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## **PART 1 – GENERAL**

### **1.01 DESCRIPTION**

- .1 This Section is supplemental to OPSS 441 and OPSS 442 and shall supersede conflicting specifications within OPSS 441 and OPSS 442.

### **1.02 RELATED SPECIFICATION**

- .1 Construction Specification Section 01330 – Submittal Procedures
- .2 Construction Specification Section 02240 - Dewatering
- .3 Construction Specification Section 02315 - Trenching, Backfilling and Compacting
- .4 Construction Specification Section 02316 - Rock Excavation
- .5 Construction Specification Section 02631 - Maintenance Holes, Catch Basins, Ditch Inlets and Valve Chambers
- .6 Construction Specification Section 02700 - Site Restoration for Underground Services
- .7 Region of Durham Approved Manufacturer's Products List and Region of Durham Standard Drawings
- .8 OPSS 201 - Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piles Boulders
- .9 OPSS 206 - Construction Specification for Grading
- .10 OPSS 441 - Construction Specification for Watermain Installation in Open Cut
- .11 OPSS 442 - Construction Specification for Cathodic Protection of Watermains and Fittings
- .12 OPSS 490 - Construction Specification for Site Preparation for Pipelines, Utilities and Associated Structures in Open Cut
- .13 OPSS 493 - Construction Specification For Temporary Potable Water Supply Services
- .14 OPSS 801 - Construction Specification for Protection of Trees

.15 AWWA C651 - Disinfecting Watermains

### 1.03 MEASUREMENT FOR PAYMENT

.1 Valves and appurtenances to be measured in units installed.

### 1.04 BASIS OF PAYMENT

- .1 Unit price bid for watermain pipe shall include all labour, equipment and materials to do the work as specified, including but not limited to:
- a) All necessary clearing and grubbing.
  - b) Excavation to grade and disposal of surplus materials.
  - c) Dewatering up to 50,000 L per day unless included in a separate item.
  - d) Supporting and protecting existing services unless otherwise noted.
  - e) Abandoning of existing watermain in accordance with Contract Drawings including:
    - i) Saw-cutting of existing pipe.
    - ii) Removal and disposal off site of existing pipes and fittings, thrust restraints and thrust blocks as required.
    - iii) Supply and placement of 15 MPa concrete plug in the ends of the existing watermains that are to be abandoned in place. Minimum length of the concrete plug shall be 300 mm.
    - iv) Supply and placement of mechanical plug on existing watermain to remain in service, where required.
  - f) Supply and installation of all pipes, fittings, bends, adapters, reducers, specials, sleeves, restrainers, thrust blocks and tracer wire, complete in the specified bedding.
  - g) All cathodic protection in accordance with Region of Durham Standard Drawings.
  - h) Connections to existing watermains complete with cathodic protection.
  - i) Cathodic protection of existing ferrous pipes and fittings where exposed in accordance with Region of Durham Standard Drawings when such exposed pipe/fitting is to remain in service.

- j) Supply and installation of 50 mm blow-off in accordance with Region of Durham Standard Drawings at all watermain stubs 100 mm and larger diameter unless paid under a separate item.
  - k) Substitution of 19 mm Clear Stone Type I in lieu of 19 mm Crusher Run Limestone for Class B bedding in wet areas at the Contract Administrator's direction in accordance with Region of Durham Standard Drawings.
  - l) Supply, placement and compaction of an additional 150 mm depth of 19 mm Clear Stone Type I for Class P bedding in wet areas at the Contract Administrator's direction in accordance with Region of Durham Standard Drawings.
  - m) Backfill with Select Native Materials and compaction.
  - n) Permanent surface restoration in accordance with Section 02700 and Special Provisions unless included in a separate item.
  - o) Supply of marker posts and all installation costs where forcemain is located within an easement or open field situation.
  - p) All cleaning, swabbing and testing of watermains in accordance with this Section.
  - q) All other work necessary to complete watermain and services as specified, including temporary mechanical plugs as required
- .2 Unit price bid for water service connection items shall include all labour, equipment and materials to do the work as specified, including:
- a) Main Stop:
    - i) Excavation and compacted backfill with select native materials where corresponding service pipe is not to be installed.
    - ii) Supply and installation complete with saddle, union adapter, connectors.
    - iii) Connection to new or existing service pipe.
    - iv) Cathodic protection in accordance with Region of Durham Standard Drawings.
    - v) Measurement for Payment - each.

- b) Curb Stop and Box:
  - i) Excavation and compacted backfill with select native materials where corresponding service pipe is not to be installed.
  - ii) Removal of existing curb stop box and rod.
  - iii) Supply and installation complete in accordance with Region of Durham Standard Drawings.
  - iv) Stainless steel rod with brass pin.
  - v) Measurement for Payment - each.
  
