PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for storm sewer.

1.2 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

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

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
- .1 ASTM C 14M-11, Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe (Metric).
- .2 ASTM C 76M-12, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).
- .3 ASTM C 117-04, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
- .4 ASTM C 136-06, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
- .5 ASTM C 443M-11, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
- .6 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .7 ASTM D 1056-07, Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
- .8 ASTM D 2680-01(2009), Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
- .9 ASTM D 3034-00, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- .10 ASTM F 794-01, Standard Specification for Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
- .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric..

.3 Canadian Standards Association (CSA International)
- .1 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A5-98, A8-98, A23.5-98, A362-98, A363-98, A456.1-98, A456.2-98, A456.3-98).
  - .1 CAN/CSA-A5, Portland Cement.
- .2 CAN/CSA-A257 Series-09, Standards for Concrete Pipe.
- .3 CSA B1800 SERIES-02, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).

.1 CAN/CSA-B182.2, PVC Sewer Pipe and Fittings (PSM Type).
.2 CAN/CSA-B182.4, Profile PVC Sewer Pipe and Fittings.
.3 CSA B182.11, Recommended Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.
.4 CSA G401-07, Corrugated Steel Pipe Products.

.4 Department of Justice Canada (Jus)
.1 Canadian Environmental Protection Act, 1999 (CEPA).

.5 Transport Canada (TC)
.1 Transportation of Dangerous Goods Act, 1992 (TDGA)

1.4 DEFINITIONS

.1 A pipe section is defined as length of pipe between successive catchbasins and/or manholes.

1.5 SUBMITTALS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures (Shop drawings and product data for manholes, catch basins, frame covers, gratings, piping, fittings and connection to drainage structure).

.2 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of bedding materials and provide access for sampling.

.3 Certification to be marked on pipe.

.4 Submit to Departmental Representative 1 copy of manufacturer's installation instructions.

1.6 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.

PART 2 - PRODUCTS

2.1 PLASTIC PIPE

.1 Type PSM Poly Vinyl Chloride (PVC): CAN/CSA-B182.2-M95.
.1 Standard Dimensional Ratio (SDR): 35.
.2 Locked-in Separate gasket and integral bell system.
.3 Nominal lengths: 6 m.

2.2 CONCRETE PIPE

.1 As indicated.

2.2 PIPE BEDDING AND SURROUND MATERIAL

.1 As indicated.

2.3 BACKFILL MATERIAL

.1 As indicated.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 TRENCHING

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

.2 Do not allow contents of sewer or sewer connection to flow into trench.

.3 Trench alignment and depth as per the profile section and to approval of Departmental Representative prior to placing bedding material and pipe.

3.3 GRANULAR BEDDING

.1 Place bedding in unfrozen condition. Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth as indicated.

.2 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe. Do not use blocks when bedding pipes.

.3 Shape transverse depressions as required to suit joints.

.4 Compact each layer full width of bed to at least 100% Corrected Maximum Dry Density to ASTM D 698.

.5 Fill excavation below bottom of specified bedding adjacent to manholes or catch basins with compacted bedding material.

3.4 INSTALLATION

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

.2 Handle pipe using methods approved by Departmental Representative.
- .1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.

.3 Lay pipes on prepared bed, true to line and grade with pipe inverts smooth and free of sags or high points.
- .1 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.

.4 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.

.5 Do not exceed maximum joint deflection recommended by pipe manufacturer.

.6 Do not allow water to flow through pipes during construction except as may be permitted by Departmental Representative.

.7 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.

.8 Install plastic pipe and fittings in accordance with CSA B182.11-95.

.9 When any stoppage of Work occurs, restrain pipes as directed by Departmental Representative, to prevent "creep" during down time.

.10 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.

.11 Make watertight connections to manholes and catch basins.
- .1 Use shrinkage compensating grout when suitable gaskets are not available.

.12 Use prefabricated saddles or approved field connections for connecting pipes to existing sewer pipes.
- .1 Joint to be structurally sound and watertight.

.13 Temporarily plug open upstream ends of pipes with removable watertight concrete, steel or plastic bulkheads.

3.5 PIPE SURROUND

.1 Place surround material in unfrozen condition.

.2 Upon completion of pipe laying, and after Departmental Representative has inspected pipe joints, surround and cover pipes as indicated.

.1 Leave joints and fittings exposed until field testing is completed. Schedule field test along with schedule of this work, to enable backfill of the trench.

.3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.

.1 Do not dump material within 1.0 m of pipe.

.4 Place layers uniformly and simultaneously on each side of pipe.

.5 Compact each layer from pipe invert to mid height of pipe to at least 100% Corrected Maximum Dry Density to ASTM D 698.

.6 Compact each layer from mid height of pipe to underside of backfill to at least 100% Corrected Maximum Dry Density to ASTM D 698.

.7 When field test results are acceptable to Departmental Representative, place surround material at pipe joints.

3.6 BACKFILL

.1 Place backfill material in unfrozen condition.

.2 Place backfill material, above pipe surround, in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.

.3 Under gravelled area, compact backfill to at least 100% Corrected Maximum Dry Density to ASTM D 698. In other areas, compact backfill to at least 100% Corrected Maximum Dry Density to ASTM D 698.

.4 Place unshrinkable backfill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.7 FIELD TESTING

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

.2 When directed by Departmental Representative, draw mandrel with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.

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

END