape form designed to protect wet or dry irregularly shaped metal surfaces according to Section 6.2.27 of these Guidelines and Policies and the Commission's Material Specifications.

6.2.13 Cut-in Fittings, Valves, Hydrants, Pipes, and Repairs -General

1. All components to be cut-in to an existing water main shall be new and meet the Commission's Material Specifications.
2. When applicable the cut-in components shall be assembled and installed according to the other relevant sections of these Guidelines and Policies.
3. The Commission Construction Crew or the Installer shall excavate and expose the pipe to be cut out.
4. The Commission shall shut all valves to isolate the pipe to be cut out. The Installer must coordinate with the Commission so that customers are properly notified.
5. Whenever possible the components to be cut-in shall be pre-assembled so that the laying length can be accurately measured.
6. All the joints for each new component, where applicable, shall be restrained with retainer glands. All components shall be properly restrained either by following these Guidelines and Policies or as directed by the Commission's Engineering and Technical Services.
7. Air Corporations and/or Air Valve Assemblies shall be installed on each side of any new or replacement valve as approved by the Commission.
8. The installed couplings shall be disinfected according to Section 6.4.5 of these Guidelines and Policies. All cut-in pipe and fittings must be swabbed or sprayed

with 1-5% or greater bleach solution immediately before installation but after inspection for internal cleanliness.

9. All new cut-in components shall be pressure and leakage tested by filling the section of pipe according to Section 6.3 of these Guidelines and Policies and visually inspecting the new cut-in components prior to backfilling.

10. The pipes shall be properly backfilled and compacted according to Section 6.2.25 of these Guidelines and Policies.

11. The Commission's Engineering and Technical Services group would define the restraint required for the Commission's Construction Crew.

12. The Installer would have to hire an engineer to submit a design to the Commission's Engineering and Technical Services group for approval.

13. All components to be cut-in to an existing water main shall be coated with petrolatum based primer and wrapped with prefabricated petrolatum coating in tape form designed to protect wet or dry irregularly shaped metal surfaces according to Section 6.2.27 of these Guidelines and Policies and the Commission's Material Specifications.

6.2.14 Install Valves and Fittings at Dead-Ends for Main Extensions

1. When cutting-in a valve onto the end of a ductile iron or cast iron water main in order to extend a water main the installation shall be in accordance with the **Install Valve or Fitting at Dead End Water Main(s) Detail (W-06.1)**, unless otherwise approved by the Commission.

2. Comply with the General requirements in Section 6.2.13;

3. Typically, at dead end water mains up to 16-inch in diameter and with less than 76-PSI static pressure, mechanical joint restraint and at least two (2) 18-foot or 20-foot pipe lengths are required after a cut-in valve. All other diameters or higher pressures require the following:

   (a) By Installer an engineer's design approved by the Commission's Engineering Technical Services.

   (b) By Commission Construction Crew a design from Engineering and Technical Services.

4. The Commission's Engineering and Technical Services group shall be contacted to determine the type and length of pipe being extended.

5. The pipe length required would be computed based on system pressure at the extension location, pipe diameter, and trench type.

6. When extending a ductile iron main the following shall be adhered to:

   (a) The Commission has determined that the existing main being extended is 18-feet or 20-feet lengths.

   (b) The cut-in valve shall be restrained with retainer glands to the end of the new and existing ductile iron water main.

7. When extending a cast iron main the following shall be adhered to:

   (a) The Commission has determined that the existing main being extended is 18-feet or 20-feet lengths.

   (b) The cut-in valve shall be restrained with retainer glands to the end of the new ductile iron water main.

   (c) The cut-in valve shall be restrained with a follower gland to the end of the existing cast iron water main.

   (d) One (1) friction clamp shall be installed on the existing cast iron pipe.

   (e) The follower gland shall be restrained to the friction clamp with ¾-inch or 1-inch, 4140-alloy steel, grade B7 threaded rods, and grade B7 fasteners and associated hardware as required.

   (f) ¾-inch or 1-inch, 4140-alloy steel, grade B7 threaded rods, and grade B7 fasteners and associated hardware shall be used. Rods are to be attached to the fittings with 90-degree bent eyebolts and to the clamps with lugs provided or cast iron or steel washers.

   (g) 10-inch diameter and smaller pipe require two (2) ¾-inch threaded rods and associated hardware.

   (h) 12-inch diameter pipe requires two (2) 1-inch threaded rods and associated hardware.

   (i) 16-inch diameter pipe requires four (4) 1-inch threaded rods and associated hardware.

   (j) All threaded rods and associated hardware shall be assembled with anti-seize lubricant applied according to the manufacturer's recommendations.

(k) All threaded rods and associated hardware shall be wrapped in a protective coating according to Section 6.2.27 of these Guidelines and Policies, prior to backfilling.

(l) All larger diameters require review and approval by the Commission's Engineering and Technical Services group.

6.2.15 Cut-In to Existing Water Mains to Replace a Valve or Fitting

1. When cutting-in a valve or fitting into existing ductile iron or cast iron water mains to replace an existing valve or fitting all the joints for each new component shall be restrained accordance with the **Cutting Into Existing Water Main to Replace Valve or Fitting Detail (W-06.2)**, unless otherwise approved by the Commission.
2. Comply with the General requirements in Section 6.2.13, above.
3. The pipe to be cut into with a new fitting or valve shall be returned to its existing condition by the following means of joint restraint.
4. For existing cast iron pipe joint restraint using couplings and friction clamps shall be as follows:

   (a) Each end of the cut-in valve or fitting shall have a short piece of ductile iron installed and restrained with retainer glands.

   (b) The existing pipe to be cut out shall be cut so as not to be longer than a ½-inch of the assembled valve or fitting and two (2) pieces of ductile iron pipe.

   (c) Typically, two (2) coupling and two (2) friction clamps are required and shall be installed in accordance with Section 6.2.10 and Section 6.2.11 of these Guidelines and Policies.

   (d) Both couplings shall be slipped onto either the existing pipe or the new pieces.

   (e) The valve or fitting and two (2) pieces of ductile iron pipe shall be installed in place of the cut out pipe and butted up against one (1) end of the existing pipe.

   (f) The couplings shall be slipped into position so that the ends of the new pipe are in the middle of the couplings.

   (g) The friction clamps shall be installed on the existing water main.

   (h) The friction clamps shall be restrained to the new valve or fitting with stainless steel rods and associated hardware as required.

(i) The threaded rods and associated hardware shall be installed in accordance with Section 6.2.14 of these Guidelines and Policies.

5. For existing ductile iron pipe joint restraint using a MJ solid sleeve shall be as follows:

   (a) One (1) end of the cut-in valve or fitting shall have a short piece of ductile iron installed and restrained with retainer glands.

   (b) The existing pipe to be cut out shall be cut so as not to be excessively longer than the assembled valve or fitting and piece of ductile iron pipe.

   (c) Typically, one MJ solid sleeve with two (2) retainer glands is required and shall be installed in accordance with Section 6.2.7 of these Guidelines and Policies and as follows:

   (d) The solid sleeve shall be slipped into position so that the ends of the new pipe are in the middle of the solid sleeve.

6.2.16 Cut-In to Existing Water Mains Install Valve with Bell Facing Valve

1. When cutting-in a valve or fitting to water mains, such as cast iron, the bell of the next pipe is found, and the bell is facing the valve or fitting to be cut-in. The installation shall be in accordance with the **Cutting into Existing Main with Bell Facing Valve Detail (W-06.3)**, unless otherwise approved by the Commission.
2. Comply with the General requirements in Section 6.2.13;
3. The pipe to be cut into with a new fitting or valve shall be returned to its existing condition by the following means of joint restraint.
4. A short piece of ductile iron pipe shall be installed into the valve or fitting and restrained with a retainer gland.
5. For existing cast iron pipe joint restraint using a coupling, retainer gland, and a split ring clamp shall be a as follows:

   (a) A coupling shall be installed to connect the cast iron or other pipe to the new short piece of ductile iron pipe.

   (b) An additional retainer gland shall be installed on the new short piece of ductile iron pipe.

   - This retainer gland may be omitted if the split ring clamp is restrained directly to the valve or fitting.

(c) One (1) split ring clamp shall be installed on the other side of the bell of the existing pipe.

(d) The additional retainer gland shall be restrained to the split ring clamp with stainless steel rods as required.

(e) The threaded rods and associated hardware shall be installed in accordance with Section 6.2.14 of these Guidelines and Policies.

(f) Two (2) new full lengths of ductile iron pipe shall be installed after the new valve. The first piece shall be restrained to the new valve with a retainer gland.

6. For existing cast iron pipe joint restraint using a MJ solid sleeve and a split ring clamp shall be a as follows:

(a) A MJ solid sleeve shall be installed to connect the cast iron or other pipe to the new short piece of ductile iron pipe.

(b) One (1) retainer gland and one (1) follower gland shall be installed on the solid sleeve. The retainer gland shall be installed on the new ductile iron pipe. The follower gland shall be installed on the existing cast iron or other pipe.

- The retainer gland may be omitted if the split ring clamp is restrained directly to the valve or fitting.

(c) One (1) split ring clamp shall be installed on the other side of the bell of the existing pipe.

(d) The follower gland shall be restrained to the split ring clamp with stainless steel rods as required.

(e) The threaded rods and associated hardware shall be installed in accordance with Section 6.2.14 of these Guidelines and Policies.

(f) Two (2) new full lengths of ductile iron pipe shall be installed after the new valve. The first piece shall be restrained to the new valve with a retainer gland.

6.2.17 Cut-In to Existing Water Main to Install Valve with Bell Facing Away from Valve

1. When cutting-in a valve or fitting to water mains, such as cast iron, the bell of the next pipe is found, and the bell is facing away from the valve or fitting to be cut-in. The installation shall be in accordance with the **Cutting into Existing Water Mains with Bell Facing Away from Valve (W-06.4)**, unless otherwise approved by the Commission.

2. Comply with the General requirements in Section 6.2.13, above.

3. The pipe to be cut into with a new fitting or valve shall be returned to its existing condition by the following means of joint restraint.

4. A short piece of ductile iron pipe shall be installed into the valve or fitting and restrained with a retainer gland.

5. For existing cast iron pipe joint restraint using a coupling, retainer gland, and a friction clamp shall be a as follows:

   (a) A coupling shall be installed to connect the cast iron or other pipe to the new short piece of ductile iron pipe.

   (b) An additional retainer gland shall be installed on the new short piece of ductile iron pipe.

   - This retainer gland may be omitted if the split ring clamp is restrained directly to the valve or fitting.

   (c) One (1) friction clamp shall be installed on the other side of the bell of the existing pipe.

   (d) The additional retainer gland shall be restrained to the friction clamp with threaded rods as required.

   (e) The threaded rods and associated hardware shall be installed in accordance with Section 6.2.14 of these Guidelines and Policies.

   (f) Two (2) new full lengths of ductile iron pipe shall be installed after the new valve. The first piece shall be restrained to the new valve with a retainer gland.

6. For existing cast iron pipe joint restraint using a MJ solid sleeve and a split ring clamp shall be a as follows:

   (a) A MJ solid sleeve shall be installed to connect the cast iron or other pipe to the new short piece of ductile iron pipe.

   (b) One (1) retainer gland and one (1) follower gland shall be installed on the solid sleeve. The retainer gland shall be installed on the new ductile iron pipe. The follower gland shall be installed on the existing cast iron or other pipe.

   - The retainer gland may be omitted if the split ring clamp is restrained directly to the valve or fitting.

   (c) One (1) friction clamp shall be installed on the other side of the bell of the existing pipe.

(d) The follower gland shall be restrained to the friction clamp with threaded rods as required.

(e) The threaded rods and associated hardware shall be installed in accordance with Section 6.2.14 of these Guidelines and Policies.

(f) Two (2) new full lengths of ductile iron pipe shall be installed after the new valve. The first piece shall be restrained to the new valve with a retainer gland.

6.2.18 Cut-In to Existing Water Main to Install Valve with No Bell Found

1. When cutting-in a valve or fitting to existing water mains, such as cast iron, the bell of the next pipe is not found. The installation shall be in accordance with the **Cutting into Existing Water Main with No Bell Found (W-06.5)**, unless otherwise approved by the Commission.
2. Comply with the General requirements in Section 6.2.13;
3. Typically, at least one (1) MJ solid sleeve is required and shall be installed in accordance with Section 6.2.7 of these Guidelines and Policies and as follows:

   (a) One (1) retainer gland and one (1) follower gland shall be installed on the solid sleeve. The retainer gland shall be installed on the ductile iron pipe. The follower gland shall be installed on the cast iron or other pipe.

   (b) One (1) concrete thrust collar and one (1) friction clamp shall be installed on the existing pipe.

   (c) The concrete thrust collar shall be installed in accordance with the **Concrete Thrust Collar Detail (W-06.6)**, unless otherwise approved by the Commission.

   (d) The follower gland shall be restrained to the friction clamp with threaded rods as required.

   (e) The threaded rods and associated hardware shall be installed in accordance with Section 6.2.14 of these Guidelines and Policies.

   (f) Two (2) new full lengths of ductile iron pipe shall be installed after the new valve. The first piece shall be restrained to the new valve with a retainer gland.

   (g) The Commission's Engineering and Technical Services group would define the restraint required for the Commission's Construction Crew.

   (h) The Installer would have to hire an engineer to submit a design to the Commission's Engineering and Technical Services group for approval.

4. or as otherwise approved by the Commission's Engineering and Technical Services.

6.2.19 Tapping Sleeves and Mechanical Joint Valve

1. Ductile iron tapping sleeves shall be used when taps onto water mains are to be size on size or as required by the Commission.
2. Stainless steel tapping sleeves will be allowed when the connecting pipe is a minimum of one size smaller than the main it is connecting to or as approved by the Commission.
3. Before ordering or installing a tapping sleeve confirm with the Commission's Engineering and Technical Services what type of tapping sleeve is required for each installation.
4. The Commission will make all taps, unless otherwise approved.
5. Install both stainless steel and ductile iron tapping sleeves in strict accordance with the manufacturer's instructions.
   (a) Pressure test sleeve and valve with air at a minimum of 50 PSI prior to beginning tap.
   (b) While the sleeve is under pressure from the air test liberally spray the tapping sleeve and valve with a soapy water solution.
   (c) Make up all body bolts to torques specified by the manufacturer.
   (d) The mechanical joint outlet of the valve shall be made up in accordance with the specifications regarding mechanical joints.
6. The tapping sleeve shall be installed under pressure while flow is maintained. The tapping operation shall be conducted by workers experienced in the procedure. The tapping machine shall be furnished by the Commission's Construction Crew or Installer.
7. The tap shall be made a minimum of three (3) feet from existing joints or fittings, unless otherwise approved by the Commission. Adequate support shall be provided under the sleeve and valve during the operation. Pipe bedding material shall be properly tamped and compacted around the work.
   (a) A concrete block 4-inches thick or equal shall be placed under valves, unless otherwise approved by the Commission.

8. Provide thrust blocking at the back of the tapping sleeve in accordance with the plans. The size and location of the thrust block shall be determined based on the application.
9. Install the tapping sleeve such that the flanged face of the sleeve is plumb with the vertical plane.
10. The coupon from the valve tap shall be supplied to Commission after the tap.
11. After completing the tap, the valve shall be flushed to ensure that the valve seat is clean.
12. The installed tapping sleeve and valves shall be disinfected according to Disinfection Section of these Guidelines and Policies.
13. If authorized, cutting of the existing pipe shall be done so that the cut is square and clean, without causing damage to the pipe lining. All pipe cutting shall be done by means of an approved type of power cutter. All cut edges shall be field beveled by use of a power grinder when necessary.
14. The tapping sleeves and valves shall be installed in accordance with Ductile Iron Tapping Sleeve Detail (W-09.0) and Stainless Steel Tapping Sleeve Detail (W-09.1).

6.2.20 Valve Boxes and Covers

1. Valve boxes shall be installed concentric to the operating nut and plumb with the vertical plane.
2. The belled base section shall be placed on standard concrete blocking (typically 4-inches X 2-2/3-inches X 8-inches) in such a way that no additional loading is transferred to the valve, unless otherwise approved by the Commission.
3. Longer valve box bottoms and/or tops will be specified as required for water mains at depths that exceed the limitations of the above specified valve box.
4. Valve boxes located in traveled ways shall be left flush with the pavement or gravel shoulder unless otherwise specified.
5. Valve boxes located in other non-paved areas shall be left flush with finish grade unless otherwise specified.
6. Valves and boxes shall be set with the stem vertical and valve box vertically centered over the operating nut.
7. The valve box shall be supported during backfilling and maintained in vertical alignment with the top section flush with finished grade.

8. A concrete ring shall be placed around the top of each Valve Box, flush with finished grade, if designated by the Commission's Authorized Field Representative.

9. Install valve box and cover in accordance with **Valve Box Detail (W-08.0).**

6.2.21 Mechanical Joint Restraint for Ductile Iron Fittings (Retainer Glands)

1. Retainer glands shall be installed as specified for ductile iron mechanical joint fittings.

2. Once gland is made up in accordance with paragraph 1, proceed to tighten.

3. Twist lugs until each one is in contact with the pipe before completing tightening.

4. Tighten heads in a diametric pattern until all heads have twisted off the nut.

5. Retainer glands may be used in place of follower glands on cast iron mains but under no circumstances shall retainer gland lugs be tightened and broken off when installed on cast iron mains.

6.2.22 Bolt-Thru Mechanical Joint Restraint (Foster Adapter)

1. The bolt-thru mechanical joint restraint may be used on 4-inch through 24-inch diameter joints with approval from the Commission.

2. The bolt-thru mechanical joint restraint may be used to restrain the following:

   (a) Mechanical joint valves to mechanical joint tees and crosses

   (b) Mechanical joint reducers and other mechanical joint fittings to mechanical joint tees and crosses

   (c) Mechanical joint bends and other mechanical joint fittings to each other

3. The bolt-thru mechanical joint restraint may not fit on both the "branch" and the "run" of compact tees or crosses because longer bolts are required and may obstruct each other.

4. The bolt-thru mechanical joint restraint is not recommended for direct connection to hydrant shoes due to bolt clearance issues.

6.2.23 Grip Ring Pipe Retainer

1. Grip Ring Pie Retainer shall only be allowed with Commission approval.

2. Clean pipe to remove as much dirt and corrosion as possible from the surface.

3. Slide the gland, Grip Ring, and M.J. gasket on to pipe end. Make sure the tapered side of the Grip Ring faces the gland.
4. Insert the pipe end into the M.J. fitting.
5. Slide the gasket into the M.J. bell pocket as far as possible. The gland (and Grip Ring) may be used to tap the gasket into place if required.
6. Slide the Grip Ring up the pipe until its face is against the M.J. gasket.
7. Slide the gland up the pipe until it engages the Grip Ring.
8. Install T-bolts in the M.J. fitting and gland. Tighten hand tight.
9. Using a torque wrench, tighten the nuts to 75-90 ft-lb. Care must be taken to assure that the flanges of the gland and M.J. fitting remain parallel. This can be done by alternating side-to-side while tightening. Wait 10 minutes and re-torque.

6.2.24 Fire Hydrant Installation

1. All fire hydrants are to be installed on a minimum 6-inch water main branch.
2. Hydrants shall be located approximately every 300-feet to 400-feet, on the same side of the street as the water main, on a property line, and as approved by the local Fire Department.
3. Hydrants are not to be placed at the end of the main in a cul-de-sac, but rather at or before the point of curvature (PC).
4. Public hydrants are connected directly to public water mains.
5. Public water mains are only found in street right of ways or easements given to the Commission by the property owner.
6. Private hydrants within a site shall be installed so as to protect the public water supply per DEP requirements, Commission requirements and the local Fire Department requirements. The Applicant's engineer will contact the Commission's Engineering and Technical Services for each such installation.
7. The Applicant's engineer must provide information to the Commission and local Fire Department with flow and demand requirements and available flow.
8. Private hydrants are owned, operated, and maintained by the property owner. It is encouraged to work with the Fire Department for any private hydrants to be part of the hydrant certification process.

   (a) The Commission does not maintain, repair, or replace private hydrants.

(b) Private hydrants are required to be painted red with gray bonnets and nozzle caps.

9. No other connections are allowed onto a hydrant branch unless approved by the Commission and the local Fire Department.

10. All fire hydrants shall be installed with a mechanical joint (MJ) hydrant valve attached to a mechanical joint by anchor (swivel) tee off the water main in accordance with **Hydrant Details - Standard (W-07.0).**

    (a) Hydrant valves may be mechanically restrained to a mechanical joint by mechanical joint tee off the water main in accordance with **Hydrant Details – Alternate 1 (W-07.1)**. This method requires Commission approval.

    - A short piece ductile iron pipe, at least 18-inches long shall be mechanically restrained to both the MJ X MJ tee and hydrant valve.

    (b) Hydrant valves may be mechanically restrained to a mechanical joint by mechanical joint tee off the water main in accordance with **Hydrant Details – Alternate 2 (W-07.2)**. This method requires Commission approval.

    - A bolt through mechanical joint adapter shall be mechanically restrained to both the MJ X MJ tee and hydrant valve.

11. Hydrant shall be installed vertically plumb.

12. The front body of the hydrant shall be set a minimum of 2-feet behind the curb when the sidewalk is set back from curb. If the sidewalk meets the curb the hydrant may be placed 1-foot in front of the property line or in the sidewalk if handicap access is not restricted. Placement 1-foot from the property line and all other locations shall be approved by the Commission.

13. The American Disabilities Act (ADA) requires a minimum of 36-inches of clearance around hydrants within sidewalks.

14. All hydrants must be installed with breakaway coupling located at least 2-inches above the finished grade surrounding the hydrant and not more than 6-inches above the finished grade surrounding the hydrant.

15. All hydrant bases shall be installed on a 16-inch by 8-inch by 4-inch concrete block and in ½ of a cubic yard of 1-1/2-inch crushed stone (about 2-1/2-feet by 2-1/2-feet by 2-1/2- feet) to allow for free draining of the hydrant. Make sure the drain holes of the hydrant are not blocked.

16. The installed hydrants shall be disinfected according to Section 6.4 of these Guidelines and Policies.

17. Backfill around the hydrant from the ground surface to 1-foot above the top of the hydrant shoe shall be with select common borrow.

6.2.25 Fire Hydrant Relocation

1. All fire hydrants that are relocated shall be installed according Sections 6.2.13 and 6.2.24 of these Guidelines and Policies and the following:

   (a) Hydrant branches shall be mechanically restrained with retainer glands or friction clamps and threaded rods according to Section 6.2.11 of these Guidelines and Policies, unless otherwise approved by the Commission.

   (b) Intentionally left blank for future use

6.2.26 Fire Hydrants Replacement

1. All fire hydrants that are relocated shall be installed according Sections 6.2.13 and 6.2.24 of these Guidelines and Policies and the following:

   (a) Hydrant branches shall be mechanically restrained with retainer glands or friction clamps and threaded rods according to Section 6.2.11 of these Guidelines and Policies, unless otherwise approved by the Commission.

   (b) Intentionally left blank for future use

6.2.27 Fire Hydrant Operations

1. All hydrants shall be operated by Springfield Water and Sewer Commission employees or Springfield Fire Department. During Fire Flow Testing the Applicants personnel may operate a hydrant in accordance with this Section and Section 6.5 of the Guidelines and Policies.
2. Open the hydrant inspection program on the field computer and document hydrant asset information.
3. Visually inspect hydrant barrel and each section of hydrant using the hydrant inspection log as a guide; look for cracks on upper barrel, check the bottom, middle, top, front, back and both sides of hydrant. Also check nozzle caps, nozzle locks and threads. Remove caps and check threads. If threads are worn out and/or damaged, make note to have them replaced.
4. Visually inspect all bolts where upper and lower barrels are connected. If necessary, have any defective bolts replaced. For breakaway couplings, check for cracks and worn bolts or to see if the coupling is loose. Manually pull and push hydrant to check that it is secure. The Hydrant should not move.

5. Remove one cap, set up spigot with ball valve on nozzle and slowly flow hydrant to prevent water quality issues. Allow hydrant to flow until clear. Open and close hydrant valve to check for smooth easy operation.

6. Perform maintenance on all parts including grease caps and Zerk fittings, gaskets, etc.

7. If the hydrant requires additional work outside the scope of this inspection, check with the working foreman to assign additional work orders to the hydrant. In some cases, repair duties may be performed on the spot or submitted to other crews. The following are examples requiring follow up work orders:

8. Intentionally left blank for future use

6.2.28 Protective Coatings

1. Protective Primer

   (a) Wire brush and scrape the surface clean.

   (b) Apply protective primer by brush, rag, or hand (glove). A thin film of primer to a minimum thickness of 2 mils (.002-inch) will be sufficient.

   (c) On wet, cold or rusty surfaces, rub and press Protective Primer firmly onto these areas, displacing moisture and ensuring adhesion to the surface.

   (d) After application of the primer, Protective Coating Tape shall be applied immediately.

2. Protective Coating Tape

   (a) After application of the primer, Protective Coating Tape shall be applied immediately.

   (b) Protective Coating Tape shall be spirally wrapped around the fitting, valve, or other appurtenance and hand molded to conform to the shape of the surfaces being coated.

   (c) Protective Coating Tape shall be overlapped no less than 1-inch. When wet or other corrosive conditions exist, the overlap shall be 50% of the width.

   (d) While wrapping all air shall be pressed out of the tape by hand and a smooth seam shall be made.

   (e) After application of the Protective Coating Tape, Protective Coating Outer Wrap shall be applied immediately.

3. Protective Coating Outer Wrap

   (a) After application of the Protective Coating Tape, Protective Coating Outer Wrap shall be applied immediately.

   (b) Protective Coating Outer Wrap shall be spirally wrapped around the fitting, valve, or other appurtenance and hand molded with sufficient tension to conform to the shape of the surfaces being coated.

6.2.29 Backfill

1. Bank-run, Screened, and Structural Gravel Aggregate

   (a) The gravel aggregate shall be spread in layers of uniform thickness not exceeding 12-inch before compaction and moistened or allowed to dry as directed.

   (b) The gravel aggregate shall be thoroughly compacted by means of suitable power driven tampers or other power driven equipment.

   (c) Backfill shall be graded with the placement of suitable soil material, as determined by the Commission Representative, in 12-inch (maximum) layers compacted to 95% of the maximum density of the soil as determined by the Standard Proctor Test, AASHTO Designation T-99.

2. Sand

   (a) The sand shall be spread in layers of uniform thickness not exceeding 8-inch before compaction and moistened or left in natural state as directed.

   (b) The sand shall be thoroughly compacted by means of suitable power driven tampers or other power driven compaction equipment.

3. Common Borrow/Fill and Select Common Borrow/Fill

   (a) The common borrow and select common borrow fill shall be spread in layers of uniform thickness not exceeding12-inch before compaction and moistened or allowed to dry as directed.

   (b) The common borrow and select common borrow fill shall be graded with the placement of material, as determined by the Commission Representative.

   (c) The common borrow gravel shall be thoroughly compacted by means of suitable power driven tampers or other power driven equipment.

(d) The common borrow and select common borrow fill shall be compacted to 95% of the maximum density of the soil as determined by the Standard Proctor Test, AASHTO Designation T-99.

4. Excavatable Flowable Fill

   (a) The Commission's Authorized Field Representative shall approve all fill procedures prior to placing excavatable flowable fill.

   (b) All pipes, bends, fittings, and other appurtenances shall be secured prior to the delivery of the excavatable flowable fill.

   (c) A piece of 4-mil poly minimum shall be placed between all pipes, bends, fittings, and other appurtenances and excavatable flowable fill.

   (d) When possible excavatable flowable fill shall be placed on a bed of compacted gravel fill.

   (e) Excavatable flowable fill shall be furnished and placed in a fluid condition on the secured pipes, bends, fittings, and other appurtenances.

   (f) Excavatable flowable fill exposed surfaces shall be protected from premature drying, wash by rain or running water, wind, mechanical injury, and excessive hot or cold temperature.

5. Non-Excavatable Flowable Fill

   (a) The Commission's Authorized Field Representative shall approve all fill procedures prior to placing non-excavatable flowable fill.

   (b) All pipes, bends, fittings, and other appurtenances shall be secured prior to the delivery of the non-excavatable flowable fill.

   (c) A piece of 4-mil poly shall be placed between all pipes, bends, fittings, and other appurtenances and non-excavatable flowable fill.

   (d) When possible non-excavatable flowable fill shall be placed on a bed of compacted gravel fill.

   (e) Non-excavatable flowable fill shall be furnished and placed in a fluid condition on the secured pipes, bends, fittings, and other appurtenances.

   (f) Non-excavatable flowable fill exposed surfaces shall be protected from premature drying, wash by rain or running water, wind, mechanical injury, and excessive hot or cold temperature.

6. Concrete for Fill

   (a) The Commission's Authorized Field Representative shall approve all fill procedures prior to placing concrete for fill.

   (b) All pipes, bends, fittings, and other appurtenances shall be secured prior to the delivery of the concrete for fill.

   (c) A piece of 4-mil minimum poly shall be placed between all pipes, bends, fittings, and other appurtenances and concrete fill.

   (d) When possible concrete for fill shall be placed on a bed of compacted gravel fill.

   (e) Concrete for fill shall be furnished and placed in a fluid condition on the secured pipes, bends, fittings, and other appurtenances.

   (f) Concrete for fill, exposed surfaces, shall be protected from premature drying, wash by rain or running water, wind, mechanical injury, and excessive hot or cold temperature.

Section 6.3 Temporary Bypass Mains

6.3.1 General

1. Furnish all labor, materials, equipment and incidentals required to install and remove by-pass and temporary water pipe and fire hydrants of the sizes required to provide adequate service to all water consumers whose service will be interrupted by new water main installation and to fulfill fire service requirements.

2. The Commission's Construction Crew or Installer shall provide temporary water service to one and two family residences and to other water customers with small diameter services currently connected to mains to be shut off, in order to facilitate the work, by means of temporary hose connections.

3. The Commission's Construction Crew or Installer shall furnish all work and fittings and make all necessary connections required to supply the bypass pipes (including service) with water from hydrants or existing water mains. Procedures for connecting bypass pipes to existing water mains that are to remain in service are specified elsewhere in this section.

4. Typically, temporary water pipe is not allowed to be installed and/or in service from November 15 to April 15 to prevent freezing of water supply to Commission customers, unless otherwise approved by Engineering and Technical Services

(E&TS). The Commission's Construction Crew or Installer may submit a plan to E&TS as defined in Section 6.3.2 that includes freeze protection.

6.3.2 Installation

1. Temporary water pipe shall not be installed without the prior approval of Engineering and Technical Services (E&TS).

2. E&TS may prepare or shall approve a bypass plan and sequence of work as indicated below:

   (a) The plan shall be drawn on a clean set of project drawings or GIS plans. A sequence of work will be defined in a memo to the Commission's Construction Crew.

