CW 3530 – MANUAL IRRIGATION SYSTEM

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1. GENERAL CONDITIONS

The General Conditions and Standard Provisions attached hereto shall apply to and be a part of this Specification.

3. DESCRIPTION

This Specification shall cover the complete supply, installation, and removal of water irrigation systems and all appurtenances as detailed on the Drawings.

The work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.

5. MATERIALS

5.1 General

The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification.

5.2 Testing and Approval

All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.

All materials shall be approved by the Contract Administrator before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials, in whole or in part, do not conform to the Specification detailed herein or are found to be defective in manufacture or have become damaged in transit, storage or handling operations, then such material shall be rejected by the Contract Administrator and replaced by the Contractor at his own expense.

5.3 Irrigation Pipe and Fittings

All irrigation pipes shall be Series 100, High Density Polyethylene pipe and shall conform to C.S.A. Standard B137.0 and B137.1., CGSB-41-GP-25m and ASTM D-1248-78.

Fittings: approved brass saddle fittings at head connections and socket-fusion external fittings at pipe connections. All fittings will be sized to fit pipe diameter and of a pressure rating equal or better than adjacent pipe. Three elbow swing joints shall be unplasticized schedule 80 threaded P.V.C. pipe and schedule 40 fittings.

5.4 Irrigation Sprinkler Heads

Sprinklers heads will be the type and size indicated on the construction drawings, or approved equal, conforming to manufacturer's performance standards for durability and operation.

Sprinklers other than the model specified shall be installed only upon prior approval of the Contract Administrator.

5.5 Manual Gate Valves

Manual gate valves shall be bronze with threaded ends, non-rising stem, removable handle and of a resilient rubber ring seal with a minimum pressure rating of 1380 KPa WOG, sizes as specified on construction drawings.

5.6 Valve Enclosure

Valve enclosure for gate valves shall be constructed from 300 mm O.D., 12 gauge 450 mm deep galvanized corrugated steel pipe with a 100 mm deep gravel sump.

5.7 Valve Enclosure Cover

Valve enclosure cover shall be constructed in accordance with detail drawing SD-242. All components shall be hot dipped galvanized after fabrication and shall be primed with a galvanized metal primer and painted a deep ivy green colour.

5.8 Meter Enclosure (Double Check Valve Assembly Backflow Preventer)

Meter enclosure for 38 mm diameter or larger water services shall be constructed from 1500 mm O.D., 12 gauge 900 mm deep galvanized corrugated steel pipe with a 300 mm deep gravel sump.

5.8.1 Meter Enclosure Cover

Meter enclosure cover for 38 mm diameter or larger water services shall be constructed in accordance with detail drawing SD-241B. All components shall be hot dipped galvanized after fabrication and shall be primed with a galvanized metal primer and painted a deep ivy green color.

5.9 Meter Enclosure (Dual Check Backflow Preventer)

Meter enclosure for 25 mm diameter or smaller water services shall be constructed from 900 mm O.D., 12 gauge 900 mm deep galvanized corrugated steel pipe with a 300 mm deep gravel sump.

5.9.1 Meter Enclosure Cover

Meter enclosure cover for 25 mm diameter or smaller water services shall be constructed in accordance with detail drawing SD-241A. All components shall be hot dipped galvanized after fabrication and shall be primed with a galvanized metal primer and painted a deep ivy green color.

5.10 Backflow Prevention

A dual check backflow preventer "Watts" No. 7 or equivalent shall be installed on 12 mm, 19 mm and 25 mm diameter water services. Specifications include bronze body construction, acetyl resin plastic check modules and stainless steel springs.

For water services 38 mm in diameter or larger a double check valve assembly backflow preventer shall be installed. Specifications include a cast bronze body, corrosive resistant internal parts and resilient seated shut-off valves and test cocks. Casing should have a flow identification marker cast

on one side for easy reference. Size shall conform to drawings. Backflow preventer to be approved by the Contract Administrator prior to installation.

9. CONSTRUCTION METHODS

9.1 General

Installation of water service will be done in accordance with Specification CW 2210.

9.2 Meter Enclosure

Meter Enclosure, as per SD-241B or SD-241A. Following the water service installation the Contractor shall excavate to 900 mm below the finished sod grade and supply and install the appropriate diameter corrugated steel pipe C/W steel lid and 300 mm deep gravel sump and with a hole cut to accommodate outgoing irrigation pipe and polyethylene protection sleeve.

The Contractor shall supply, install and connect from the copper water service a gate valve, meter supplied by the City, backflow prevention device, 25 mm quick coupler blowout valve and all appurtenances as per detail drawing SD-241B for 38 mm diameter or larger water services or SD-241A for 25 mm diameter or smaller water services.

The meter pit shall be backfilled and graded to the Contract Administrator's satisfaction.

