Part 1 General

1.1 RELATED SECTIONS

.1 Section 22 05 00 - Common Work Results for Plumbing.

.2 Section 22 11 16 - Domestic Water Piping.

.3 Section 23 08 02 - Cleaning and Start-Up of Mechanical Piping Systems.

.4 Section 33 11 16 - Site Water Utility Distribution Piping.

1.2 REFERENCES

.1 American National Standards Institute/American Water Works Association (ANSI/AWWA).

.1 ANSI/AWWA B300, Hypochlorites.

.2 ANSI/AWWA C104/A21.4, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

.3 ANSI/AWWA C110/A21.10, Ductile Iron and Gray Iron Fittings, 3 inch through 48 inch for Water and Other Liquids.

.4 ANSI/AWWA C111/A21.11, Rubber Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.

.5 ANSI/AWWA C151/A21.51, Ductile-Iron Pipe, Centrifugally Cast, for Water.

.6 ANSI/AWWA C651, Disinfecting Water Mains.

.2 American Society for Testing and Materials International (ASTM).

.1 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.3 Manufacturer's Standardization Society of the Valve and Fittings Industry.

.1 MSS-SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.

.4 National Fire Protection Association.

.1 NFPA 13-2013, Installation of Sprinkler Systems.

.2 NFPA 24-2013, Installation of Private Fire Service Mains and their Appurtenances.

1.3 SUBMITTALS

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures and in accordance with ANSI/NFPA 13.

.2 Data Sheet:

.1 Submit manufacturer's printed product literature, specifications and datasheet for the following equipment: pipes, couplings, and fittings.

1.4 CLOSEOUT SUBMITTALS

.1 Specs sheets and maintenance literature, which will be appended to the manual mentioned in the section 01 78 00 – Closeout Submittals.

1.5 HEALTH AND SAFETY

.1 Take necessary measures to ensure health and safety on construction site, in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Sort waste in order to re-use and recycle in conformity with section 01 74 21 - Waste Management Plan.

.2 Collect packaging materials and send to appropriate recycling facilities.

.3 Collect and sort plastic, paper, and corrugated cardboard wrappings, and dispose them in appropriate designated bins in conformity with the Waste Management Plan.

.4 Disposed unused metallic elements and cables in designated area for metal recycling.

1.7 ACCEPTABLE PRODUCTS AND MATERIALS

.1 Where a particular brand name is stipulated, see Instructions to Bidders for procedure for requesting approval of substitute materials and products.

Part 2 Products

2.1 PIPING

.1 Main canalisation: made from ductile cast iron, with a cement mortar inner coating, from 1 m outside the building to the inside of building.

.1 Ductile cast iron: Class 52, compliant with ANSI/AWWA C151/A21.51, ANSI/NFPA 13, NFPA 24 Standards, and Section 33 11 16.

.2 Cement mortar inner coating for ductile cast iron piping: must meet ANSI/AWWA C104/A21.4 Standards Requirements.

2.2 FITTINGS

.1 Flange ductile iron fittings, diameter of NPS 3 or more: complying with ANSI/AWWA C110/A21.10 Standards Requirements.

2.3 JOINTS

.1 Rubber trims for flange fittings must meet ANSI/AWWA C111/A21.11 Standards Requirements.

.2 Hexagonal Bolts, Nuts and Washers: Heavy Series, must meet ASTM A307 Standards Requirements.

2.4 GATE VALVES

.1 Outside screw valves type, must meet MSS-SP-70 Standards Requirements, Class 125, category 860 kPa, cast iron frame, internal parts made from bronze, flat flanges, and bolted cap.

.2 Acceptable products :

.1 Crane No. 465 ½.

.2 Nibco FE 617 O.

.3 Newman Hattersley 504.

.4 Milwaukee No. F-2885-M.

.5 Toyo-R/W No. 421A.

.6 Replacement materials or products: approved by addendum according to Instructions to bidders.

Part 3 Execution

3.1 PIPING INSTALLATION

.1 Underground domestic water piping shall be installed, checked, and a reception test must be carried out, compliant with National Plumbing Code of Canada.