   - The plan shall address how pipe will be laid at catch basins, address how pipe will cross intersections, address how pipe will be laid at intersections to avoid contact with cars cutting turns sharply, provide the make and model of all valves to be utilized, provide the type of temporary water piping to be utilized, brass sampling tap locations and address pedestrian safety issues such as but not limited to the, American with Disabilities Act (ADA) compliance, and include a disinfection procedure as described herein.
   - The plan for temporary water pipe layout shall include 4-inch temporary water pipe on one side of the route and 2-inch temporary water pipe on the other side of the route.
   - If freeze protection is being proposed it shall include a minimum coverage of 3-feet of earth with a 6-inch straw layer over the earth over the pipe or other means to be approved by E&TS. No running water will be allowed as a means of freeze protection.

   (b) The plan by the Installer shall be drawn on a clean set of project drawings or other approved plans and include the bullet points in paragraph (a) above. A sequence of work will be defined in a memo to E&TS.

3. The bypass pipes shall be supplied from connections made to hydrants or existing water mains that are to remain in service as specified elsewhere in this section. Each bypass piping section shall have a minimum of two (2) connections, unless otherwise approved by E&TS.

4. Temporary water pipe typically is laid in gutters, but during road reconstruction may be moved to back of walk.

   (a) At street intersections, a straight line shall be cut in the existing bituminous paving and the temporary water pipe shall be laid in a shallow trench covered with temporary surfacing.

(b) At driveways, pipe crossings may either be provided by cold patch cover, a straight line shall be cut in the existing bituminous paving and the temporary water pipe shall be laid in a shallow trench covered with temporary surfacing or other approved method.

(c) At sidewalks, pipe crossings may either be provided by cold patch cover, a straight line shall be cut in the existing bituminous paving and the temporary water pipe shall be laid in a shallow trench covered with temporary surfacing or other approved method. ADA compliance shall be enforced.

5. Minimum ADA accessibility requires the following:

   (a) Typically, a 48-inch minimum width is required for new or temporary installations,

   (b) Curb ramps shall be firm, stable, and have a non-slip surface. Curb ramps should not warp or buckle and should be made of materials strong enough to support the weight of pedestrians as well as motorized scooters and wheelchairs. Ramps should also be color contrasting and contain marked edges, so they are noticeable by pedestrians who have visual impairments. Furthermore, ramps should also have free draining surfaces with a maximum cross slope of 2 percent. Note that the cross slope for midblock crosswalks can match the running slope of the roadway up to a maximum of 5 percent,

   (c) Curb ramp slope shall have a slope of 1:12 maximum for a rise of 6 inches,

   (d) Curb ramp slope shall have a slope of 1:8 maximum for a rise of 3 inches,

   (e) A slope steeper than 1:8 is not allowed, and

   (f) When a ramp is installed parallel to the curb, a 48 inch by 48 inch platform should be provided at curb level to allow pedestrians to turn 90 degrees before descending the ramp.

6. At E&TS's discretion, hose may be allowed to come around bends, to cross driveways, to connect temporary water mains to existing hydrants, or to connect temporary water mains to existing water services. All hose shall comply with NSF 61 standards. No kinks, excessive bends, or other restrictions shall be allowed to any hose used on the temporary water pipe, temporary hydrants, or temporary water services.

7. Sanitary precautions shall be satisfactory to E&TS and shall meet all requirements of the public health authorities having jurisdiction. The installation shall be watertight. Care shall be exercised throughout to avoid any possible pollution of mains, house services, or the temporary water pipe. The interior of temporary

water pipe, temporary hoses and any other connection pipe to convey water for potable use shall be flushed and disinfected prior to its use in accordance with AWWA C651 and in accordance with Section 6.4 of these Guidelines and Policies

8. All temporary pipes shall have valves installed that meet the approval of E&TS. A valve shall be provided at each hydrant connection and each tap hole connection. Main line valves shall be located no further than 500-feett apart when directed by the E&TS. Handles shall be removed from temporary hydrants. Main line temporary valves may require the handles be removed at the discretion of the SWSC.

9. Sample taps shall be furnished and installed on temporary water pipe in accordance with of these Guidelines and Policies.

10. Whether it is being installed, in service, or being removed, the amount of temporary water pipe kept on the job shall be the minimum that will allow the work to continue at a reasonable rate.

11. The Commission Construction Crew or Installer shall maintain the temporary water pipe during all emergencies on a 24 hour basis. The Installer shall provide the SWSC the name and phone number of their 24 hour emergency contact person. The 24 hour emergency contact person shall be located within 30 minutes traveling distance from the project site. The Installer's emergency staff shall have vehicles, equipment, tools, and parts to maintain the temporary water pipe if it is broken or out of service for any reason.

6.3.3 Temporary Connection to Existing Mains

1. At some locations, as directed or approved by the SWSC, it may be necessary to tap the existing water mains in order to supply the temporary water piping with water service.

2. The normal connection to an existing water main shall consist of a single 4-inch tap, with one (1) 4-inch hose feeding into a 4-inch temporary bypass pipe. A 4-inch valve shall be provided on the temporary water pipe near the taps.

3. An alternative connection to an existing water main may be allowed but requires approval E&TS and shall consist of a double 2-inch tap, with two 2-inch lines feeding into a 4-inch temporary bypass pipe. A 4-inch valve shall be provided on the temporary bypass pipe near the taps.

4. At locations, as approved or directed by E&TS, where connections for temporary water piping are to be made underground to the existing water mains with corporation stops or wet taps, the Commission Construction Crew or Installer shall make the necessary excavations at the locations and to the limits as necessary to

uncover the existing underground water lines and permit the installation of corporations stops or wet taps thereto. The Commission Construction Crew or Installer shall furnish and install a shutoff valve at the connection to the existing water line; connect the temporary water piping to the shutoff valve and, where directed by E&TS, backfill the excavation and install temporary bituminous pavement. When the need for the temporary water service has ceased, the Commission Construction Crew or Installer shall re-excavate, where necessary cap the corporation stop or wet tap; disconnect and remove the water piping, shutoff valve, backfill the excavations; and provide the gravel base course and temporary and permanent pavements over the excavated and disturbed areas in accordance with the requirements specified and as directed.

6.3.4 Temporary Fire Hydrants

1. Where fire hydrants are by-passed, the Commission Construction Crew or Installer shall furnish, install, maintain and remove temporary hydrants. The temporary hydrant shall be placed within 25 feet and on the same side of the street as the hydrant to be out of service, unless otherwise directed by E&TS. Each temporary hydrant shall be installed on a 4-inch bypass line, and shall consist of a 4-inch branch, 4-inch valve, two (2) 90-degre bends (installed vertically), one 45-degree bend (installed vertically down) and 4-1/2-inch National Standard Thread (NST) nozzle or a 4-inch by 2-1/2-inch tee and two 2.5-inch nozzles, if approved by E&TS, for fire hose attachment. Nozzles shall be threaded for cap and grooved for fire hose attachment, using National Standard Thread.

2. Temporary hydrants shall be staked to the ground with a 1-inch diameter steel rebar approximately 4-feet long. The rebar shall driven into the ground a minimum of 2-feet. The temporary hydrant shall be clamped to the remaining rebar with at least two (2) steel hose clamps. Blocking shall be provided to raise hydrants above curbs when required.

3. Temporary hydrants shall meet the approval of the SWSC and the Fire Department. They shall be set in such a manner that the Fire Department will have no difficulty making a connection with a fire hose, where they will cause the least obstruction to vehicular and pedestrian traffic, and where they will be least likely to be damaged. Before permanently shutting off the water main that is to be replaced, the Commission Construction Crew or Installer shall test all temporary hydrants and valves to be sure that they are in proper working order.

4. The same type of temporary hydrant shall be utilized throughout the project.

5. Once put into use, the temporary hydrants shall be maintained by the Commission Construction Crew or Installer until the existing hydrants and or new hydrants are restored to service.

6. Any existing hydrants that are out of service shall be "bagged" by the Commission Construction Crew or Installer and reported to the Fire Department as being out of service.

6.3.5 Temporary Water Service to Buildings

1. Temporary water service connections shall be made to the temporary water pipe with a tap of the appropriate size.

2. Temporary water service connections shall be made to sill cocks outside the buildings or to temporary connections at the meter inside the buildings, as may be required or directed.

3. The temporary hoses shall generally be laid up the side of driveways and shall be as inconspicuous as possible for their entire length.

4. In cases where access to the building water meter is not possible or where temporary service connection using hoses would not provide adequate supply capacity a temporary service connection shall be made to the existing service pipe in the street between the corporation cock at the main and the curb stop, or in the sidewalk area between the curb stop and the service shut off valves inside the building.

5. The Commission Construction Crew or Installer with the SWSC present shall connect each home to be out of service during water main replacement to the 2-inch or 4-inch temporary water piping after approval of the temporary piping for service by SWSC.

6. Commission Construction Crew or Installer shall flush and disinfect each individual temporary water service per SWSC's Guidelines and Policies (separately bound).

6.3.6 Temporary Bypass System Sequence and Requirements

1. Commission Construction Crew or Installer shall connect onto the 4-1/2-inch pumper connections on existing and new hydrants at locations shown on the bypass plan.

2. Commission Construction Crew or Installer shall install temporary hydrants after each connection to new hydrants or existing hydrant used as part of the temporary bypass system.

3. Commission Construction Crew or Installer shall install a 4-inch valve after each temporary hydrant.
4. Commission Construction Crew or Installer shall install temporary bypass piping, valves and fittings at the locations shown on the Contract Drawings and in accordance with the Contract Documents.
5. Commission Construction Crew or Installer shall bury 2-inch temporary water piping and any temporary building service piping at all road crossings in a trench at least 12-inches deep and in a 4-inch sleeve or method as approved by Engineer.
6. Commission Construction Crew or Installer may utilize asphalt ramps for 2-inch by-pass at driveways but shall bury 2-inch by-pass if deemed necessary by the SWSC at driveways to allow the homeowner to enter and leave the driveway without damaging vehicle or by-pass piping.
7. Commission Construction Crew or Installer shall bury 4-inch by-pass at all road crossings in a trench at least 12-inches deep and in a 6-inch sleeve or other method as approved method by the Engineer.
8. Commission Construction Crew or Installer shall bury 4-inch by-pass at all driveways as required to allow the homeowner to enter and leave the driveway without damaging vehicle or by-pass piping.
9. Commission Construction Crew or Installer shall provide a minimum 2-inch valves and/or taps as required to flush the temporary bypass piping, unless otherwise approved by E&TS.
10. Commission Construction Crew or Installer shall flush and disinfect entire by-pass system before connecting individual water in accordance with Section 6.4 of these Guidelines and Policies.
11. Commission Construction Crew or Installer shall provide all material (including, but not limited to pipe, valves, and fittings), labor, and equipment to perform above.
12. SWSC to provide bacteria sampling service.
13. The Commission Construction Crew or Installer shall connect, flush, and disinfect each individual temporary water service to each home to be out of service as described above.
14. The Commission Construction Crew or Installer shall maintain temporary water piping at all time. The Commission Construction Crew or Installer shall provide to the SWSC, the local DPW, local police department, and the local fire

department a 24-hour contact person with cell phone number that can be available within 60-minutes of a pipe break or other safety issue.

15. Upon completion of the new replacement water main and services, the Commission Construction Crew or Installer shall remove all temporary water piping and restore site to original condition.

Section 6.4 Filling, Leakage testing, Disinfection, and Bacteria Testing of Water Mains

6.4.1 General

All water mains and temporary water mains before being put into service shall be filled and leak tested in accordance with the latest version of AWWA standard C-600, and flushed, disinfected, and bacteria tested in accordance with the latest version of AWWA standard C-651 and the following:

6.4.2 Filling of Pipe:

1. The new main or repaired main must always be separated from the active water system until the Filling, Pressure and Leak Test, Flushing, Disinfecting, and Testing is completed and approved.
2. The supply main, to which the new or repaired mains will obtain its fill water, will be flushed for 15 minutes prior to filling under the direction and upon approval of the Commission.
3. The fill water shall come from a potable source in one direction at a slow rate equivalent to a valve cracked open. In any event the maximum number of turns on any valve shall be five (5) ½-turns.
4. The pipe that is to be filled with water shall have all air expelled from the water main through hydrants, air valve assemblies located at the high points, services and blow-offs, located at the end of water mains. If temporary air corporations are installed by Commission's Construction Crew or Installer, they shall be capped with a threaded brass cap upon the successful completion of the pressure test.
5. All temporary air corporations used for flushing shall have a Commission style flushing device temporarily installed on it according to the Flushing Section of these Guidelines and Policies.
6. Once the new main or repaired main is filled with water see the Pressure and Leakage Section of this document.
7. Once the new main or repaired main passes the pressure and leakage tests see the Disinfection Section of this document.
8. Once disinfection has been achieved, see the Flushing Section of this document.

6.4.3 Pressure and Leakage Testing

1. All water mains and fire services shall be subjected to pressure and leakage testing in accordance with the latest version of AWWA standard C-600. Allowable

leakage for each section of water main tested shall be compared against the table attached at the end of this section in order to determine the acceptability of the test.

2. At a minimum the leak test shall be for two (2) hours at either 150-PSI or 1-1/2 times the working or static pressure, whichever is greater.

3. The Owner, Owner's authorized representative, the Commission Approved Contractor, or the Commission's designee shall hire a testing company who is acceptable to Commission to complete the required pressure and leakage test. The tester shall submit certified leakage testing results in writing to Commission for each section of main tested. The tester shall be approved by Commission prior to initiating the pressure test. Commission shall be notified a minimum of 24 hours in advance prior to any pressure and leakage testing. **Pressure and leakage testing must be completed in the presence of a Commission Authorized Field Representative unless otherwise arranged.**

4. If a section of main fails pressure and leakage testing, the Commission's Construction Crew or Installer shall locate, uncover, and repair or replace the defective section of pipe, fitting, valve or joint at no additional expense to Commission. The Commission's Construction Crew's or Installer's tester shall then conduct additional pressure and leakage testing until satisfactory test results are achieved.

5. Table for Allowable Leakage per 1000 ft. of Pipeline in gallons per hour*

Average Test Pressure (in PSI)	NOMINAL PIPE DIAMETER (in inches)																
	3	4	6	8	10	12	14	16	18	24	30	36	42	48	54	60	64
450	0.48	0.64	0.96	1.27	1.59	1.91	2.23	2.55	2.87	3.82	4.78	5.73	6.69	7.64	8.60	9.56	10.19
400	0.45	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.60	4.50	5.41	6.31	7.21	8.11	9.01	9.61
350	0.42	0.56	0.84	1.12	1.40	1.69	1.97	2.25	2.53	3.37	4.21	5.06	5.90	6.74	7.58	8.43	8.99
300	0.39	0.52	0.78	1.04	1.30	1.56	1.82	2.08	2.34	3.12	3.90	4.68	5.46	6.24	7.02	7.80	8.32
275	0.37	0.50	0.75	1.00	1.24	1.49	1.74	1.99	2.24	2.99	3.73	4.48	5.23	5.98	6.72	7.47	7.97
250	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90	2.14	2.85	3.56	4.27	4.99	5.70	6.41	7.12	7.60
225	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.70	3.38	4.05	4.73	5.41	6.08	6.76	7.21
200	0.32	0.42	0.64	0.85	1.06	1.27	1.49	1.70	1.91	2.55	3.19	3.82	4.46	5.10	5.73	6.37	6.80
175	0.30	0.40	0.60	0.79	0.99	1.19	1.39	1.59	1.79	2.38	2.98	3.58	4.17	4.77	5.36	5.96	6.36
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	2.21	2.76	3.31	3.86	4.41	4.97	5.52	5.88
125	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	2.01	2.52	3.02	3.53	4.03	4.53	5.04	5.37
100	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.80	2.25	2.70	3.15	3.60	4.05	4.50	4.80

* If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

6.4.4 Flushing

1. The Commission's Construction Crew or Installer shall conduct flushing operations using methods and procedures conforming to AWWA C651.
2. The Commission's Construction Crew or Installer shall flush the water main under the direction of Commission's Authorized Field Representative.
3. The Commission's Construction Crew or Installer shall notify all customers affected by the flushing 24-hours in advance of any flushing operation.
4. Flushing may be required during the late evening hours if it is determined that flushing will result in off colored water to the Commission's existing customers.
5. All flushing must be done using fire hydrants, air valve assemblies, Air Corporation, or end caps through a Commission approved flushing device.
6. The flushing device should be made up in accordance with the **Flushing Device Detail (W-10),** unless another method to flush the water main or water service is approved by the Commission. Flushing devices may be provided by the Installer or rented from the Commission beginning July 1, 2008, at rates as set forth in the Commission's Rules and Regulations.
7. The flushing device shall be made up of the following components:

   (a) The flushing devices shall be either 1-inch or 2-inch, whichever is required by the Commission.

   (b) All components shall be brass and/or k-type copper.

   (c) All threaded joints shall be assembled with Teflon tape sealant.

   (d) The flushing device shall have a copper tube or brass riser/connector from the fire hydrant, air valve assembly, air-corporation, or end cap. The riser shall be 1-inch or 2-inch diameter.

   (e) The riser shall connect to the brass tee with a brass copper tube service quick joint inlet by male iron pipe thread outlet. The tee shall be 1-inch or 2-inch diameter.

   (f) One side of the tee shall be bushed down to ¾-inch with a brass bushing. This side of the tee shall be used for water quality sampling.

   (g) A ¾-inch nip shall be used to connect a ¾-inch by ½-inch brass reducer.

   (h) A ½-inch, chrome plated, and without threads brass globe spigot, shall be installed onto the reducer. Be sure the spigot is always pointing down.

(i) On the other side of the tee, which shall be used for flushing, it shall be either bushed down to ¾-inch or left at 2-inches.

(j) A ¾-inch or 2-inch brass ball valve shall be installed onto the ¾-inch bushing or 2-inch brass nip.

(k) A ¾-inch or 2-inch brass nip shall be installed onto the ¾-inch or 2-inch brass ball valve.

(l) A ¾-inch brass vacuum breaker with hose thread shall be installed onto the ¾-inch brass nip or a 2-inch Commission approved check valve shall be installed onto the 2-inch nip.

- A check valve may be installed in place of the vacuum breaker.

(m) Proper support of the flushing device shall be provided.

8. Water that is flushed to the street or sewer must be collected in a controlled manner and not find access to nearby natural waterways. Hoses hooked up to hydrants to facilitate flushing and the control of drainage shall not be submerged or laid flat on the ground but must be air gapped at the discharge end.

9. The following is the approved procedure for flushing pipe.

(a) The discharge hose shall be equivalent in diameter or greater to the discharge opening.

(b) The allowed flushing time in minutes for 500 feet of up to 8-inch pipe using a fire hydrant (preferred) or end cap with 2-inch or larger opening shall be as follows:

- All flushing must follow flushing time requirements.
- A wide-open flush (greater than to 250 gallons per minute) shall be a minimum of 15 minutes (a diffuser must be in place prior to beginning the flush).
- A low flow flush (up to 250 gallons per minute) shall be a minimum of 30 minutes (a diffuser must be in place prior to beginning the flush).
- Flushing may not extend for longer periods of time unchecked.
- Contact the Water Quality Manager or the Commission's Engineering and Technical Services for assistance with flushing time requirements.

(c) After each period of flushing, a decision must be made to stop or continue for another designated period.

(d) Disposal of water from the flushing of new mains must be pre-approved by the Commission.

- All newly installed hydrants shall also be flushed at this time.
- In most instances, a discharge of chlorinated water into a sewer main is acceptable provided a sewer manhole is available. If a catch basin, that is part of the Combined System, is available discharge of chlorinated water may be allowed.
- The sewer inlets or allowed catch basins to which the chlorinated water will be flushed must be identified and pre-approved for use.
- If a sewer main is not available, then de-chlorination of the discharge of chlorinated water must be in accordance with AWWA standard C651 prior to discharge.

10. By Commission's Construction Crew:

(a) A Commission owned water meter and back flow preventer shall be installed on the fire hydrants, air valve assemblies, air corps, or end caps.

(b) The begin reading and end reading shall be recorded and submitted to the Customer Service office of the Commission.

11. By Installer:

(a) An Installer owned water meter or Commission owned that is rented from the Commission by the Installer, that reads in gallons and back flow preventer shall be installed on the fire hydrants, air valve assemblies, air corps, or end caps.

(b) The begin reading and end reading shall be recorded and submitted to the Customer Service office of the Commission.

12. When flushing and scouring the pipe of debris, in the event the main became contaminated, cannot be done from a hydrant or any smaller hookup. Flushing to remove contamination must involve installing a blow-off at least 2/3 the size of the pipe being flushed.

13. All residual from the flushing must be cleaned up after the flushing process is complete.

6.4.5 Disinfection – General:

1. The Commission's Construction Crew or Installer shall conduct disinfection operations using methods and procedures conforming to AWWA Standard C651.

2. Methods for the disinfection of pipe must be pre-approved by the Commission.

   (a) The continuous feed method shall be used to disinfect new water main installations.

   (b) The tablet method may be allowed to disinfect new water mains but shall be approved by the Commission.

   (c) The slug method may be allowed to disinfect new water mains but shall be approved by the Commission.

   (d) The swab method shall be used to disinfect repairs, replacement of valves, fittings, and/or hydrants.

   (e) Any other method to disinfect new or repaired/replaced water mains shall be submitted to the Commission for review and approval prior to being used.

3. A free chlorine residual of at least 25-mg/L (ppm) must be established throughout the newly installed main prior to waiting 24-hours. The free chlorine residual of at least 25-mg/l (ppm) must be maintained for at least 24 hours.

4. Generally, flushing and sampling locations are located at the end of new main installations.

   - At least one sampling location should be at the beginning of the new installation.
   - Any new tie in longer than one pipe length requires at least one sampling location at the end of the new tie in.
   - Every 500-feet of the new main installation requires a least one sampling location.

5. Failure of the newly constructed main to meet the Commission's requirements for cleanliness and water quality could require flushing of the system, disinfection of the system, removal of system components, or other action as deemed necessary by the Commission to guarantee the protection of the existing drinking water system.

6. All costs associated with filling, pressure and leakage testing, flushing, and disinfecting the water main shall be borne by the Installer.

6.4.6 Disinfection – Continuous Feed Method:

7. This procedure for disinfection requires that the below amount of water be chlorinated outside the new water main, such as in a water truck, and then pumped into the main to displace the existing water in the main.

Gallons of Chlorine Water Required to Fill 100 Feet of Pipe With 25 ppm of Chlorine According to Diameter of Pipe			
		Add the following amount of chlorine to the water:	
Pipe Diameter (Inches)	Water in Pipe (Gallons)	5%Chlorine Solution	1%Chlorine Solution
6	150	1 cup	1-½ quarts
8	260	1 pint	2-½ quarts
12	590	1-½ quarts	1-½ gallons
16	920	2 quarts	2-½ gallons

8. Making Chlorine Solutions:

   (a) With HTH Granular Calcium Hypochlorite: add 1 pound of calcium hypochlorite to every 8-gallons of water to make a 1% solution.

   (b) With liquid Sodium Hypochlorite: dilute according to the percent available chlorine on the container.

   (c) For example, a 20% available chlorine solution would require 1 gallon in 19 gallons of water to get a 1% chlorine solution.

9. The chlorine water is fed in through a corporation near the valve for the supply.

10. The valve(s) connecting the new pipe to the existing system must be closed completely.

11. At the other end of the main, or at several ends, water is flushed at a low rate to allow the existing water to be displaced with the chlorine water.

12. It is good practice to test for chlorine at these flushing points to confirm that highly chlorinated water has made it through to all ends before the main is shut down.

13. This chlorinated water will then be allowed to sit inside the main for at least 24 hours before it is flushed out according to the Flushing section of this document.

14. Testing at the sampling location at the end of the main will be done until the flushed water contains at least 25 mg/L of chlorine (which could require increasing the injection rate of chlorine).

15. Once the proper amount of chlorine is produced all other sampling locations that were installed for the sanitary release must be flushed until chlorine is also

detected at these points (flush one point at a time while maintaining chlorine injection).

16. When all sampling points have a proper level of chlorine, the main is shut down and the chlorine injection stopped.

17. This chlorinated water will then be allowed to sit inside the main for at least 24 hours before it is flushed out according to the Flushing section of this document.

6.4.7 Disinfection – Tablet Method

1. This procedure for disinfection is the application to each pipe length (see table) of an approved calcium hypochlorite tablet(s) using approved adhesives. The Commission approves the use of 5-7-gram calcium hypochlorite tablets (approximately 65% available chlorine by weight or 3.25-4.55 grams of available chlorine per tablet). These tablets shall be affixed using approved adhesive (Permatex Form A-Gasket No. 2 or Permatex Clear RTV Silicone Adhesive Sealant) to the top of each pipe length, internally. Marking of the pipe externally is a good practice to identify the locations of the tablets so that the pipe is installed correctly.

2. One chlorine tablet shall be placed in each fire hydrant branch.

3. Minimum Number of Tablets for Each Pipe Length (18-20 feet) to obtain a 25 mg/L dose of Chlorine shall be as follows:

Pipe Diameter (in inches)	Number of Tablets per Pipe Length (in inches)
6	1
8	2
10	3
12	4
16	6
24	8

4. All tie-in pipe and fittings must be swabbed or sprayed with 1-5% or greater bleach solution immediately before installation but after inspection for internal cleanliness.

5. Free Chlorine Residual Sampling Procedure:

   (a) The Commission's Authorized Field Representative shall take an, initial free chlorine residual test immediately following the filling procedure or the tablet disinfection procedure. The initial free chlorine residual shall exceed 25 mg/L (Parts per Million (PPM)) at this time.

   (b) The chlorinated water shall set in the main for 24 hours.

   (c) At the end of the 24-hour period, a free chlorine residual shall be taken by the Commission's Authorized Field Representative from the main and it must exceed 10 mg/L (PPM) of free chlorine residual.

   (d) If sufficient free chlorine is detected by the Commission's Authorized Field Representative, then the main will be considered ready for bacteria testing because the chlorine demand has been met.

   (e) The chlorinated water shall be flushed from the main upon completion of the chlorination process and a bacteriological sample shall be taken from the main once the chlorine residual of the water being discharged from the main has dropped below 1.5 PPM.

   (f) If sufficient free chlorine is not detected by the Commission's Authorized Field Representative, then the main will be considered to have failed without testing. Re-chlorination shall be required.

6. After the flushing and disinfection of the new main, the water in the new main must sit without movement for at least 24 hours and there must result no negative impact on the water's quality as tested and determined by the Commission.

7. The Commission's Construction Crew or Installer must provide approved sampling access to the new main for the testing of the water. New mains exceeding 500 feet or tie-ins exceeding 50 feet in length must have multiple sampling locations.

8. Re-chlorination or additional disinfection requires the following the procedures set forth in the Disinfection – Chlorinated Water Supply Section of this document.

9. After the new main has been approved, the water main shall be flushed by approved means before installing the service connections. Refer to the procedures as set forth in Flushing Section of this document.

10. If the water main has been approved but has not been put into service for more than one week then the main shall be flushed weekly using approved means. Refer to the procedures as set forth in Flushing Section of this document.

6.4.8 Disinfection – Swab method

1. This procedure for disinfection is used when existing mains are dewatered and cut open for a repair.

2. If the trench cannot be dewatered, then liberal quantities of 1% solution of water and sodium hypochlorite (bleach) shall be applied to the trench areas.

3. The existing pipe shall be cleaned and swabbed or sprayed with bleach prior to the repair piece being put into place.

4. The repair piece and repair couplings shall be cleaned and swabbed or sprayed with bleach prior to the repair piece being put into place.

5. The Commission's Construction Crew or Installer shall flush the main as described in this section and/or until discolored water is eliminated.

6. The Commission's Construction Crew shall put the main into service.

6.4.9 Disinfection of Water Service Pipes and By-Pass Hoses

1. Disinfection of Water Service Pipes and Bypass Hoses provides an as needed method for disinfection of Water Services and a mandatory method for disinfection of By-Pass Hoses before being placed in service. The Commission shall determine when a Water Service Pipe shall be disinfected.

2. The intent is to provide a methodology and a minimum essential standard for disinfection of water services, 2-inches and smaller, that are new, replaced, or repaired and hoses used for By-Pass Connections and house tie-overs. This is an as needed procedure that may be used before any copper tube water service pipe is placed in service. This mandatory procedure shall be used before any hose is placed in service. This applies to any work of any nature being performed within the Commission's Water Transmission or Distribution System.

3. When work on the job has proceeded to the point that all joints have been made, the service shall be flushed at full open until the water runs clear for a minimum of one (1) minute. The water meter must be removed during this flushing operation. The use of a discharge hose is normally necessary.

4. Close the meter valve in the cellar. Close the curb stop at the main, Open the joint on the outlet side of the curb stop at the main. Pour the chlorine and water solution into the tubing that has been prepared according to the Chlorine Disinfection Table that follows.

5. Add the amount of Household Bleach as indicated by the size and length of service to one (1) gallon of water. Strength will be approximately 300 mg/l or 300 PPM.

6. Water Service Pipe Chlorine Disinfection Table

Diameter of Copper Tube Pipe	Approximate Length of Water Service			
	30FT.	**60FT.**	**90FT.**	**120FT.**
¾"	1 oz.	1 ½ oz.	2 ¼ oz.	3 oz.
1"	1 ½ oz.	2 ½ oz.	4 oz.	5 oz.
1 ¼"	2 oz.	4 oz.	6 oz.	8 oz.
1 ½"	3 oz.	5 ½ oz.	8 ½ oz.	11 oz.
2"	15 oz.	30 oz.	45 oz.	60 oz.

7. Remake the connection. With the cellar valve closed, open the curb stop at the main. Open the Cellar valve just enough to get a stream the size of a pencil lead (less than 1/8 of an inch) flow. Let this run until the water smells of chlorine. Shut the cellar valve and wait 15 minutes. After 15 minutes flush very slowly open until all chlorine has been removed.

8. At the conclusion of the disinfection process, pressure test at existing main pipe pressure. After inspecting the joint(s) and eliminating any observed leaks, backfilling may proceed.

9. **IMPORTANT REMINDER**: The most important and most basic factor to ensure that water of the highest quality is provided is to avoid contamination. This is accomplished by using good construction practices, which includes preventing dirt, water, and other contaminating materials from entering the service pipe.

6.4.10 Disinfection of By-Pass Hoses

1. Using the same principles of Service Disinfection above By-Pass hoses are also disinfected. A hose is flushed, dosed, filled, slowly flowed (1/8-inch) and then flushed clear.

2. Storage time and location may require an increase in dose rate and/or slow flow rate.

3. Hoses used for House tie-overs must be disinfected in the same manner as By-Pass Hoses.

6.4.11 Testing of the Water in the New or Repaired Main:

1. The Commission's Authorized Field Representative will communicate with the Commission lab for sampling arrangements needed to obtain all test results.