9.3 Installation of Pipe

Following the grading of the area to the design subgrade elevations the Contractor shall install polyethylene pipe.

Polyethylene pipe shall be installed in accordance with the method or methods indicated on the construction drawings or as directed by the Contract Administrator.

Approved methods for installing polyethylene pipe are by either standard trenching techniques or for 60 mm diameter and smaller pipe, the vibratory ploughing method.

The Contractor shall excavate trenches or plough in pipe to a depth to maintain a minimum coverage of 500 mm above pipe, regardless of pipe size. The Contractor shall take due care and caution when trenching or ploughing in areas of existing sod. Sod that is unnecessarily damaged, as deemed by the Contract Administrator, shall be repaired or replaced to the satisfaction of the Contract Administrator at the Contractor's expense.

9.4 Polyethylene Waterline

The Contractor shall supply and install the polyethylene pipe distribution system extending from the meter enclosure as shown on the construction drawings.

The Contractor shall place conduit as required to enclose piping under paving areas. Diameter and length as indicated on the construction drawings. Coordinate with other trades.

All pipe connections shall be made in accordance with the manufacturer's instructions and shall be done prior to installation.

Make connections to the pipe for sprinklers with approved saddle fittings for polyethylene pipe.

The Contractor shall exercise extreme caution in the handling of materials to prevent damage. Damaged pipes or fittings shall be replaced.

9.5 Manual Gate Valves

The Contractor shall install specified sized manual gate valves in valve enclosures at locations shown on the construction drawings. All gate valves except in Meter Enclosure shall be installed in an upright position for accessibility.

9.6 Manual Gate Valve Enclosure

Manual Gate Valve Enclosure, 300 mm diameter, 12 gauge 450 mm deep galvanized corrugated steel pipe c/w cover shall be supplied and installed by the Contractor in accordance with SD-243.

9.7 Sprinklers

The Contractor shall install the specified model of sprinkler at the locations shown on the drawing and approved in the field by the Contract Administrator. The work under this item shall include trenching, backfill, supply and installation of the sprinklers, complete with 3 elbow swing joints in accordance with the manufacturer's specifications.

Backfill under each sprinkler with 0.015 cubic metres of thoroughly compacted pea gravel.

Top of sprinklers shall be adjusted to the level of finished sod.

9.8 Backfill

All trenches shall be backfilled to the finished sub-grade elevation in 150 mm maximum lifts with each lift being compacted to ninety-five (95%) percent Standard Proctor Density. Compaction shall be inspected and approved by the Contract Administrator.

Foreign objects and stones of greater than 50 mm diameter shall be removed from the backfill prior to placement.

The Contractor shall remove and legally dispose of excess and/or unsuitable excavated material and if required provide imported fill for backfilling at no additional cost to the project.

9.9 Sod Restoration

Restoration of sod areas damaged by irrigation pipe installation shall be performed by the Contractor in accordance with Specification CW 3510 or CW 3520 as directed by the Contract Administrator.

Within the warranty period, the Contractor shall repair any settlement of trenches with topsoil and sod/seed to the Contract Administrator's satisfaction.

9.10 Testing and Adjustment

The Contractor shall be responsible for all testing of the irrigation system and for making adjustments to various components so the overall operation is most efficient and coverage is uniform to the satisfaction of the Contract Administrator. Leave all joints and fittings exposed and pressure test in the presence of the Contract Administrator.

Following the installation of the backflow preventer the Contractor shall test and tag same in the presence of the Contract Administrator.

9.11 Maintenance

Should movement of the sprinklers or valve assemblies occur within the warranty period the Contractor shall adjust the same to the proper elevation.

Upon completion of the final inspection and in the event that the thirty (30) day sod/seed maintenance period has to be carried over into the following construction season, the Contractor shall blow out all irrigation lines prior to freeze-up and re-connect the irrigation system when weather permits in the spring of the following year. Notify the Parks and Recreation Department's Superintendent for the area when ready to proceed with both operations.

9.12 Clean-up

Following completion of the sprinkler system installation the Contractor shall grade all excavated areas level and shall clean up and dispose of all excess and waste material to the Contract Administrator's satisfaction.

9.13 Removal of Irrigation Pipe and Sprinkler Heads

Irrigation pipe and sprinkler heads to be removed shall be those designated on the Drawings or as designated by the Contract Administrator.

The Contract Administrator and the Contractor shall inspect the existing irrigation system prior to commencement of construction to determine the extent of material that has to be repaired or replaced. The City shall assume responsibility for the cost of replacing any of the reported damaged materials.

The Contractor shall take due care and caution when removing the existing irrigation pipe and sprinkler heads. Unnecessary damage, as deemed by the Contract Administrator, shall be replaced or repaired by the Contractor at his expense and to the satisfaction of the Contract Administrator.