.2 Underground fire protection piping shall be installed, checked, and a reception test must be carried out, compliant with ANSI/NFPA 13, ANSI/NFPA 24 and National Plumbing Code of Canada.

.3 Cut square pipes, rid of all foreign matter and trim cut edges.

.4 Minimal Burying Depth: in accordance with indications.

.5 Apply a layer of protective coating on all buried piping.

.6 In accordance with AWWA’s Requirements (Class "B" installation bed), install buried piping over a compacted washed sand bed.

.7 At the entrance of the piping in the building, install supports and seal the passage of the piping through the wall to prevent from water/moisture infiltration. Works must be approved. Install piping with some clearance, in order to prevent a further soil compaction to alter its integrity and tightness.

.8 Assemble piping using fittings complying with the ANSI, in accordance with manufacturer's instructions.

3.2 FLUSHING AND SANITIZING

.1 Use sodium hypochlorite in accordance with ANSI/AWWA B300, to sanitized the water network.

.2 Proceed to the sanitizing of the water network in accordance with ANSI/AWWA C651.

.3 Proceed to the sanitizing in the presence of the Departmental Representative. Inform the Departmental Representative at least 4 days before the beginning of the works.

.4 Inject rinsing water inside the main pipe by available fittings, at a flow rate needed for the water to circulate at a minimum velocity of 1,5 m/s, for a period minimum of 10 minutes or the time needed to evacuate any foreign matter and the water to be clear.

.5 The flow rate must be established following:

Nominal Pipe Size (NPS)	Minimal Flow Rate (L/s)
6 or less	38
8	75
10	115
12	150

.6 If needed for the rinse, provide and install pumps and fittings.

.7 Open fittings of the main pipes and the distribution pipes to drain the complete system. Close the fittings after.

.8 After the rinse of the pipes has been approved by the Departmental Representative, inject inside the pipes, a chlorine concentrated solution, approved by the Departmental Representative and assure that the solution is distribute in all the network.

.9 The amount of chlorine injected must be proportional to the amount of water in the network.

.10 Pore the chlorine near the supply point of the main pipe while pipe is filled with water.

.11 Activate couplings and fittings while the network is filled with chlorine solution.

.12 Wait 24 hours then inject water in the network in order to rinse the chlorine solution.

.13 Measure the amount of residual chlorine at the further end from the tested section.

.14 After the chlorine solution has been rinsed, submit the network to bacteriological analyses.

.1 Take samples every day for at least 2 days.

.2 If contamination persists, sanitized the network until the water is drinkable.

.3 The contractor must submit a certified copy of the analyses results.

.15 Take water samples regularly at the connections to verify the amount of residual chlorine in water.

.16 Once the amount of residual chlorine of less than 50 ppm is obtained, leave the chorine solution in the network for 24 hours.

.1 After 24 hours, take new samples to verify that the amount of residual chlorine in the network is less than 10 ppm.

3.3 FIELD QUALITY CONTROL

.1 Field Tests/Inspections.

.1 Must be carried out in order to validate the conformity to prescript Requirements.

.2 Carry out tests and inspections on piping prior burying.

.3 Fire protection underground main preliminary tests.

.1 Proceed with a hydrostatic test of every system at a gauge pressure of 1380 kPa, for a period of two (2) hours, during which there is no occurrence of leaks or pressure drops greater than 35 kPa.

.2 Rinse piping with potable water complying with NFPA 24.

.3 Carry out tests and inspections required and approve installed piping

.4 Final Tests and Inspections.

.1 Final tests and inspections must be carried out only once the preliminary tests are over and corrective action has been taken.

.2 Submit final inspection request at least 15 days before expected date.

.3 Proceed with tests following directives.

.4 Correct any abnormality and carry out additional tests until the system complies with contractual requirements.

.5 Provide equipment, materials, instruments, connection devices and labour in order to complete tests.

.6 Authority having jurisdiction must assist to tests and approve the system before delivery.

.7 Provide properly filled signed Contractor’s material and test certificate for underground piping.

END OF SECTION