2. A representative of the Commission's lab will meet the Commission's Authorized Field Representative and Commission's Construction Crew or Installer at the scheduled times and places for sampling of the mains.

3. Primary water quality tests and secondary water quality tests shall be performed by the Commission prior to any Bacteria Samples being taken by the Commission. The Installer shall notify the Commission 24-hours in advance of the chlorine being flushed out of the main.

   (a) The Commission will perform the primary water quality test for chlorine residual and chlorine demand. The free chlorine residual shall be equal to or greater than 0.03 mg/L, unless otherwise approved by the Commission. The chlorine demand shall be essentially satisfied by free chlorine residuals taken over a two (2) hour period.

   (b) The Commission will perform the secondary water quality test for pH and turbidity. The pH shall be less than 9.0 units, unless otherwise approved by the Commission. The turbidity shall be less than 4.0 NTU, unless otherwise approved by the Commission. (All flushing protocols require continued flushing until turbidity values are below 4.0 NTU).

(c) Two (2) primary and two (2) secondary water quality tests will be run by Commission at no cost to the Contractor any additional tests required shall be at the Contractor's expense and at the amount established in the Commission's Rules and Regulations for Water / Sewer Pipe Inspection.

(d) Additional testing by the Commission as a result, of unacceptable water quality in the new main or repaired main, may incur monetary penalties as listed in the Commission's Rules & Regulations.

4. No Bacteria samples will be taken until the primary and secondary water quality tests have met the limits set forth above.

5. Bacteria Samples from the disinfected main will be taken by Commission and will be run through the Commission lab. If a sample does not pass then the Installer shall perform additional flushing and disinfection operations until such time as a good bacteria test is achieved. Additional flushing and disinfection operations shall be run at the Installer's expense.

   (a) Two (2) bacteriological tests will be run by Commission at no cost to the Installer any additional tests required shall be at the Installer's expense and at the amount established in the Commission's Rules and Regulations for Water / Sewer Pipe Inspection.

   (b) Additional testing by the Commission because of unacceptable water quality in the new main or repaired main, may incur monetary penalties as listed in the Commission's Rules & Regulations.

6. The Commission's Construction Crew or Installer shall supply suitable sampling taps at the end of the disinfected water main for the purpose of bacteriological testing. The Owner, Owner's authorized representative, Commission Approved Contractor, or Commission's designee shall cap these taps with a brass cap upon successful completion of the main disinfection.

7. The Commission's Construction Crew or Installer shall make provisions for the sampling. This involves making a copper tube connection to a corporation for every 500 feet, at most, of new pipe (including significant branches) from the source of supply water or as the Commission's Authorized Field Representative allows. A sampling access point shall also exist within 2 feet of the end of the main and at the end of all tie-ins exceeding 50 feet in length. These copper sampling lines shall extend out of the trench to ground level, shall be briefly pre-flushed with chlorine solution (household bleach) and main water, and there will be no water in the trench at the level of the ferrule connection.

8. It is at the discretion of the Springfield Water and Sewer Commission to decide what water quality testing will be done to approve the new water main for release. The water quality must meet all federal, state and Commission standards for water quality.

9. The Commission Representative will inform the Commission's Construction Crew or Installer if the bacterial testing has passed or failed.

6.4.12 What to do when Testing Fails:

1. Re-chlorination or additional disinfection requires loading the whole of the interior of the new water main and fittings with at least 25 ppm of free chlorine.

2. The water main shall sit stagnant for at least 24 hours.

3. The water main shall be flushed according to the Flushing Section.

4. The water main shall be left stagnant for at least 24 hours, and the testing of the water again for approval.

6.4.13 Who to Call with Questions:

For questions relating to filling, flushing, and disinfecting water mains, and other water quality related issues call the Water Quality Manager at the Commission's Customer Service number 413-310-3500.

Section 6.5 Fire Flow Testing Procedures

6.5.1 General

1. The Commission does not perform Fire Flow Tests for private Persons nor provide Fire Flow Test data to private Persons.

2. Private Persons shall apply for a Fire Flow Test(s) in accordance with the Commission's Rules and Regulations and Section 4.1 of the Guidelines and Policies.

3. Commission staff shall be present and observe Fire Flow Test(s).

4. Applicant shall provide their own personnel and equipment, including equipment as specified in these Guidelines and Policies, for each Fire Flow Test(s) to be performed. The Applicant's personnel shall operate the hydrants and observe and record the Fire Flow Test(s) results.

5. The Applicant is responsible for any damage caused to the hydrant and/or property that water is discharged on to.

6. The Commission will notify Customers at least 24-hours in advance of the scheduled Fire Flow Test. Customers to be notified shall be located along the length of the Fire Flow Test and at least 500-feet beyond the test on each side.

6.5.2 Office Planning Prior to Fire Flow Testing

1. Prior to performing the Fire Flow Test(s) the Applicant shall review the Commission distribution map(s) to determine which hydrants will be used to measure flow and which will be used to measure static and residual pressure. It is best to use hydrants that are at the same elevation or measure the differences in elevation in the field. The Fire Flow Test(s) usually involves two (2) fire hydrants. The first one is called the static and residual hydrant. The second one is called the flow hydrant.

2. Review, if available, previous Fire Flow Test data to estimate the flow and pressure that may be expected.

6.5.3 Field Fire Flow Test Procedures

1. In order to obtain valuable flow test data, flow and pressure readings need to be taken accurately and all necessary data recorded. Calibrated gauges are required and shall be checked regularly and recalibrated as necessary. Preprinted Fire Flow Test Form(s), attached in Section 15.1.9 of these Guidelines and Policies, are to be used to record the following information:

   (a) Date, time of day, temperature, weather, and work order number,

   (b) Static and residual hydrant number, manufacturer and model, street name, location, and main size,

   (c) Static reading at the static and residual hydrant,

   (d) Residual reading at the static and residual hydrant

   (e) Flow hydrant number, manufacturer and model, street name, location, and main size,

   (f) Pitot and/or residual pressure reading at the flow hydrant,

   (g) Total Flow in gallons per minute (GPM) during test, estimated flow available in GPM at 20-PSI, length of time of flow in minutes, and total gallons flowed, and

   (h) Name of observer(s) and Commission Inspector(s).

2. Prior to beginning the Fire Flow Test, notify Customer Service that a Fire Flow Test is going to take place. Provide Customer Service with a location such as, an address or intersection and estimated duration of the Fire Flow Test(s).

3. Make sure provisions are made for minimizing interruption of traffic and for adequate drainage of water.

4. Locate the static and residual hydrant and do the following:

   (a) Remove one of the 2-1/2-inch hydrant nozzle caps and open the hydrant slowly to the full open position to flush sediment out of the hydrant that could damage the gauge.

   (b) When the flush water has cleared slowly close the hydrant and install a 2-1/2-inch hydrant nozzle cap equipped with a pressure gauge and air bleed valve.

   (c) Slowly open the hydrant allowing water under pressure into the hydrant. Open the bleed valve until a steady stream of water is discharged and no air is present.

   (d) Close the bleed valve and wait a minute or two until the pressure gauge has stabilized and read the gauge.

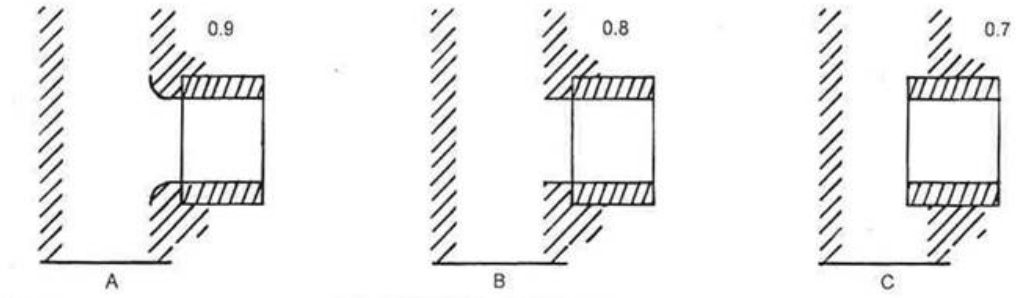
   (e) This pressure reading is referred to as the static pressure. This represents the water pressure in the water main as measured at the elevation of the hydrant outlet. Record this reading on the Fire Flow Test Form.

5. Locate the flow hydrant(s) and do the following:

   (a) Remove one of the 2-1/2-inch hydrant nozzle caps and measure the inside diameter to the nearest 1/16-inch. Typically, hydrants within the Commission's distribution system have a 2-1/2-inch inside diameter, but should be measured for each fire flow test.

(b) Determine the outlet nozzle coefficient (C).

- C = 0.9 when the outlet nozzle is smooth and well rounded, A below
- C = 0.8 when the outlet nozzle is square and sharp, B below
- C = 0.7 when the outlet nozzle is square, sharp and projecting into the barrel, C below
- Outlet nozzle Coefficients:



- Typically, new hydrants in the Commission distribution system have smooth and well rounded out let nozzles with a C = 0.9, but older hydrants need to be checked.

(c) If a pitot gauge is not going to be used or back-up flow data is required install a 2-1/2-inch hydrant nozzle cap equipped with a pressure gauge on the 2-1/2-inch nozzle not going to be used to flow water.

6. Conduct the Fire Flow Test as follows:

(a) Station one (1) observer at the static and residual hydrant and one (1) observer at each hydrant to be flowed.

(b) Open each flow hydrant slowly to the fully open position to create a steady flow of water from the outlet. Open one (1) hydrant at a time to avoid a pressure surge. In some cases, the resulting horizontal water flow from the hydrant(s) may be sufficiently disruptive to justify street closures.

(c) When pressure at the static and residual hydrant has stabilized the observer signals the observer(s) at the flow hydrant(s) to take the readings. The pressure reading at the static and residual hydrant is taken the same time as the reading at the flow hydrant. The pressure reading at the static and residual hydrant while the flow hydrant(s) is discharging is called the residual pressure. The residual pressure records both the domestic and fire flows occurring in the water main.

(d) A pressure gauge installed on a pitot tube (pitot tube) is used to measure the velocity pressure of the stream discharging from the hydrant. All the air should be exhausted from the discharge before a pitot reading is taken. For an accurate pitot reading the pitot tube must be held in the center of the nozzle, with the axis of the pitot tube parallel to the direction of flow. The pitot tube should be held away from the end of the nozzle at a distance of about half the nozzle diameter (for a 2-1/2-inch nozzle about 1-1/4-inches).

(e) The pressure gauge installed on the unused nozzle will provide a pressure reading similar to the pitot tube reading, but typically the flow results are more conservative.

(f) Record the both the pitot tube reading (and/or the pressure gauge reading on the second nozzle) and the residual pressure reading at the static and residual hydrant on the Fire Flow Test Form.

7. Shut down the Fire Flow Test and observe the following:

(a) The final step in the flow test involves shutting down the flow hydrant(s) slowly and taking another static pressure reading as a check on the previous reading.

(b) The two readings must be similar. There are good reasons to double-check the static pressure. If the second static pressure reading falls very far below the first one recorded, it's possible that a water main broke during the test. Contact Customer Service at 413-787-6207 and report the low pressure and possible main break.

(c) For reasonably accurate results the pressure drop between the static and residual pressures should at least 10- pounds per square inch (PSI). If the piping system is strong and the pressure drop is less than 10-PSI an additional flow hydrant should be added to the test and another fire flow test should be performed.

(d) It is best for the observers to calculate the Fire Flow Test Results in the field, so that if results appear to be in error, the test can be repeated immediately.

(e) To calculate Flow in gallons per minute (GPM) "Q" use the following equation, where the pitot pressure reading in PSI is "P", the hydrant nozzle diameter in inches is "D" and the hydrant coefficient is "C":

- $Q = 29.83*C*D^2*\sqrt{P}$
- Also see Fire Flow Discharge Tables attached in Sections 15.1.10, 15.1.11, and 15.1.12 of these Guidelines and Policies.

(f) To calculate the Available Flow at 20-PSI in GPM "Q-20" use the following equation, where the sum of the actual flow(s) in GPM is "Q" from the previous equation for each flow hydrant, the static pressure in PSI is "S", the residual pressure in PSI is "R":

- Q-20 = Q*((S-20)^.54/(S-R)^.54)
- Also see Values for Pressure to the .54 Power Table attached in Section 15.1.13 of these Guidelines and Policies.

8. Cautions to observe during Fire Flow Testing are as follows:

(a) Opening a hydrant rapidly can cause a negative pressure fluctuation. Hydrants should be opened slowly until fully opened.

(b) Closing hydrants is more critical and must be done very slowly until after the flow has diminished to about 20-percent. Closing a hydrant to quickly could cause a pressure surge, or water hammer, this could cause a weakened main to fail.

(c) Hydrants should be opened and closed one at a time to minimize the effect on the distribution system.

(d) Hydrants must be opened fully because the drain-valve mechanism operates the main valve. A partially opened hydrant could force water though the drain outlets under pressure, eroding the thrust support behind the hydrant.

(e) After the Fire Flow Test, the hydrant should be drained before the outlet nozzle cap(s) are tightened. If nozzle caps are tightened before the hydrant drains, water could remain in the hydrant barrel and freeze in the winter causing the hydrant to be out of service.

(f) Readings taken on any gauge instrument should only be taken when the water is running clear because sediment could damage the instrument.

CHAPTER 7 WATER SERVICES

Section 7.1 Purpose

1. These procedures are established by the Commission in order to establish standard procedures for the replacement of unserviceable water services and for the installation of new water services. The goal in establishing these procedures is to achieve a completed installation that ensures the protection of water quality, a leak free connection, the use of high quality materials, a reliable service protected from freezing, and efficiently installed
2. Procedures for the issuance of the work order are covered in other sections of these "Guidelines and Policies" and in the "Rules and Regulations of the Commission".

7.1.1 General

1. All material shall be as specified in the Commission's Material Specifications.
    - Water Services 2-inch and less shall be copper tube
    - Water Services 4-inch and larger shall be ductile iron
    - No 4-inch valves are allowed
2. The water meter shall be sized and provided by the Commission.
3. All water services shall be sized by the Owner or the Owner's authorized representative.
4. Depth of cover: - The 2-inch or less copper tube water pipes shall be laid a minimum of 5 feet deep, a maximum of 6-feet deep unless otherwise approved by the Commission, on suitable bedding, and backfill with proper material. No large stone or debris will be acceptable in the trench.
5. Excavate trench to ensure sides of trench are stable. Slope trench walls or provide support in conformance with the CHAPTER 5 Safety of these Guidelines and Policies and the Commission's Health and Safety Policies.
6. Utility Separation: - All water services shall be separated from other utilities and septic fields in accordance with the 310 Code of Massachusetts Regulations. Furthermore, the separation shall be in accordance with **Service Separation Detail (W-01.1).**
    (a) At a minimum, any water service shall be horizontally 10-feet from any sewer lateral and laid above/over any sewer main or lateral, unless otherwise approved by the Commission.

(b) At a minimum, all water services at a minimum shall be horizontally 4-feet from any other water service or other utility unless otherwise approved by the Commission.

7. In the absence of a recognized and/or approved industry standard for such hardware the Commission will be the final judge as to the acceptability of miscellaneous hardware used in the installation of water services.

8. The installed water service pipe and/or replacement service shall be disinfected according to Disinfection Section of these Guidelines and Policies, unless otherwise approved by the Commission.

9. During the Application process, a Proposed Site Plan must be submitted according to Section 4.2 of these Guidelines and Policies for review and approved by the Commission. This section describes the requirements for installing new and replacement Water Service Pipes in the location as defined on the approved plan.

10. The type of joint referred to as Quick Joint is based on the Mueller 110 Compression Joint or an equivalent approved by the Commission.

11. All copper tube water services must be visually inspected by a Commission inspector prior to backfilling. The corporation, curb valve and any couplings must be left exposed for inspection prior to backfilling.

12. A leak test may be required and shall be at the Commission's discretion. The test shall be a static pressure test of the service and visually inspecting each joint along the service to ensure that there is no leakage according to Section 4.4 of these Guidelines and Policies, unless otherwise approved by the Commission.

Section 7.2 Water Service - Two (2) Inch and Less

7.2.1 Installation of New Water Service Pipes

This procedure is written for installation of three-quarter-inch (¾") – NO LONGER ALLOWED, one-inch (1"), one-and-one-half-inch (1-½") and two-inch (2") copper tube water service pipes. Sizes ¾-inch and 1-1/4-inch services have been eliminated and replaced with standard sizes 1-inch, 1-½-inch, and 2-inch. On occasion and as directed by the Commission, the eliminated ¾ and 1-1/4-inch tubing sizes may be considered but shall be approved by the Commission prior to installation.

7.2.2 Ball Type Corporation Stops

1. Ball Type Corporations Stops (corporations) shall be installed horizontally on all water services at the service tap into the water main in accordance with **New**

Water Service Installation Detail (W-11.0) and with a Buffalo style Arch pattern curb box, in accordance with **Service Box Detail at the Tree-belt (W-12.0) and/or Service Box Detail at the Main (W-12.1)**.

(a) Typically, corporations are installed by the Commission or the Commission's designee unless other arrangements are made with the Commission's Engineering and Technical Services (E&TS).

(b) The Owner or the Owner's authorized representative shall make arrangements with the Commission's E&TS after an Application for a water service has been filled out and signed by the Owner.

2. Corporations may be direct tapped into ductile iron water main as follows:

Tap Size	Main Sizes which may be direct tapped
1-inch	none
1-1/2-inch	none
2-inch	none

3. Corporations must be tapped through a tapping saddle.

4. A tapping machine shall be provided which will permit tapping mains under pressure, also a supply of combination drills and taps having Mueller threads.

5. The tapping machine shall be rigidly fastened to the pipe horizontal to the pipe axis as detailed on the Drawings. The length of travel of the tap should be so established that when the stop is inserted and tightened with a 14-inch wrench, not more than one to three threads shall be exposed on the outside. When a wet tapping machine is used, the corporation stop shall be inserted with the machine while it is still in place. Stops shall be tightened only sufficiently to give water tightness and care must be constantly exercised not to over tighten them. All Ball Type Corporations stops shall be set on a concrete brick.

7.2.3 Copper Tubing

1. Care shall be exercised in the placing and laying of copper tubing to be sure that the pipe does not have kinks or sharp bends and to assure against its being in contact with sharp stones or ledge which would cause damage to the pipe.

2. At least 6-inches of processed gravel shall be placed adjacent to and above the pipe, and no stone shall be placed over the pipe until the depth of backfill above the copper tube is in excess of 1-foot.

3. The use of soldered fittings underground prior to Commission meter is prohibited.

4. No crimping tools may be used on copper tubing.
5. If copper becomes kinked or egg shaped in its installation, the use of that section of copper containing the kink or egg shape will be disallowed. Final decision as to the acceptability of a "kink" or a section of "egg shaped" pipe shall be made by Commission.
6. Copper tubing shall be installed with brass compression fittings according to the Water Service Installation Section of these Guidelines and Policies.
7. Copper tubing water services shall be bedded and installed in accordance with New Water Service Installation Detail (W-11.0) and/or Replacement Water Service Installation Detail (W-11.1).
8. Copper tubing water services installed with less than 18-inches of tubing beyond the wall or above the floor shall be reinstalled in its entirety by the Installer.

7.2.4 Ball Valve Curb Stops

1. 1-inch, 1-1/2-inch, and 2-inch curb stops shall be installed with a Buffalo style Arch pattern curb box, in accordance with **Service Box Detail at the Tree-belt (W-12.0) and/or Service Box Detail at the Main (W-12.1)**.
2. Curb stops shall be installed as close as practicable to 1' of the edge of the municipal ROW within the municipal ROW. Under no circumstances is the curb stop to be installed beyond the municipal ROW or onto private property.
3. Curb stops shall be installed with the operator plumb and vertical.
4. Curb stops shall be set on a 2-inchx6-inchx12-inch piece of pressure treated blocking or a flat rock of similar dimensions.

7.2.5 Compression Couplings

1. Install straight Compression couplings to existing service connections of the sizes required in the locations designated by the plans, Commission's Authorized Field Representative, or where required to extend or relocate the water service pipe. The manufacturer's recommended installation procedures shall be utilized while performing the work. Care shall be taken to ensure a watertight connection.
2. The compression coupling shall be centered over the connection point of the pipes being joined.
3. The coupling shall be tightened in accordance with the manufacturer's recommendations. Do not over tighten the coupling.
4. No couplings are allowed before meter valves in building.

7.2.6 Service Boxes

1. Service box bases shall be centered over the curb stop ball valve and shall be plumb and vertical in all directions. The box bottom shall be placed on the same blocking or flat surface as the curb stop.
2. Service box tops and bases shall have a minimum 6-inches of overlap.
3. Service box tops shall be painted florescent blue after installation.
4. Service boxes installed in tree-belts sidewalks, or driveways shall be installed flush with the existing finished grade and in accordance with **Service Box Detail at the Tree-belt (W-12.0).**
5. Service boxes installed at the water main and typically in paved or non-paved roadways shall be set buried 24-inches below finished road grade and in accordance with **Service Box Detail at the Main (W-12.1).**
    - Service boxes installed over 1-1/2 and 2-inch corporation shall have approximately ½-inch removed off the side closest to the water main by cutting or grinding in order to center the box over the valve.
6. Maintain a minimum of a 4’ clearance in all directions from curb box to other utilities, structures, appurtenances or obstructions.

Section 7.3 Installation of New Water Service Pipe

7.3.1 Product Installation – New Water Service Pipe

1. All material shall be in accordance with the Commission’s Material Specifications.
2. The actual new water service installation will be done in accordance with the **New Water Service Detail (W-11.0)**. This drawing is an integral component of the Service Installation Procedure.
3. The connection or tap at the water main will be made using a ball type corporation stop, which also serves as a curb stop when equipped with a tee head adapter.
4. The new copper tube shall be laid in a trench that has been excavated to a depth that will provide 5-feet and 6-inches of cover when final grading is established.
5. A second curb stop will be installed approximately 2-feet from the curbing or edge of road in the direction of the building.

6. The Curb Box over the Corporation at the main will be set buried 24-inch below finished road grade and in accordance with **Service Box Detail at the Tree-belt (W-12.0).**

   (a) Water shall be turned on prior to back filling to note any leaks and to ensure it is on.

   (b) The curb box base shall be placed on same blocking as curb stop

7. The Curb Box located between the curbing and the property line will be set to finished grade and accordance with **Service Box Detail at the Main (W-12.1)**. Before backfilling, all joints must be pressure tested using existing pressure in the main.

8. The meter valve in the cellar shall be a Ball Valve selected from one (1) of the following:

   (a) When entering the building through the basement floor or slab a Ball Meter Valve - 90º Angle: 1-inch Quick joint x ¾ or 1-inch meter swivel nut or Quick Joint x Elliptical flange in sizes 1 ½-inch and 2-inch. This is the normal valve used.

   - Note: this valve is a curb stop with a brass handle used as inside meter valve.

   (b) When entering the building through a foundation wall typically, a Ball Meter Valve – straight is used but as described in the following selected cases:

   - 1-inch Quick joint x ¾ or 1-inch meter swivel nut,
   - 1-½-inch or 2-inch Quick Joint x Elliptical flange.
   - For 1-inch water services when necessary to keep the meter within 18-inches of the wall a Ball Meter Valve - 90º Angle: 1-inch Quick joint x ¾ or 1-inch meter swivel nut may be used (same as 8. (a) above).
   - For 1-1/2-inch or 2-inch water services when necessary to keep the meter within 18-inches of the wall a 1-1/2-inch or 2-inch Quick Joint x 1-1/2-inch or 2-inch Female Iron Pipe (FIP) 90-degree elbow, and a 1-1/2-inch or 2-inch Male Iron Pipe (MIP) x 1-1/2-inch or 2-inch elliptical flange Ball Meter Valve – straight may be used for the meter valve.

   (c) Ball Type Curb Stop: 1-inch Quick Joint x 1-inch FIP. This is most common in replacement service work.

   - Note: This is a Curb Stop with brass handle used as an inside cellar meter valve.

9. The leak inspection shall be conducted in the trench at each joint by a competent work person.

10. Joints shall be "Bubble Tight", i.e. DRY.

11. Before the meter is connected to the new service, the line shall be flushed clean at full pressure using the Ball Valve Curb Stop at the main in accordance with Section 4.4 of these Guidelines and Policies, unless otherwise approved by the Commission. The service may be disinfected at the discretion of the Commission in accordance with Section 6.4.9 of these Guidelines and Policies. The trench shall be backfilled, compacted and the road patched as necessary. Care must be taken to protect the tubing from being damaged by backfilling, and to ensure the curb boxes are plumb, set at the correct grade, and centered over the valve.

12. The entry point of the tubing through the foundation shall be patched both inside and outside using duct seal and mortar to prevent water entry.

13. For purposes of the record sketch water service card, a minimum of three (3) location ties will be taken along with other measurements. The service installation sketch and final service card shall indicate curb stop at main "buried 2-feet"; curb stop at edge of road shall indicate "set to finished grade". The location of any fittings along the service line should be noted

14. Commission Construction Crews and Installers shall restore or install pavement in accordance with CHAPTER 8 of these Guidelines and Policies, unless otherwise approved by the Commission.

15. Commission Construction Crews shall notify the Commission Construction Crew responsible for pavement restoration the amount of pavement to be installed at the end of each week.

Section 7.4 Replacement of Existing Water Service Pipe

7.4.1 General

1. This section describes the requirements for replacing existing water service pipes in the same location that are no longer serviceable. Serviceability issues may be due to internal and/or external corrosion, poor flow, poor pressure, leaks, or any combination of these condition factors.

2. This procedure is written for replacement of ¾-inch, 1-inch, 1-1/4-inch, 1-1/2-inch, and 2-inch copper tube, brass, or iron Water Service Pipes. If the existing Water Service Pipe is ¾-inch and 1-1/4-inch it shall be replaced with standard sizes as directed by the Commission.

3. The type joint referred to as Quick Joint is based on the Mueller 110 Compression Joint or an equivalent approved by the Commission. No soldered joints are allowed.

4. No joint repairs shall be installed inside a building. All joint repairs shall be outside the building.

5. An existing Water Service Pipe may be replaced in accordance with Section 7.3 of these Guidelines and Policies or may be pulled in accordance with this Section of these Guidelines and Policies. It is at the Commission's discretion which method shall be allowed on a case by case basis.

   (a) Installer shall open cut all water services from main to home/building and replace Water Service Pipes in accordance with Section 7.3 of these Guidelines and Policies.

   (b) Commission Construction Crews or Commission Approved Contractors hired by the Commission to replace water service may pull Water Service Pipes in accordance with this Section of these Guidelines and Policies.

6. All copper tube water services must be visually inspected by a Commission inspector prior to backfilling. The corporation, curb valve and any couplings must be left exposed for visual inspection when the water service is temporarily turned-on. The test shall involve pressuring the service with the water service turned-on and visually inspecting each joint along the service to ensure that there is no leakage. At the Commission's option a completed water service may be required to pass a leak test as described below.

7. A leak test is required before an existing or repaired 1-inch or greater Water Service Pipe may be reused and/or turned-on. No ¾-inch Water Service Pipe may be reused.

7.4.2 Leak Testing – Existing Water Service Pipes

1. The leak test shall be performed by the Commission's operation staff.

2. The Customer or a Customer representative must be present to observe the leak test.

3. The existing water service must be able to be isolated from the shut-off valve at the main to the first meter valve. If a meter valve is installed on each side of the meter than each meter valves should be closed.

4. The meter shall be removed and a pressure gauge with a bleed valve shall be installed on the closed first meter valve.

5. Open the first meter valve and bleed air out of existing water service into a 5-gallon bucket through the bleed valve. When all the air has been bled close the bleed valve. Check for leaks, if there are no leaks read the pressure gauge. If there are leaks at loose fittings the fittings must be tightened until there are no leaks and then the pressure gauge can be read.
6. Close the shut-off valve in the street. At this point the Water Service Pipe is at the same pressure as the Public Water Main and should remain so.
7. If the pressure gauge remains constant it indicates there are no leaks on the Customer's Water Service Pipe, and it may be reused.
8. If the pressure immediately drops or over a 5-minute period it continues to drop the Water Service pipe has a leak on it and must be replaced.
9. This test is conducted three (3) times during the service call to determine if the existing Water Service Pipe can be reused or if it must be replaced.
10. 2-inch brass Water Service Pipe may be repaired if the leak location can be determined in a timely manner and at the discretion of the Commission.
11. The Customer is notified at the completion of the leak test(s) whether the existing Water Service Pipe has passed or failed. If the Water Service Pipe has failed the Customer is asked to apply for a Replacement Water Service at the Commission's customer Service Office at 71 Colton Street Springfield MA.

    (a) If the leak is not causing a safety issue and is located in the Customer's property, the Customer will be allowed five (5) workdays to apply for a replacement water service.

    (b) If the leak is causing a safety issue and/or is located is the public right-of-way the customer shall immediately apply for a replacement water service or be subject to immediate Turn-off by the Commission.

7.4.3 Product Installation – Existing Water Service Pipe

1. All material shall be in accordance with the Commission's Material Specifications.
2. The actual water service replacement may be done in accordance with the **Replacement Water Service Detail (W-11.1)** (this drawing is an integral component of the water service replacement procedure) or the existing service may be abandoned in place. This decision is at the discretion of the Commission and will be decided on a case-by-case basis.

3. Abandonment in place requires the existing corporation to be exposed, turned off, capped with a brass cap, and backfilled. Typically, this can be done in the same excavation as the new service connection.

4. Abandonment in place or replacement by open trench requires the installation of a new water service pipe in accordance with Section 7.3 of these Guidelines and Policies, unless otherwise approved by the Commission.

5. Replacement of the existing water service by pulling the old and new water service pipe shall be as follows:

6. Existing service replacement will be accomplished by excavating a safe hole that exposes the corporation stop and curb stop.

   (a) The existing ¾-inch cc x 1-inch MIP Corporation Stop will be reused if and only if it is serviceable and free from leaks.

   (b) The Mueller B101 Drilling and Tapping Machine (or equivalent type) can be used to replace a corporation stop under pressure when the stop is unserviceable or leaking.

7. The new copper tube shall be attached to the old pipe in the cellar.

8. From the street hole, the old pipe is pulled, and the new tubing follows.

9. The reconnection at the main is made using a Ball Valve Curb Stop 1-inch FIP x 1-inch Quick joint. Buffalo style curb boxes at the main will be removed, legally disposed of, and replaced with a new Buffalo box long. The Curb Box over the Curb Stop at the main will be set buried 2-feet below finished road grade.

10. When the existing curb stop is removed, the existing corporation stop must be cleaned in the opened position using a cleaning tool with a cutter of the appropriate size.