- c) Copper Service Pipe:
  - i) Excavation to grade and disposal of surplus materials.
  - ii) Removal and disposal of existing service pipe as required.
  - iii) Supply and installation of pipe in specified bedding and cover including connections to existing service with required unions/adapters.
  - iv) Cathodic protection in accordance with Region of Durham Standard Drawings.
  - v) Backfill with select native materials and compaction.
  - vi) Permanent surface restoration in accordance with Section 02700 and Special Provisions.
  - vii) Measurement for Payment - actual length, in metres, of service pipe installed.
  
- .3 Valves and related appurtenances shall be paid as separate items. Valve box and/or rod extension(s) shall be installed and included in the unit price bid for valve items. This shall apply only to new valves called for on Contract Drawings. All other extensions shall be paid "extra over" (reference Section 01210 - Contingencies/Allowances) unless otherwise noted.
  
- .4 Hydrants (including secondary valves) shall be paid as separate items per compete assembly installed. Valve box and valve stem extensions and hydrant extensions shall be installed and included in the unit price bid for hydrant items. This shall apply only to new hydrants. All other extensions shall be paid "extra over" (reference Section 01210 - Contingencies/ Allowances) unless otherwise noted.
  
- .5 Removal of a plug or blow off from an existing watermain or fitting and reconstruction of joint will be considered part of work of constructing new watermain.

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## **PART 2 – PRODUCTS**

### **2.01 PIPE MATERIALS**

- .1 Reference Region of Durham Approved Manufacturers' Products List, on *The Road Authority* website at [www.roadauthority.com](http://www.roadauthority.com).
- .2 All watermain and service connection materials shall be in accordance with Contract Drawings and Special Provisions.
- .3 Supply fittings suitable for and compatible with class and type of pipe with which they will be used.

### **2.02 CONCRETE PRESSURE PIPE**

- .1 Use Concrete Cylinder Pipe only.
- .2 Supply: Pipe to be supplied from plant certified by CSA.
- .3 Supply shop drawings in accordance with Section 01330.

### **2.03 POLYVINYL CHLORIDE (PVC) PIPE**

- .1 Supply: Pipe to be supplied from plant certified by CSA.

### **2.04 CASING PIPES**

- .1 Pipe: to OPSS 1802
- .2 Size: In accordance with Region of Durham Standard Drawings unless specified otherwise.

### **2.05 VALVES - GENERAL**

- .1 Valves shall be supplied in accordance with the Region of Durham Approved Manufacturers' Products List.
- .2 Provide 19 mm test point by-pass in accordance with Region of Durham Standard Drawings for new water mains.
- .3 Provide by-pass for valves greater than 600 mm diameter. By-pass to consist of two flanged nozzles cast integrally with pipe body, flanged elbows and a flanged resilient seat gate valve. By-pass valves to be suitable for same working and test pressures as associated main valve.

- .4 Valves smaller than 75 mm diameter to be a standard curb stop in accordance with Region of Durham Standard Drawings.
- .5 Valves 100 - 300 mm diameter to be resilient seat gate valves.
- .6 Valves larger than 300 mm diameter to be butterfly valves. Resilient seat gate valves may be permitted for use for 400 mm diameter valves on a site-specific basis only

## **2.06 AIR / VACUUM COMBINATION VALVES**

- .1 Valves to be double acting type air release and vacuum combination.
- .2 Valves shall be supplied in accordance with Region of Durham Standard Drawings or as specified otherwise.

## **2.07 HYDRANTS**

- .1 Contractor shall supply all flushing hydrants.
- .2 For Region of Durham-tendered work, Local Municipalities tendered work and private subdivision work, hydrants shall be inspected at installation and at completion of the work. Any hydrant showing surface damage shall be totally repainted in the colour and quality of the original paint to the satisfaction of the Contract Administrator.
- .3 For private subdivision work only, hydrants shall be inspected for surface damage at the time of final inspection near the end of the warranty period. Any hydrant showing surface damage shall be totally repainted in the colour and quality of the original paint to the satisfaction of the Contract Administrator.

## **2.08 CATHODIC PROTECTION ANODES**

- .1 All sacrificial anodes shall conform to the requirements of OPSS 442 and the following:
  - a) Information indicating the contents and size of the anode shall be stamped on the outside of each tube.
  - b) The Region of Durham may reject any anode for any reason and request a suitable replacement.
  - c) The Region of Durham may have any anode(s) tested to guarantee the authenticity of its composition. The Contractor shall supply the anode(s) for testing at no expense to the Region of Durham.

## **2.09 BEDDING, COVER AND BACKFILL MATERIALS**

- .1 Bedding, cover and backfill materials shall be as specified in Section 02315.

