PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCES

.1 American Association of State Highway Transportation Officials.
.1 ASSHTO M294-16 Standard Specification for Corrugated Polyethylene Pipe, 300 to 1500 mm (12 to 60 in.) diameter.

.2 ASTM International.
.1 ASTM D 698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.3 Canada Green Building Council (CaGBC)
.1 LEED Canada-NC-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.

.4 Washington State Department of Ecology.
.1 Stormwater Management Manual for Western Washington, Volume II, Construction Pollution Prevention (2015 edition).

.5 Newfoundland and Labrador Department of Municipal Affairs.
.1 Municipal Water, Sewer and Roads Master Construction Specifications, latest revision.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for pipes and backfill and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.3 Samples:
.1 Inform Departmental Representative at least 4 weeks before beginning Work, of proposed source of bedding materials and provide access for sampling.
.2 Submit to Departmental Representative for testing, at least 4 weeks before beginning Work, samples of materials proposed for use as follows:
.1 Granular bedding and backfill.

.4 Certification: to be marked on pipe.

.5 Test and Evaluation Reports:
.1 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work.

.6 Sustainable Design Submittals:
.1 LEED Canada Submittals: in accordance with Section 01 35 21 - LEED Requirements.
.2 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with EPA 832/R-92-2005, authorities having jurisdiction and Section 01 35 21 - LEED Requirements.
.3 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
.4 Recycled Content:
.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
.2 Submit evidence, when Supplementary Cementing Materials (SCMs) are used, to certify reduction in cement from Base Mix to Actual SCMs Mix, as percentage.
.5 Regional Materials: submit evidence that project incorporates required percentage 20%

1.3 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.6 Sustainable Design Submittals: (Cont'd)
.5 Regional Materials: (Cont'd)
of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

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: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials in accordance with manufacturer's recommendations.
.2 Store and protect pipes from damage.
.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 21 - LEED Requirements.

.5 Packaging Waste Management: remove for reuse or return of pallets, crates, padding, banding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.

PART 2 - PRODUCTS

2.1 CORRUGATED POLYETHYLENE PIPE AND FITTINGS

.1 Corrugated HDPE pipe shall have a smooth interior and annular exterior corrugation and shall meet AASHTO M294, Type S.

2.2 GRANULAR BEDDING AND BACKFILL

.1 Type 1 bedding in accordance with Section 02223 of the Newfoundland and Labrador Municipal Water, Sewer and Roads Master Construction Specification.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for pipe culvert installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Departmental Representative.
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.1 Temporary Erosion and Sedimentation Control:
.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control drawings.
.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

3.2 PREPARATION (Cont'd)

.1 (Cont'd)

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TRENCHING

.1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

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

3.4 BEDDING

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

.2 Place 200 mm minimum thickness of approved granular material on bottom of excavation and compact to 95% minimum of maximum density to ASTM D 698.

.3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.

.4 Place bedding in unfrozen condition.

3.5 LAYING CORRUGATED POLYETHYLENE PIPE CULVERTS

.1 Begin laying at downstream end of culvert.

.2 Install pipe in trench by lowering.

.3 Ensure bottom of pipe is in contact with shaped bedding throughout pipe length.

.4 Allow water to flow through pipes during construction only as permitted by Departmental Representative.

3.6 JOINTS FOR POLYETHYLENE CULVERTS

.1 Install couplings in accordance with manufacturer's instructions.

3.7 BACKFILLING

.1 Backfill around and over culverts as indicated or as directed by Departmental Representative.

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

.3 Compact each layer to 95% maximum density to ASTM D 698 taking special care to obtain required density under haunches.

.4 Protect installed culvert with minimum 600 mm cover of compacted fill before heavy equipment is permitted to cross.
.1 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.

.5 Place backfill in unfrozen condition.

3.8 DEFLECTION TESTING

.1 Measure deflection of each plastic pipe, by pulling a deflection gauge through each pipe from end to end after backfilling.

.2 Provide deflection gauges to measure a 5% and 7 1/2% deflection. Gauges to be a "Go-No-Go" mandrel device. The device shall meet the requirements of the pipe manufacturer and shall be subject to the approval of the Departmental Representative.

.3 Within thirty days after installation, pull a deflection gauge measuring 5% deflection through the installed section of pipeline. If this test fails, proceed with 7 1/2% deflection test. If 7 1/2% deflection test fails, locate defect and repair. Retest using same methodology.

3.8 DEFLECTION TESTING (Cont'd)

.4 Provide deflection test report.

3.9 TESTING

.1 Inspection and testing of pipe bedding, surround and backfill material will be carried out by independent inspection and testing agency designated by Departmental Representative. Costs of these tests will be paid by Contractor in accordance with Section 01 29 83 - Payment Procedures for Testing Laboratory Services and Section 01 45 00 - Quality Control.

3.10 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END