Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

1.2 REFERENCES

.1 American Water Works Association

- .1 AWWA C800-12 Standard for Underground Service Line Valves and Fittings
- .2 AWWA C904-06 Cross-Linked Polyethylene (PEX) Pressure Pipe, ½ In. (12 mm) Through 3 In. (76 mm) for Water Service

.2 American Society for Testing and Materials

- .1 ASTM F876-13 Standard Specification for Crosslinked Polyethylene (PEX) Tubing
- .2 ASTM F877-11a Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems
- .3 ASTM F2023-10 Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water

.3 CSA International

- .1 CSA B137.5-2005 - Crosslinked Polyethylene (Pex) Tubing Systems for Pressure Applications

.4 NSF International

- .1 NSF 14-2012 - Plastics Piping System Components and Related Materials
- .2 NSF 61-2012 - Drinking Water System Components - Health Effects

.5 Ontario Provincial Standard Specifications

- .1 OPSS 441-12 - Construction Specification for Watermain Installation In Open Cut

.6 City of Ottawa Material Specifications

- .1 M.S. No MW-19.6-2013 - Water Meters

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for irrigation piping materials and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect water irrigation piping from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse by manufacturer of pallets, crates, padding and packaging materials.

1.5 SCHEDULING OF WORK

.1 Schedule Work to minimize interruptions to existing services.

.2 Submit schedule of expected interruptions for approval and adhere to interruption schedule as approved by Departmental Representative.

Part 2 Products

.1 PEX Tubing

.1 PEX service tubing shall conform to AWWA C904, ASTM F876, F877, F2023, CSA B137.5, NSF 14 and 61. The degree of cross linking for PEX pipe shall be not less than 80% when tested according to ASTM D2765, Method B. PEX pipe shall have CSA/NSF approved pressure rating of 1100 kPa @ 23°C.

.2 The outside diameter of the pipe shall be copper tube size (CTS) and must have a standard dimension ratio (SDR) of 9. PEX pipe shall be manufactured in sky blue.

.3 Only stainless steel support liners shall be used and shall comply with the requirements of AWWA C800 and must be approved by the fitting manufacturer for CTS SDR9 PEX tubing per the AWWA C904 standard.

.4 19mm nominal size shall have an average O.D. of 22.2mm +/- 0.10mm.

.5 51mm nominal size shall have an average O.D. of 53.98mm +/- 0.16mm.

.6 PEX Tubing shall be of the best quality. Each length of PEX tubing shall be uniform in bore and thickness of material. It shall be free from cracks, grooves and other defects. Pipe of inferior material will not be accepted. All PEX tubing shall be third party certified.

.2 Fittings

.1 Fitting shall be in accordance with AWWA C800-12 Standard for Underground Service Line Valves and Fittings.

.3 Water Meter

.1 Water meter shall be in accordance with City of Ottawa Material Standard MW-19.6-2013

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for distribution piping installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.1 Clean pipes, fittings, valves, and appurtenances of accumulated debris and water before installation.

.1 Inspect materials for defects to approval of Departmental Representative.

.2 Remove defective materials from site as directed by Departmental Representative.

3.3 TRENCHING

.1 Do trenching work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Ensure trench depth allows coverage over pipe as indicated.

.3 Trench alignment and depth require Departmental Representative's approval prior to placing pipe.

3.4 PIPE INSTALLATION

.1 Handle pipe by methods recommended by pipe manufacturer.

.2 Lay pipes true to line and grade.

.1 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.

.2 Take up and replace defective pipe.

.3 Correct pipe which is not in true alignment or grade or pipe which shows differential settlement after installation greater than 10 mm in 3 m.

.3 Keep jointing materials and installed pipe free of dirt and water and other foreign materials.

.1 Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.

.4 Position and join pipes with equipment and methods approved by Departmental Representative.

.5 Cut pipes in approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

.6 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.

.7 Recheck plastic pipe joints assembled above ground after placing in trench to ensure that no movement of joint has taken place.

.8 Do not lay pipe on frozen bedding.

.9 Do hydrostatic and leakage test and have results approved by Departmental Representative before surrounding and covering joints and fittings with granular material.

.10 Place and compact cover material in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.5 WATER METER

.1 Water meter shall rest on pre-cast or cast-in-place concrete pad.

.2 Water meter shall be installed horizontally.

.3 Remote radio end point shall be installed on post in planting bed, 1000 mm to 1200 mm above finished grade.

3.6 CROSSING THROUGH CONCRETE WALL

.1 Core hole in concrete wall. Hole to be of sufficient diameter to allow the required pipe(s) to cross through, with a minimum 10mm clearance between each pipe and between the pipes and the edge of the hole.

.2 Seal hole using non-shrink grout in a watertight fashion.

3.7 HYDROSTATIC AND LEAKAGE TESTING

.1 Do tests in accordance with OPSS 441.