11. It is mandatory that a second hole be excavated over the new copper tubing approximately 2-feet from the curbing or edge of road in the direction of the building. In sub-division or on unimproved roads (dirt), the location will be indicated by the plans or the Commission's Authorized Field Representative.

    (a) At this location, a second Ball Valve Curb Stop with Quick joint both ends will be cut in.

    (b) The Buffalo Box over the Curb Stop at the main will be set buried 24-inch below finished road grade and in accordance with **Service Box Detail at the Main (W-12.1)**.

(c) The Buffalo Box located between the curbing and the property line will be set to finished grade and accordance with **Service Box Detail at the Tree-belt (W-12.0).** Before backfilling, all joints must be pressure tested using existing pressure in the main.

(d) For purposes of the record sketch water service card, a minimum of three (3) location ties will be taken along with other measurements.

(e) Before backfilling, all joints must be pressure tested using existing pressure in the main. The leak inspection shall be conducted in the trench at each joint by a Commission Authorized Field Representative. Joints shall be "Bubble Tight", i.e. DRY.

12. The installation of a curb stop at a point between the curbing (or edge of pavement) and the property line is MANDATORY. If this valve cannot be installed, this exception must be identified during the pre-job site visit.

(a) A request for exception to this procedure must be written by the Owner, the Owner's authorized representative, or the Commission's designee who has conducted an onsite evaluation.

(b) This request will be submitted to the Commission for evaluation and written approval or disapproval.

(c) Five working days must be allowed for the Commission portion of the exception process.

13. The meter valve in the cellar shall be a Ball Valve selected from one (1) of the following:

(a) Ball Type Curb Stop: 1-inch Quick Joint x 1-inch FIP. This is most common in replacement service work.

- Note: This is a Curb Stop with brass handle used as an inside cellar meter valve.

(b) When entering the building through the basement floor or slab a Ball Meter Valve - 90º Angle: 1-inch Quick joint x ¾ or 1-inch meter swivel nut or Quick Joint x Elliptical flange in sizes 1 ½-inch and 2-inch. This is the normal valve used.

(c) When entering the building through a foundation wall typically, a Ball Meter Valve – straight is used but as described in the following selected cases:

- 1-inch Quick joint x ¾ or 1-inch meter swivel nut,
- 1-½-inch or 2-inch Quick Joint x Elliptical flange.

- For 1-inch water services when necessary to keep the meter within 18-inches of the wall a Ball Meter Valve - 90º Angle: 1-inch Quick joint x ¾ or 1-inch meter swivel nut may be used (same as 13. (a) above).
- For 1-1/2-inch or 2-inch water services when necessary to keep the meter within 18-inches of the wall a 1-1/2-inch or 2-inch Quick Joint x 1-1/2-inch or 2-inch Female Iron Pipe (FIP) 90-degree elbow, 1-1/2-inch or 2-inch Ball Meter Valve – straight, and a 1-1/2-inch or 2-inch Male Iron Pipe (MIP) x 1-1/2-inch or 2-inch elliptical flange meter valve may be used.

14. The Quick type compression joint requires that the copper tubing be round not flattened. Copper tubing supplied in coils and transported to a job site can be expected to be partially flattened. This must be corrected by using a flaring tool or rounding tool of the appropriate size.

15. Before the meter is connected to the new service, the line shall be flushed clean at full pressure using the Ball Valve Curb Stop at the main in accordance with Section 4.4 of these Guidelines and Policies, unless otherwise approved by the Commission. The service may be disinfected at the discretion of the Commission in accordance with Section 6.4.9 of these Guidelines and Policies. The trench shall be backfilled, compacted and the road patched as necessary. Care must be taken to protect the tubing from being damaged by backfilling, and to ensure the curb boxes are plumb, set at the correct grade, and centered over the valve.

16. The entry point of the tubing through the foundation shall be patched both inside and outside using duct seal and mortar to prevent water entry.

17. Both holes shall be backfilled, compacted and patched or restored as necessary. The entry point of the tubing will be patched in the cellar using duct seal to prevent water entry.

18. For purposes of the record sketch water service card, a minimum of three (3) location ties will be taken along with other measurements. The service installation sketch and final service card shall indicate curb stop at main “buried 2-feet”; curb stop at edge of road shall indicate, “set to finished grade”. The location of any fittings along the service line should be noted

19. Commission construction Crews and Installers shall restore or install pavement in accordance with CHAPTER 8 of these Guidelines and Policies, unless otherwise approved by the Commission.

20. Commission Construction Crews shall notify the Commission Construction Crew responsible for pavement restoration the amount of pavement to be installed at the end of each week.

Section 7.5 Seasonal Water Services

7.5.1 General

1. Seasonal water services are typically some type of irrigation system and requires a backflow preventer. This section will address 2-inch and smaller copper tube irrigation systems. All other seasonal water services or larger ductile iron water services shall be reviewed by the Commission.
2. Seasonal water services shall have a maintenance plan to protect the Commission's meter from freezing and approved by the Commission prior to the water service being turned on.
3. Seasonal water service shall be installed in accordance with Section 7.1, Section 7.2, Section 7.3, and/or Section 7.4 of these Guidelines and Policies and the following:

7.5.2 Product Installation – Seasonal Water Services 2-inch and less

1. All material shall be in accordance with the Commission's Material Specifications.
2. The Seasonal Water Service installation will be done in accordance with the Seasonal Water Service Detail (W-17.0), Seasonal Water Service Base Detail (W17.1), and Seasonal Water Service Cover Detail (17.2). These drawings are an integral component of the Seasonal Service Installation Procedure.
3. The copper tube from the water main for a seasonal water service shall terminate on public property at a concrete pad and enclosure which shall be located on the public property.
4. The meter shall be installed before the backflow preventer.
5. The enclosures shall be set on concrete pads at least 54-inches long, 34-inches wide, and not more than 60-inches long, 50-inches wide and 6-inches thick with two (2) 3-inch sleeves for the water service pipe and sprinkler pipe to enter and exit or as otherwise approved by the SWSC during the submittal process. The sleeves shall be centered along length and be at least 6-inches to 12-inches from ends. The pad shall be placed on a base of at least 6-inches of ¾-inch crushed stone.
6. The enclosures shall be a minimum size of 48-inches long, 24-inches wide, and 32-inches high, a maximum of 54-inches long, 44-inches wide, and 38-inches high, or as otherwise approved by SWSC during the submittal process. Please note the enclosures submitted must fit on the pads and must enclose the complete meter and backflow preventer assembly described herein.

7. On an existing water service to an island or greenspace the Installer shall provide and install the following:

   (a) A drilled curb stop with a full length water service box shall be provided in the treebelt before the enclosure to allow the water service to drain prior to the winter.

   (b) New copper tube from the curb stop into the enclosure.

   (c) One (1) angle meter valve

   (d) Two (2) meter couplings (meter spuds)

   (e) Space for SWSC meter between meter couplings

   (f) Convert to iron pipe thread and One 90-degree bend up

   (g) One (1) testable vacuum breaker assembly or reduced pressure zone assembly – each includes two valves as part of the assembly

   - A testable Pressure Vacuum Breaker assembly (PVB) is allowed when the PVB can be installed at least 12 inches or greater above the highest sprinkler head. A PVB is designed to prevent only back-siphonage and is designed for use under static line pressure. A PVB is not allowed where back-pressure is possible. A Reduced Pressure Zone assembly (RPZ) is required when a PVB does not meet the installation requirements. A single spigot is allowed on the downstream side of a RPZ and on the downstream side of a PVB installed 12 inches below the PVB. (The highest sprinkler head and/or fixture shall be 12-inches or greater below the PVB. If it is less than 12-inches a RPZ is required.)

   (h) One 90-degree bend with IP by Quick Joint ends

   (i) Copper tube to sprinkler control box

8. On a new water service to an island or greenspace the Installer shall provide and install the following:

   (a) The installer shall have a public water main tapped with a corporation, water service box 2-feet below finish pavement, and new copper tube from corporation to treebelt.

   (b) A drilled curb stop with a full length water service box shall be provided in the treebelt before the enclosure to allow the water service to drain prior to the winter.

(c) New copper tube from the curb stop into the enclosure.

(d) One (1) angle meter valve.

(e) Two (2) meter couplings (meter spuds).

(f) Space for SWSC meter between meter couplings.

(g) Convert to iron pipe thread and one 90-degree bend up.

(h) One (1) testable vacuum breaker assembly or reduced pressure zone assembly – each includes two valves as part of the assembly

- A testable vacuum breaker is allowed when the highest sprinkler head and/or fixture is 12-inches or greater below the breaker. If it is less than 12-inches a RPZ is required

(i) One 90-degree bend with IP by Quick Joint ends.

(j) Copper tube to sprinkler control box.

Section 7.6 Ductile Iron Water Services 4-inch and Larger

7.6.1 General

1. During the Application process, a Proposed Site Plan must be submitted according to Section 4.2 of these Guidelines and Policies for review and approved by the Commission. This section describes the requirements for installing new water service pipes in the location as defined on the approved plan.

2. A Design Memo issued by the Commission's Engineering and Technical Services (E&TS) shall provide all requirements of the installation.

   (a) The design memo and associated plans shall always be on site by the Installer(s).

3. New ductile iron water services 4-inch and larger shall be installed, flushed, leak tested, and disinfected in accordance with CHAPTER 6 of these Guidelines and Policies and the additional requirements of this section. In addition to the required Commission testing a fire service pipe shall meet the requirements of the Fire Department Flush Tests described below.

4. All material supplied shall be in accordance with the Commission's Material Specifications.

5. A minimum of 18-inches of clearance is required from the wall(s) and the floor to the side and bottom of the pipe as of January 1st, 2014, unless otherwise approved by the Commission. Pipe shall not be installed more than 4-feet above the floor.
6. 5-feet of cover over the water service pipe is required, unless otherwise approved by the Commission.
7. All shut-off valves at the water main shall be 6-inch or larger. If a 4-inch ductile iron water service is required, the Installer shall provide a 6-inch connection and 6-inch shut-off valve and then reduce to 4-inch.
8. A stainless steel (SS) or ductile iron (DI) tapping sleeve, or a mechanical joint (MJ) tee is required on the main in front of the property to be served, unless otherwise approved by E&TS.
9. A 6-inch or larger tapping by MJ or MJ by MJ gate valve is required, unless otherwise approved by E&TS.
10. A 1-inch Air corporation or 1-inch Air valve Assembly for disinfecting the Water Service Pipe or fire Service Pipe is required after the gate valve at the main. The Commission shall determine if an Air Corporation or Air Valve Assembly is required.
11. All tees, bends, crosses, and other fittings shall be ductile iron mechanical joint unless otherwise approved by the Commission. If a reducer is required, it shall be DI MJ by MJ.
12. All pipe shall be DI, thickness class 52, cement lined, and polyethylene encased (underground only).
13. A companion flange(s) shall be temporarily bolted onto the flanged OS&Y gate valve(s). The companion flange(s) shall have a 2-inch threaded outlet. The threaded outlet shall be utilized for flushing, leak testing, and disinfection.
14. When the water service pipe is to be utilized for a fire service pipe the OS&Y gate valve is not required. The companion flange may be installed on the first flange through the wall or floor.
15. All joints outside/underground shall be MJ or push-on. The final 80-feet shall be fully restrained to the flange (F) connection(s) for the outside, spindle and yoke (OS&Y) gate valve(s), in accordance with Commission Material Specification - Joint Accessories.
16. All joints inside and/or above grade shall be flanged, in accordance with Commission Material Specification – Flanged Pipe. Flanged joints shall be joined

with gaskets and stainless steel hardware in accordance with Commission Material Specification - Joint Accessories.

7.6.2 Main to Meter Vault or Basement

1. The Water Service Pipe from the main to the meter vault or basement shall be installed in accordance with Section 7.6.1, above and the following:

2. The Water Service Pipe for the Main to Meter Vault shall be installed in accordance with **Typical Ductile Iron Water Service through Foundation Wall Detail (W-13.4)**.

3. A DI MJ by MJ solid sleeve with restrainer glands or gasket joint restraint at the bell shall connect the F by plain end (PE) by minimum 6-feet long DI pipe to the DI pipe from the gate valve in the street.

4. The F by PE by minimum 6-foot pipe shall be additionally restrained in place with ¾-inch rods from the flange to the mechanical joint. All rods and other hardware shall be coated with petrolatum based primer and wrapped with prefabricated petrolatum coating in tape form designed to protect wet or dry irregularly shaped metal surfaces according to Section 6.2.28 of these Guidelines and Policies and the Commission's Material Specifications.

   (b) Alternatively, if a mechanical joint solid sleeve is not used then the F by PE pipe shall be restrained in place with a steel socket clamp installed at the exterior of the meter vault wall and ¾-inch rods from the socket clamp to the flange. All socket clamps, rods, and other hardware shall be coated with petrolatum based primer and wrapped with prefabricated petrolatum coating in tape form designed to protect wet or dry irregularly shaped metal surfaces according to Section 6.2.28 of these Guidelines and Policies and the Commission's Material Specifications.

5. An F by F OS&Y gate valve shall be installed onto the flange through the wall.

   (a) For Fire Services this valve is referred to as the building control valve and shall be in accordance with the Commission's Material Specifications.

   (b) For Commercial and Industrial Water Services all the valves, fittings, strainers, pressure reducing valves, and check valves shall be that is in accordance with the Commission's Material Specifications.

6. Annular space through meter pit or basement wall may be filled with a link-seal or non-shrink grout/hydraulic cement.

7.6.3 Main to Floor Slab

1. The Water Service Pipe from the main to the floor slab shall be installed in accordance with the Section 7.6.1, above and the following:
2. The Water Service Pipe for the Main to Floor Slab shall be installed in accordance with **Typical Ductile Iron Water Service through Concrete Floor Detail (W-13.5)**.
3. A minimum of 80-feet from the first flange on the 90-degree bend below the slab out toward the main shall be fully restrained.
4. The 90-degree bend below the slab shall be DI MJ by MJ and a thrust block shall be installed to undisturbed soil.
5. The 90-degree bend above the floor slab is required and it shall be DI F by F.
6. An F by PE DI pipe shall connect the two bends. The pipe shall be cut to ensure the proper cover and height of the flange.
7. The F by PE by minimum 6-foot pipe shall be additionally restrained in place with ¾-inch rods from the flange to the mechanical joint. All rods and other hardware shall be coated with petrolatum based primer and wrapped with prefabricated petrolatum coating in tape form designed to protect wet or dry irregularly shaped metal surfaces according to Section 6.2.28 of these Guidelines and Policies and the Commission's Material Specifications.
8. An F by F OS&Y gate valve shall be installed onto the flange of the 90-degree F by F bend.

   (c) For Fire Services this valve is referred to as the building control valve and shall be in accordance with the Commission's Material Specifications.

   (d) For Commercial and Industrial Water Services all the valves, fittings, strainers, pressure reducing valves, and check valves shall be that is in accordance with the Commission's Material Specifications.

9. Annular space through floor shall be filled with 4000-PSI concrete

7.6.4 Water Services that Require Bypass

1. The Water Service Pipe that require a bypass shall be installed in accordance with the Sections 7.6.1 and 7.6.2 or 7.6.3 above and the following:
2. The Water Service Pipe for Combination Water Services or Customers that cannot have the water supply interrupted for meter maintenance may have a bypass installed around the meter. The proposed bypass piping arrangement shall be

submitted to the Commission's Engineering and Technical Services group for review and approval.

3. Typically, the bypass pipe may be one (1) pipe size smaller than the Water Service pipe.
4. A minimum of one (1) valve shall be installed on the bypass line.
5. For installations around a Meter Vault the bypass piping arrangement shall be installed in accordance with **Meter Vault Piping (W-13.0) and Large Meter Installation Detail (W-13.1)**.
6. For installations around a Meter in a building or basement the proposed bypass piping arrangement shall be submitted to the Commissions Engineering and Technical Services group for review and approval.

7.6.5 Fire Department Flush Test

1. The Springfield Fire Department requires a flush test on the fire service pipe to be performed by the Installer and observed by the Fire Department.
2. The Installer is responsible to schedule this test in addition to standard Commission testing requirements of flushing, leak testing, disinfection, and bacterial testing.
3. The Fire Department Flush may occur before the standard Commission testing.
4. The Fire Department may have additional requirements and should be contacted to ensure compliance.

Section 7.7 Water Meters

7.7.1 General

1. All material shall be in accordance with the Commission's Material Specifications.
2. The Owner's licensed plumber shall install all piping, fittings, and restraint within the building.
3. Prior to any work on a meter, a jumper wire shall be installed to prevent potential electrocution when the meter is removed for replacement or service.

   (a) The jumper shall be connected from the copper tube (CT) water service pipe to the house piping on the customer's side of the meter.

4. Commission supplies and installs all meters and meter couplings (meter spuds) at its expense.

5. The cost of supplying and installing any fittings, valves or meter horns required for the meter installation and the actual installation shall be at the Owners expense in Rates set forth in the Commission's Rules and Regulations.

6. The Owner shall supply and install all backflow prevention devices with detector check meters, utilized for fire services or other uses according to CHAPTER 10 of these Guidelines and Policies, at their expense.

7.7.2 Product Installation – 5/8-inch to 2-inch Water Meter

1. The 5/8-inch to 2-inch Water Meters shall be installed in accordance with the Sections 7.7.1 above and the following:

2. The meter can only be installed in a warm (continually above 45° F), clean, dry and accessible location.

3. The meter and meter valves shall have at least 18-inches of clearance from floors, walls, and other obstructions and shall not be higher than 4-feet from the floor. The location provided for the meter shall be in accordance with **New Water Service Detail (W-11.0) or Replacement Water Service Detail (W-11.1).**

4. Where meters are installed in buildings constructed on a slab on grade the service entrance shall be in accordance with **New Water Service Detail (W-11.0) or Replacement Water Service Detail (W-11.1).** The meter and meter valves shall have at least 18-inches of clearance from floors, walls, and other obstructions and shall not be higher than 4-feet from the floor.

5. The meters shall be installed in a horizontal position, unless otherwise approved by the Commission.

6. Meter coupling (meter spuds) nuts shall be sealed to the meter at both ends of the meter in accordance with **Water Meter Sealing Detail (W-11.2)**, as follows:

   (a) On the water main side of the meter; the meter shall be sealed with a wire that passes thru the meter coupling, the screw on the base plate, the meter cover, then to the meter coupling on the Customers side of the meter, and then back to the meter cover.

   (b) The two ends shall be sealed by a Commission meter installer or meter reader only.

7. When the meter cannot be installed in a building, a plastic meter pit shall be provided by the Owner in accordance with either Water Detail - Plastic Meter Pit

for 5/8-inch – 1-inch Meters (W-11.3) or Water Detail - Plastic Meter Pit for 1.5-inch – 2-inch Meters (W- 11.4).

(a) The plastic meter pit shall be located on the Owner's property in a non-traffic area, unless otherwise approved by the Commission.

(b) The plastic meter pit shall be HDPE or PVC plastic with an open bottom,

- 5/8-inch or 1-inch meter requires a 20-inch minimum diameter either smooth or corrugated, as approved by the Commission
- 1-1/2-inch or 2-inch requires a 36-inches minimum diameter corrugated

(c) The plastic meter pit shall be set on concrete blocks and a base of at least 6-inches of ¾-inch crushed stone.

(d) The top cover of the plastic meter pit shall be cast iron or ductile iron with a plastic inner lid and set flush to the existing grade.

(e) A copper meter setter (meter horn) shall be installed in the Plastic Meter Pit.

- The copper meter setter shall have male iron pipe (MIP) inlet and outlet.
- The copper meter setter shall have two (2) Ball Meter Valves - 90º Angle. For 5/8-inch through 1-inch meters either a ¾ or 1-inch meter swivel nut and for 1-1/2-inch and 2-inch meters an Elliptical flange in sizes 1-½-inch and 2-inch.
- The copper meter setter shall have K tube copper that shall be braced with PVC or copper tube.

(f) Before the meter is connected to the copper meter setter, the line shall be flushed clean at full pressure using the Ball Valve Curb Stop at the main in accordance with Section 4.4 of these Guidelines and Policies, unless otherwise approved by the Commission. The service may be disinfected at the discretion of the Commission in accordance with Section 6.4.9 of these Guidelines and Policies. The trench shall be backfilled, compacted and the road patched as necessary. Care must be taken to protect the tubing from being damaged by backfilling, and to ensure the curb boxes are plumb, set at the correct grade, and centered over the valve.

7.7.3 Product Installation – 4-inch and Larger Water Meter

1. The meter can only be installed in a warm (continually above 45° F), clean, dry and accessible location.

2. When the meter cannot be installed in a building a concrete meter pit shall be provided and installed in accordance with **Large Meter Vault Piping Detail (W-13.0),** unless otherwise approved by the Commission.

3. Where meters are installed in meter Vaults, the meter shall be in accordance with accordance with **Large Meter Installation Detail (W-13.1),** unless otherwise approved by the Commission.

4. The meter and meter valves shall have at least 18-inches of clearance from floors, walls, and other obstructions and shall not be higher than 4-feet from the floor. The location provided for the meter shall be in accordance with **Large Meter Vault Piping Detail (W-13.0) and Large Meter Installation Detail (W-13.1),** unless otherwise approved by the Commission.

5. Where meters are installed in buildings constructed on a slab on grade the service entrance shall allow the meter and meter valves to have at least 18-inches of clearance from floors, walls, and other obstructions and shall not be higher than 4-feet from the floor.

6. The meters shall be installed in a horizontal position, unless otherwise approved by the Commission.

7. Only one (1) uni-flange is allowed and shall be installed on a plain end piece of pipe between the meter and the outlet OS&Y valve. All other connections shall be flanged connections, unless otherwise approved by the Commission.

7.7.4 Product Installation – Concrete Meter Vaults

1. Pre-cast Concrete Meter Vaults and all materials used in its construction and structures shall be constructed to the dimensions as specified herein, and in accordance with the Commission's Material Specifications, unless otherwise approved by the Commission.

2. Pre-cast Concrete Meter Vaults installed in the Commission's distribution system shall be provided in accordance with the Standard Meter Vault for Ductile Iron Water Service Pipe and Oversize Meter Vault for Ductile Iron Water Service Pipe Details (W-13.2 – 13.3), unless otherwise approved by the Commission.

3. Pre-cast Concrete Meter vaults may be either standard size at 10-feet long by 6-feet wide by 6-feet & 6-inches tall (inside dimensions) with 6-inch thick walls, floor, and roof or oversize at 12-feet long by 8-feet wide by 6-feet & 6-inches (inside dimensions) with 6-inch thick walls, floor, and roof in accordance with the Commission's Material Specifications. Before a meter vault is installed the developer shall submit the proposed meter vault to the Commissions Engineering and Technical Services group for review and approval.

(a) Standard Vault size may be used for 4-inch through 8-inch single supply Water Service, multiple supply Water Service, and single supply Combination Water Service.

(b) Oversize Vault may be used for any 8-inch through 12-inch single supply or multiple supply Water Service or Combination Water Service if it is determined during the review process more space is needed.

(c) All Fire Services shall be installed above grade in a heated enclosure or in a heated basement or building. Below grade vaults for Fire Services are not allowed.

4. Pre-cast Concrete Meter Vaults shall be installed on the Owner's property.
5. Outside/exterior surfaces of Pre-cast Concrete Meter Vaults shall be painted with two coats of bituminous damp proofing at the rate of 30 to 60 sq ft per gallon, in accordance with manufacturer's instructions.
6. Pre-cast Concrete Meter Pit bases shall be placed on a bed of 12-inches of crushed stone ¾-inch. Meter Pit base grades shall be set so that any required grade adjustment to bring the manhole frame and cover to final grade does not exceed 8-in.
7. All work shall be protected at all times against flooding and/or flotation.
8. Pre-cast Concrete Meter Vaults shall be set plumb with a 1/4-in maximum out of plumb tolerance allowed.
9. Jointing of Pre-cast Concrete Meter Vaults shall be accomplished with butyl rubber joint sealant gasket in accordance with the Commission's Materials Specifications installed at the shiplap joints of each section, unless otherwise approved by the Commission.

   (a) All installation surfaces shall be clean and dry.

   (b) Apply one (1) continuous bead of sealant around the periphery of the joint by pressing the bead firmly into place. Remove backing paper as the installation progresses.

   (c) Use of primer is required when temperatures are below 40-degrees F and/or the concrete is damp.

   (d) Extremely wet conditions require the installation to have two (2) beads applied in the same manner as above.

10. Joints shall be allowed to set for at least 14 hours before backfilling unless a shorter period is specifically approved by the Commission or its representative.

11. Holes required for handling in the concrete barrel sections shall be plugged with a non-shrinking grout, or concrete plugs in combination with non-shrinking grout. Finish flush on the inside.

12. Pre-cast Meter Vaults shall have a formed, tapered circular opening larger than the intended pipe size (outside diameter) in accordance with the **Large Meter Installation Detail (W-13.1)**.

13. Integrally cast knockout panels shall be provided at locations in accordance with the Standard Meter Vault for Ductile Iron Water Service Pipe (W-13.2) and Oversize Meter Vault for Ductile Iron Water Service Pipe Details (W-13.3). Sizes shall be adequate for intended pipe sizes. Knockout panels shall have no steel reinforcing.

14. When pre-formed hole are not provided the holes in Pre-cast Meter Vaults shall be cut to accommodate pipes prior to setting manhole sections in place to prevent jarring that may loosen the mortar joints.

15. Connections into the manhole shall be grout in place. The non-shrink grout shall be installed around the pipe connection where a formed, tapered circular opening is larger than the pipe outside diameter.

16. Backfill shall be laid and compacted carefully and evenly around Pre-cast Meter Vaults.

17. The Commission will visually inspect Pre-cast Meter Vaults after the backfill is in place. The inside of any leaking Pre-cast Meter Pit joint shall be caulked with lead wool or non-shrink grout to the satisfaction of the Commission or its representative.

18. All concrete work performed inside the Pre-cast Meter Pit shall be finished smooth and swept clean before acceptance by the Commission.

7.7.5 Product Installation - Manhole Frame and Cover:

1. Manhole frame and covers shall be installed in accordance with Large Meter Vault Piping Detail (W-13.0), Standard Meter Vault for Ductile Iron Water Service Pipe (W-13.2), and Oversize Meter Vault for Ductile Iron Water Service Pipe Details (W-13.3), unless otherwise approved by the Commission.

2. Pre-cast concrete grade rings and/or brick and non-shrink mortar shall be used to adjust manhole frame and cover to final grade.

3. The inside and outside of pre-cast concrete grade rings and/or brick shall be sealed with hydraulic cement.
4. Under no circumstances shall barrel blocks be allowed.
5. Castings shall be set in non-shrink grout. Non-shrink grout shall be placed all around casting to 4-inches above flange.
6. Castings shall be thoroughly cleaned and subject to hammer inspection.
7. All brick and mortar dropped into manhole if the finished invert is built before the frame and covers are installed shall be cleaned and removed.

Section 7.8 Removal of Existing Materials and Parts from Customers Homes, Businesses and/or Underground Infrastructure

7.8.1 Ownership

1. All service valves at the meter, service pipes, hydrants, and gate valves on the service pipes, and/or any other parts on the service pipes are solely the Customer's property.
2. Any service valves at the meter, service pipes, hydrants, gate valves on the service pipes, and/or any other parts on the service pipes that are removed from a customer's property, with the Customer's permission, shall become property of the Commission.
3. All service valves at the main and meters are solely the Water and Sewer Commission's property.
4. Any service valves at the main and meters that are removed from a Customer's property, shall remain property of the Commission.
5. Under no circumstances shall a Commission employee be allowed to keep any parts and/or materials removed from a home, business, or underground infrastructure during hours of employment and/or during the use of a Commission vehicle.

7.8.2 Handling

1. In the event that a customer service valve in the building is being replaced and/or repair is performed on the underground infrastructure, as part of the Commission's work, the Commission employee must ask the customer if they wish to keep the service valve other material or if they prefer the Commission to dispose of the parts and/or materials.

2. Any service valves, service pipes, meters, main pipes, gate valves, hydrants, valve box, service box and any other parts or materials that the customer does not wish to keep must be returned to the Field Services Office at 71 Colton Street.

3. In the event that the customer request that the Commission dispose of the parts and/or materials, the employee must document the request and return all parts and/or materials to the Field Services Office at 71 Colton Street.

4. Under no circumstances, will any Commission employee be allowed to enter any recycling and/or scrap metal facility (junkyard, scrap metal, recycling, etc.) with a Commission vehicle without authorization from the Executive Director or his/her designee.

Section 7.9 Terms of Warranty on Installation

7.9.1 General -

1. The Owner will be held responsible for the repair of any service or main leaks up to one (1) year after the successful pressure testing and disinfection has been accepted by the Commission Engineering Services Department.

2. The Owner will have the opportunity to make repairs at his cost under the direction of Commission field inspector, or any leaks will be repaired by Commission and the cost of such repairs will be at the owner's expense.

3. The Owner will be responsible for the repair or correction of trench settlement. Commission retains the right to repair the settlement and the cost of repairs will be charged to the Owner.

CHAPTER 8 PAVEMENT

Section 8.1 General

1. Bituminous paving installed in the Commission's water distribution systems in Springfield and Ludlow and the sewer collection system in Springfield shall be in accordance with the following details:

   (a) Paving repairs and/or installations in Ludlow that require flowable fill as backfill shall be installed in accordance with **Trench Backfilling – Method 1 for Ludlow Roadways Detail (W-02.1)**, unless otherwise approved by the Town of Ludlow Department of Public Works (DPW) and the Commission.

   (b) Paving repairs and/or installations in Ludlow that require compacted common borrow fill as backfill shall be installed in accordance with **Trench Backfilling – Method 2 for Ludlow Roadways Detail (W-02.2)**, unless otherwise approved by the Town of Ludlow DPW and the Commission.

   (c) Paving repairs and/or installations in Springfield on arterial streets shall be installed in accordance with **Trench Backfilling – Method for Arterial Streets in Springfield (W-02.3)**, unless otherwise approved by the City of Springfield Department of Public Works (DPW) and the Commission.

   (d) Paving repairs and/or installations in Springfield on residential streets shall be installed in accordance with **Trench Backfilling – Method for Residential Streets in Springfield (W-02.4)**, unless otherwise approved by the City of Springfield DPW and the Commission.

2. Bituminous paving repairs and all materials used in the construction and structures shall be constructed to the dimensions shown on the Design Drawings, as specified herein, and in accordance with the Commission's Material Specifications, unless otherwise approved by the Commission.

3. Typically, temporary or binder coarse bituminous pavement shall be installed at the end of each work week on all Commission Construction Crew or Installer installed water main, sewer main, water service, and/or building sewer connection in Ludlow or Springfield, unless otherwise approved by the appropriate DPW and the Commission.

