

1.0 GENERAL

1.1 Scope

- 1.1.1 The work will consist of installing corrugated steel pipe culverts at locations and in conformity with lines, grades and cross-sections shown on the plans or designated by the Engineer.

1.2 Related Sections

- 1.2.1 Section 1340 – Erosion Control
- 1.2.2 Section 2110 – Excavation
- 1.2.3 Section 2130 – Subgrade Preparation
- 1.2.4 Section 2155 – Geotextiles
- 1.2.5 Section 2220 – Subbase
- 1.2.6 Section 2271 – Rip Rap

2.0 PRODUCTS

2.1 CSP Pipe

- 2.1.1 Corrugated Steel Pipe (CSP) shall be hot-dip galvanized with zinc coating at a rate of 610 g/m² and shall conform to the requirements of CSA G401-14, with rolled annular ends. Pipe wall thickness shall be minimum 2.0mm and size shall be as shown on the plans or as designated by the Engineer. Unless otherwise specified, the corrugation profile shall be 68 mm x 15 mm. Minimum size of culverts for roadway applications shall be 400mm.
- 2.1.2 Couplers to be corrugated, annular type (i.e. no wedge-type permitted), with gaskets; nuts and bolts to ASTM A307.
- 2.1.3 When polymer-coated CSP is specified, the polymer coating shall be applied to both sides of the galvanized sheet prior to corrugating in accordance with classification grade 250/250 as specified in CSA G401-14.
- 2.1.4 When aluminized-coated CSP is specified, the coating shall be to CSA G401-14.
- 2.1.5 Shop fabricated galvanized steel end sections shall be provided on all culverts, unless otherwise shown on the plans.

2.2 Concrete Pipe

- 2.2.1 Reinforced concrete pipe shall conform to the material and fabrication requirements of the ASTM C76M. Non-reinforced circular concrete pipe shall conform to ASTM C14M.
- 2.2.2 Pre-cast concrete flared end sections shall be provided on all culverts, unless otherwise noted on the plans.

2.3 Concrete Box Culvert

2.3.1 Reinforced concrete box culvert shall conform to the material and fabrication requirements of ASTM C1433M.

2.4 High Density Polyethylene Pipe (HDPE)

2.4.1 Corrugated, dual wall, smooth profile to CSA B182.8, Type 1, water-tight joints for 74kPa internal hydrostatic pressure, 320 KPa pipe stiffness.

2.4.2 HDPE Flared end sections shall be provided on all culverts, unless otherwise noted on the plans. HDPE flared end sections shall meet the requirements of CSA B182.8.

2.5 Granular Material

2.5.1 Shall be clean sand free from injurious amounts of deleterious substances. For granular backfill, refer to Section 2220 – Subbase Course.

2.6 Rip Rap

2.6.1 Refer to Section 2271 – Rip Rap.

2.7 Geotextile

2.7.1 Refer to Section 2155 –Geotextiles

3.0 EXECUTION

3.1 Construction

3.1.1 The excavation for the culvert and the culvert bed, including sub-cut if required, shall be in accordance with Sections 2110 and 2130. If the foundation is unsuitable, the bottom of the bed shall be sub-cut to the dimensions staked by the Engineer. The sub-cut shall be backfilled in accordance with the requirements for embankments as designated by the Engineer. The bedding line shall be shaped to fit the culvert.

3.1.2 Corrugated steel pipe culverts shall be placed with the inside circumferential laps pointing downgrade and with the longitudinal laps at the sides or quarter points. The sections of the culvert shall be firmly joined with coupling bands. Joints shall be as tight as possible.

3.1.3 Granular backfill under the haunches of culverts shall be compacted with mechanical impact tampers. If a density for embankments has not been specified, mechanical impact tampers shall be used for compacting the earth material against the culvert.

3.1.4 After the earth backfill and granular backfill has been placed and compacted around the culvert, the remainder of the embankment shall be constructed in accordance with the requirements for Embankments. The earth material above the bedding line shall be placed, simultaneously and uniformly, in lifts on each side of the culvert. In sub-cut, the lift shall extend to the limits of the

sub-cut; otherwise the lifts shall extend not less than 15 m from each side of the culvert.

- 3.1.5 No objectionable material shall be used within that portion of the embankment above or below the bedding line on culverts through the roadbed. The embankment, within three (3) diameters or three (3) spans of the culvert barrel, shall be free from rocks having a dimension of 75 mm or greater when measured in any direction.
- 3.1.6 Riprap placement for erosion control culverts shall conform to Standard Sewer Drawing S-23 and Section 2771 – Rip Rap
- 3.1.7 The Contractor shall repair or replace, at no direct expense to the City of Regina, any culvert damaged by his operation.