

PART 1 - GENERAL

1.1 SECTION  
INCLUDES

- .1 Materials and installation for storm sewer, drainage pipe installation.

1.2 RELATED  
REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 31 05 16 - Aggregates for Earthwork.
- .3 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

1.3 MEASUREMENT FOR  
PAYMENT

- .1 100 mm dia. SDR 28 PVC Piping:
  - .1 Measurement for payment by linear meters (LM) and includes the cost of all plant, labour and materials required to complete the work including all couplers and fittings, concrete, etc.

1.4 REFERENCES

- .1 Codes and Standards in this section refer to the latest edition thereof.
- .2 American Society for Testing and Materials (ASTM).
  - .1 ASTM C 117-04, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C 136-06, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D 698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - .4 ASTM D 1056-07, Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
  - .5 ASTM D 3350, Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
  - .6 ASSHTO M294 Standard Specification for Corrugated Polyethylene Pipe.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.1-M89, Sieves, Testing, Woven Wire.
  - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.4 REFERENCES  
(Cont'd)

- .4 Canadian Standards Association (CSA International), Latest Edition.
  - .1 CAN/CSA-B1800-06, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.4, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11). CSA 182.2, PVC Sewer Pipe and Fittings (PSM Type). PVC Sewer Pipe and Fittings (PSM Type).
    - .1 CSA B182.4, Profile PVC Sewer Pipe and Fittings.
    - .2 CSA B182.11, Recommended Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.

1.5 DEFINITIONS

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

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Shop Drawings to indicate proposed method for installing carrier pipe for undercrossings.
- .2 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of bedding materials and provide access for sampling.
- .3 Submit manufacturer's test data and certification at least 2 weeks prior to beginning work.
- .4 Certification to be marked on pipe.
- .5 Submit to Departmental Representative 1 copy of manufacturer's installation instructions.

PART 2 - PRODUCTS

2.1 PIPING

- .1 High density PVC SDR 28 pipe, smooth liner wall, to ASTM 3034, ASTM FA77.
- .2 Nominal lengths: 6m.
- .3 Pipe couplers: As recommended by pipe supplier.

2.2 PIPE BEDDING  
AND SURROUND  
MATERIAL

- .1 Granular material in accordance with Section 31 05 16 - Aggregates for Earthwork and following requirements:  
.1 Crushed or screened stone, gravel or sand.  
.2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117 . Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.

.2 Table:

Sieve Designation	% Passing Stone/Gravel	Gravel/Sand
25	100	-
19	-	-
12.5	65-90	100
9.5	-	-
4.75	35-55	50-100
2.00		30-90
0.425	10-25	10-50
0.180	-	-
0.075	0-8	0-10

- .3 Concrete mixes and materials for bedding, cradles, encasement, supports: to CSA A23.1/A23.2.

2.3 BACKFILL  
MATERIAL

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

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.

3.2 TRENCHING  
(Cont'd)

- .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 - TYPE 1

- .1 Place bedding in unfrozen condition.
- .2 Place granular bedding material in uniform layers.
- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
  - .1 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 95% corrected 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.
  - .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.

3.4 INSTALLATION  
(Cont'd)

- .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 When any stoppage of work occurs, restrain pipes as directed by Departmental Representative to prevent "creep" during down time.
- .9 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.
- .10 Use prefabricated saddles or approved field pipes. Joint to be structurally sound and watertight.
- .11 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 Place geotextile fabric before placing Type 1 bedding. Wrap geotextile around bedding as indicated on drawings details.
- .3 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.
- .4 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.
- .5 Place layers uniformly and simultaneously on each side of pipe.
- .6 Compact each layer from pipe invert to mid height of pipe to at least 95% corrected maximum dry density.
- .7 Compact each layer from mid height of pipe to underside of backfill to at least 90% corrected maximum dry density to ASTM D 698.

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.

3.7 FIELD TESTING

- .1 Repair or replace pipe, pipe joint, geotextile or bedding found defective.
- .2 Remove foreign material from sewers and related appurtenances by flushing with water.