

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Materials and installation for gravity sewers.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 61 00 - Common Product Requirements.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Section 01 78 00 - Closeout Submittals.
- .5 Section 03 30 00 - Cast-in-Place Concrete.
- .6 Section 31 05 16 - Aggregate Materials.
- .7 Section 31 23 33.01 - Excavating Trenching and Backfilling.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C 117-04, Standard Test Method for Materials Finer Than 75 MU m (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D 698-12, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft⁴-lbf/ft² (600 kN-m/m²)).
 - .4 ASTM D 3034-08, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 - .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, A8, A23.5, A362, A363, A456.1, A456.2, A456.3).
 - .2 CSA B1800, Plastic Non-pressure Pipe Compendium - B1800
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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 B182.1, Plastic Drain and Sewer Pipe and Pipe Fittings.
 - .2 CSA B182.2, PVC Sewer Pipe and Fittings (PSM Type).
 - .3 CSA B182.11, Recommended Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.
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- .3 Newfoundland and Labrador Department of Transportation Standard Specification for Highway Construction and Maintenance, Latest Edition.

1.4 DEFINITIONS

- .1 Pipe section is defined as length of pipe between successive manholes and/or between manhole and any other structure which is part of sewer system.

1.5 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Inform Departmental Representative at least two (2) weeks prior to beginning Work, of proposed source of bedding materials and provide access for sampling.
- .3 Ensure certification is marked on pipe.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.7 SCHEDULING

- .1 Schedule Work to minimize interruptions to existing services and maintain existing sewage flows during construction.
 - .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.
 - .3 Notify Departmental Representative twenty-four (24) hours minimum in advance of any interruption in service. .
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1.8 MEASUREMENT FOR PAYMENT

- .1 Piping (Sanitary System): The supply of all labour, materials, plant and equipment for the installation of sanitary sewer piping, as indicated on the drawings, will be measured by the Lineal Metre (LM) calculated from actual field measurements.
- .2 Include incidental to the unit price the cost of all connections, mortar, etc. as required.
- .3 Also, include incidental to the unit price any costs associated with connection of the new sewer pipe to the existing sewer system including any required testing.

PART 2 - PRODUCTS

2.1 PLASTIC PIPE

- .1 Type PSM Polyvinyl Chloride (PVC): to CSA-B182.2.
 - .1 Standard Dimensional Ratio (SDR): 28 for pipe equal to or less than 150mm in diameter, 35 for a pipe greater than 150mm diameter.
- .2 Locked-in gasket and integral bell system.
- .3 Nominal lengths: 6 m.

2.2 SERVICE CONNECTIONS

- .1 Type PSM Poly (Vinyl) Chloride: to CSA-B182.2.
- .2 Plastic pipe: to CSA B182.1, with push-on joints.

2.3 CEMENT MORTAR

- .1 Portland cement: to CAN/CSA-A5, normal type 10.
- .2 Mix mortar one (1) part by volume of cement to two (2) parts of clean, sharp sand mixed dry.
 - .1 Add only sufficient water after mixing to give optimum consistency for placement.
 - .2 Do not use additives.

2.4 PIPE BEDDING AND SURROUND MATERIALS

- .1 As indicated.
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2.5 BACKFILL MATERIAL

- .1 As indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Clean and dry pipes and fittings before installation.
- .2 Obtain Departmental Representative's approval of pipes and fittings prior to installation.

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 require approval of Departmental Representative prior to placing bedding material and pipe.

3.3 GRANULAR BEDDING

- .1 Place bedding in unfrozen condition.
 - .2 Place granular bedding materials in uniform layer to depth as indicated.
 - .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
 - .1 Do not use blocks when bedding pipe.
 - .4 Shape transverse depressions as required to suit joints.
 - .5 Compact each layer full width of bed to at least 100% Corrected Maximum Dry Density to ASTM D 698.
 - .6 Fill excavation below bottom of specified bedding adjacent to manholes or structures with compacted Granular B gravel to 100% Corrected Maximum Dry Density to ASTM D 698.
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3.4 INSTALLATION

- .1 Lay and join pipes in accordance with manufacturer's recommendations and to approval of Departmental Representative.
 - .2 Handle pipe using methods approved by Department 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 invert 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 pipe 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 Pipe jointing:
 - .1 Install gaskets in accordance with manufacturer's recommendations.
 - .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. Gaskets so disturbed shall be removed, cleaned and lubricated and replaced 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 At rigid structures, install pipe joints not more than 0.45 m from side of structure.
 - .9 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
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- .10 When stoppage of Work occurs, block pipes as directed by Departmental Representative to prevent creep during down time.
- .11 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.
- .12 Make watertight connections to manholes.
 - .1 As indicated;
 - .2 Pipe to manhole connecting gaskets to manufacturer's specifications and recommendations;
 - .3 Use shrinkage compensating grout when suitable gaskets are not available.

3.5 PIPE SURROUND

- .1 Place surround material in unfrozen condition.
- .2 Upon completion of pipe laying, and after Engineer has inspected pipe joints, surround and cover pipes as indicated.
 - .1 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.
 - .1 Do not dump material within 0.25 m of pipe.
- .4 Place layers uniformly and simultaneously on each side of pipe.
- .5 Compact each layer from pipe invert to depth as indicated 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 200 mm compacted thickness up to grades as indicated.
 - .3 Under paving and walks, compact backfill to at least 100% Corrected Maximum
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Dry Density to ASTM D 698.

- .1 In other areas, compact to at least 100% Corrected Maximum Dry Density to ASTM D 698.

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