3.8 BACKFILL

.1 Place backfill material, above pipe surround, in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.

.2 Do not place backfill in frozen condition.

.3 Compact backfill to at least 95% SPMDD.

3.9 FLUSHING AND DISINFECTING

.1 Flush drinking water and irrigation piping in accordance with OPSS 441.

.2 Disinfect drinking water piping in accordance with OPSS 441.

3.10 SURFACE RESTORATION

.1 After installing and backfilling over water mains, restore surface as specified.

3.11 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Ontario Provincial Standard Specifications (OPSS)

.1 OPSS 1841-10, Material Specification for Non-Pressure Polyvinyl Chloride (PVC) Pipe Products.

1.2 SCHEDULING

.1 Schedule Work to minimize interruptions to existing services and to maintain existing flow during construction.

.2 Submit schedule of expected interruptions for approval and adhere to approved schedule.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Certification to be marked on pipe.

.3 Test and Evaluation Reports: submit manufacturer's test data and certification at least 2 weeks prior to beginning Work.

.4 Manufacturer's Instructions: submit to Departmental Representative 1 copy of manufacturer's installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations.

.2 Store and protect pipes from damage.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse by manufacturer pallets, crates, padding and packaging materials.

Part 2 Products

2.1 PLASTIC PIPE

.1 Type PSM Poly Vinyl Chloride PVC (perforated and non-perforated): in accordance with OPSS 1841.

.1 Standard Dimensional Ratio (SDR): 35.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.1 Clean pipes and fittings of debris and water before installation, and remove defective materials from site to approval of Departmental Representative.

3.3 TRENCHING

.1 Do trenching work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Ensure trench depth allows coverage over pipe as indicated.

.3 Trench alignment and depth require Departmental Representative's approval prior to placing pipe.

3.4 PIPE INSTALLATION

.1 Place and compact bedding material in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Lay and join pipe in accordance with manufacturer's recommendations and to approval of Departmental Representative.

.3 Handle pipe using methods approved by Departmental Representative.

.4 Joint deflection permitted within limits recommended by pipe manufacturer.

.5 Water to flow through pipes during construction only as permitted by Departmental Representative.

.6 Install plastic pipe and fittings in accordance with manufacturers recommendations.

.7 Cut pipes as required for special inserts, fittings or closure pieces, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

.8 Place and compact cover material in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.5 CONNECTIONS TO EXISTING SEWER

.1 Connections to the existing sewer shall be made using factory-made tees.

3.6 BACKFILL

.1 Place and compact backfill material in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.7 FIELD TESTS AND INSPECTIONS

.1 Repair or replace pipe, pipe joint or bedding found defective.

.2 Draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction directed by Departmental Representative.

.3 Remove foreign material from sewers and related appurtenances by flushing with water.

3.8 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 32 19.01 - Geotextiles

1.2 REFERENCES

.1 Ontario Provincial Standard Specifications (OPSS)

.1 OPSS 1840-11, Material Specification for Non-Pressure Polyethylene (PE) Plastic Pipe Products.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for pipes and pipe fittings and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Certificates:

.1 Certification to be marked on pipe.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations.

.2 Store and protect pipes from damage.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return to manufacturer of pallets, crates, padding, packaging materials.

Part 2 Products

2.1 MATERIALS

.1 HDPE Plastic pipe and fittings: to OPSS 1840.

.2 Perforated HDPE plastic pipe and fittings: to OPSS 1840.

.3 Geotextile filter: In accordance with Section 31 32 19.01 - Geotextiles.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sub-drainage piping installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION OF PIPE SUB-DRAINS

.1 Lay pipe drains on prepared bed, true to line and grade with inverts smooth and free of sags or high points.

- .1 Bed to be prepared in accordance with section 31 00 99.
- .2 Ensure barrel of each pipe is in contact with bed throughout full length.

.2 Begin laying at outlet and proceed in upstream direction.

.3 Lay perforated pipes with perforations at 4 o'clock and 8 o'clock positions.

.4 Lay bell and spigot pipe with bell ends facing upstream.

- .1 Do not mortar joints.

.5 Cover joints with geotextile fabric strips 600mm wide and sufficiently long to wrap full circumference and lap by 150mm. Pin strips in place.

.6 Make joints tight in accordance with manufacturer's instructions.

.7 Wrap or sleeve perforated pipe with geotextile filter as indicated.

.8 Backfill remainder of trench as indicated.

.9 Protect sub-drains against flotation during installation.

.10 Seal connections into existing catchbasins using non-shrink grout in a watertight fashion. Pipe end shall be flush with inside face of catchbasins.

.11 Connection to rigid PVC pipe using one of the following two methods:

- .1 Factory-made adapter
- .2 Insert the pipe subdrain 150mm into the rigid PVC pipe, and encase the connection in 32MPa cast-in-place concrete.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

- .1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION