PART 1 - GENERAL

1.1 Related Sections

.1 Excavating and Backfilling - Section 31 23 10.

.2 Roadway Embankments - Section 31 24 13.

1.2 References

.1 American Society for Testing and Materials (ASTM).

.2 ASTM C 14M-15, Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe.

.3 ASTM C 76M-14, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.

.4 ASTM C 443M-11, Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.

.5 ASTM D 698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m3).

.6 Canadian Standards Association (CSA)

.7 CSA B182.1 and B182.2 for PVC Sewer Pipe, SDR=35.

.8 CAN/CSA-A257 Series-M92, Standards for Concrete Pipe.

.9 Canadian General Standards Board (CGSB).

1.3 Samples

.1 Submit samples in accordance with Section 01 33 00- Submissions/Shop Drawings.

.2 Inform Consultant at least 2 weeks prior to commencing work, of proposed source of bedding materials and provide access for sampling.

1.4 Material Certification

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

.2 Certification to be marked on pipe.

1.5 Delivery, Storage and Handling

.1 Contractor to deliver, store and handle materials in accordance with Product Requirements or DOTIE standards.

1.6 Waste Management and Disposal

.1 Separate and recycle waste materials as indicated by Consultant

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

PART 2 - PRODUCTS

2.1 Pipe

.1 Concrete Pipe and Fittings:
.1 Reinforced: to ASTM C 76M or CAN/CSA A257.2.
.2 Joints: bell and spigot with flexible rubber gaskets to CAN/CSA A257.3-M.

.2 PVC Pipe and Fittings (300 mm dia. and smaller):
.1 Type PSM polyvinyl chloride, to CAN/CSA-B1800, DR35, complete with Bell and Spigot joints with locked in rubber gaskets.

.3 HDPE Pipe and Fittings:
.1 Double walled HDPE pipe with smooth walled interior and corrugated exterior to 320 Kpa. To CSA B182.6.
.2 Joints: bell and spigot with flexible rubber gaskets.
.3 Connect to catchbasins with PVC manhole adaptor.
.4 Acceptable products: Solflo Max by Soleno, Boss 200 by Big "0", ADS N12-ST.

2.2 Granular Bedding and Backfill

.1 Select Backfill Material: approved material from site excavation or borrow pits. Such material shall be free from stumps, trees, roots, sod, muck or other deleterious material, and shall not contain rock, boulders or masonry larger than 150 mm diameter. The material shall be free from frost, and shall not be placed on frozen ground or in water. It must have a

2.2 Granular Bedding and Backfill (Cont'd)

.1 (Cont'd) moisture content that will allow compaction to the specified densities.

.2 Sand Bedding Material: hard, granular, sharp material, well graded from course to fine, free from impurities, chemicals or organic matter, chloride content to be less than 250 ppm and graded as follows:

Opening	(by weight)
4.75 mm	100
2.00 mm	90-96
0.85 mm	75-96
0.425 mm	45-82
0.250 mm	18-40
0.150 mm	10-17
0.075 mm	0-5

PART 3 - EXECUTION

3.1 Trenching

.1 Do trenching work in accordance with Section 31 23 10 - Excavating and Backfilling

.2 Obtain Consultant's approval of trench line and depth prior to placing bedding material or pipe.

3.2 Bedding

.1 Dewater excavation, as necessary, to allow placement of culvert bedding in the dry.

.2 Place minimum thickness of 150 mm of approved granular material on bottom of excavation and compact to minimum 98% maximum density to ASTM D 698.

.3 Shape bedding to fit lower segment of pipe exterior so that width of at least 25% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Consultant, free from sags or high points.

.4 Place bedding in unfrozen condition.

3.3 Backfilling

.1 Place approved backfill material in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.

.2 Compact each layer to 98% maximum density to ASTM D 698 taking special care to obtain required density under haunches.

.3 Protect installed culvert with minimum 600 mm cover of compacted fill before heavy equipment is permitted to cross. During construction, width of fill, at its top, to be at least twice diameter or span of pipe and with slopes not steeper than 1:2.

END