4. Approximately, 90-days after the last temporary or binder coarse of bituminous paving has been in place on a project the Commission Construction Crew or Installer shall mill the appropriate width and depth of existing paving and temporary or binder paving, unless otherwise approved by the appropriate DPW and the Commission.

5. The mill surface shall be tack coated prior to the final pavement being installed.
6. The final paving or top coarse shall be installed the full width and depth of the milled area.
7. All water valve boxes, water services boxes, sewer manholes, and/or structures in the area of pavement installation shall be raised to finish grade prior to the installation of any paving, unless otherwise approved by the appropriate DPW and the Commission..

Section 8.2 Springfield

8.2.1 Permanent Bituminous Concrete Patch: Residential in Springfield: 3-inch Or Less in Depth

1. In addition to the General, requirements of this Section the work shall be performed in accordance with Springfield Department of Public Works Pavement Restoration Requirements.
2. Restoration work shall be scheduled and inspected in accordance with Springfield Department of Public Works Standard Procedures.
3. The Commission designated Inspector shall also be notified by written schedule submitted thru the Deputy Director of Field Services at the Commission Customer Field Service Building, 71 Colton St., Springfield MA, Fax Number is 413-787-7975.

8.2.2 Permanent Bituminous Concrete Patch: Arterial in Springfield: More Than 3-inch in Depth, But Not Greater Than 6-inch in Depth

Items found in Section 8.2.1 of these Guidelines and Policies, numbered 1 thru 3 apply here.

Section 8.3 Ludlow

8.3.1 Permanent Bituminous Concrete Patch: Residential in Ludlow: 3-inch Or Less in Depth.

1. In addition to the General, requirements of this Section the work shall be performed in accordance with Ludlow Department of Public Works Pavement Restoration Requirements.
2. Restoration work shall be scheduled and inspected in accordance with Ludlow Department of Public Works Standard Procedures.

3. The Commission designated Inspector shall also be notified by written schedule submitted thru the Deputy Director of Field Services at the Commission Customer Field Service Building, 71 Colton St., Springfield MA, Fax Number is 413-787-7975.

8.3.2 Permanent Bituminous Concrete Patch: Arterial in Ludlow: More Than 3-inch In Depth, But Not Greater Than 6-inch In Depth

Items found in Section 8.3.1 of these Guidelines and Policies, numbered 1 thru 3 apply here.

8.3.3 Bituminous Concrete Sidewalk or Driveway Restorations: Type I, Surface Course

1. Sidewalk and Driveway Bituminous surfaces that are disturbed shall be restored, full width, in kind, a minimum of one foot beyond the disturbed area.
2. After the sub-grade has been prepared, a foundation of gravel shall be placed upon it. After thorough mechanical compaction to at least 95% modified proctor density, the foundation of gravel shall at least 8-inch thick.
3. The bituminous concrete sidewalk or driveway surface shall be laid in 2 courses to a depth-after rolling of 3-inch. The bottom course shall be 1-½-inch and its surface after rolling shall be 1-½-inch below the parallel to the proposed grade of the finished surface. The top course shall be 1-½-inch thick after rolling.
4. The existing vertical surfaces of bituminous concrete shall be thoroughly cleaned, and tack coated before placing new, hot bituminous concrete.
5. After rolling the top course, the edges of the permanent bituminous concrete patch shall be sealed with liquid asphalt emulsion (AASHTO M140) and coated with sand.
6. Bituminous concrete mixtures shall be distributed by direct dumping, wheelbarrow, or other approved means into the area to be patched. It shall then be immediately distributed into place by means of shovels and raked into a uniformly loose layer to the full width required and of such depth that, when work is completed, it shall conform to the grade and surface contour required. An approved mechanical spreader may be used.
7. Surfaces shall be rolled with a self-propelled tandem roller with a mass of a minimum 3 tons. In places where a power roller cannot be used, compaction shall be obtained by mechanical rammers or by hand tampers.
8. Where walls, curbing or other suitable permanent supports are not present, or where an approved mechanical spreader is not used, satisfactory forms shall be

installed to assist in securing proper alignment and adequate compaction of the base and surface courses.

Section 8.4 Water Valve Box and Service Box Adjustment and Replacement

8.4.1 General

This Policy is intended to be used, by either the Springfield Department of Public Works or the Ludlow Department of Publics Works for paving improvement projects within the respective City or Town boundaries.

The following section should be included as a bid alternate in a contract bid document. The following section includes six (6) items the Commission would be responsible for paying for, at its sole discretion.

If the Commission were not to choose to use the bid alternate it would then adjust or replace the valve and services boxes with its own employees.

8.4.2 Commission Valve and Service Box Adjustment and Replacement Policy

The Contractor shall notify in writing the Springfield Water and Sewer Commission for field location of water mains and valves. All valves shall be operated by Springfield Water and Sewer Commission employees only. Springfield Water and Sewer Commission personnel shall inspect all work on water mains and valves. All gate and service boxes are property of the Springfield Water and Sewer Commission.

The Springfield Water and Sewer Commission shall identify all structures, which are to remain, be raised or lowered, removed and reset, or removed and replaced with new structure.

Work done by a Contractor shall include the locating and recording in a field book of all Springfield Water and Sewer Commission valves lowered or removed during construction. This book shall be available to the Resident Engineer and become property of the Springfield Water and Sewer Commission.

The Contractor shall be held responsible for the protection of all castings. The Contractor at his expense shall replace any water boxes damaged in any manner during the progress of construction with new castings.

No water box shall remain exposed without suitable maintenance for the safety of the traveling public.

Before final payment is made, the Springfield Water and Sewer Commission will inspect all work to ensure that all boxes are centered over the appurtenance that they supply access to, and that they are straight and clean.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks,

cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Springfield Department of Public Works or Ludlow Department of Public Works (Department of Publics Works), and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's Guidelines and Policies and Material Specifications at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM 1 GATE BOX REMOVED AND RESET EA

Cost of these items shall include, but not be limited to, removing the existing gate box top, gate box bottom, and gate box cover by excavating to expose the structures, carefully removing the structures, resetting the undamaged structures, and backfilling the structures with excavatable flowable fill to within 6 inches of the corporation or gate level, and placing of a 6 inch thick concrete collar (4,000 psi minimum) around the box to all patch edges.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall

agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM 1a GATE BOX ADJUST EA

Cost of these items shall include, but limited to, removing the existing material around the existing box top to a depth of 6" below the existing grade. Pry up the box top to the proposed finish grade. Pour a concrete collar (4,000 psi minimum mix) around the adjusted box top and up to the flange of the box top and finish the collar to all patch edges.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM 2 GATE BOX REMOVED AND STACKED EA

Cost of these items shall include, but not be limited to, removing the existing gate box top, gate box bottom, and gate box cover by excavating to expose the structures, and carefully removing the structures.

All removed and stacked gate boxes shall be brought to a location determined by the Springfield Water and Sewer Commission. If the Springfield Water and Sewer

Commission determines that the removed materials are not suitable, the Contractor shall discard the removed materials properly. All related costs to discard this material will be included in this item.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM 3 NEW GATE BOX INSTALLED EA

Cost of these items shall include, but not be limited, supplying the valve box that meets the Springfield Water and Sewer Commission's Specifications. Valve boxes shall be installed concentric to the operating nut and plumb with the vertical plane. The belled base section shall be placed on blocking in such a way that no additional loading is transferred to the valve. Longer valve box bottoms and/or tops will be specified as required for water mains at depths that exceed the limitations of the above specified valve box. Valve boxes located in traveled ways shall be left flush with the pavement or gravel shoulder unless otherwise specified. Valve boxes located in other non-paved areas shall be left flush with finish grade unless otherwise specified. Valves and boxes shall be set with the stem vertical and valve box vertically centered over the operating nut. The valve box shall be supported during backfilling and maintained in vertical alignment with the top section flush with finished grade. The Valve Box shall be flush with finished grade, and backfill the structures with excavatable flowable fill to within 6 inches of the corporation or gate level, and placing of a 6 inch thick concrete collar (4,000 psi minimum) around the box to all patch edges.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

These provisions in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM 3a NEW GATE BOX TOP INSTALLED EA

SWSC will supply the casting needed for this Item. Cost of these items shall include, but not be limited to valve boxes installed concentric to the operating nut and plumb with the vertical plane. Valve boxes located in traveled ways shall be left flush with the pavement or gravel shoulder unless otherwise specified. Valve boxes located in other non-paved areas shall be left flush with finish grade unless otherwise specified. Valves and boxes shall be set with the stem vertical and valve box vertically centered over the operating nut. The valve box shall be supported during backfilling and maintained in vertical alignment with the top section flush with finished grade. The Valve Box shall be flush with finished grade, and backfill the structures with excavatable flowable fill to within 6 inches of the corporation or gate level, and placing of a 6 inch thick concrete collar (4,000 psi minimum) around the box to all patch edges.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair

or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM 4 NEW SERVICE BOX INSTALLED EA

Cost of these items shall include, but not be limited, supplying the service box that meets the Springfield Water and Sewer Commission's Specifications. Service box bases shall be centered over the curb stop ball valve and shall be plumb and vertical in all directions. The box bottom shall be placed on the same blocking or flat surface as the curb stop. Service boxes located in other non-paved areas shall be left flush with finish grade unless otherwise specified. The service box shall be supported during backfilling and maintained in vertical alignment with the top section flush with finished grade. The service box shall be flush with finished grade, and backfill the structures with excavatable flowable fill to within 6 inches of the corporation or gate level, and placing of a 6 inch thick concrete collar (4,000 psi minimum) around the box to all patch edges.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall

agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM 4a NEW SERVICE BOX TOP INSTALLED EA

SWSC will supply the casting needed for this Item. Cost of these items shall include, but not be limited to service boxes centered over the curb stop ball valve and shall be plumb and vertical in all directions. Service boxes located in other non-paved areas shall be left flush with finish grade unless otherwise specified. The service box shall be supported during backfilling and maintained in vertical alignment with the top section flush with finished grade. The service box shall be flush with finished grade, and backfill the structures with excavatable flowable fill to within 6 inches of the corporation or gate level, and placing of a 6 inch thick concrete collar (4,000 psi minimum) around the box to all patch edges.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM 5 SERVICE BOX REMOVED AND RESET EA

Cost of these items shall include, but not be limited to, removing the existing service box top, service box bottom, and service box cover by excavating to expose the

structures, and carefully removing the structures, resetting the undamaged structures, and backfilling the structures with excavatable flowable fill to within 6 inches of the corporation or gate level, and placing of a 6 inch thick concrete collar (4,000 psi minimum) around the box to all patch edges.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM 5a SERVICE BOX ADJUST EA

Cost of these items shall include, but limited to, removing the existing material around the existing box top to a depth of 6" below the existing grade. Pry up the box top to the proposed finish grade. Pour a concrete collar (4,000 psi minimum mix) around the adjusted box top and up to the flange of the box top and finish the collar to all patch edges.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM6 SERVICE BOX REMOVED AND STACKED EA

Cost of these items shall include, but not be limited to, removing the existing service box top, service box bottom, and service box cover by excavating to expose the structures, and carefully removing the structures.

All removed and stacked service boxes shall be brought to a location determined by the Springfield Water and Sewer Commission. If the Springfield Water and Sewer Commission determines that the removed materials are not suitable, the Contractor shall discard the removed materials properly. All related costs to discard this material will be included in this item.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

Please provide quote to perform each of the above items below:

ITEM 1	**GATE BOX REMOVED AND RESET**	**$**	**EA**
ITEM 1a	**GATE BOX ADJUST**	**$**	**EA**
ITEM 2	**GATE BOX REMOVED AND STACKED**	**$**	**EA**
ITEM 3	**NEW GATE BOX INSTALLED**	**$**	**EA**
ITEM 3a	**NEW GATE BOX TOP INSTALLED**	**$**	**EA**
ITEM 4	**NEW SERVICE BOX INSTALLED**	**$**	**EA**
ITEM 4a	**NEW SERVICE BOX TOP INSTALLED**	**$**	**EA**
ITEM 5	**SERVICE BOX REMOVED AND RESET**	**$**	**EA**
ITEM 5a	**SERVICE BOX ADJUST**	**$**	**EA**
ITEM 6	**SERVICE BOX REMOVED AND STACKED**	**$**	**EA**

Section 8.5 Sewer Manhole Frame and Cover Adjustment and Replacement

8.5.1 General

This Policy is intended to be used, by the Springfield Department of Public Works for paving improvement projects within the City boundaries.

The following section should be included as a bid alternate in a contract bid document. The following section includes three (3) items the Commission would be responsible for paying for at its sole discretion.

If the Commission were not to choose to use the bid alternate it would then adjust or replace the manhole frame and covers with its own employees.

8.5.2 Commission Sewer Manhole Frame and Cover Adjustment and Replacement Policy

The Contractor shall notify in writing the Springfield Water and Sewer Commission for field location of Sewer Manhole Frames and Covers. Springfield Water and Sewer Commission personnel shall inspect all work on Sewer Manhole Frames and Covers. All Sewer Manhole Frames and Covers are property of the Springfield Water and Sewer Commission.

The Springfield Water and Sewer Commission shall identify all structures which are to remain, be raised or lowered, removed and reset, or removed and replaced with new structure.

Work done by a Contractor shall include the locating and recording in a field book of all Springfield Water and Sewer Commission valves lowered or removed during construction. This book shall be available to the Resident Engineer and become property of the Springfield Water and Sewer Commission.

The Contractor shall be held responsible for the protection of all castings. The Contractor at his expense shall replace any water boxes damaged in any manner during the progress of construction with new castings.

No Sewer Manhole Frames and Covers shall remain exposed without suitable maintenance for the safety of the traveling public.

Before final payment is made, the Springfield Water and Sewer Commission will inspect all work to ensure that all Sewer Manhole Frames and Covers are centered over the appurtenance that they supply access to, that they are straight and clean, and are set to finish grade.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks,

cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Springfield Department of Public Works (Department of Publics Works), and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's Guidelines and Policies and Material Specifications at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM 7 SEWER MANHOLE FRAME AND COVER REMOVED AND RESET EA

Cost of these items shall include, but not be limited to, removing the existing sewer manhole frame and cover by excavating to expose the structures, carefully removing the structures, storing and securing the frame and cover, maintaining the manhole during milling operations, resetting the undamaged structures with the appropriate courses of leveling bricks and mortar, sealing the leveling courses with hydraulic cement, and backfilling the structures with 4-inches of non-shrink grout above the flange of the structure. Invert table must be cleaned of all bricks chips and mortar before payment will be made.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and

Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM 8 SEWER MANHOLE FRAME AND COVER REMOVED AND STACKED EA

Cost of these items shall include, but not be limited to, removing the existing sewer manhole frame and cover by excavating to expose the structures, carefully removing the structures, and maintaining the structure during milling operations.

All removed and stacked sewer manhole frames and covers shall be brought to a location determined by the Springfield Water and Sewer Commission. If the Springfield Water and Sewer Commission determines that the removed materials are not suitable, the Contractor shall discard the removed materials properly. All related costs to discard this material will be included in this item.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

ITEM 9 SEWER MANHOLE FRAME AND COVER INSTALLED EA

Cost of these items shall include, but not be limited, supplying the new sewer manhole frame and cover that meets the Springfield Water and Sewer Commission's Specifications. Sewer manhole frames and covers shall be installed and set with the appropriate courses of leveling bricks and mortar, sealing the leveling courses with hydraulic cement, and backfilling the structures with 4-inches of non-shrink grout above the flange of the sewer manhole frame and cover. Sewer manhole frames and covers located in traveled ways shall be left flush with the pavement or gravel shoulder unless otherwise specified. Sewer manhole frames and covers located in other non-paved areas shall be left flush with finish grade unless otherwise specified. Invert table must be cleaned of all bricks chips and mortar before payment will be made.

The Contractor shall exercise diligence and care using standard construction methods to complete all related items. If during the course of normal contractual work leaks, cracks, or any other damage to any Water and Sewer Commission lines, services or appurtenances is found, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards and be paid for under an extra work order. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary and cost of such repair or replacement will be on a time and material payment, using the Massachusetts Standard Specifications for Highways and Bridges for extra work.

If during the course of normal contractual work the contractor causes leaks, cracks, breakage, or any other damage to any Water and Sewer Commission lines, services or appurtenances, the Contractor shall repair or replace to the Springfield Water and Sewer Commission's standards at the contractors expense. The Contractor, Department of Public Works, and Springfield Water and Sewer Commission shall agree on any repair or replacement necessary prior to the repair or replacement taking place.

The provision in no way shall excuse the Contractor from careless acts, negligence or inappropriate construction methods, which cause damage to any Springfield Water and Sewer Commission property.

Please provide quote to perform each of the above items below:

ITEM 7 SEWER MANHOLE FRAME AND COVER

REMOVED AND RESET $ EA

ITEM 8 SEWER MANHOLE FRAME AND COVER

REMOVED AND STACKED $ EA

ITEM 9 SEWER MANHOLE FRAME AND COVER INSTALLED $ EA

CHAPTER 9 WATER PUMP STATIONS

Intentionally left blank for future use.

CHAPTER 10 CROSS CONNECTION DEVICES

Section 10.1 General

1. Cross Connection Devices provided to the Springfield Water and Sewer Commission or Installers shall be manufactured, tested, inspected and delivered in full compliance with the Commission's Material Specifications.

2. The Cross Connection Devices shall conform to AWWA C-510 (most current revision) Standard for Double Check Valve Backflow Prevention Assembly and/or AWWA C-511 (most current revision) Standard for Reduced Pressure Principle Backflow Preventer.

   (a) Devices are the back flow preventer only.

   (b) Assemblies are from the manufacturer and include two isolation valves and the back flow preventer.

3. The Commission will determine the degree of hazard and type of back flow preventer required. The Owner shall hire a professional engineer to determine the size and flow capacity of the backflow preventer. The engineer or a fire suppression firm shall design the back flow preventer installation in accordance with the design engineer's requirements and theses Guidelines and Policies.

4. Depending on the degree of health hazard the acceptable types of back flow prevention devices that may be installed for backflow prevention shall include air gap separation, reduced pressure zone backflow preventers, double check valve assemblies, atmospheric or pressure vacuum breakers, backflow preventers with intermediate atmospheric vents, and barometric loops.

   (a) Degree of health hazard shall be as set forth in Massachusetts Drinking Water Regulations 310 CMR 22.22.

   (b) List of locations that require approved BFP devices installed at the meter along with in plant protection at the point of use shall be as follows:

   - Nuclear reactors or other facilities where radioactive materials are used;
   - Sewage treatment plants and sewage pumping stations;
   - Piers, docks, marinas, shipyards;
   - Chemical plants;
   - Metal plating industries;
   - Hospitals, mortuaries, medical clinics, dental offices and clinics;

- Laboratories, except when the Massachusetts Department of Environmental Protection (MDEP) or its Designee has made a specific determination that no health hazard exists on the premises and;
- Other types of facilities as determined in writing by the MDEP or its Designee.

5. If continuous Water Service is necessary, two approved Backflow Prevention Devices shall be installed in a parallel installation, so that Water Service will not be interrupted during testing and maintenance operations.

   -

6. Backflow Prevention Devices and assemblies shall be installed in a horizontal position at least three (3) to four (4) feet above the floor, eighteen (18) inches from any wall, ceiling, or other device and with clear access to the BFP device without any obstructions.

7. Tightly closing shut off valves end shall be installed at each end of the BFP device, unless otherwise approved by the Commission.

8. All metered installations such as, but not limited to, process plants, Commercial Customers, Industrial Customers and/or Combination services require the following connections:

   (a) Less than 2-inch services shall have a Commission meter valve in accordance within accordance with the **New or Replacement Service Details (W-11.0 and 11.1)**

   (b) 4-inch and larger assemblies after the flange entering the building shall have a building control valve that is a flange by flange (F x F) outside spindle and yoke (OS&Y) gate valve that is in accordance with the Commission's Material Specifications.

   (c) 4-inch and larger services shall have a F x F and OS&Y gate valves on the inlet and outlet sides of the meter, pressure reducing valve, and the BFP device in accordance with the **Typical Ductile Iron Commercial and Industrial Service Details through Foundation Wall or Floor Details (W-13.14 or 13.15)**.

   (d) The device shall have F x F connections on the inlet and outlet side of the device.

   (e) The inlet and outlet sides of the device shall have F x F OS&Y gate valves on each side.

9. Fire suppression systems shall have assemblies installed as follows:

(a) Less than 2-inch shall have a Commission meter valve in accordance with the **New or Replacement Service Details (W-11.0 and 11.1)** and after the meter valve may have the device or assembly with ball valves or butterfly valves.

(b) Less than 2-inch the assembly valves and device may have threaded connections.

(c) 4-inch and larger assemblies after the flange entering the building shall have a building control valve that is an F x F OS&Y gate valve in accordance with the **Typical Ductile Iron Fire Service Details through Foundation Wall or Floor Details (W-13.11 or 13.12)**.

(d) An assembly or device with inlet and outlet shut-off valves shall be installed downstream of the building control valve.

(e) 4-inch and larger valves and devices may have all flange or grooved (Victaulic) connections, or some combination of both.

(f) All shut off valves for the device shall have tamper switches and open close indicators.

10. For all flange connections the connection hardware shall be 304 stainless steel which includes the bolt, nut, and two flat washers.
11. For grooved connections, the hardware may be heat-treated plated carbon steel, track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.
12. When the device or assembly is provided with a drain, the drain shall exit facility and shall not be connected to sewer.
13. Metered Services and Fire Services shall be tested in accordance with Section 4.5.4 of these Guidelines and Policies.
14. After testing is complete and the approved device or assembly is onsite and ready to install then the blank flange and ball valve used for testing may be removed and the shut-off valves and device or assembly may be installed.
15. The Backflow Prevention Devices shall be protected from freezing, flooding, mechanical damage, vandalism, shall be easily accessible, and shall not have any stored goods, merchandise, materials, refuse, or installed equipment in a manner that will obstruct testing, inspection, and maintenance purposes unless otherwise approved by the Commission.

16. Installation of a Backflow prevention device below grade in a pit or chamber is prohibited unless approved by the Commission and installed as provided in 310 CMR 22.22.

    (a) It is preferable that all Back Flow Prevention Devices be installed above grade, in buildings according to this Section of the Commission's Guidelines and Policies.

    (b) When a Back Flow Prevention Device cannot be installed inside a building then it shall be installed above grade, in a heated enclosure in accordance with the **Typical Ductile Iron Fire Service Detail in a Hot Box (W-13.13)**.

    (c) For seasonal services such as irrigation systems the enclosure may be unheated provided there is a maintenance plan to prevent the meter from freezing.

    (d) Enclosures shall be set on concrete pads

    - 2-inch and smaller copper tube services the concrete pad shall be 5-feet long, 3-feet wide, and 6-inches thick with 3-inch sleeves on each end centered on the pad and 6-inches from each end.
    - For 4-inch and larger ductile iron water services or fire services
    - For 4-inch and larger ductile iron water services the pad shall be 6-inches larger than the required enclosure and as thick as the manufacturer requires.
    - All pads shall have the top surface at least 2-inch above finish grade and sloped outwards.
    - The enclosure shall be anchored to the pad with a minimum of four (4) 3/8-inch by 5-inch L anchors.

    (e) Enclosures shall be provided in accordance with the SWSC's Material Specifications.

Section 10.2 Acceptance of Backflow Preventers

10.2.1 Turn-ons

1. Water Services or Fire Services, other than Residential, shall not be Turned-on until they are inspected by the Commissions Cross Control Inspectors in accordance with Section 4.5 of these Guidelines and Policies, unless otherwise approved in writing by the Cross Connection Inspector.
2. Water Services and Fire Services shall only be Turned-on by a Commission employee after the Cross Connection Inspector has approved the Backflow Preventer.

CHAPTER 11 SEWER MAINS AND APPURTENANCES

Section 11.1 Control of Work

11.1.1 General

1. Failure to meet the requirements of these Guidelines and Policies and/or the Material Specifications for materials may result in removal of the pipe, fittings, and/or appurtenances from the construction site and the rejection of its use by the Commission.
2. The new or proposed sanitary sewer main shall be located in the street in accordance with **Utility Separation Detail (W-01.0)**.
3. The new or proposed sanitary sewer main shall be bedded and installed in accordance with the **Trench Detail (S-01.0)**.
4. Collection system sewer pipe shall be at least 8-inches in diameter, shall be Polyvinyl Chloride (PVC) Gravity Pipe as specified in the Commission's Material Specifications unless otherwise approved by the Commission's Engineering and Technical Services.
5. Pipe used for building sewer pipe shall be at least 6-inches in diameter, shall be PVC Gravity Pipe as specified in the Commission's Material Specifications unless otherwise approved by the Commission's Engineering and Technical Services.
6. All pipe furnished shall be either in 13-foot, 18-foot, or 20-foot lengths, unless otherwise approved by the Commission.
7. All pipe and fittings furnished shall be clearly marked on the outside indicating name, manufacturer, nominal diameter, ASTM, schedule, and/or pipe or pressure class designation.
8. Typical collection system sewer pipe and building sewer pipe installations shall be as follows, unless otherwise approved by the Commission:

   (a) Collection system sewer pipe and building sewer pipe with less than 4-feet of cover shall be insulated cement lined thickness class 52 ductile iron pipe, bitumastic coated inside and out and as specified in the Commission's Material Specifications. Commission approval is required prior to the installation of sewer main with less than 4-feet of cover.

   (b) Collection system sewer pipe and building sewer pipe 4-feet to 15-feet of cover: shall be PVC standard dimension ration (SDR) 35 minimum, with a minimum pipe stiffness of 46 PSI. Pipe up to 15-inches in diameter shall

conform to ASTM 3034 and pipe 18-inches in diameter or larger shall conform to ASTM F679, and as specified in the Commission's Material Specifications, unless otherwise approved by the Commission.

(c) Collection system sewer pipe and building sewer pipe deeper than 15-feet, but less than 30-feet deep: shall be PVC SDR 26 thick wall minimum, with a minimum pipe stiffness of 115 PSI. Pipe up to 15-inches in diameter shall conform to ASTM 3034 and pipe 18-inches in diameter or larger shall conform to ASTM F679, and as specified in the Commission's Material Specifications, unless otherwise approved by the Commission.

(d) Collection system sewer pipe and building sewer pipe deeper than 30-feet: shall be approved by the Commission prior to installation.

9. Other pipes for Collection system sewer pipe and building sewer pipe installation that are acceptable to the Commission, but must be approved for use, are as follows:

   (a) Ductile Iron Pipe (DIP) as specified in the Commission's Material Specifications for water main installation and in CHAPTER 6 of these guidelines and Policies.

   (b) Reinforced Concrete Pipe (RCP) as specified in the Commission's Material Specifications.

   (c) High Density Polyethylene Pipe (HDPEP) as specified in the Commission's Material Specifications.

10. All pipes for collection system sewer pipe and building sewer pipe installation shall be the same material from manhole to manhole and/or building to main.

11. All pipes shall be laid at the grade, depth, and as indicated on the approved plans. Inspections cannot take place unless a set of approved plans are at the construction site.

12. Manholes shall be in accordance with Pre-cast Concrete Sewer Manhole and Pipe Connection Details (S 02.0, S-02.1, S-02.2, S-02.3, S-02.4, and S-02.5).

13. When new or proposed sanitary sewer main or other utility crosses a water main or other utility requiring protection, the main shall be encased in concrete and installed in accordance with the Utility Crossing Detail (S-03.0), unless otherwise approved by the Commission.

14. Commission Construction Crews and Installers shall restore or install pavement in accordance with CHAPTER 8 of these Guidelines and Policies, unless otherwise approved by the Commission.

15. Commission Construction Crews shall notify the Commission Construction Crew responsible for pavement restoration the amount of pavement to be installed at the end of each week.

11.1.2 Labor, Materials, and Equipment

1. The Installer shall furnish labor, materials, and equipment that is appropriate to accomplish quality work in an efficient and timely manner. Sufficient resources must be committed to the work to ensure a rate of progress that will enable completion within established timelines.
2. All equipment requiring special licenses shall be operated only by persons who possesses a current, valid license for that piece of equipment

11.1.3 Private Land

1. The Commission Construction Crew or Installer will have to enter private land and private residences in order to accomplish the work. The Commission Construction Crew or Installer shall plan the work to ensure the Owner or the Owner's authorized representative is on site to permit the Commission Construction Crew or Installer and his/her employee's access to the premises.
2. The Commission Construction Crew or Installer must ensure that premises are left neat and clean after job completion.
3. In most homes and businesses, the Commission Construction Crew or Installer must take all necessary precautions to ensure that theft or damage does not occur during work activities.

11.1.4 Supervision

1. The Installer shall have, on site, at all times during the work activities, a full time competent Foreman who shall be in charge of the project. This Foreman shall be the agent for the Installer on site, and shall coordinate inspections, record keeping, future work, and other issues with the Field Inspector assigned by the Commission to okay and inspect the work.
2. The Installer shall notify the Commission in writing whenever there is a change in Foremen.

11.1.5 Existing Underground Utilities and Structures

1. The Commission Construction Crew or Installer shall refer to Section 5.3 of these Guidelines and Policies for more information concerning DIG SAFE.

2. The Commission Construction Crew or Installer shall determine the location or absence of all underground utilities, and plan and conduct his work operations to ensure that those utilities shall not be damaged.

3. The Commission Construction Crew or Installer shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, and services to buildings, mail boxes, utilities, gas pipes, water pipes, hydrants, sewers, drains, and cables, whether on private or public property.

4. Any damage resulting from the Installer's operations shall be repaired at the Installer's expense.

11.1.6 Delivery, Storage, and Handling

1. New pipe, fittings, and other appurtenances shall be delivered to the construction site as close in time to installation as possible.

2. All pipe shall be shipped with lifts separated by work separators such that, pipe to pipe contact is prevented during the transit and/or storage of the pipe.

3. Care shall be taken during the loading, trucking, unloading and handling of all pipe, fittings, and other appurtenances so as not to damage the materials or surrounding area.

   (a) Pipe, fittings, and other appurtenances shall not be dropped directly from the truck to the ground.

   (b) The Commission's Construction Crew or Installer is responsible for any pipe, fittings, and other appurtenances damaged during delivery, handling or storage.

   (c) A pipe clamp with protective coating is a preferred means to handle pipe, but forks may be used during the unloading process provided care is taken not to damage the pipe. Forks shall not be used in the interior of the pipe to handle pipe.

   (d) All damaged materials will be removed from the site immediately.

4. All pipe, fittings, and other appurtenances shall be stored in a manner that prevents water on the ground and / or animals from entering the material and prevent damage to the material and / or others' property.

5. All pipe and fittings shall be carefully lowered into the trench piece by piece by means of a boom, straps, or other suitable tools or equipment, in such a manner as to prevent damage to materials and protective coatings or linings.

