

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1            Materials and installation for foundation and underslab drainage.

**1.2                REFERENCES**

- .1            American Society for Testing and Materials International, (ASTM)
  - .1            ASTM D698-00a, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
- .2            Canadian General Standards Board (CGSB)
  - .1            CAN/CGSB-34.22-94, Asbestos-Cement Drain Pipe.
- .3            Canadian Standards Association (CSA International)
  - .1            CSA-A23.1/A23.2-00(June 2001), Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
  - .2            CSA B1800-02, 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            CSA B182.2-02, PVC Sewer Pipe and Fittings (PSM Type).
  - .3            CSA-G401-01, 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)

**1.3                WASTE MANAGEMENT AND DISPOSAL**

- .1            Separate waste materials for reuse, donation and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

**1.4                SITE CONDITIONS**

- .1            Examine sub-surface investigation report which is available for inspection in this Specification.
- .2            Known underground utility lines and buried objects are as indicated on plans.

**Part 2            Products**

**2.1                BEDDING AND SURROUND MATERIALS**

- .1            Coarse filter aggregate: to CSA-A23.1/A23.2, Group 1 20-5 mm.

- .2 Fine filter aggregate: to CSA-A23.1/A23.2.
- .3 Rigid plastic pipe and fittings: to CSA-B182.1, size 100mm complete with fittings, geo-sock and geotextile filter.

## **2.2 BACKFILL MATERIAL**

- .1 Type 2, in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Excavated or graded material existing on site may be suitable to use if approved by Departmental Representative.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Ensure graded subgrade, conforms with required drainage pattern before placing bedding material.
- .2 Ensure improper slopes, unstable areas, areas requiring additional compaction or other unsatisfactory conditions are corrected to approval of Contract Administrator.
- .3 Ensure foundation wall and dampproofing, waterproofing and rigid insulation have been installed and approved by Contract Administrator before placing bedding material.

### **3.2 BEDDING PREPARATION**

- .1 Cut trenches in subgrade and place bedding materials 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.
- .3 Shape transverse depressions, as required, to suit joints.
- .4 Compact each layer full width of bed to at least 95% of corrected maximum dry density.
- .5 Fill excavation below design elevation of bottom of specified bedding with compacted bedding material.

### **3.3 PIPE OR TUBING INSTALLATION**

- .1 Ensure pipe interior and coupling surfaces are clean before laying.
- .2 Lay perforated pipe level minimum to slope of 1:100. For pipe face perforations and coupling slots downward.
- .3 Lay non-perforated pipe to slope of 1:50 from perforated pipe to disposal area. Make joints watertight.
- .4 Grade bedding to establish pipe slope.

- .5 Install end plugs at ends of collector drains to protect pipe ends from damage and ingress of foreign material.
- .6 Connect non-perforated pipe to sump pit by appropriate adapters manufactured for this purpose.
- .7 Provide cleanouts on non-perforated pipe at changes of pipe direction and in runs greater than 15 m.
- .8 Provide flush cleanouts where directed by Contract Administrator.
- .9 Connect drainage system to building sewers, as indicated.

### **3.4 PIPE OR TUBING SURROUND MATERIAL**

- .1 Upon completion of pipe laying and after Contract Administrator has inspected Work in place, surround and cover pipe and install geotextile filter as indicated.
- .2 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness, as indicated.
- .3 Place layers uniformly and simultaneously on each side of pipe.
- .4 Compact each layer from pipe invert to mid-height of pipe to at least 95% of corrected maximum dry density.
- .5 Compact each layer from mid-height of pipe to underside of backfill to at least 90% of corrected maximum dry density.

### **3.5 BACKFILL MATERIAL**

- .1 Place backfill material above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
- .2 Under paving and walks, compact backfill to at least 95% corrected maximum dry density. In other areas, compact to at least 90% corrected maximum dry density.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CAN/CSA A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

**1.3                QUALITY ASSURANCE**

- .1 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
- .2 Regulatory Requirements:
  - .1 Perform Work to comply with applicable Provincial/Territorial regulations.
  - .2 Co-ordinate and meet requirements of power supply authority.
    - .1 Ensure availability of power when required.
- .3 Certificates: submit certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.
- .4 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

**1.4                DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
  - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Waste Management and Disposal:
  - .1 Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

- .2 Indoor Environmental Quality Credit EQ - 4.4 Low - Emitting Materials. Co-ordinate with Section 01 35 21 - LEED Requirements.
- .3 Adhesives, sealants and sealant primers: Low VOC to meet requirements of LEED Indoor Environmental Quality Credit EQ – 4.1 Low-Emitting Materials: Adhesives and Sealants.
  - .1 Low VOC complying with SCAQMD Rule #1168, October 2003,
- .4 Paints and coatings: Low VOC to meet requirements of LEED Indoor Environmental Quality Credit EQ – 4.2: Low-Emitting Materials: Paints and Coatings.
  - .1 Conform with VOC and Chemical component limits of Green Seal's Standard GS-11 January 1993 requirements.
  - .2 VOC content of anti-corrosive coatings must be less than VOC content limits of Green Seal Standard GS-03 May 1997 requirements.
  - .3 Paints and coatings not covered by GS-11 and GS-03 to meet requirements of SCAQMD Rule #1113, November 1996.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Underground ducts: rigid type DB2, size as indicated.
- .2 Rigid steel galvanized conduit and fittings: size as indicated.
- .3 Conductors: copper, type RWU-90 and RA-90, size and number of conductors as indicated.
- .4 Meter socket: weatherproof and approval of supply authority.
- .5 Backfill: clean and free of debris.

## **Part 3 Execution**

### **3.1 APPLICATION**

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

### **3.2 INSTALLATION**

- .1 Install cables in trenches and in ducts or conduit or direct in accordance with Section 26 05 43.01 - Installation of Cables in Trenches and in Ducts.
- .2 Allow adequate conductor length for connection to supply by power supply authority.
- .3 Install meter socket and conduit.

- .4 Allow adequate conductor length for connection to service equipment.
- .5 Make grounding connections in accordance with Section 26 05 28 - Grounding - Secondary.
- .6 Seal ducts and conduits at building entrance location after installation of cable.

### **3.3 FIELD QUALITY CONTROL**

- .1 Site Tests:
  - .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
  - .2 Perform additional tests if required by authority having jurisdiction.
- .2 Submit written test results to Contract Administrator for review approval.

### **3.4 CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal 01 35 21 - LEED Requirements.

**END OF SECTION**