1.0 GENERAL

1.1 DETAILED DRAWINGS

.1 The following detail drawings are appended hereto and form part of this section:

Number	Title
[ ]	[ ]
[ ]	[Sloped End Section]

1.2 REFERENCES

.1 Provide corrugated steel pipe (CSP) in accordance with the following standards (latest revision) except where specified otherwise.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM D1056 Specification for Flexible Cellular Materials – Sponge or Expanded Rubber.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181 Ready-Mixed Organic Zinc-Rich Coating.

.4 Canadian Standards Association (CSA)

.1 CSA-G401 Corrugated Steel Pipe Products.

1.3 SUBMITTALS

.1 Provide the following submittals.

.2 Shop drawings prior to fabrication. Indicate on the shop drawings details of non-standard materials, details of the bevel ends, material and coating specifications.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Inspect each shipment of material and timely replace any damaged material.

.2 Unload, handle, and store pipe according to the manufacturer's written instructions to prevent damage to the galvanized coating and the pipe.

2.0 PRODUCTS

2.1 MATERIALS

.1 Provide materials in accordance with the following.

.2 CSP :

.1 Galvanized helical corrugated lock seam pipe in accordance with CSA-G401, with a corrugation profile of [68 mm by 13 mm] [125 mm by 25 mm] and with the ends re-corrugated to provide annular corrugations for couplers.

.2

CSP Wall Thickness	CSP Diameter (D)
[2.0 mm	D ≤ 600 mm
2.8 mm	600 mm < D ≤ 900 mm
3.5 mm	D > 900 mm]

.3 Shop fabricated sloped end sections of 3H:1V [4H:1V] as specified. Smooth the cut edges by grinding. For CSP 1000 mm or greater in diameter, weld the lock seams terminating at the cut edges of the sloped end sections with a 75 mm long fillet weld along the lock seam.

.3 Couplers:

.1 Galvanized couplers with annular corrugations and minimum wall thickness of [2 mm].

.2 For CSP greater than 300 mm in diameter, couplers of sufficient width to cover a minimum of 2 outside crest corrugations on each re-corrugated end.

.3 For CSP greater than 800 mm in diameter, couplers with a minimum of 3 bolts.

.4 Gaskets: Rubber gaskets in accordance with ASTM D1056.

.4 Galvanizing: Minimum zinc coating of [610 g/m^2] [1220 g/m^2] when tested by the triple spot test.

3.0 EXECUTION

3.1 EXCAVATION AND PREPARATION OF THE FOUNDATION

.1 Excavate the pipe foundation to the lines, grades, slopes, and elevations specified in the Contract Documents.

.2 Provide care of water to permit the work to be carried out in the dry.

.3 The Minister will identify unsuitable bearing soils when encountered at the earth foundation level. Perform [excavation, as classified by the Minister,] [Authorized Structure Over-Excavation] to remove unsuitable bearing soils and replace with [fill materials] [Authorized Fill Placement] as directed by the Minister.

.4 Compact the base of the excavation to provide a firm foundation of uniform density beneath the entire length of the pipe.

.5 Place and compact the bedding material as specified in the Contract Documents.

.6 Shape the bed to conform to the curvature of the pipe.

.7 Where camber is specified in the Contract Documents, provide a gradual crest curve in the bedding with no sudden breaks in the grade.

3.2 INSTALLATION

.1 Securely join separate pipe sections using couplers installed in accordance with the manufacturer's written instructions. Provide a completed installation that is watertight, and install the pipes so that they are free of depressions, and are free draining.

.2 Install the pipe at the locations, of the sizes, and to the lines, grades, slopes, and elevations specified. The tolerance from the specified lines, grades, slopes, and elevations is +/-15 mm. Where departures occur that are within the specified tolerance, return to the specified lines, grades, slopes, and elevations at a rate of not more than 5 mm per metre length of the pipe. For greater departures, remove and reinstall the pipe.

.3 When a laser beam is used to maintain grade, use manual survey methods to check the pipe invert at several intermediate locations and at the termination points.

3.3 FILL AND BACKFILL

.1 Do not commence fill placement operations until the installed pipes have been inspected by the Minister. Rectify defects, including any identified by the Minister.

.2 Provide the fill material, as specified in the Contract Documents under the haunches and adjacent to the pipe. Fill all corrugations so that direct and continuous contact between the pipe wall and the fill material is attained.

.3 Compact each lift of fill at the moisture content and to the density specified in Section 02331 – Fill Placement.

.4 Within 600 mm of the pipe, remove stones larger than 80 mm from the fill, and place fill material in lifts not exceeding 100 mm in thickness. Compact each lift of fill using pneumatic or mechanical hand tamping equipment.

.5 Prevent damage to the galvanized coating and the pipe during fill placement. Do not permit compaction equipment to come into direct contact with the pipe.

.6 Bring fill up simultaneously and evenly on both sides of the pipe. Do not allow construction equipment to pass over the pipe until a minimum cover of 600 mm, or greater if necessary to prevent damage to the pipe, of compacted fill has been placed.

.7 Operate compacting equipment parallel to the longitudinal axis of the pipe, until sufficient fill has been placed to allow construction of the embankment in the normal manner.

.8 Prevent displacement of the pipe during fill placement operations or through floatation.

.9 Maintain the interior of the pipe free of foreign material.

3.4 REPAIR AND DAMAGED GALVANIZED COATING

.1 Repair damaged galvanized surfaces with a zinc-rich paint that is in accordance with CAN/CGSB-1.181.

.2 Power tool clean the surfaces to be repaired to a bright metal surface. Apply multiple coats of zinc-rich paint in accordance with the manufacturer's written instructions to obtain a minimum dry film thickness of 50 microns or greater where required by the paint manufacturer.

END OF SECTION