(a) Under no circumstances shall chains be used or material be dropped or dumped into trench.

(b) Use of forks to handle pipe at construction sites is not allowed,

6. Pipe may not be strung along the line of work unless approved by a Commission representative. Materials must be stored in such a manner that it does not obstruct driveways, sidewalks, etc.

7. All pipe, fittings, and other appurtenances shall be stored in a manner that prevents water on the ground (run-off or puddles), debris, and/or animals from entering the material and prevent damage to the material and/or others' property.

   (a) Pipe may not be strung along the line of work unless approved by a Commission representative.

   (b) Materials must be stored in such a manner that it does not obstruct driveways, sidewalks, etc.

   (c) The Installer shall contact the Department of Public Works having jurisdiction to determine if it is permitted to string materials along the roadway of the work.

   (d) Materials that have had water, debris, and/or animals will be removed from the site.

8. All pipe and fittings shall be carefully lowered into the trench piece by piece by means of a boom, straps, or other suitable tools or equipment, in such a manner as to prevent damage to materials and protective coatings or linings.

   (a) Under no circumstances shall chains be used, or material be dropped or dumped into trench.

   (b) Use of forks to handle pipe at construction sites is not allowed. Unless approved by the Commission.

11.1.7 Trenching

1. Excavate trench to ensure sides of trench are stable. Slope trench walls or provide support in conformance with the CHAPTER 5 Safety of these Guidelines and Policies and the Commission's Health and Safety Policies.

2. Do not lay or embed pipe in standing or running water. At all times, prevent runoff and/or surface water from entering trench.

3. When ground water is present in the work area, dewater trench area to maintain stability of existing trench and imported materials. The water level shall be

maintained below pipe bedding and foundation of the trench to provide a stable trench bottom. Use, as appropriate, sump pumps, well points, deep wells, geo-fabrics, perforated under-drains, or stone blankets of sufficient thickness to remove and control water in the trench. Maintain and control water in the trench before, during, and after the pipe installation, until the embedment is installed and sufficient backfill has been placed to prevent flotation of the pipe.

4. Where trench walls are stable, or support is provided the minimum trench width shall be no greater than needed to perform the work properly and safely. The space between the trench wall and pipe shall be wider than the compaction equipment to be used in the pipe zone. Minimum trench width shall be the greater of: (1) 16-inches plus the diameter of the pipe installed or (2) the pipe diameter times 1.25 plus 12-inches.

5. When supports, such as those required in CHAPTER 5 of these Guidelines and Policies, are used then support of the pipe and embedment shall be maintained throughout the installation. The support shall be kept tight to against the trench wall to ensure the trench wall does not wash out.

6. When required by the Commission trench support shall be left in place but shall be cut off a minimum of 4-feet below finish grade.

7. Movable trench wall supports shall not disturb the installed pipe and its embedment when being moved. Embedment shall be compacted before trench wall supports are moved. When trench wall supports are moved finish placing and compacting embedment.

Section 11.2 Product Installation - Polyvinyl Chloride (PVC) Sewer Pipe

1. Pipe installations shall conform to, but not limited to, these Guidelines and Policies, ASTM D2321, ASTM 3034, AWWA C-900, and AWWA C-905.

2. Comply with Section 11.1 of these Guidelines and Policies, the following shall be adhered to.

11.2.1 Laying Polyvinyl Chloride (PVC) Sewer Pipe

1. Pipe and materials shall be provided with all necessary equipment and incidentals required to install and test PVC pipe and fittings for sewer conveyance uses.

2. PVC Pipe is not intended to be continuously stored in direct sunlight. The Contractor shall be responsible for providing an area, close to the area of work, to protect the PVC Pipe from damage due to direct sunlight exposure.

3. Pipe shall be laid in accordance with **Trench Detail for Sewer Pipe (S-01.0)**.
4. Pipe and fittings shall be carefully cleaned with a dry cloth to remove all sand, mud, clay, oil, and/or ice to be left clean and dry. Every precaution shall be taken to prevent all foreign material from entering the pipe while it is being placed in the trench.
5. At times when pipe laying is not in progress, the open ends of the pipes shall be closed by a watertight plug or other means approved by the Commission's Authorized Field Representative. If water is in the trench, the seal shall remain in place until the trench is pumped dry. No pipe shall be laid in water or when, in the opinion of the Commission's Authorized Field Representative trench conditions are unsuitable.
6. Proper implements, tools, and facilities satisfactory to the Commission's Authorized Field Representative shall be provided and used by the Installer and/or the Commission's Construction Crew for the safe and convenient prosecution of the work.
7. All pipes shall be laid at the grade, depth, and as indicated on the approved Site Plans.
8. Pipe and fittings shall be placed in the trench with the invert conforming to the elevations, slope, and depth as indicated on the approved Site Plans. Bell holes shall be provided in the bedding to ensure uniform pipe support.
9. All pipe ends shall be marked to indicate the insertion stop position.
10. Push spigot into bell after properly applying lubricant according to jointing procedures below.

11.2.2 Jointing Polyvinyl Chloride (PVC) Sewer Pipe

1. Pipe shall be carefully jointed in conformity with the best practice and the detailed instructions of manufacturer.
2. All pipe ends shall be thoroughly cleaned prior to and during the jointing operation.
3. All joints shall be made with proper lubrication as specified by the manufacturer of the pipe.

11.2.3 Bedding and Backfilling Polyvinyl Chloride (PVC) Sewer Pipe

1. Pipe embedment and backfill shall be in accordance with **Trench Detail for Sewer Pipe (S-01.0).**

2. Pipe Bedding Material shall meet Class I ASTM D2321 embedment material that shall be ¾-inch crushed stone, according to the Commission's Material Specifications.

3. The pipe embedment material in the pipe zone shall be placed by hand and compacted under and around the pipe.

4. The pipe embedment material shall be placed in 6-inch layers above top of pipe and hand compact to a point 12-inches, minimum, above the top of pipe.

5. Materials placed in the Backfill Zone from the pipe embedment materials in the Pipe Zone shall be Common Borrow Fill, according to the Commission's Material Specifications and shall be mechanically compacted. Common Borrow Fill shall be free from large clods, rocks, and cinders.

6. Backfill shall be graded with the placement of suitable soil material, as determined by the Commission Representative, in 12-inch (maximum) layers compacted to 95% of the maximum density of the soil as determined by the Standard Proctor Test, AASHTO Designation T-99.

7. Any backfill area that does not conform to the above to the compaction requirement shall require the installation of ductile iron pipe, according to the Commission's Material Specifications, from manhole to manhole for sewer mains and along the entire service line run for Building Lateral Sewers.

11.2.4 Testing Polyvinyl Chloride (PVC) Sewer Pipe

1. The testing requirements for testing PVC sewer pipe are stated in the project specifications. Each Engineer will specify the type of tests required. The test could vary from a ball and cleaning test, a visual test, a leakage test, a low-pressure air test, infiltration or exfiltration test, or a pipe deflection test. Each test has its own specific methods. Testing is generally done between two consecutive manholes.

2. When testing, it is very important to make sure that the lines are clean. The ball test will usually accomplish this by flushing an appropriate size cleaning ball through the line.

3. Simple visual lamping with mirrors and lights can be used for visual tests, or a closed circuit television can also be used.

4. Leakage tests for sewer pipe shall be an air test in accordance with the following and the Standard Method for Pressure Testing Gravity Sewer Lines Form, attached in Section 0 of these Guidelines and Policies.

(a) It is extremely important that all branch connections be capped and secured before this type of test is attempted. Isolate the section of the sewer line to be tested by inflatable stoppers or other suitable test plugs.

(b) Plug or cap the ends of all branches, laterals, tees, wyes, and stubs to be included in the test to prevent air leakage. All plugs and caps shall be securely braced to prevent blow-out. One of the plugs or caps should have an inlet tap or other provision for connecting a hose to a portable air control source.

(c) Connect the air hose to the inlet tap and portable air control source. The air equipment shall consist of necessary valves and pressure gauges to control an oil-free air source and the rate at which air flows into the test section to enable monitoring of the air pressure within the test section.

(d) Air testing sewer line can be done with very low pressure. At no time will the air pressure exceed 5 PSI, unless otherwise approved by the Commission. Slowly introduce air into the section of pipe to be tested, until the air pressure is raised to approximately 4 psi and the test pipe section has stabilized. Disconnect the air supply and decrease the pressure to 3.5 psi before starting the test. Determine the time for a drop of 1 psi (3.5 psi to 2.5 psi), and compare this interval to the minimum specified pressure drop time from the following table to decide if the rate of air loss is within the allowable limits.

(e) Upon completion of the test, open the bleeder valve and allow all air to escape. Plugs should not be removed until all air pressure in the tested section has been reduced to atmospheric pressure.

5. Leakage tests may be infiltration and ex-filtration testing but shall be at the discretion of the Commission. Leakage will not exceed fifty gallons per inch of external pipe diameter per mile of pipe per day. Other requirements regarding level of water must be met to accomplish this kind of testing.

6. Proper placement and compaction of the backfill material in the embedment zone of the pipe in the installation process is the key to maintaining minimum deflection.

7. Deflection tests shall be taken at the discretion of the Commission with a proper size mandrel or sewer ball that is put through the pipe on a go or no-go basis. Again, it must be emphasized that to ensure accurate testing, the lines must be thoroughly cleaned prior to testing.

8. In deflection testing, the maximum allowable pipe deflection (which is reducing the vertical inside diameter) is 7 1/2%.

9. Other specific testing details may be found in the ASTM D-2321 Specification on the Standard Recommended Practice for Underground Installations of PVC Sewer Pipe, or in the PVC pipe installation chapter of the Handbook of PVC Pipe Design and Construction Manual published by the Uni-Bell Plastic Pipe Association.

Section 11.3 Product Installation – Ductile Iron (DI) Pipe and Fittings

1. Pipe installations shall conform to, but not limited to, these Guidelines and Policies, ASTM A746-03, AWWA C-104, AWWA C-110, AWWA C150, AWWA C-151, and/or AWWA C153.
2. Comply with Section 11.1 of these Guidelines and Policies and the following shall be adhered to.

11.3.1 Laying and Jointing Ductile Iron (DI) Pipe

1. No deflection at the joints is allowed.
2. Accept for the deflection requirement above, all new or proposed DI sanitary sewer main shall be installed in accordance with Section 6.2.1 of these Guidelines and Policies, unless otherwise approved by the Commission.

11.3.2 Installing Ductile Iron (DI) Fittings

1. Restraint for push on joint pipe shall be "Locked-type" joints manufactured by the pipe and fitting manufacturer that utilize restraint independent of the joint gasket. Restraint for mechanical joint pipe shall use retainer glands for restraining joint. All restrained joints shall be suitable for the specified conditions and shall be as recommended by the manufacturer. The required lengths of restrained joints shall be as specified by the Commission.
2. Fittings shall have, as a minimum, the same pressure rating of a connecting pipe.
3. Closures shall be made with mechanical joint ductile iron solid sleeves and shall be located in straight runs of pipe at minimum cover outside the limits of restrained joint sections. Location of closures shall be as directed by the Commission.
4. In addition to the above, all new or proposed DI sanitary sewer fittings shall be installed in accordance with Section 6.2.7 of these Guidelines and Policies, unless otherwise approved by the Commission.

11.3.3 Installing Couplings for use with Ductile Iron (DI) Pipe

All sleeve type couplings used in the installation or repair of new, existing, or proposed DI sanitary sewer main shall be installed in accordance with Section 6.2.10 of these Guidelines and Policies, unless otherwise approved by the Commission.

11.3.4 Bedding and Backfilling Ductile Iron (DI) Pipe and Fittings

All new or proposed DI sanitary sewer main shall be bedded and backfilled in accordance with Section 6.2.1 and Section 11.2.3 of these Guidelines and Policies, unless otherwise approved by the Commission.

11.3.5 Testing Ductile Iron (DI) Pipe and Fittings

All new or proposed DI sanitary sewer main shall be tested in accordance with Section 11.2.4 of these Guidelines and Policies, unless otherwise approved by the Commission.

Section 11.4 Sanitary Sewer Manholes

11.4.1 General

1. Manholes installed in the Commission's collection system shall be in accordance with the following details:

   (a) Pre-cast Concrete Sewer Manhole shall be installed in accordance with **Pre-cast Concrete Sewer Manhole Detail (S-02.0)**.

   (b) Pre-cast Concrete Sewer Manhole Pipe Connections shall be installed in accordance with **Pre-cast Concrete Sewer Manhole Pipe Connections Detail (S-02.1)**.

   (c) End of sewer mains shall terminate in a manhole. End of sewer mains shall be installed in accordance with **Pre-cast Concrete Sewer Manhole Detail (S-02.0), Pre-cast Concrete Sewer Manhole Pipe Connections Detail (S-02.1), and End of Sewer Main Detail (S-02.2)**.

   (d) Connections to manholes requiring an external connection shall be installed in accordance with **External Drop Manhole Detail (S-02.3)**.

   (e) Connections to manholes requiring an internal connection shall be installed in accordance with **Internal Drop Manhole Detail (S-02.4)**.

2. Pre-cast Concrete Manholes and all materials used in its construction and structures shall be constructed to the dimensions shown on the Design Drawings,

as specified herein, and in accordance with the Commission's Material Specifications, unless otherwise approved by the Commission.

3. Pre-cast Manholes shall be provided in 4-foot, 5-foot, and 6-foot diameter in accordance with the Commission's Material Specifications. All other diameters must be approved by the Commission.

   (a) The minimum diameter manhole allowed is 4-feet.

(b) The maximum pipe diameter allowed is defined in the following table.

Diameter (feet)	Wall Thickness (inches)	Base Thickness (inches)	Max Pipe* (RCP) Diameter Allowed (inches)	Max Pipe* (DI/PVC) Diameter Allowed (inches)
4	5	6	18	24
5	6	8	30	36
6	7	8	36	48

* Pipe diameter may vary depending on number of penetrations.

(c) Internal drop manholes, installed along sanitary sewer mains, shall be at least 6-feet in diameter.

(d) Internal drop manholes, installed for Building Sewer Connections, typically are not allowed, but may be considered on a case-by-case basis if other connection options are not feasible.

4. Pre-cast Concrete Manholes shall be at no more than 300-feet apart and at all changes in diameter, material, slope, and direction.

11.4.2 Pre-cast Concrete Manholes

1. Surfaces of Pre-cast Concrete Manholes and structures shall be painted with two coats of bituminous damp proofing at the rate of 30 to 60 sq ft per gallon, in accordance with manufacturer's instructions.

2. Pre-cast Concrete Manholes bases shall be placed on a bed of 12-inches of crushed stone ¾-inch. Manhole base grades shall be set so that any required grade adjustment to bring the manhole frame and cover to final grade does not exceed 8-in.

3. All work shall be protected at all times against flooding and/or flotation. Cast-in-place bases, if required, shall be constructed in accordance with the manufacturer's recommendations.

4. Pre-cast Concrete Manholes concrete barrel sections and structures shall be set plumb with a 1/4-in maximum out of plumb tolerance allowed. The inside of any leaking barrel section joint shall be caulked with lead wool or non-shrink grout to the satisfaction of the Commission or its representative.

5. Jointing of Pre-cast Concrete Manholes sections and structures sections shall be accomplished with butyl rubber joint sealant gasket in accordance with the Commission's Materials Specifications installed at the bell and spigot joints of each section, unless otherwise approved by the Commission.

   (a) All installation surfaces shall be clean and dry.

   (b) Apply one (1) continuous bead of sealant around the periphery of the joint by pressing the bead firmly into place. Remove backing paper as the installation progresses.

   (c) Use of primer is required when temperatures are below 40-degrees F and/or the concrete is damp.

   (d) Extremely wet conditions require the installation to have two (2) beads applied in the same manner as above.

6. Seal tongue and groove joints of pre-cast manhole sections with rubber O-ring gasket installed per the manufacturer's instructions in a recessed groove.

7. The outside and inside joint of tongue and groove manhole sections shall be filled with non-shrink mortar and finished flush with the adjoining surfaces.

8. Joints shall be allowed to set for at least 14 hours before backfilling unless a shorter period is specifically approved by the Commission or its representative.

9. Holes required for handling in the concrete barrel sections shall be plugged with a non-shrinking grout, or concrete plugs in combination with non-shrinking grout. Finish flush on the inside.

10. Holes in pre-cast sections shall be cut to accommodate pipes prior to setting manhole sections in place to prevent jarring that may loosen the mortar joints.

11. Pre-cast manhole sections shall have a formed, tapered circular opening larger than the intended pipe size (outside diameter).

12. Integrally cast knockout panels shall be provided at locations where indicated by the Commission or shown on Design Drawings. Sizes shall be adequate for intended pipe sizes. Knockout panels shall have no steel reinforcing.

13. Backfill shall be laid and compacted carefully and evenly around manhole sections.

14. The Commission will visually inspect manholes for possible leaks before backfilling of manholes is allowed. All joints shall be sealed satisfactorily for the Commission.

15. Connections into the manhole shall be in accordance with **Pre-cast Concrete Sewer Pipe Connection Details (S-02.1)** and the following:

    (a) Flexible sleeve - Integrally cast sleeve in pre-cast manhole section or install sleeve in a formed or cored opening. Fasten pipe in sleeve with stainless steel clamp(s). Coat stainless steel clamp(s) with bituminous material to protect from corrosion.

    (b) Grout in place - Grout around the pipe connection where a formed, tapered circular opening is larger than the pipe outside diameter.

11.4.3 Testing Pre-cast Concrete Manholes

1. Each manhole shall be tested for leakage. An exfiltration test or a vacuum test may be used.

2. The exfiltration test is as follows:

    (a) Assemble manhole in place; fill and point all lifting holes and exterior joints within 6-feet of the ground surface with an approved non-shrinking mortar. Test prior to placing the shelf and invert and before filling and pointing the horizontal joints below 6-feet of depth. Lower ground water table below bottom of the manhole for the duration of the test. Plug all pipes and other openings into the manhole and brace to prevent blow out

    (b) Fill manhole with water to the top of the cone section. If the excavation has not been backfilled and no water is observed moving down the surface of the manhole, then the manhole is satisfactorily watertight.

    (c) If the manhole fails the initial test, necessary repairs shall be made with a non-shrink grout. Retesting as described below shall proceed until a satisfactory test is obtained.

3. The vacuum test in shall be accordance with the following and the Standard Method for Concrete Sewer Manhole Vacuum Test Form, attached in Section 15.1.7 of these Guidelines and Policies.

    (a) After a manhole has been constructed, and before the frame and cover have been installed, the Contractor shall conduct a Manhole Acceptance Test using the following vacuum test procedure:

    (b) Plug all lift holes with an approved non-shrink grout.

    (c) Plug all pipes entering the manhole, taking care to securely brace the plug from being drawn into the manhole.

(d) The test head shall be placed at the inside of the top of the concrete cone section and the seal inflated in accordance with manufacturer's recommendations.

(e) Draw a vacuum of 10-inches of mercury (Hg) and shut off the vacuum pump. With the valves closed, the time shall be measured for the vacuum to drop to 9-inches. Use the following table to determine minimum test times for various manhole diameters and depths.

(f) If the manhole fails the initial test, necessary repairs shall be made with a non-shrink grout. Retesting shall proceed until a satisfactory test is obtained.

4. If the manhole excavation has been backfilled before the test, or if the test results, as described above are unsatisfactory to the Commission or its representative, then continue with the test as follows:

   (a) A period of time shall be permitted to allow for absorption. Following this period, refill manhole to the top of the cone, and allow at least 8-hours to pass. At the end of the test period, refill the manhole to the top of the cone again, measuring the volume of water added. Extrapolate the refill amount to a 24-hour leakage rate. The leakage for each manhole shall not exceed one gallon per vertical foot for a 24-hour period. If the manhole fails this requirement, but the leakage does not exceed three gallons per vertical foot per day, repairs by manufacturer recommended methods shall be made and as directed by the Commission. A retest shall follow. If leakage due to a defective section of joint exceeds three gallons per vertical foot per day, the manhole shall be rejected, replaced, and retested.

   (b) No adjustment in the leakage allowance will be permitted for unknown causes such as leaking plugs, absorptions, etc. It will be assumed that all loss of water during the test is a result of leaks through the joints or through the concrete.

5. An infiltration test may be substituted for an exfiltration test if the ground water table is above the highest joint in the manhole. If there is no leakage into the manhole as determined by the Commission or its representative, the manhole will be considered water-tight. If the Commission is not satisfied, testing shall be performed as described above.

6. All new Pre-cast Concrete Manholes shall be thoroughly cleaned of all silt, debris, and foreign matter of any kind, prior to final inspections.

11.4.4 Brick Masonry:

1. In all manholes, the invert channel within the structure shall be an inverted arch with bricks laid as stretchers and on edge and so constructed as to conform in shape to the lower half of the pipe.

2. In manholes, an arch shall be constructed over the inlet and outlet pipes with bricks laid as headers and on edge.

3. The shelf in the manholes shall consist of bricks laid flat and the top of the shelf shall be at the elevation of the top of the pipe, in accordance with **Pre-cast Concrete Sewer Manhole Detail (S-02.0)**, and shall be sloped toward the channel.

11.4.5 Manhole Frame and Cover:

1. Manhole frame and covers shall be installed in accordance with **Pre-cast Concrete Sewer Manhole Detail (S-02.0)**.

2. Pre-cast concrete grade rings and/or brick and non-shrink mortar shall be used to adjust manhole frame and cover to final grade.

3. The inside and outside of pre-cast concrete grade rings and/or brick shall be sealed with hydraulic cement.

4. Under no circumstances shall barrel blocks be allowed.

5. Castings shall be set in non-shrink grout. Non-shrink grout shall be placed all around casting to 4-inches above flange.

6. Castings shall be thoroughly cleaned and subject to hammer inspection.

Section 11.5 Repair of Sewer Mains and Building Sewer Connections

1. Sewer Mains and Building Sewer Connections shall be repaired in accordance with **Building Sewer Connection and Sewer Main Repair Detail (S-04.0)**, unless otherwise approved by the Commission.

2. Sewer Mains and Building Sewer Connections repairs and all materials used in its construction and structures shall be constructed to the dimensions shown on the Design Drawings, as specified herein, and in accordance with the Commission's Material Specifications, unless otherwise approved by the Commission.

CHAPTER 12 BUILDING SEWER CONNECTIONS

12.1.1 General

1. Typically, Building Sewer Connections installed in the Commission's collection system shall be connected to sewer mains and in accordance with the following details, unless otherwise approved by the Commission:

   (a) Building Sewer Connections to be connected to an existing sewer main shall be installed in accordance with **Existing Sewer Main to Building Sewer Connection Detail (S-04.0)**.

   (b) Building Sewer Connections to be connected to a new sewer main shall be installed in accordance with **New Sewer Main to Building Sewer Connection Detail (S-04.1)**.

   (c) Building Sewer Connections longer than 100-feet require a clean out that shall be installed in accordance with **Clean Out with Sweep Detail (S-04.2)**.

   (d) Building Sewer Connections to sewer mains 12-feet deep or greater require a chimney that shall be installed in accordance with **Building Sewer Connection with Chimney Detail (S-04.3)**.

   (e) Building Sewer Connections that conflict with the location of a new or existing utility require an offset that shall be installed in accordance with **Building Sewer Connection to Sewer Main with Conflicts Detail (S-04.4)**.

2. The Commission may allow Building Sewer Connections that require an external drop connection into a Sanitary Sewer Manhole with prior approval from the Commission' E&TS and the following:

   (a) Building Sewer Connections that require connection to a manhole shall be installed in accordance with **External Drop Manhole Detail (S-02.3),** unless otherwise approved by the Commission.

   (b) Building Sewer Connections that require an external drop manhole connection shall be installed in accordance with Section 11.4, unless otherwise approved by the Commission.

3. The Commission may allow Building Sewer Connections by an internal drop connection into a Sanitary Sewer manhole with prior approval from the Commission's E&TS and the following:

   (a) Building Sewer Connections that require an internal drop connection, typically are not allowed, but may be considered on a case-by-case basis, and only if the other connection options are not feasible.

(b) Building Sewer Connections that require an internal drop connection shall be installed in accordance with **Internal Drop Manhole Detail (S-02.4)**, unless otherwise approved by the Commission.

(c) Building Sewer Connections that require an internal drop connection shall be installed in accordance with Section 11.4, unless otherwise approved by the Commission.

4. Building Sewer Connections and all materials used in its construction and structures shall be constructed to the dimensions shown on the Design Drawings, as specified herein, and in accordance with the Commission's Material Specifications, unless otherwise approved by the Commission.

12.1.2 Building Sewer Connections

1. Pipe used for building sewer pipe shall be at least 6-inches in diameter, shall be PVC Gravity Pipe as specified in the Commission's Material Specifications unless otherwise approved by the Commission's Engineering and Technical Services.

   (a) All Building Sewer Connections shall be installed in accordance with these Guidelines and Policies and in accordance with the Massachusetts State Plumbing Code.

   (b) When a conflict in minimum diameters exists these Guidelines and Policies shall govern.

2. Building Sewer Pipes running from the main sewer line to the building being serviced are installed in the same manner as the main line using proper installation procedures.

3. If main line full wyes have been installed, put the correct bend into the outlet of the wye and lay the service line to the building, making the connection at that point.

4. It is extremely important when making the connection to the main that proper bedding and compaction is done at the point of connection to prevent any movement, collapse, or deflection.

5. If the full wye has not been installed in the line, a saddle type wye must be installed on the pipe to gain entry for the service line. Care must be exercised when preparing the main line for this saddle.

6. The saddle wye has a unique centering ring feature. A template is provided which is placed on the main line and a hole cut to the exact size.

7. When the hole is completed, use care to clean, making sure that no rough edges remain.
8. Stainless steel galvanized straps will be used to secure the wye in position after the solvent has been applied to the saddle and the pipe.
9. The fitting or bend needed to make the correct position of the service line can then be placed and the service line laid to the unit.
10. Typically, horizontal deflection on the Building Sewer Pipe shall not exceed 45-degrees.
    (a) Each single 45-degree horizontal bend shall require a clean out up stream of the bend.
    (b) Any combination of lesser bends that creates horizontal deflection(s) greater than 45-degrees shall require a clean out up stream of the bends for each 45-degrees of deflection.
11. The same method of carefully trenching, placing, and backfilling done on the main lines shall be in practice on the service lines.
12. Commission construction Crews and Installers shall restore or install pavement in accordance with CHAPTER 8 of these Guidelines and Policies, unless otherwise approved by the Commission.
13. Commission Construction Crews shall notify the Commission Construction Crew responsible for pavement restoration the amount of pavement to be installed at the end of each week.

CHAPTER 13 SEWER PUMP STATIONS

Section 13.1 SUBMERSIBLE SEWAGE PUMP STATIONS

13.1.1 General

1. The submersible pumping station shall be provided in accordance with the Commission's Material Specifications, unless otherwise approved by the Commission.
2. All materials, equipment and incidentals required to install wastewater pumping stations shall be provided with all related interior piping and electrical works as specified herein and in accordance with the **Pre-cast Wet Well and Valve Vault Detail (S-06.0)**, unless otherwise approved by the Commission.
3. The Installer shall coordinate his/her operations and those of the supplier of the pumping station such that the site is excavated, and the stations materials delivered and installed in accordance with the manufacturer's recommendations.

13.1.2 Pump Station Chambers – Wet Well and Valve Vault

1. The underground pump station chambers shall be of reinforced concrete construction, in accordance with the Commission's Material Specifications and provided in accordance with the **Pre-cast Wet Well and Valve Vault Detail (S-06.0),** unless otherwise approved by the Commission.
2. The underground pump station chambers shall be installed as recommended by the manufacturer and/or as detailed by the design engineer.
3. Pre-cast concrete base shall be installed as recommended by the manufacturer and/or as detailed by the design engineer.
4. The valve vault shall be designed with a minimum internal vertical clearance of 7-feet.

13.1.3 Pump Station Controls and Ancillary Equipment

1. The Pumps Station Controls and Ancillary Equipment shall be in accordance with the Commission's Material Specifications and provided in accordance with the **Pre-cast Wet Well and Valve Vault Detail (S-06.0),** unless otherwise approved by the Commission.
2. Pumps Station Controls and Ancillary Equipment shall be installed as recommended by the manufacturer and/or detailed by the design engineer.

13.1.4 Pump Station Control Panels

1. The Pumps Station Control Panels shall be in accordance with the Commission's Material Specifications and provided in accordance with the **Pre-cast Wet Well and Valve Vault Detail (S-06.0),** unless otherwise approved by the Commission.
2. Pumps Station Control Panels shall be installed as recommended by the manufacturer and/or detailed by the design engineer.

13.1.5 Pump Station Communication System

1. The pump station shall be equipped with radio contact and SCADA system for relay of alarms and monitoring signals to pump station operator.
2. Radio/SCADA systems must be compatible with the Springfield Water and Sewer Commission Operator's system, namely United Water (UW). Contact UW at (413) 732-0293 for coordination of design/procurement of communications equipment.

13.1.6 Pump Station Piping and Valves

1. The Pump Station Piping and Valves shall be in accordance with the Commission's Material Specifications and provided in accordance with the **Pre-cast Wet Well and Valve Vault Detail (S-06.0),** unless otherwise approved by the Commission.
2. Pump Station Piping and Valves shall be installed as recommended by the manufacturer and/or as detailed by the design engineer.
3. Ductile iron (DI) pipe shall be used for sewer pump station piping and shall be in accordance with the **Pre-cast Wet Well and Valve Vault Detail (S-06.0)** and as specified herein, unless otherwise approved by the Commission.

13.1.7 Pressure Gauges

1. The Pump Station Pressure Gauges shall be in accordance with the Commission's Material Specifications and provided in accordance with the **Pre-cast Wet Well and Valve Vault Detail (S-06.0),** unless otherwise approved by the Commission.
2. Pump Station Pressure Gauges shall be installed as recommended by the manufacturer and/or as detailed by the design engineer.
3. Pump Station Pressure Gauges shall be installed in tapped holes provided in the discharge pipes located in the valve vault, upstream of each check valve.
4. Tapped holes shall be 1/4-inch NPT.

13.1.8 Vent

1. The Pump Station Vents shall be in accordance with the Commission's Material Specifications and provided in accordance with the **Pre-cast Wet Well and Valve Vault Detail (S-06.0),** unless otherwise approved by the Commission.
2. Pump Station Vents shall be installed as recommended by the manufacturer and/or as detailed by the design engineer.
3. Pump Station Vents shall be located in the top section of the wet well with the inlet facing down and at least 3-feet above finish grade.

