Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for storm sewer.

1.2 RELATED SECTIONS

.1 Section 01 35 43 - Environmental Procedures.

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

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

.4 Section 32 11 23 - Aggregates: Base Course.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C76M-08, Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe(Metric).

.2 Canadian Standards Association (CSA)

.1 CAN/CSA-A257 Series-03, Standards for Concrete Pipe.

.2 CSA-B182.2- 95, PVC Sewer Pipe and Fittings (PSM Type).

.3 CAN/CSA B1800-06, Thermoplastic Nonpressure Piping Compendium including CSA B182.2 PVC Sewer Pipe and Fittings (PSM Type) and

.4 CSA B182.11 Recommended Practice for the Installation of Plastic Drain and Sewer Pipe and Pipe Fittings.

.3 Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD)

.1 OPSS 409 – November 2005, Construction Specification for Closed Circuit Television Inspection of Pipelines.

.2 OPSS 410 – November 2006, Construction Specification For Pipe Installation in Open Cut.

1.4 SUBMITTALS

.1 Inform Departmental Representative at least 4 weeks prior to commencing work, of proposed source of bedding materials and provide access for sampling.

.2 Submit manufacturer's test data and certification at least 2 weeks prior to commencing work.

.3 Certification to be marked on pipe.

1.5 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.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Divert unused materials from landfill to recycling facility for disposal approved by Departmental Representative.

.4 Fold up metal banding, flatten and place in designated area for recycling.

1.7 DEFINITIONS

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

Part 2 Products

2.1 CONCRETE PIPE

.1 Reinforced circular concrete pipe and fittings: to CAN/CSA-A257, ASTM C76M, strength classification as indicated on drawings, designed for flexible rubber gasket joints to CAN/CSA-257.

.2 Lift holes:

.1 Pipe 900 mm and less diameter: no lift holes.

.2 Pipe greater than 900 mm diameter: lift holes not to exceed two in piece of pipe.

.3 Provide pre-fabricated plugs to effectively seal lift holes after installation of pipe.

2.2 PLASTIC PIPE

.1 Type PSM Poly Vinyl Chloride (PVC): to ASTM D3034, CAN/CSA-B1800/B182.4

.1 Locked-in gasket and integral bell system.

.2 Nominal lengths: 6 m.

.3 Standard Dimensional Ratio (SDR): 35.

2.3 PIPE BEDDING AND SURROUND MATERIAL

.1 Bedding material:

.1 150mm of OPSS Granular ‘A’.

.2 Surround material:

.1 To 300mm above pipe with OPSS Granular ‘A’

.2 Gradations to OPSS guidelines.

.3 Concrete mixes and materials for bedding, cradles, encasement, and supports: to Section 03 30 00 - Cast-in-Place Concrete.

2.4 BACKFILL MATERIAL

.1 Backfill for trenches in landscaped areas may consist of excavated material that is free of organic/topsoil, replaced and compacted in lifts. Trenches below paved areas should be backfilled with Subgrade Fill as defined in section 31 23 10 – Excavating, Trenching and Backfilling. The material used within the upper 1.2 m and below the subgrade line must be similar to that exposed in trench walls to prevent differential frost heave and shall be placed in lifts and compacted to 98% of SPD.

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 any sewer or sewer connection to flow into trench.

.3 Trench alignment and depth to approval of Departmental Representative prior to placing bedding material and pipe.

.4 Water jetting of backfill under haunches of corrugated steel pipe may be permitted if recommended by manufacturer and approved by Departmental Representative.

3.3 GRANULAR BEDDING

.1 Place bedding in unfrozen condition.

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

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

.4 Shape transverse depressions as required to suit joints.

.5 Compact each layer full width of bed to at least 98 % standard proctor maximum dry density.

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

.4 Commence 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.

.9 Joints:

.1 Concrete and PVC pipe:

.1 Install gaskets as recommended by manufacturer.

.2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.

.3 Align pipes before joining.

.4 Maintain pipe joints free from mud, silt, gravel and other foreign material.

.5 Avoid displacing gasket or contaminating with dirt or other foreign material. Remove disturbed or dirty gaskets; clean, lubricate and replace before joining is attempted.

.6 Complete each joint before laying next length of pipe.

.7 Minimize joint deflection after joint has been made to avoid joint damage.

.8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.

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

.11 Plug lifting holes with Departmental Representative approved prefabricated plugs, set in shrinkage compensating grout.

.12 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.

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

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

.15 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. Leave joints and fittings exposed until field testing is completed.

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

.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 98 % standard proctor maximum dry density.

.6 Compact each layer from mid height of pipe to underside of backfill to at least 98 % standard proctor maximum dry density.

.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 Compact backfill to at least 98 % standard proctor maximum dry density.

3.7 SERVICE CONNECTION

.1 Extend service lateral into the Building.

.2 Plug service laterals with water tight caps or plugs as approved by Departmental Representative.

.3 Place location marker at ends of plugged or capped unconnected sewer lies. Paint exposed portion of stake red with designation ST SWR LINE in black.

3.8 FIELD TESTING

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

.2 When directed by Departmental Representative, draw tapered wooden plug 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.

.4 Television and photographic inspections:

.1 Carry out inspection of installed sewers by closed circuit television as per OPSS409.

.2 Prior to the granting of Substantial Completion, the contractor shall be required to clean out and perform a T.V. inspection for the complete length of sewers constructed. Since it is important to establish the value of “known defects” as described in the Construction Lien Act the certification of substantial performance shall not be granted prior to receiving the T.V. inspection reports.

.3 Notify Departmental Representative at least 24 hours prior to commencement of the T.V. inspection and the contractor shall ensure that representatives from the Departmental Representative are available to monitor and approve all phases of the T.V. inspection, including the inspection firm.

.4 No T.V. inspection report will be accepted where the sewer system is contaminated with dirt.

.5 The contractor shall supply two (2) copies of the video report of the T.V. inspection including:

.1 A written report giving a list of all service connections identifying catch basin connections with a picture and description of deficiencies only (with video tape footages listed in the report for easy cross-reference.)

.2 The distance the camera is in the pipe shall be provided continuously throughout the tape. This description is to be done using the manhole numbers listed on the design drawings.

.6 T.V. inspection shall be required for all storm sewers.

.7 All deficiencies of the system that are, in the opinion of the Departmental Representative, detrimental to the proper operation of the system, will be repaired by the contractor at no extra cost to this contract. After deficiencies have been completed the sewer sections that had deficiencies shall be re-televised completed with a supplemental report. The cost of the re-televised sections shall be included.

END OF SECTION