

Part 1 General

1.1 Section Includes

- .1 Materials and installation for pipe culverts.

1.2 Related Sections

- .1 Section 01 33 00 – Shop Drawings and Submittals.
- .2 Section 01 61 00 - Common Product Requirements.
- .3 Section 31 05 16 - Aggregates.
- .4 Section 31 23 33.01 - Trenching and Backfilling.
- .5 Section 31 37 00 – Rip-Rap.
- .6 Section 32 11 23 – Roadway Grading.

1.3 Reference Standards

- .1 ASTM International (ASTM)
 - .1 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .2 Canadian Standards Association (CSA Group)
 - .1 CSA B182.6, Profile Polyethylene (PE) Sewer Pipe and Fittings for Leak-Proof Sewer Applications [Part of B1800, Thermoplastic Nonpressure Piping Compendium].
 - .2 CSA B182.8, Profile Polyethylene (PE) Storm Sewer and Drainage Pipe and Fittings [Part of B1800, Thermoplastic Nonpressure Piping Compendium].
 - .3 CSA G401, Corrugated Steel Pipe and Buried Structures.
- .3 American Association of State Highway and Transportation Officials (AASHTO)
 - .1 M294, Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter.
 - .2 M306, Standard Specification for Drainage, Sewer, Utility, and Related Castings.

1.4 Submittals

- .1 Certification to be marked on pipe.

1.5 Delivery, Storage, and Handling

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

Part 2 Products

2.1 Corrugated Steel Pipe

- .1 Corrugated steel pipe shall conform to the requirements of CSA G401; pipe stiffness as per AASHTO M306.
- .2 Galvanized.
- .3 Minimum wall thickness of 1.6 mm or as specified.
- .4 Watertight cut-off collars: as indicated.
- .5 Prefabricated end sections: as indicated.
- .6 Annular Corrugated Couplers.

2.2 High Density Polyethylene

2.2.2.3 Granular Bedding and Backfill

- .1 In accordance with Section 31 05 16 – Aggregates.

Part 3 Execution

3.1 Trenching

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Trenching and Backfilling.
- .2 Obtain Owner's Representative's approval of trench line and depth prior to placing bedding material or pipe.

3.2 Bedding

- .1 Do bedding Work in accordance with Section 31 23 33.01 – Trenching and Backfilling.

3.3 Corrugated Steel Pipe Culverts Installation

- .1 Confirm inverts prior to commencement of construction.
- .2 Commence pipe placing at downstream end and proceed in an upstream direction with outside circumferential laps facing upstream and longitudinal laps or seam at side or quarter points.
- .3 Lay and join pipes in accordance with CSA G401 and the manufacturer's recommendations.
- .4 Handle pipe by approved methods. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends.

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- .5 Lay pipes on prepared bed, true to line and grade, with pipe invert smooth and free of sags and high points. Do not lay pipe on frozen bedding.
- .6 Ensure barrel of each pipe is in contact with shaped bed throughout its full length. Take up and replace defective pipe. Correct pipe which is not true to alignment and grade and pipe which shows differential settlement after installation.
- .7 Position and join pipes with suitable equipment and methods. Do not use excavating equipment to force pipe sections together.
- .8 Cut pipes in an approved manner, as recommended by the pipe manufacturer, without damaging the pipe and to leave a smooth end at right angles to axis of pipe.
- .9 Do not allow water to flow through pipes during construction.
- .10 Install end treatment as specified on the Drawings, in accordance with the manufacturer's recommendations.

3.4 Joints: Corrugated Steel Culverts

- .1 Corrugated steel pipe:
 - .1 Align pipes carefully before jointing.
 - .2 Match corrugations or indentations of coupling with pipe sections before tightening.
 - .3 Tap couplings firmly as they are being tightened to take up slack and ensure a snug fit. Insert and tighten bolts.
 - .4 Repair spots where damage has occurred to spelter coating by applying two coats of zinc rich epoxy paint.
 - .5 Complete each joint before laying the next length of pipe.
 - .6 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes in accordance with Section 31 23 33.01 – Trenching and Backfilling.
- .2 Structural plate:
 - .1 Erect in final position by connecting plates with bolts at longitudinal and circumferential seams.
 - .2 Drift pins may be used to facilitate matching of holes.
 - .3 Place plates in sequence recommended by manufacturer with joints staggered so that not more than three plates come together at any one point.
 - .4 Draw bolts up tight, without overstress, before beginning to backfill.
 - .5 Repair spots where damage has occurred to spelter coating by applying two coats of zinc rich epoxy paint approved by the Owner's Representative.

Part 4 Basis for Payment

4.1 Culvert

- .1 Unit of Measurement: Lineal Metres
- .2 Method of Measurement: The number of lineal metres of culvert installed, for the pipe sizes and materials indicated on the Unit Price Schedule, as measured from end to end along the centreline of the pipe, including the length of fittings.
- .3 Item Includes: Supply, shipping, handling, and installation of the pipe, fittings, hardware, and end treatment, excavation, bedding, and backfilling as specified on the Drawings.

END OF SECTION