13.1.9 Emergency Power Generation

1. The Pump Station Emergency Power Generation shall be in accordance with the Commission's Material Specifications unless otherwise approved by the Commission.
2. Pump Station Vents shall be installed as recommended by the manufacturer and/or as detailed by the design engineer.
3. Pump station shall be equipped with a stand-by emergency power generation source.
4. The power generator housing shall consist of a concrete structure. Prefabricated housing units may be proposed for the Commission's consideration.
5. Type of fuel, storage capacity, and storage location shall be approved by the City of Springfield Fire Department.

13.1.10 Pump Station Site

1. Pump station site shall be protected by means suitable to prevent access to pump station structures, electric panels, fuel tank, etc.
2. At minimum, the site shall be enclosed by an 8-foot fence (6-feet of fence and 2-feet of barbed wire).
3. Adequate lighting shall be included in the design to ensure safety to operators at all access points to the station structures.
4. Site layout shall meet all City of Springfield zoning requirements.
5. Site layout shall include a minimum 10-foot width paved access ways to pump station entrance, vaults, generator building access doors, fuel tank, and other locations, if any, as directed by the Commission.

6. Minimum clearance for fuel tank shall be in accordance with the City of Springfield Fire Department requirements and/or directive.
7. Signage shall conform to the Springfield Water and Sewer Commission requirements.

13.1.11 Submittals

Submittals shall be in accordance with Section 4.1 of these Guidelines and Polices and in accordance with the Commission's Material Specifications.

CHAPTER 14 LOW PRESSURE SEWER PUMP STATIONS

Section 14.1 Low Pressure Sanitary Sewer (LPSS) Systems

14.1.1 Low Pressure Sanitary Sewer – General

1. The LPSS main is the portion of the LPSS system collecting sewer service laterals and shall be located within the public right of way or within an easement granted, and formalized with the registry of deeds, to the Springfield Water and Sewer Commission (Commission).
2. LPSS mains shall include the LPSS main pipe, flushing cleanout manholes, main valves, service tees, and connection to an outlet manhole discharging to the existing gravity sewer system.
3. LPSS systems shall be designed by the project owner's professionally licensed consulting engineer and approved by the Commission.
4. All LPSS main installs shall be reviewed and inspected by the Commission.
5. Upon project completion, inspection, testing, acceptance, and the warranty period the Commission assumes ownership and operation of the LPSS main.
6. LPSS system layout shall be such that there is no vertical high point requiring an air relief valve.
7. All materials used for the pressure portion of these systems must be pressure rated at a minimum of 160 psi operating pressure and suitable for the wastewater environment and resistant to corrosion.
8. All metal components shall be 316 stainless steel and hardware shall be 304 stainless steel unless otherwise specified herein or approved by the Commission.

14.1.2 Low Pressure Sanitary Sewer – Mains < 3 inch Diameter

1. LPSS pipe shall be provided in accordance with the Commission's Material Specifications and installed in accordance with the **Low Pressure Sanitary Sewer Pipe Trench Detail (S-09.2),** and these Guidelines and Policies, unless otherwise approved by the Commission.
2. LPSS mains shall be installed in straight segments such that there are no horizontal alignment deviations. If a horizontal alignment change is required, a flushing manhole shall be installed at the horizontal alignment change in accordance with the **Low Pressure Sanitary Sewer Main Inline Flushing Detail (S-09.4),** unless otherwise approved by the Commission.

3. The discharge point of LPSS system shall be to a manhole on the exiting gravity wastewater collection system and may require replacement or upgrade of the Commission's exiting collection system, by the LPSS project owner, as determined by the Commission. The connection to the discharge point manhole shall be cored at same elevation as spring line of effluent gravity sewer pipe and a minimum of 2 inch annular space between LPSS. The cored hole shall be sealed watertight in accordance with the **Precast Concrete Sewer Pipe Connections Detail (S-02.1),** unless otherwise approved by the Commission. The brick invert and shelf of manhole shall be configured /modified to channel flows from LPSS main toward gravity pipe.

4. The LPSS main shall have a service lateral tee and corporation stop installed along the frontage of each and every property it passes by regardless of who owns the property or property level of development. No additional future service taps or tee installations will be allowed along the main which are not part of the original system design, unless allowed by the Executive Director.

5. LPSS mains shall be hydrostatically tested at one and a half times the maximum designed operating pressure. No pressure drop will be allowed for the 2 hour test duration.

6. Minimum bury depth shall be 6 inches below the average frost depth (48 inch) for a total of 54 inches. Pipe that is not installed at least 54 inches deep must be insulated. Pre-insulated pipe shall be required if insulated segments exceed 40 feet in length. Insulated segments under 40 feet in length may utilize field applied insulation.

7. Pipe shall be stored on clean, level ground to prevent undue scratching or gouging of the pipe. If the pipe must be stacked for storage, such stacking should be in accordance with the pipe manufacturer's recommendations. The pipe should be handled in such a manner that it is not damaged by being dragged over sharp objects or cut by chokers or lifting equipment.

8. Segments of pipe having cuts or gouges in excess of 10 percent of the wall thickness of the pipe shall be cut out and removed. The undamaged portions of the pipe shall be rejoined using the butt fusion joining method. Sections of polyethylene pipe should be joined into continuous lengths on the job site above ground. The joining method shall be the butt-fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt-fusion equipment used in the joining procedure shall be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, fusion temperature, alignment, and fusion pressure.

9. Fused segments of pipe shall be handled so as to avoid damage to the pipe. When lifting fused sections of pipe, chains or cable-type chokers should be avoided. Nylon slings are preferred. Spreader bars should be used when lifting long, fused sections. Care should be exercised to avoid cutting or gouging the pipe.

10. Assemble the compression fittings according to the fitting manufacturer's recommendations.

11. The trench and trench bottom should be constructed in accordance with ASTM D 2321. Embedment materials should be Class I, Class II or Class III materials as defined in ASTM D 2321. Bedding of the pipe should be performed in accordance with ASTM D 2321. Compaction should be as specified in ASTM D 2321.

12. Haunching and initial backfill should be as specified in ASTM D 2321 using Class I, Class II or Class III materials. In cases where a compaction of 85 percent Standard Proctor Density is not attainable, the Commission may wish to increase the SDR of the pipe to provide adequate stiffness. ASTM D 2321 sections titled "Minimum Cover for Load Application," "Use of Compaction Equipment" and "Removal of Trench Protection" shall apply, unless directed otherwise by the Commission.

14.1.3 Low Pressure Sewer System – Valves

1. Valves shall be sized to match LPSS main pipe diameter and shall be 316 stainless steel fully ported quarter turn ball valves, with a corrosion resistant handle and installed inside flushing manholes.

14.1.4 Inline Flushing Structure

1. The LPSS main shall include an inline flushing structure at every 500 feet of LPSS main installed and at all horizontal alignment changes. Flushing structures shall be located within the right of way and accessible by SWSC crews. Flushing structures shall not be within a driveway or in a location that would be impeded by snow storage.

2. All fittings and valves shall be restrained to the base of the structure using 3/4 inch 304 stainless steel rods set 3 inches into the base with anchoring epoxy, 304 stainless steel hardware, and 1/8 inch thick by 1 ½ inch thick anchor straps. Horizontal bends shall also be restrained with blocking/concrete against the interior walls of the structure.

3. Inline flushing structures shall be installed in accordance with the Low Pressure Sanitary Sewer Main Inline Flushing Structure Detail (S-09.4).

14.1.5 Terminal Flushing Structure

1. The LPSS main shall include a terminal flushing structure at the lowest elevation end of each LPSS main line to flush out the pipe as needed for maintenance. Flushing structures shall be located within the right of way and accessible by SWSC crews. It shall not be within a driveway or in a location that would be impeded by snow storage.
2. All valves and fittings within the terminal flushing structure shall be restrained at every 18 inches minimum to the base of the structure using ¾ inch 304 stainless steel rods set 3 inches into the base with anchoring epoxy, 304 stainless steel hardware, and 1/8 inch thick by 1 ½ inch thick anchor straps. The terminus of LPSS main pipe shall also be restrained with blocking/concrete against the interior wall of the structure.
3. Terminal flushing structures shall be installed in accordance with the **Low Pressure Sanitary Sewer Terminal Flushing Structure Detail (S-09.5)**.

14.1.6 Detectable Warning Tape

1. Detectable warning tape shall be installed 12-18 inches below grade to allow use of a metal detector for future field location during Dig Safe mark out. Detectable warning tape is required for all pressure sewer main installations.

Section 14.2 Low Pressure Sanitary Sewer Services

14.2.1 Low Pressure Sanitary Sewer Services – General

1. LPSS service laterals are owned, operated, and maintained by the property Owner. This includes all service and maintenance of the grinder pump unit, service piping, electrical equipment, control system, and appurtenances.
2. A LPSS service lateral is the portion of the LPSS system between the LPSS or gravity sewer main and the building. The LPSS service lateral shall include gravity piping from the building to the sewage grinder pump/wetwell unit, sewage grinder pump/wetwell unit, low pressure service piping from the sewage grinder pump/wetwell unit, to the low pressure sewer main, lateral valve and lateral check valve, service valve at the service tee along the low pressure sewer main.
3. LPSS service laterals with grinder pumps in commercial, industrial, and dense residential complex applications shall be designed and specified by the project's professionally licensed Engineer of Record and approved by SWSC.

4. LPSS service laterals with grinder pumps in low density residential applications, with up to two dwelling units, may be installed per the project owner's sewage grinder pump station's manufacturer and as approved by the SWSC.

5. LPSS service laterals shall be installed in accordance with the **LPSS Service Lateral Detail (S-09.3)**.

6. All LPSS service lateral installs shall be reviewed and inspected by SWSC.

7. It is the Owner's responsibility to not abuse the LPSS system by avoiding the disposal of materials which should not be introduced into a grinder pump system. These include but are not limited to: hazardous chemicals, flammable materials, gasoline, fats oils and grease, metal, sand, wood, cloth, cat litter, paint, sanitary products, floss, cleaning wipes, gravel, seafood shells, and syringes. Owner shall review their grinder pump system owner's manual for further information and details.

8. LPSS service laterals shall be hydrostatically tested at one and a half times the maximum system designed operating pressure. No pressure drop will be allowed for the 2 hour test duration.

9. All metal components shall be 316 stainless steel and hardware shall be 304 stainless steel unless otherwise specified herein or approved by the SWSC.

14.2.2 Low Pressure Sanitary Sewer Services – Laterals < 3 inch Diameter

1. Pipe and fitting material shall be one of the following SDR-21 PVC, Sch 40 PVC, or SDR-11 HDPE. Final determination of the type and size is the responsibility of the project owner's consulting engineer (MA P.E.) or the sewage grinder pump station's manufacturer and must be approved by the SWSC.

2. LPSS service laterals shall be hydrostatically tested at one and a half times the maximum system designed operating pressure. No pressure drop will be allowed for the 2 hour test duration.

3. Minimum bury depth shall be 6 inches below the average frost depth (48 inch) for a total of 54 inches. Pre-insulated pipe shall be required if insulated segments exceed 40 feet in length. Insulated segments under 40 feet in length may utilize field applied insulation.

14.2.3 Detectable Warning Tape

1. Detectable warning tape shall be installed 12-18 inches below grade to allow use of a metal detector for future field location during Dig Safe mark out. Detectable warning tape is required for all non-metal pressure sewer installations.

14.2.4 LPSS Service Lateral Curb Stop and Check Valve Assembly

1. A 304 or 316 stainless steel curb stop/check valve assembly shall be located 2 feet from face of curb and within the public right of way. The curb stop shall have an integral IK operating nut and be fully ported. The check valve shall have a flapper hinge which seats completely at low back pressure. The assembly shall be specifically designed for use with HDPE and PVC pressure sewer piping with female NPT at each end.

14.2.5 LPSS Service Lateral Valve Box

1. Installed over the Curb Stop/Check Valve Assembly shall be a buffalo style service box. The service box shall be heavy cast iron extension (adjustable) type, slide style, with arch pattern base and a recessed cover. The arch pattern base shall accommodate a curb stop matching size of lateral pipe.
2. LPSS service lateral valve box shall be installed in accordance with the Low Pressure Sanitary Service / Main Valve Box in Non-paved Areas Detail (S-09.1).

Section 14.3 Sewage Grinder Pump Station

14.3.1 Sewage Grinder Pump Station – General

1. This section is intended to establish the minimum criteria and requirements for private grinder pump stations installation on private property for sewer service for a location which cannot be served by gravity sewer.
2. The Owner is responsible for the design, procurement, delivery, installation, and maintenance of grinder pump station units.
3. Grinder pump stations shall conform to all state, federal, and local regulations, and meet accepted standards for plumbing equipment for use near residences. It shall be free from noise, odor, or health hazards, and shall have been tested by an independent laboratory to certify its capability to perform as specified in either individual or low pressure sewer system applications. As evidence of compliance with this requirement, the grinder pump shall bear the National Sanitation Foundation seal.
4. Sewage grinder pump stations and appurtenances are private structures that are to be owned, operated, and maintained by the property Owner.
5. The grinder pump station supplier, or manufacturer, and project Engineer of Record shall participate in the installation and start-up testing of the grinder pump station.

6. The grinder pump station shall be installed on the Owner's property.

CHAPTER 15 FORMS

Springfield Water and Sewer Commission

Guidelines and Policies

15.1.1 Commission Approved Contractor - Application Form

1. Date Application Submitted:_____

2. Type of Work to be Performed by Applicant: ☐ Water ☐ Sewer ☐ Both

3. Application Fee must be submitted with this completed application. This fee is non-refundable. The fee may be paid with a check or money order.

   Application Fee: ☐ $250.00 Received by: _____

   Renewal Fee: ☐ $100.00 Received by: _____

4. Applicant's Company Name: _____

   Owner:_____

   Business Address: _____

   _____

   Office Contact: _____

   Telephone Number: _____

   Fax Number: _____

   Email Address: _____

5. Applicant's Responsible Supervisors:

Name	Cellular Phone Number

6. Please provide a narrative description of the following:

   A. A brief company history indicating the Applicant has been in business for five (5) years installing and repairing water and/or sewer facilities.

   B. Briefly, discuss the Applicant's procedure and equipment for pressure testing water and sewer mains that indicate the Applicant's company has the proper equipment and method of work to successfully pressure test said mains and services in projects. Hiring of a subcontractor to perform the pressure test is allowed provided specific information about the subcontractor, such as Name, Company, Company's core business, address, phone number, name of responsible supervisor is submitted.

C. Briefly, discuss the Applicant's procedure and equipment for disinfecting water mains and services that indicate the Applicant's company has the proper equipment and method of work to successfully disinfect said mains and services in projects. Hiring of a subcontractor to perform the disinfecting is allowed provided specific information about the subcontractor, such as Name, Company, Company's core business, address, phone number, name of responsible supervisor is submitted. (Required for water work only)

_____

_____

_____

_____

_____

_____

D. List any applicable licenses (MA Master or Journeyman Plumber or Drinking Water Operator – Distribution 2 or higher License)

_____

_____

_____

_____

E. Proof of Required Bonding

Bonding Company _____

Telephone Number _____

Contact Person _____

☐ If the Applicant does not have MA Master/Journeyman Plumber License or a Drinking Water Operator – Distribution 2 or higher License the Bond Amount shall be $10,000.00

☐ If the Applicant does have MA Master/Journeyman Plumber License or a Drinking Water Operator – Distribution 2 or higher License the Bond Amount shall be $7,500.00

☐ If the Applicant does have both a MA Master/Journeyman Plumber License and a Drinking Water Operator – Distribution 2 or higher License the Bond Amount shall be $5,000.00

F. Proof of Required Insurance

Insurance Company _____

Telephone Number _____

Contact Person _____

☐ Workmen's Compensation, Employer's Liability Insurance, and Occupational Disease Insurance:

☐ Comprehensive General Liability Insurance: in an amount of not less than $250,000.00 for bodily injury insurance and accidental death insurance for each occurrence and not less than $100,000.00 for property damage insurance

☐ Automobile Public Liability Insurance in an amount of not less than $250,000.00 for bodily injury insurance and accidental death insurance for each occurrence and not less than $100,000.00 for property damage insurance.

G. Sign and date the form titled "Indemnity" attached in the Form Section of these Guidelines and Policies.

7. The Applicant shall provide references which shall list a minimum of five (5) Municipal projects that the Applicant has performed on Public Water Systems and/or Public Sewer, in the last five (5) years. The intent is to permit the Commission to contact parties for whom the Applicant has done Water System and/or Sewer System work in the immediate past. Start with your last or current project, detailing the immediate past five (5) projects. The reference is to include:

   A. Most recent or current project:

      Municipal Project:_____

      Description of services provided: _____

      _____

      _____

      Date the work was performed and date the work was completed: _____

      Point of Contact and Desk Top Telephone:

      _____

      Address:

      _____

B. Next recent or current project:

Municipal Project:_____

Description of services provided: _____

_____

_____

Date the work was performed and date the work was completed: _____

Point of Contact and Desk Top Telephone:

_____

Address:

_____

C. Next recent or current project:

Municipal Project:_____

Description of services provided: _____

_____

_____

Date the work was performed and date the work was completed: _____

Point of Contact and Desk Top Telephone:

_____

Address:

_____

D. Next recent or current project:

Municipal Project:_____

Description of services provided: _____

_____

_____

Date the work was performed and date the work was completed: _____

Point of Contact and Desk Top Telephone:

_____

Address:

_____

E. Next recent or current project:

Municipal Project:_____

Description of services provided: _____

_____

_____

Date the work was performed and date the work was completed: _____

Point of Contact and Desk Top Telephone:

_____

Address:

_____

15.1.2 Approved Contractor Safety Assurance Form

By signing this form, your company agrees to the following:

1. To abide by MGL Chapter 82 Sections 40 thru 40D also known as the Dig Safe Law.
2. The Commission is now part of DIG SAFE. Call 811 for mark out of Commission Facilities.
3. To abide by MGL Chapter 82A Section 1 also known as “Jackie’s' Law”.
4. To have all equipment operators licensed by the MA Department of Public Safety.
5. To ensure that ALL employees of the Company engaged in excavations have read and are familiar with Federal Safety Standards promulgated by OSHA on excavations: 29 CFR 1926, Subpart P “Excavations”.

Failure to comply with the above requirements may result in the removal from the Commission Approved Contractor List.

Contractor Name: _____
(PRINT FULL NAME)

Contractor Signature: _____ Date _____

15.1.3 Indemnity Form

The Commission Approved Contractor (Installer) shall save and hold harmless, indemnify, and defend the Springfield Water & Sewer Commission, its directors, officers, agents and employees from and against the following:

1. Any Liability, claim, suit, cost, loss, expense, fine, or damage of any kind allegedly suffered, incurred or threatened, either directly or through a third party, arising from the construction or installation of the Work including personal injury; death; property damage; inverse condemnation; patent and/or copyright infringement; damages arising from disputes as to licensing fees or the ownership of any land associated with the matters covered by this Agreement, any and all damages arising from the imposition of regulatory fines imposed for the violation of local ordinances, administrative regulations, or the like, in connection with the Work; or any combination of these, and regardless of whether or not such liability, claim, suit, cost, loss, expense, fine, or damage was unforeseeable at any time before acceptance of the improvements as completed, and including the defense of any suit(s), or other proceeding(s) concerning same.
2. The indemnification shall extend to and include any act or omission (negligent or no negligent) in connection with the matters covered by this Permit and attributable to the Owner, contractor, subcontractor, material supplier, or any officer, agent or employee of one or more of them, including, but not limited to, actions related to the construction, testing and connection of the Work and the ownership or use of real property.
3. Non-conditions: The covenants set forth in this Section are not conditioned or dependent on whether or not the Springfield Water & Sewer Commission has prepared, supplied, accepted, or approved any plan(s) or specification(s) in connection with this Work or has insurance or other indemnification covering any of these matters.

_____

Contractor's Signature

_____

Date

15.1.4 License Agreement Form

See next five (5) pages.

Springfield Water and Sewer Commission

Guidelines and Policies

LICENSE AGREEMENT
SANITARY SEWER MAIN EXTENSION
AND/OR
WATER MAIN EXTENSION

Revised October 3,2007

Agreement made this _____day of _____ 2008 by and between the SPRINGFIELD WATER AND SEWER COMMISSION (hereinafter referred to as the "COMMISSION"), a body politic incorporate and political subdivision of the Commonwealth of Massachusetts, with its offices at the 250 M St. Ext., Agawam, MA 01001, and

_____

(herein after referred to as "OWNER").

WHEREAS, the Owner has applied to the Commission for permission to construct the following;

- _____length in feet of 8-inch diameter Sanitary Sewer Main,
- _____length in feet of 10-inch diameter Sanitary Sewer Main,
- _____length in feet of 12-inch diameter Sanitary Sewer Main,
- _____length in feet of ___-inch diameter Sanitary Sewer Main,

and associated structures, as shown on the Plan and Profile entitled:

"_____",

Scale: 1 inch = ___ feet Date: _____, 200_, ___ revision ,

Prepared by: _____,

_____ said Plan and Profile being on file with the Commission.

WHEREAS, the Owner has applied to the Commission for permission to construct the following,

- _____length in feet of 6-inch diameter Water Main,
- _____length in feet of 8-inch diameter Water Main,
- _____length in feet of 12-inch diameter Water Main,
- _____length in feet of ___-inch diameter Water Main,
- _____tons of asphalt for paving restoration,

and associated structures, as shown on the Plan and Profile entitled:

"_____",

Scale: 1 inch = ___ feet Date: _____, 200_, ___ revision ,

Prepared by: _____,

_____ said Plan and Profile being on file with the Commission.

NOW, THEREFORE, in consideration of the grant of this license, the Owner agrees that the installation works shall comply with the Commission's latest version of the Rules and Regulations, Guidelines, Policies, and Specifications; and also meet the following key requirements:

1. To install said work in accordance with the approved Plans reviewed by the Commission.
2. To hire a Commission Approved Contractor(s) to install said work.
3. To notify the Commission a minimum of forty-eight (48) hours prior to commencing any activity, which requires Commission inspections and/or assistance.
4. To ensure all work requiring inspection gets inspected by a representative of the Commission.
5. To begin the installation of sewer and/or water pipe(s) called for on said Plans and Specifications, no later than two calendar years from date of Commission approval of said plans and specifications.
6. To indemnify, defend, and hold harmless the Commission, and all of its officers, agents and/or employees against all suits, claims or liability of every name and nature, for/or on account of any injuries to persons or damage to property arising out of, or in consequence of, any acts of the Owner in the performance of the work covered by this Agreement, whether by it/themselves, or its/their employees and/or sub-contractors, in respect of such injuries or damages sustained during the performance of, prior to the completion and acceptance of the installation, damage to property due to the Owner's construction means and methods, and restoration of property impacted by the Owner's performance of the work covered by this Agreement.
7. By entering into this License Agreement, the Commission makes no representation and grants no privileges or permits to the Owner to enter any private way for the purpose of installing said sanitary sewer and/or water main.
8. Any easements required for the construction, and / or continued operation of water and/or sewer main extensions shall be secured by the Owner, reviewed, and approved as to form and extents by the Commission as part of the License Agreement. Any easements through private property shall be in the name of the Owner during the construction and warranty period. Easements shall be recorded at the Hampden County Registry of deeds. After all mains are approved by the Commission, have completed the warranty period, and have been accepted by the Commission, shall be deeded to the Commission by the Owner. That deed shall be recorded in the Hampden County Registry of Deeds.

9. The following shall apply with respect to both water and/or sewer main extensions:

   (a) A main is approved for use, when the installation of a Public Water Main and/or Public Sewer main has been properly installed, completed, and passed all required inspections and tests according to the Commission's Guidelines and Policies.

   (b) A main is accepted, and become property of the Commission, only after the main installation of a Public Water Main and/or Public Sewer main has been approved for use, the warranty period has ended, and the Commission has received the "As-Built' plans in according with the Commission's Guidelines and Policies and any other required certification.

10. To furnish surety for Performance/Payment Bond and Maintenance Bond in the form of a Bond, Letter of Credit, or other Commission approved financial guarantee, made payable to the Springfield Water and Sewer Commission,

Description of Surety

Performance / Payment Bond (during construction period until all mains approved), in the amount of _____ dollars.

_____ Bond No. _____ – _____ Company.
(Bond Number & Surety Company)

Description of Surety

Maintenance Bond (after construction period from time of all main approvals until end of warranty period – one-year minimum), in the amount of _____

_____

_____ dollars.

+

(Bond Number & Surety Company)

NOTE: Originals of sureties shall be attached as part of this License Agreement for the Commission.

11. Building sewer connection and sanitary main testing shall proceed as per the Commission's Guidelines and Policies, with key tasks summarized as follows:

    (a) The sanitary main shall be extended from the existing or proposed sanitary manhole at the existing public collection system. The connection between public and private systems shall be plugged until approved by the Commission. Sanitary Wyes for Building Sewer Connections shall be installed integral with the main line construction.

    (b) Sanitary building sewer connections shall be stubbed out to street line, capped, braced, and marked at grade level so that all required testing procedures may occur. No Building Sewer Connections may be completed and tied into a service location until the sewer has passed all testing requirements and main is approved in writing by the Commission.

    (c) Upon completion of the sanitary sewer and service stubs, said sewer shall be tested for infiltration-exfiltration (pressure test).

    (d) A closed circuit television inspection of the sewer main shall be completed after the successful completion of the infiltration-exfiltration testing. Documentation of the results shall be submitted to the Commission by the Owner.

    (e) Upon successful completion of all requirements above and as stated in the Commission's Rules and Regulations, Guidelines, and Policies, the sanitary main extension shall be approved for final connection with Building Sewer Connections. No service connections will be allowed to homes / buildings until the sanitary main is approved for use in writing by the Commission

12. Water main testing shall proceed as per the Commission's Guidelines and Policies, with key tasks summarized as follows.

    (a) Upon completion of the water main installation, said water main shall be tested for leaks (pressure test) prior to approval by the Commission.

    (b) Upon successful completion of the leakage test, the water main shall be disinfected with liquid chlorine, flushed, and shall successfully pass two consecutive bacterial tests prior to approval of the water main by the Commission.

    (c) Upon successful completion of all requirements above and as stated in the Commission's Rules and Regulations, Guidelines and Policies, the water main extension shall be approved for final connection with Water Services to buildings.

13. In the event of a failure of water and/or sewer mains under any required testing, the Owner shall direct their contractor to remove and reinstall defective pipes and/or other system components and retest. All installation, repairs, and retesting shall take place at the Owner's expense.

14. If the Owner, or its contractor(s), fails to take needed prompt or corrective action during installation of the sewer and/or water pipe (in the opinion of the Executive Director of the Commission or authorized designees), the Commission shall make all repairs necessary or cause the same to be made. The cost for such repairs shall be paid by the Owner.

15. Upon successful completion of all sewer and water main testing requirements and approval of the water and sewer mains by the Commission, a minimum one year warranty period shall commence. If during the warranty period, defects become apparent, the Owner shall direct their contractor to effect repairs and replacements of defective pipes and other system components. Repairs and re-testing shall be required at the discretion of the Commission. The one year warranty period shall restart at the time of the completion of those repairs.

IN WITNESS WHEREOF, the Springfield Water and Sewer Commission and Owner have executed this Agreement on the day and year first above written.

SPRINGFIELD WATER AND SEWER COMMISSION:

_____	_____
Owner Signature	**Executive Director Signature**
_____	_____
_____	
Print Name and Title	**Print Name**
_____	_____
Print Date	**Print Date**
_____	250 M Street Extension, Agawam, MA 01001
Print Address	**Print Address**
_____	413-787-6256
Print Telephone Number	**Print Telephone Number**

Attachments: Performance / Payment Bond – By Owner
Maintenance Bond – By Owner

15.1.5 Inspection Form

Intentionally left blank for future use

15.1.6 Standard Method for Pressure Testing Gravity Sewer Lines Form

Location _____

Test Date _____

Installed By _____

Test Performed By _____

Inspector _____

ASTM Standard Method for Pressure Testing Gravity Sewer Lines

a. Isolate the section of the sewer line to be tested by inflatable stoppers or other suitable test plugs.

b. Plug or cap the ends of all branches, laterals, tees, wyes, and stubs to be included in the test to prevent air leakage. All plugs and caps shall be securely braced to prevent blow-out. One of the plugs or caps should have an inlet tap or other provision for connecting a hose to a portable air control source.

c. Connect the air hose to the inlet tap and portable air control source. The air equipment shall consist of necessary valves and pressure gauges to control an oil-free air source and the rate at which air flows into the test section to enable monitoring of the air pressure within the test section.

d. Slowly introduce air into the section of pipe to be tested, until the air pressure is raised to approximately 4 psi and the test pipe section has stabilized. Disconnect the air supply and decrease the pressure to 3.5 psi before starting the test. Determine the time for a drop of 1 psi (3.5 psi to 2.5 psi), and compare this interval to the minimum specified pressure drop time from the following table to decide if the rate of air loss is within the allowable limits.

e. Upon completion of the test, open the bleeder valve and allow all air to escape. Plugs should not be removed until all air pressure in the tested section has been reduced to atmospheric pressure.

Pipe Dia. (in.)	Minimum Time (min:sec)	Length for Min. Time (ft.)	Time for Various Length (sec)	Specification Time for Length (L) Shown (in min:sec)							
				100ft.	150ft	200ft	250ft	300ft	350ft	400ft	450ft
4	3:46	597	0.380L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33

Test Information

Diameter of Test Section (in inches) _____ Length of Test Section (in feet) _____

Allowable time for drop to 2.5 psi _____

Actual time for drop to 2.5 psi _____

Test Results

Passed (actual time > allowable time) _____ **Failed** (allowable time > actual time) _____

Springfield Water and Sewer Commission

Guidelines and Policies

15.1.7 Standard Method for Sewer Manhole Vacuum Test Form

Location _____

Test Date _____

Installed By _____

Test Performed By _____

Manhole Tested _____

Inspector _____

ASTM Standard Method for Concrete Sewer Manhole Vacuum Test

After a manhole has been constructed, and before the frame and cover have been installed, the Contractor shall conduct a Manhole Acceptance Test using the following vacuum test procedure:

Plug all lift holes with an approved non-shrink grout.

Plug all pipes entering the manhole, taking care to securely brace the plug from being drawn into the manhole.

The test head shall be placed at the inside of the top of the concrete cone section and the seal inflated in accordance with manufacturer's recommendations.

Draw a vacuum of 10 inches of mercury (Hg) and shut off the vacuum pump. With the valves closed, the time shall be measured for the vacuum to drop to 9 inches. Use the following table to determine minimum test times for various manhole diameters and depths.

If the manhole fails the initial test, necessary repairs shall be made with a non-shrink grout. Retesting shall proceed until a satisfactory test is obtained.

