



Part 1 General

1.1 DESCRIPTION OF WORK

- .1 The word 'culvert' as used in this Section shall include pipe culverts and pipe arches. This work shall consist of the supply and transporting of culverts to the point of construction site installation, performing the necessary excavation, placing the culverts, floodgates (if applicable), and backfilling as set forth in this Section.

1.2 STANDARDS

- .1 The following organizations publish Standards which have been referred to in this Section:
 - .1 A.S.T.M. - American Society For Testing and Materials
 100 Barr Harbor Drive
 West Conshohocken PA 19428-2859 U.S.A
 - .2 CSA International
 178 Rexdale Blvd.
 Etobicoke, ON M9W 1R3
 - .3 Manitoba Transportation and Infrastructure
 215 Garry Street
 Winnipeg MB R3C 3Z1

The Standards referred to shall be the most recent edition.

1.3 INSPECTION

- .1 Inspection shall be performed by the Engineer prior to and during backfilling operations.

Effective Date: March 2022



Part 2 Products

2.1 MATERIAL

- .1 CULVERTS - The Owner shall supply the culverts, couplers and bolts for the work required under this Contract in accordance with Section 02 43 50, Supply of Corrugated Steel Pipe or as shown on the Plans or otherwise specified in Section 01 00 10, Special Provisions.
- .2 CORRUGATED STEEL PIPE – Corrugated steel pipe, couplers and bolts shall conform to CSA G401. Pipe 600 mm or less shall have a minimum wall thickness of 1.6 mm. Pipe 600 mm or to 900 mm shall have a minimum wall thickness of 2 mm. Pipe supplied in diameters larger than 900 mm shall be as specified by the Engineer. Helical corrugated pipe shall have end sections corrugated to annular corrugations over a length of 300 mm at the ends of each pipe.
- .3 COMPACTED COMMON BACKFILL – The material obtained from the excavation or suitable borrow area.
- .4 COMPACTED SELECT GRANULAR BACKFILL – When directed by the Engineer, the material shall meet the following gradation:

<u>Sieve</u>	<u>% Passing</u>
37.5mm	100
25mm	80-100
4.75mm	40-70
75um	0 - 15

and shall be supplied and hauled by the Contractor, unless otherwise specified in Section 01 00 10, Special Provisions.

Effective Date: March 2022



Part 3 Execution

3.1 COMPACTION OF BACKFILL

- .1 Backfill shall be compacted in the following manner:
 - .1 COMPACTED COMMON BACKFILL – shall be placed in 300 mm lifts and compacted to 98% of maximum standard Proctor dry density ASTM D698, at a moisture content between 0.9 and 1.2% of optimum.
 - .2 COMPACTED SELECT GRANULAR BACKFILL – shall be placed in 150 mm lifts and compacted to 98% of maximum standard Proctor dry density ASTM D698.

3.2 DELIVERY AND ASSEMBLY

- .1 The Contractor shall supply, deliver and assemble the corrugated steel pipe in accordance with the Manitoba Transportation and Infrastructure Specification for Removing Culverts and Placing Culverts, No. 400, most recent edition and CSA G401 Corrugated Steel Pipe Products.

3.3 PROCEDURE

- .1 As per the Water Rights Regulation the construction of a Water Control Work which includes the installation of a new culvert (Class C) and the replacement of an existing culvert (Class D) are registrable projects and require a Registration Certificate. Application for the Registration Certificate must be submitted by the Engineer prior to construction.
- .2 The Contractor shall transport the culverts with care to avoid damage to the galvanized or bituminous coating. The culverts shall be transported to the point of installation as directed by the Engineer.
- .3 The excavation shall be made to the required depth so that the invert of the pipe is true to the grade staked on the ground by the Engineer. When a trench is required, the width at the top of the trench shall be sufficient to permit thorough tamping of backfill under the haunches and around the pipe.
- .4 If, in the opinion of the Engineer, the foundation for the pipe, at the grade established, is a soft, spongy, or otherwise unsuitable material, this material shall be excavated to the depth required by the Engineer, and to a width of three times

Effective Date: March 2022



the width of the pipe being installed, or as otherwise directed by the Engineer. Such excavation material shall be disposed of, and replaced with suitable material, as directed by the Engineer.

- .5 Where possible, culverts shall be laid so that the horizontal seams are aligned at the sides with horizontal seams in alternate lengths, placed on alternate sides. Separate sections of pipe shall be butted at the ends and joined with tightly drawn couplers. Fabricated laps on riveted sections shall face the downstream end of the culvert.
- .6 Floodgates, where required, shall be placed in as near a vertical plane as possible.
- .7 Where directed by the Engineer, a 150 mm bedding of compacted select granular backfill shall be placed under the invert of culverts. For culverts less than 900 mm in diameter the foundation shall be shaped to the contour of the pipe and shall be compacted to the satisfaction of the Engineer prior to the placing of the pipe.
- .8 The backfill material shall be placed in the trench in uniform layers and compacted in accordance with Clause 3.1.
- .9 Special care shall be taken to ensure the compaction of material under the haunches of the pipe. If the backfill material is dry, sufficient water shall be added to bring it to its optimum moisture, and tamping shall then be continued until all material under the haunches of the pipe is thoroughly compacted and free from voids.
- .10 Backfill material shall be placed uniformly on each side of the pipe, and at no time shall there be a difference of more than one 150 mm layer of backfill between one side of the pipe and the other.
- .11 Backfilling shall continue in uniform layers up to a minimum of 600 mm above the top of the pipe. If directed by the Engineer, backfilling shall be continued in lifts not exceeding 150 mm up to the elevation of the adjacent grade.
- .12 All materials used in backfilling shall be as approved by the Engineer. Frozen material shall not be permitted to be used as backfill.

Effective Date: March 2022



3.4 TRAFFIC CONTROL

- .1 The Contractor shall provide warning signage, detours, flag persons and any other device or procedure required in accordance with the latest edition of the Manitoba Infrastructure and Transportation Work Zone Traffic Control Manual.

Effective Date: March 2022