## **PART 3 – EXECUTION**

### **3.01 TRANSPORTING, UNLOADING, AND PIPE STORING**

- .1 Subsection 441.07.07 of OPSS 441 is revised by the deletion of the second and third paragraphs. End covers are not required for watermain pipe. Ensure pipes are laid in a clean and sanitary condition and capable of passing the required bacteriological test.
- .2 Take delivery of pipes and fittings near to trench. Do not impede traffic.
- .3 Unload pipe using mechanical equipment.
- .4 Place materials in safe storage.
- .5 Do not drop pipe onto ground, rubber tires, or equivalent.

### **3.02 SITE PREPARATION**

- .1 Do site preparation to OPSS 490 unless covered under separate item.

### **3.03 TRENCHING AND BACKFILLING**

- .1 Do trenching and backfilling to Section 02315.

### **3.04 PIPE BEDDING**

- .1 Place bedding materials as shown on Contract Drawings and Region of Durham Standard Drawings.
- .2 Keep pipe joints clear of bedding materials to permit jointing. After jointing is complete, place bedding materials as specified.

### **3.05 INSTALLATION OF PIPES**

- .1 The third paragraph of Subsection 441.07.14 of OPSS 441 is modified in that the Owner may raise or lower the invert of the watermain by up to 300 mm without constituting a Change in the Work.

- .2 Lower pipe into trench carefully by means approved by Contract Administrator.
- .3 Keep trench dry to 1.0 m below invert. Do not lay pipe in water. Reference Section 02240 - Dewatering.

### **3.06 CATHODIC PROTECTION ANODE INSTALLATION**

- .1 All ferrous and other non-plastic materials, including tracer wire and mechanical restrainers, shall be cathodically protected in accordance with Region of Durham Standard Drawings.
- .2 The pipe or fitting surface shall be cleaned to facilitate welding of the anode lead wire to the pipe.
- .3 The anode lead shall be CAD welded to the pipe surface and the integrity of each weld tested and verified by the Contract Administrator. The weld shall be repeated if necessary.
- .4 The anode shall be placed at least 300 mm from the pipe. The positioned anode shall be soaked after installation until saturated with water to ensure immediate operation.

### **3.07 BEDDING AND COVER**

- .1 Place bedding and cover materials in accordance with Region of Durham Standard Drawings and as specified.

### **3.08 INSTALLATION OF VALVES**

- .1 Install valves in accordance with Region of Durham Standard Drawings.

### **3.09 INSTALLATION OF HYDRANTS**

- .1 Install each hydrant assembly, including tracer wire, in accordance with Region of Durham Standard Drawings.
- .2 Anti-tampering devices shall be installed by Region of Durham forces on all hydrants deemed necessary by the Region of Durham. These hydrants will be duly marked indicating an appropriate penalty of \$5,000.00 by by-law. A fee will be charged for each device supplied and installed by the Region of Durham.

### 3.10 INSTALLATION OF SERVICE CONNECTIONS

- .1 Install water service connections as shown on Contract Drawings, in accordance with Region of Durham Standard Drawings and as ordered by the Contract Administrator.
- .2 Install curb stop box vertically and flush with final grade elevation.
- .3 All services are to be blown-off prior to completing trench backfill.
- .4 Install a 50 mm dia. blow-off on all services 100 mm dia. and larger.
- .5 Install 19 mm dia. Test Point at all service connection valves 100 mm dia. and larger where service pipe is longer than one length of pipe.

### 3.11 MARKING AND RECORDING HOUSE SERVICE CONNECTIONS

- .1 Place temporary location marker consisting of a 50 mm x 75 mm stake or two short sections of lumber connected by a piece of heavy gauge wire at end of plugged or capped service connection. Top 100 mm of marker to be painted blue.
- .2 Place painted marker at a point 300 mm above plugged end of service pipe. Marker shall extend to 900 mm above finished grade.
- .3 Do not backfill house service connections until inspected and measurements of locations have been taken by Contract Administrator. Measurements shall include both horizontal ties to nearby structures/ landmarks and geodetic elevations. Location measurements must be taken for new and replacement services.

### 3.12 SHUTTING DOWN OR CHARGING WATERMAINS

- .1 All existing watermain valves and hydrants are to be operated by Region of Durham forces except in case of an emergency or with written approval of Region of Durham.
- .2 Contractor is responsible to give 48 hours notice, or longer if requested by Contract Administrator, to any consumer affected by closing down of any section of existing system.