	Diameter (in Inches)								
Depth (in Feet)	**30**	**33**	**36**	**42**	**48**	**54**	**60**	**66**	**72**
	Time (in seconds)								
8	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	39	43	49
14	20	21	25	30	35	41	46	51	57
16	22	24	39	34	40	46	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	53	65	72	81
22	31	33	39	46	55	64	72	79	89
24	33	36	42	51	59	64	78	87	97
26	36	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	45	53	63	74	87	98	108	121

Test Information

Depth of Manhole (in feet & inches) _____ Diameter of Manhole (in inches) _____

Allowable time for drop to 9-inches of Hg _____

Actual time for drop to 9-inches of Hg _____

Test Results

Passed (actual time > allowable time) _____ **Failed** (allowable time > actual time) _____

15.1.8 Application for Crossing Water Transmission Mains

Applicant Name: _____ Date: _____

Address: _____

_____

_____

Telephone Number: _____ Fax Number: _____

Cellular Number: _____ Other Number: _____

Project Engineer Name: _____

Address: _____

_____

_____

Telephone Number: _____ Fax Number: _____

Cellular Number: _____ Other Number: _____

Address: _____

_____

_____

Location of Project: _____

_____

_____

Type of Crossing: _____

_____

_____

_____

_____

Other Alternatives Reviewed: _____

_____

_____

_____

_____

Attachments:	**Yes**	**No**
Signed/Stamped Plans:	_____	_____
Location Maps:	_____	_____
Project Description:	_____	_____
Material Specifications:	_____	_____
Permitting Requirements:	_____	_____
Other:	_____	_____

By Commission:

Reviewer's Name: _____ Date: _____

	Yes	**No**
Crossing less than 18-inches below Grade ($1,500)	_____	_____
Crossing greater than 18-inches below Grade ($5000)	_____	_____
Crossing Under Transmission Main ($10,000)	_____	_____

Reviewer's Comments: _____

_____

_____

_____

15.1.9 Fire Flow Test Form

STATIC & RESIDUAL HYDRANT:		
HYD#: TYPE: MAIN SIZE:		
STREET NAME		
LOCATION		
PRESSURE	GAUGE	OBSERVER
STATIC		
RESIDUAL		

DATE _____

TIME _____

TEMP. _____

WEATHER _____

WO # _____

FLOW HYDRANT(S):

HYDRANT NUMBER, TYPE, STREET NAME, AND LOCATION	MAIN SIZE IN INCHES	GAUGE NUMBER	NOZZLE SIZE IN INCHES	NUMBER OF NOZZLES	NOZZLE COEFFICIENT (0.9, 0.8, OR 0.7)	PITO READING OR PRESSURE IN PSI	FLOW IN GPMS	OBSERVER

FIRE FLOW TEST RESULTS

FLOW DURING TEST _____ in GPM **TIME FLOWED _____ in minutes**

AVAILABLE @ 20 PSI _____ in GPM **TOTAL FLOWED _____ in gallons**

REMARKS: _____

SPRINGFIELD WATER & SEWER INSPECTOR: _____

15.1.10 Fire Flow Discharge Table – Coefficient of Nozzle (C) = 0.9

Note: all discharges in Gallons per Minute (GPM) and all flows rounded to nearest GPM

Diameter of Nozzle	2-3/8-inch	2-7/16-inch	2-1/2-inch	2-9/16-inch	2-5/8-inch	4-1/2-inch
Pitot Gauge reading in PSI	2.375	2.4375	2.5	2.5625	2.625	4.5
1	151	160	168	176	185	544
2	214	226	237	249	262	769
3	262	276	291	305	320	942
4	303	319	336	353	370	1087
5	339	357	375	394	414	1216
6	371	391	411	432	453	1332
7	401	422	444	466	489	1438
8	428	451	475	499	523	1538
9	454	479	503	529	555	1631
10	479	504	531	557	585	1719
11	502	529	557	585	614	1803
12	525	553	581	611	641	1883
13	546	575	605	636	667	1960
14	567	597	628	660	692	2034
15	587	618	650	683	716	2106
16	606	638	671	705	740	2175
17	624	658	692	727	763	2242
18	642	677	712	748	785	2307
19	660	695	731	768	806	2370
20	677	713	750	788	827	2431
22	710	748	787	827	868	2550
24	742	781	822	864	906	2663
26	772	813	856	899	943	2772
28	801	844	888	933	979	2877
30	829	874	919	966	1013	2978
32	857	902	949	997	1046	3075
34	883	930	978	1028	1079	3170
36	909	957	1007	1058	1110	3262
38	934	983	1034	1087	1140	3351
40	958	1009	1061	1115	1170	3438
42	981	1034	1087	1142	1199	3523
44	1004	1058	1113	1169	1227	3606
46	1027	1082	1138	1196	1255	3687
48	1049	1105	1163	1221	1282	3767
50	1071	1128	1186	1247	1308	3844
52	1092	1150	1210	1271	1334	3920

C=0.09

Diameter of Nozzle	2-3/8-inch	2-7/16-inch	2-1/2-inch	2-9/16-inch	2-5/8-inch	4-1/2-inch
Pitot Gauge reading in PSI	2.375	2.4375	2.5	2.5625	2.625	4.5
54	1113	1172	1233	1295	1359	3995
56	1133	1194	1256	1319	1384	4068
58	1153	1215	1278	1343	1409	4140
60	1173	1236	1300	1366	1433	4211
62	1192	1256	1321	1388	1457	4281
64	1211	1276	1342	1410	1480	4349
66	1230	1296	1363	1432	1503	4417
68	1249	1315	1384	1454	1525	4483
70	1267	1335	1404	1475	1548	4549
72	1285	1353	1424	1496	1570	4613
74	1303	1372	1443	1516	1591	4677
76	1320	1391	1463	1537	1613	4739
78	1337	1409	1482	1557	1634	4801
80	1354	1427	1501	1577	1655	4863
82	1371	1444	1519	1596	1675	4923
84	1388	1462	1538	1616	1695	4983
86	1404	1479	1556	1635	1716	5042
88	1421	1496	1574	1654	1735	5100
90	1437	1513	1592	1672	1755	5158
92	1453	1530	1609	1691	1774	5215
94	1468	1546	1627	1709	1794	5271
96	1484	1563	1644	1727	1813	5327
98	1499	1579	1661	1745	1831	5382
100	1514	1595	1678	1763	1850	5437
102	1529	1611	1695	1780	1868	5491
104	1544	1627	1711	1798	1887	5544
106	1559	1642	1728	1815	1905	5597
108	1574	1658	1744	1832	1922	5650
110	1588	1673	1760	1849	1940	5702
112	1603	1688	1776	1866	1958	5753
114	1617	1703	1792	1882	1975	5805
116	1631	1718	1807	1899	1992	5855
118	1645	1733	1823	1915	2010	5906
120	1659	1747	1838	1931	2026	5955
122	1673	1762	1853	1947	2043	6005
124	1686	1776	1868	1963	2060	6054
126	1700	1790	1883	1979	2077	6102
128	1713	1805	1898	1994	2093	6151
130	1727	1819	1913	2010	2109	6199

C = 0.9

Diameter of Nozzle	2-3/8-inch	2-7/16-inch	2-1/2-inch	2-9/16-inch	2-5/8-inch	4-1/2-inch
Pitot Gauge reading in PSI	2.375	2.4375	2.5	2.5625	2.625	4.5
132	1740	1833	1928	2025	2125	6246
134	1753	1846	1942	2041	2141	6293
136	1766	1860	1957	2056	2157	6340
138	1779	1874	1971	2071	2173	6386
140	1792	1887	1985	2086	2189	6433
142	1805	1901	1999	2101	2204	6478
144	1817	1914	2014	2115	2220	6524
146	1830	1927	2027	2130	2235	6569
148	1842	1941	2041	2145	2251	6614
150	1855	1954	2055	2159	2266	6658
152	1867	1967	2069	2173	2281	6703
154	1879	1979	2082	2188	2296	6747
156	1891	1992	2096	2202	2311	6790
158	1903	2005	2109	2216	2325	6834
160	1916	2018	2122	2230	2340	6877

15.1.11 Fire Flow Discharge Table – Coefficient of Nozzle = 0.8

Note: all discharges in Gallons per Minute (GPM) and all flows rounded to nearest GPM

Diameter of Nozzle	2-3/8-inch	2-7/16-inch	2-1/2-inch	2-9/16-inch	2-5/8-inch	4-1/2-inch
Pitot Gauge reading in PSI	2.375	2.4375	2.5	2.5625	2.625	4.5
1	135	142	149	157	164	483
2	190	201	211	222	233	683
3	233	246	258	271	285	837
4	269	284	298	313	329	966
5	301	317	334	350	368	1081
6	330	347	365	384	403	1184
7	356	375	395	415	435	1279
8	381	401	422	443	465	1367
9	404	425	447	470	493	1450
10	426	448	472	496	520	1528
11	446	470	495	520	545	1603
12	466	491	517	543	570	1674
13	485	511	538	565	593	1742
14	504	531	558	586	615	1808
15	521	549	578	607	637	1872
16	538	567	597	627	658	1933
17	555	585	615	646	678	1992
18	571	602	633	665	698	2050
19	587	618	650	683	717	2106
20	602	634	667	701	735	2161
22	631	665	700	735	771	2267
24	659	695	731	768	806	2367
26	686	723	761	799	838	2464
28	712	750	789	829	870	2557
30	737	777	817	858	901	2647
32	761	802	844	886	930	2734
34	785	827	870	914	959	2818
36	808	851	895	940	987	2899
38	830	874	919	966	1014	2979
40	851	897	943	991	1040	3056
42	872	919	967	1016	1066	3132
44	893	941	989	1039	1091	3205
46	913	962	1012	1063	1115	3278
48	933	982	1033	1086	1139	3348
50	952	1003	1055	1108	1163	3417
52	971	1022	1076	1130	1186	3485

C = 0.8

Diameter of Nozzle	2-3/8-inch	2-7/16-inch	2-1/2-inch	2-9/16-inch	2-5/8-inch	4-1/2-inch
Pitot Gauge reading in PSI	2.375	2.4375	2.5	2.5625	2.625	4.5
54	989	1042	1096	1152	1208	3551
56	1007	1061	1116	1173	1231	3616
58	1025	1080	1136	1193	1252	3680
60	1043	1098	1155	1214	1274	3743
62	1060	1116	1174	1234	1295	3805
64	1077	1134	1193	1254	1316	3866
66	1094	1152	1212	1273	1336	3926
68	1110	1169	1230	1292	1356	3985
70	1126	1186	1248	1311	1376	4043
72	1142	1203	1266	1330	1395	4100
74	1158	1220	1283	1348	1415	4157
76	1173	1236	1300	1366	1434	4213
78	1189	1252	1317	1384	1452	4268
80	1204	1268	1334	1402	1471	4322
82	1219	1284	1351	1419	1489	4376
84	1234	1299	1367	1436	1507	4429
86	1248	1315	1383	1453	1525	4481
88	1263	1330	1399	1470	1543	4533
90	1277	1345	1415	1487	1560	4584
92	1291	1360	1431	1503	1577	4635
94	1305	1375	1446	1519	1594	4685
96	1319	1389	1461	1535	1611	4735
98	1333	1404	1477	1551	1628	4784
100	1346	1418	1492	1567	1644	4832
102	1359	1432	1506	1583	1661	4881
104	1373	1446	1521	1598	1677	4928
106	1386	1460	1536	1613	1693	4975
108	1399	1473	1550	1628	1709	5022
110	1412	1487	1564	1643	1725	5068
112	1425	1501	1578	1658	1740	5114
114	1437	1514	1592	1673	1756	5160
116	1450	1527	1606	1688	1771	5205
118	1462	1540	1620	1702	1786	5249
120	1475	1553	1634	1717	1801	5294
122	1487	1566	1647	1731	1816	5338
124	1499	1579	1661	1745	1831	5381
126	1511	1592	1674	1759	1846	5424
128	1523	1604	1687	1773	1860	5467
130	1535	1617	1701	1787	1875	5510

C = 0.8

Diameter of Nozzle	2-3/8-inch	2-7/16-inch	2-1/2-inch	2-9/16-inch	2-5/8-inch	4-1/2-inch
Pitot Gauge reading in PSI	2.375	2.4375	2.5	2.5625	2.625	4.5
132	1547	1629	1714	1800	1889	5552
134	1558	1641	1727	1814	1904	5594
136	1570	1653	1739	1827	1918	5636
138	1581	1666	1752	1841	1932	5677
140	1593	1678	1765	1854	1946	5718
142	1604	1690	1777	1867	1960	5759
144	1615	1701	1790	1880	1973	5799
146	1626	1713	1802	1893	1987	5839
148	1638	1725	1814	1906	2000	5879
150	1649	1737	1827	1919	2014	5919
152	1660	1748	1839	1932	2027	5958
154	1670	1760	1851	1945	2041	5997
156	1681	1771	1863	1957	2054	6036
158	1692	1782	1875	1970	2067	6074
160	1703	1793	1887	1982	2080	6113

C = 0.8

15.1.12 Fire Flow Discharge Table – Coefficient of Nozzle = 0.7

Note: all discharges in Gallons per Minute (GPM) and all flows rounded to nearest GPM

Diameter of Nozzle	2-3/8-inch	2-7/16-inch	2-1/2-inch	2-9/16-inch	2-5/8-inch	4-1/2-inch
Pitot Gauge reading in PSI	2.375	2.4375	2.5	2.5625	2.625	4.5
1	118	124	131	137	144	423
2	167	175	185	194	203	598
3	204	215	226	237	249	732
4	236	248	261	274	288	846
5	263	277	292	307	322	945
6	289	304	320	336	352	1036
7	312	328	345	363	381	1119
8	333	351	369	388	407	1196
9	353	372	392	411	432	1269
10	372	392	413	434	455	1337
11	391	411	433	455	477	1402
12	408	430	452	475	498	1465
13	425	447	471	494	519	1525
14	441	464	488	513	538	1582
15	456	480	505	531	557	1638
16	471	496	522	548	576	1691
17	486	512	538	565	593	1743
18	500	526	554	582	610	1794
19	513	541	569	598	627	1843
20	527	555	584	613	643	1891
22	552	582	612	643	675	1983
24	577	608	639	672	705	2071
26	601	633	665	699	734	2156
28	623	656	691	726	761	2237
30	645	680	715	751	788	2316
32	666	702	738	776	814	2392
34	687	723	761	800	839	2466
36	707	744	783	823	863	2537
38	726	765	804	845	887	2607
40	745	785	825	867	910	2674
42	763	804	846	889	932	2740
44	781	823	866	910	954	2805
46	799	841	885	930	976	2868
48	816	860	904	950	997	2930
50	833	877	923	970	1017	2990
52	849	895	941	989	1038	3049
54	866	912	959	1008	1057	3107

C = 0.7

Diameter of Nozzle	2-3/8-inch	2-7/16-inch	2-1/2-inch	2-9/16-inch	2-5/8-inch	4-1/2-inch
Pitot Gauge reading in PSI	2.375	2.4375	2.5	2.5625	2.625	4.5
56	881	928	977	1026	1077	3164
58	897	945	994	1044	1096	3220
60	912	961	1011	1062	1115	3275
62	927	977	1028	1080	1133	3329
64	942	993	1044	1097	1151	3383
66	957	1008	1060	1114	1169	3435
68	971	1023	1076	1131	1186	3487
70	985	1038	1092	1147	1204	3538
72	999	1053	1107	1163	1221	3588
74	1013	1067	1123	1179	1238	3637
76	1027	1082	1138	1195	1254	3686
78	1040	1096	1153	1211	1271	3734
80	1053	1110	1167	1226	1287	3782
82	1067	1123	1182	1242	1303	3829
84	1079	1137	1196	1257	1319	3875
86	1092	1151	1210	1272	1334	3921
88	1105	1164	1224	1286	1350	3967
90	1117	1177	1238	1301	1365	4011
92	1130	1190	1252	1315	1380	4056
94	1142	1203	1265	1329	1395	4100
96	1154	1216	1279	1343	1410	4143
98	1166	1228	1292	1357	1424	4186
100	1178	1241	1305	1371	1439	4228
102	1190	1253	1318	1385	1453	4270
104	1201	1265	1331	1398	1467	4312
106	1213	1277	1344	1412	1481	4353
108	1224	1289	1356	1425	1495	4394
110	1235	1301	1369	1438	1509	4435
112	1246	1313	1381	1451	1523	4475
114	1258	1325	1393	1464	1536	4515
116	1269	1336	1406	1477	1550	4554
118	1279	1348	1418	1489	1563	4593
120	1290	1359	1430	1502	1576	4632
122	1301	1370	1441	1514	1589	4670
124	1312	1382	1453	1527	1602	4709
126	1322	1393	1465	1539	1615	4746
128	1333	1404	1477	1551	1628	4784
130	1343	1415	1488	1563	1641	4821
132	1353	1425	1499	1575	1653	4858

C = 0.7

Diameter of Nozzle	2-3/8-inch	2-7/16-inch	2-1/2-inch	2-9/16-inch	2-5/8-inch	4-1/2-inch
Pitot Gauge reading in PSI	2.375	2.4375	2.5	2.5625	2.625	4.5
134	1363	1436	1511	1587	1666	4895
136	1374	1447	1522	1599	1678	4931
138	1384	1457	1533	1611	1690	4967
140	1394	1468	1544	1622	1702	5003
142	1404	1478	1555	1634	1715	5039
144	1413	1489	1566	1645	1727	5074
146	1423	1499	1577	1657	1739	5109
148	1433	1509	1588	1668	1750	5144
150	1443	1519	1598	1679	1762	5179
152	1452	1530	1609	1690	1774	5213
154	1462	1540	1620	1702	1786	5247
156	1471	1550	1630	1713	1797	5281
158	1480	1559	1640	1723	1809	5315
160	1490	1569	1651	1734	1820	5349

C = 0.7

15.1.13 Values for Pressures Raised to the .54 Power

PSI	PSI RAISED TO THE .54 POWER	PSI	PSI RAISED TO THE .54 POWER	PSI	PSI RAISED TO THE .54 POWER	PSI	PSI RAISED TO THE .54 POWER
1	1.00	41	7.43	81	10.73	121	13.33
2	1.45	42	7.53	82	10.80	122	13.39
3	1.81	43	7.62	83	10.87	123	13.44
4	2.11	44	7.72	84	10.94	124	13.50
5	2.38	45	7.81	85	11.01	125	13.56
6	2.63	46	7.90	86	11.08	126	13.62
7	2.86	47	8.00	87	11.15	127	13.68
8	3.07	48	8.09	88	11.22	128	13.74
9	3.28	49	8.18	89	11.29	129	13.79
10	3.47	50	8.27	90	11.36	130	13.85
11	3.65	51	8.36	91	11.43	131	13.91
12	3.83	52	8.45	92	11.49	132	13.97
13	4.00	53	8.53	93	11.56	133	14.02
14	4.16	54	8.62	94	11.63	134	14.08
15	4.32	55	8.71	95	11.69	135	14.14
16	4.47	56	8.79	96	11.76	136	14.19
17	4.62	57	8.88	97	11.83	137	14.25
18	4.76	58	8.96	98	11.89	138	14.31
19	4.90	59	9.04	99	11.96	139	14.36
20	5.04	60	9.12	100	12.02	140	14.42
21	5.18	61	9.21	101	12.09	141	14.47
22	5.31	62	9.29	102	12.15	142	14.53
23	5.44	63	9.37	103	12.22	143	14.58
24	5.56	64	9.45	104	12.28	144	14.64
25	5.69	65	9.53	105	12.34	145	14.69
26	5.81	66	9.61	106	12.41	146	14.75
27	5.93	67	9.68	107	12.47	147	14.80
28	6.05	68	9.76	108	12.53	148	14.86
29	6.16	69	9.84	109	12.60	149	14.91
30	6.28	70	9.92	110	12.66	150	14.97
31	6.39	71	9.99	111	12.72	151	15.02
32	6.50	72	10.07	112	12.78	152	15.07
33	6.61	73	10.14	113	12.84	153	15.13
34	6.71	74	10.22	114	12.90	154	15.18
35	6.82	75	10.29	115	12.97	155	15.23
36	6.92	76	10.37	116	13.03	156	15.29
37	7.03	77	10.44	117	13.09	157	15.34
38	7.13	78	10.51	118	13.15	158	15.39
39	7.23	79	10.59	119	13.21	159	15.44
40	7.33	80	10.66	120	13.27	160	15.50

CHAPTER 16 CROSSING COMMISSION TRANSMISSION MAINS, EASEMENTS, OR PROPERTY

16.1.1 Description of Commission Transmission Mains

The following general descriptions of the three Transmission Mains are as follows:

1. BETWEEN WEST PARISH FILTRATION PLANT AND PROVIN MOUNTAIN:

   (a) 42" Lock Bar Riveted Steel pipe, seven miles long, (1909) either 3/8" or 5/16" plate. Cement lined in 1960.

   (b) 51 5/8" Welded Steel pipe [12,500 feet], fabricated from smaller sizes with Dresser Coupling Joints (1943) generally less than 1" wall thickness. Remainder of this main is 48" Welded Steel pipe [25,900 feet] with Dresser Coupling Joints (1948)

   (c) 60" Lock Joint Prestressed Cylinder Pipe [39,000 feet] (1963) with 6" concrete wall.

2. BETWEEN PROVIN MOUNTAIN AND SPRINGFIELD:

   (a) 42" Lock Bar Riveted Steel pipe five miles long through Agawam and West Springfield (1909) either 3/8" or 5/16" plate. Cement lined in 1960.

   (b) 48" [2.5-miles] and 54" [3.4-miles] of Vianini Pre-Stressed Concrete Cylinder with push-on joints and about 6" wall thickness installed 2014 and [0.3-miles] of Electrically Welded Steel pipe with riveted girth generally less than 1" wall thickness installed in 1928 and C&L in 2014. The Right of Way through Agawam is owned by the Commission.

   (c) 60" Lock Joint Prestressed Cylinder Pipe five miles long through Agawam and West Springfield (1957) with 6" concrete wall. The right of way for this Main is generally thirty feet.

16.1.2 Application Procedure for Crossing Commission Transmission Mains

1. The Applicant should contact the Commission's Engineering and Technical Services indicating the location and general nature of the proposed crossing. This initial contact should include why this crossing is needed and should discuss what other locations or alternatives have been investigated which would be possible without the necessity of crossing the Commission's transmission mains, easements, or property.

2. In the event that the Applicant wishes to pursue the proposal, the Applicant will be required to complete the Application for Crossing Commission Transmission Mains, Easements, or Property, attached in Section 15.1.8 of these Guidelines and Policies. Payment of the application fee does not ensure that the proposed project will be approved by the Commission.

3. The following information will be required by the Application for Crossing Transmission Mains, Easements, and Property:

   (a) Nature of the request including type of utility crossing, whether above or below the grade of the Transmission Main(s), type of material, sizes, and other pertinent information.

   (b) Location maps, preferably Assessors Maps and USGS topographic maps, indicating the property in question for the crossing.

   (c) Plan and profile, if available, showing relationship between Transmission Main(s) and proposed crossing and details of access to and use of Commission Property or easement and how said property or easement and transmissions main(s) shall be protected.

   (d) Names, addresses, telephone and fax numbers of Applicant and Project Engineer.

   (e) Discussion why Commission property or easements must be crossed and what other alternatives have been investigated by the Applicant which do not include crossing of the Commission's Transmission Mains.

16.1.3 Submittals Required to Crossing Commission Transmission Mains

1. The Applicant for Crossing of Commission Transmission Mains, Easements, or Property must submit a Proposed Site Plan(s) for review, comments, and potential approval by the Commission.

2. The Commission reviews Proposed Site Plan(s) and other plan(s), as appropriate to determine compliance with Commission Rules and Regulations, the Guidelines and Policies, and the Commission's Material Specifications.

3. The Applicant's engineer may contact the Commission for copies of records of existing water and sewer mains and services.

4. The Commission needs one (1) Proposed Site Plan for draft review and comment and after the draft is approved, five (5) Final Site Plans shall be submitted.

5. A License Agreement(s), according to the Commission's Rules and Regulations shall be submitted after the Final Site Plan has been approved and before access or construction can begin.

6. The Commission, at its discretion, may require additional design requirements based on site conditions, capacity issues, existing infrastructure materials, and/or other unknown conditions.

7. No work or access shall commence prior to, or without, the written approval of the Commission. All approvals are solely at the discretion of the Commission.

16.1.4 Minimum Design Standards Required to Cross Commission Transmission Mains

1. Applicants will be required to dig test pits, witnessed by Commission Inspectors, to determine the actual location and depths of main(s).

2. Soil borings may also be required to determine the actual site conditions. Crossings, which involve all three of the Commission's Transmission Mains, shall be held to a higher standard to maintain structural integrity due to the potential for more catastrophic consequences of any failures.

3. Because of the Commission's requirement for clearance between the Transmission Mains and any other utility piping (as specified below) and because of the generally shallow cover (3-feet to 6-feet) over the Mains, the following requirements assume that all crossings are below the Transmission Mains. In certain site-specific locations, crossings may be technically possible above the Transmission Mains and would be reviewed by the Commission subject to the applicable requirements below; as well as, any other limitations pertinent to that site. The requirements listed below assume that all crossings are to be jacked; however, micro tunneling can be a viable option for Applicants to consider in some situations.

   (a) Prior to the commencement of work, the contractor will be required to hire an experienced civil/geotechnical engineer to design the entire jacking operation, to include the dewatering design of the jacking and receiving pits, the steel sleeve, the jacks, the loads on the reaction box and the installation schedule. This design shall be submitted to the Commission on a stamped plan prior to the commencement of work.

   (b) The Commission shall require that the following requirements be incorporated into bidding specifications and construction plans as appropriate:

   (c) The Commission shall require all crossings to be jacked or micro tunneled under the water Transmission Mains.

(d) All sewer and water pipes shall be installed in a steel casting sleeve jacked beneath the water Transmission Mains. The contractor shall be required to perform any additional test pits as required at both sides of the casing sleeve to ensure familiarity with the soil and to determine the actual horizontal and vertical control and to locate any additional utilities which might be in the area. Based on the test pit results, the contractor shall adjust the alignment of the sleeve in the field to avoid any interference with the existing water lines or other utilities. The contractor shall determine the maximum clearance possible between the top of the steel sleeve and the actual bottom of the existing water Transmission Mains. Any potential field adjustments shall be reported to the Commission prior to commencing with the jacking operation.

(e) The Commission requires a minimum of two (2) feet clearance between the top of the steel casing and the bottom of a Transmission Main. The Commission would prefer that any jacking under all three mains be conducted on the side of the main with the least amount of clearance.

(f) Specifications for the work should include requiring the contractor to install sufficient dewatering wells to lower the groundwater at least two feet below the invert of the jacked sleeve. Observation wells need to be included to ensure that this is accomplished. It is important to ensure that materials are not washed into the proposed steel sleeve during installation. This could result in voids, ultimate settlement of the water mains, and potential rupture.

(g) Before any work is begun within the limits of jacking, the contractor shall have assembled all material, tools and equipment which will be required. The Commission, local DPW, Town or City Engineers, abutters, and other interested parties shall be notified at least 72 hours, excluding weekends and holidays, prior to jacking so that representatives can be present during the jacking operation. When the contractor has started the jacking operation, the contractor will proceed in a continuous operation without stopping until the casing sleeve installation is complete.

(h) Steel sleeve shall meet or exceed ASTM A252 Grade 2 and welded with AWS D1.1 Standards. The steel in the pipe must meet or exceed 35,000 psi minimum yield strength, and 60,000 psi minimum tensile strength. Pipe shall be in 20’ 0” lengths beveled for welding and square end cut. Contractor shall submit pipe manufacturer certification to the Commission for review.

(i) Sewer pipe shall meet requirements of AWWA C151 (Hub type) and gasket material shall meet AWWA C111 (Similar to American Fastite Joint pipe). Contractor shall submit to the Commission for review.

(j) The contractor must use extreme caution when working around the existing Transmission Mains. Transmission Mains shall be protected from possible

damage from contractors equipment. Crossing the mains with equipment is to be minimized and only with one inch, or greater, thick steel construction plates with a minimum size of 8' by 10' or other approved means of distributing loads shall be used to prevent heavy loads being placed directly on the pipelines. Extra heavy equipment may require removable concrete pads over the Main(s) as may be required by the Commission's Engineer. Any such crossing areas shall not be construed as a "construction highway" to other areas of the project.

(k) The Applicant shall obtain from the appropriate local community Public Works Director or Engineer assurance that the proposed sewer or water main is sized to meet reasonably expected future demands. The purpose of this requirement is to ensure that another crossing of the Transmission Mains in the immediate area will not be required because of additional growth or subsequent subdivisions.

(l) No construction, temporary work or grade changes shall be permitted on Commission property or easements unless and until a License Agreement is executed between the Commission and the Applicant.

(m) Gravity sewers crossing under the Transmission Mains shall have concrete manhole structures constructed at the terminus of each end of the steel casing sleeve with suitable joint sealants and connections as designed by a Registered Professional Engineer. Suitable seals shall be provided around the pipes inside the manholes to prevent any liquids from "piping" around the casing sleeve under the Transmission Mains from the manhole. It is the preference that these manholes be constructed outside the property line or easement boundary where practical.

(n) Gravity sewer lines may be shimmed to final plan grade and elevation by use of pressure treated lumber secured to the ductile iron pipe on four sides with steel bands. Flowable grout fill in a continuous pour shall be injected into the steel casing to fill all voids between the steel casing and the sewer pipe.

(o) The Commission would prefer that pressurized sewers and water pipes not cross over, or under, its Transmission Mains due to the accelerated damages possible in the event of failure. The Commission reserves the right to institute stricter controls for these utility types.

(p) Water mains crossing under the Transmission Mains shall have suitable valves located adjacent to the Commission's property line or easement boundary to allow for prompt shutdown in any future emergency. The intent is to lessen the flow from a third parties water main leak or rupture as promptly as possible to avoid total undermining of the Transmission Mains and catastrophic failure. Flowable grout fill in a continuous pour shall be injected into the steel casing to fill all voids between the steel casing and the ductile iron water pipe.

(q) In the event that rock or other obstructions hinder the advancement of the casing, the auger shall be removed and a manual attempt to remove the obstruction will be made. If it is determined that it is either unwise or impossible to remove an obstruction, the casing shall be filled with concrete grout and abandoned.

(r) These guidelines have neither been approved by the Commissioners nor should they be construed as amending or altering the Policy adopted by the Commissioners relative to this issue. These guidelines are meant to provide additional initial guidance to prospective Applicants and indicate the types of specific requirements which will be incorporated into any approvals for such crossings, including any Plans and Specifications developed by Project Applicants' Engineer(s). All parties to any crossing shall note that all approvals for crossings are made at the sole discretion of the Commission.

(s) Upon receipt of the formal request for access as outlined in the "Procedure" section of the Commission Policy, the Commission will furnish location plan of Transmission Main(s) in question with approximate depth(s).

Springfield Water and Sewer Commission

Guidelines and Policies