### 3.13 CONNECTIONS TO EXISTING WATERMAINS

- .1 Connections to existing watermains and water services shall normally be performed Monday to Friday between the hours of 6:00 a.m. and 10:00 p.m. No extra payment will be made for connections made within these hours.
- .2 Connections to existing watermains shall not be completed until the new watermain installation has been swabbed, pressure tested and chlorinated to the satisfaction of the Contract Administrator.
- .3 Chlorinate and sample new watermain prior to connecting existing services to new watermain/service in compliance with AWWA C651 in accordance with the Ontario Drinking Water Standards, Section 2.1g.
- .4 Disinfect all appurtenances used in connecting to an existing watermain, or cutting into an existing watermain, with a certified chlorine.
- .5 Maintain existing watermains and water services to customers at all times except with consent of the Contact Administrator.
- .6 Install 14.5 kg magnesium anode on all exposed ferrous watermains and fittings. Reference Region of Durham Standard Drawings.

### 3.14 THRUST RESTRAINT

- .1 All fittings on PVC pipe shall have restrained joints and granular thrust blocks as required by Region of Durham Standard Drawings.
- .2 All joints encountered within the specified restraining length as indicated on Region of Durham Standard Drawings, shall be restrained.
- .3 Concrete Pressure Pipe shall have thrust restraints as shown on Contract Drawings and verified by the manufacturer.
- .4 All branch valves 100 mm diameter and larger shall be restrained to the tee.
- .5 All in-line valves shall be restrained. Reference Region of Durham Standard Drawings for restraint of valves.

### 3.15 TRACER WIRE

- .1 On open cut installations, provide one tracer wire in accordance with Region of Durham Standard Drawings.

- .2 On all Horizontal Directional Drilling installations, provide two tracer wires, positioned on opposite sides of the pipe.

### 3.16 FOAM SWABBING

- .1 Foam swabbing shall be the responsibility of the Contractor and shall be performed on ALL new PVC watermains.
- .2 Region of Durham staff must be present during swabbing for valve operation and to ensure conformance with the specifications.
- .3 A sufficient quantity of dense foam swabs by at least 50 mm greater than the inside diameter of the largest size pipe being cleaned shall be passed through the entire length of the completed pipeline at a rate not exceeding 0.45 m/s and shall be run until debris or contaminants are removed. Each swab shall be exited out each fire hydrant.
- .4 The foam swabs used are to be a minimum medium density in the range of 7.32 kg/m<sup>2</sup>.
- .5 Foam swabbing shall only be performed by an experienced pipeline cleaning company using workers certified as Level 1 Water Distribution. Acceptable firms are: Corix, Jackson-Tkach and Ontario Clean Water Agency or other licensed companies that may be approved by the Contract Administrator on a site specific basis only. At least one worker on site must have the following qualifications: Drinking Water Operator Certificate - Water Distribution Class 1.

### 3.17 HYDROSTATIC PRESSURE TESTING

- .1 Hydrostatic pressure and hydrostatic leakage tests will be carried out by Region of Durham forces unless otherwise specified, however, Contractor shall pre-test watermain prior to Region of Durham testing. Testing pressure shall be 1035 kPa.
- .2 Supply labour and equipment as required to assist Region of Durham crew conduct tests.
- .3 Provide shelter of minimum size 2.6 m x 2.6 m x 2.6 m to protect Test Point and equipment from freezing. Maintain temperature inside shelter at minimum 5°C using propane or other acceptable heater.
- .4 Hydrostatic pressure test shall be performed by Region of Durham after foam swabbing.

- .5 If a second test is required on Region of Durham or Local Municipalities capital contracts, all costs shall be borne by the Contractor.
- .6 Tracer wire shall be tested by Region of Durham at time of hydrostatic pressure testing or during Final Inspection.

### **3.18 FLUSHING AND DISINFECTING WATERMAINS**

- .1 Charging and Flushing: Chlorination of watermain and appurtenances shall be carried out by Region of Durham forces, unless specified otherwise.
- .2 Clean and chlorinate all tie-ins and short sections of watermain and service connections (100 mm dia. and larger) during installation where such pipes cannot be isolated for chlorination after installation.
- .3 Where more than one chlorination is required on Regional or Local Municipalities capital contracts, the Contractor may be required to bear the costs of such testing.
- .4 Subdivision Developers shall pay all Region of Durham costs for flushing and disinfecting of watermains and appurtenances.

### **3.19 DISPOSAL OF WASTE WATER**

- .1 Disposal of all chlorinated water used for testing, flushing or disinfecting watermain will be carried out by the Region of Durham unless otherwise specified.

### **3.20 MARKER SIGNS**

- .1 If a watermain is located within an easement or open field situation, the Developer/Contractor shall be responsible to place Region of Durham watermain marker signs in accordance with Region of Durham Standard Drawings.
- .2 Marker signs will be made available to the Developer/Contractor from the Region of Durham at no cost. Marker posts and all installation costs shall be at the Developer's/Contractor's expense. Spacing shall be as shown on the Contract Drawings.

**END OF SECTION**