All live pipe ends as related to the removal shall be capped. The cap installed shall be material sized to fit pipe size and of a pressure rating equal or better than adjacent pipe.

All surplus materials that are salvageable as determined by the Contract Administrator, shall be delivered to the location specified by the Contract Administrator.

Open trenches left by the removal shall be backfilled and restored to a condition equal to or better than the original condition prior to starting construction and to the satisfaction of the Contract Administrator.

9.14 Removal of Existing Box Enclosure

Box enclosures to be removed shall be those designated on the Drawings or as designated by the Contract Administrator.

The existing box enclosures and appurtenances shall be inspected by the Contractor and the Contract Administrator prior to the commencement of construction, to determine the extent of damage to the existing components. The City shall be responsible for the cost of replacing any of the reported damaged materials.

Box enclosures and gate valves, dual/double check valves, blow out valves and all other appurtenances as related to the box enclosure removal shall be carefully removed and stored as directed by the Contract Administrator. The Contractor shall take due care and caution when removing the box enclosure and interior parts. Unnecessary damage, as deemed by the Contract Administrator, shall be replaced or repaired by the Contractor at his expense and to the satisfaction of the Contract Administrator.

All surplus materials that are salvageable shall be delivered to the location specified by the Contract Administrator.

Existing water services that are abandoned shall be disconnected from the watermain and the corporation stop turned off.

All work as related to the installation of new water services shall be done in accordance with CW 2210 of this Specification.

10. QUALITY CONTROL

10.1 Inspection

All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works, which are not in accordance with the requirements of this Specification.

10.2 Access

The Contract Administrator shall be afforded full access for the inspection and control testing of materials, to determine whether the material is being supplied in accordance with this Specification.

10.3 Corrective Action

The Contractor shall, at his own expense, correct such work or replace such materials found to be defective under this Specification in an approved manner to the satisfaction of the Contract Administrator.

10.4 Warranty

The Contractor shall agree and guarantee all workmanship, materials and operation of the irrigation system for a period of one year from the recognized date of acceptance.

12. METHOD OF MEASUREMENT

12.1 Meter Pit Assembly

Installation of Meter Pit Assemblies will be measured on a unit basis. The number to be paid for shall be the total number of meter pit assemblies supplied and installed in accordance with this Specification and accepted by the Contract Administrator.

All costs of excavation, gravel sump, corrugated steel pipe and checker plate lid, hot-dipped galvanizing, painting, backfill, piping and fittings, gate valve and backflow prevention device, quick coupler blowout valve, connection, clean-up and all other items required to complete the installation shall be included in the unit price bid for meter pit assemblies.

12.2 Supply and Installation of Irrigation Pipe and Appurtenances

Supply and installation of irrigation pipe will be measured on a linear measure basis. The length to be paid for shall be the total number of metres of irrigation pipe supplied and installed in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

All costs of excavation, backfilling and compaction, supply and installation of polyethylene pipe and fittings, testing, grading, clean-up and all other items required to complete installation shall be included in the price bid per linear metre for the supply and installation of irrigation pipe.

12.3 Supply and Installation of Sprinkler Assemblies

Supply and installation of sprinkler assemblies will be measured on a unit basis. The number to be paid for shall be the total number of sprinkler assemblies supplied and installed in accordance with this Specification and accepted by the Contract Administrator.

All costs of excavation, backfill, supply, installation and connection of sprinklers, swing joints, saddles at supply main, testing, grading, clean-up and all other items required to complete the installation shall be included in the unit price quoted for the supply and installation of sprinkler heads.

12.4 Supply and Installation of Manual Gate Valves and Valve Enclosure

Supply and installation of Manual Gate Valves and Valve Enclosures will be measured on a unit basis. The number to be paid for shall be the total number of manual gate valves and valve enclosures supplied and installed in accordance with this Specification and accepted by the Contract Administrator.

12.5 Removal of Irrigation Pipe and Sprinkler Heads

Removal of irrigation pipe and sprinkler heads will be measured on a linear measure basis. The length to be paid for shall be the total number of metres of irrigation pipe and sprinkler heads removed in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

12.6 Removal of Existing Box Enclosure

Removal of existing box enclosure will be measured on a unit basis. The number to be paid for shall be the total number of box enclosures including appurtenances removed in accordance with this Specification and accepted by the Contract Administrator.

13. BASIS OF PAYMENT

13.1 Meter Pit Assembly

Installation of meter pit assemblies will be paid for at the Contract Unit Price for "Meter Pit Assemblies", which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

13.2 Supply and Installation of Irrigation Pipe and Appurtenances

Supply and installation of irrigation pipe and appurtenances will be paid for at the Contract Unit Price per metre for "Polyethylene Waterline"*, measured as specified herein, which price shall be payment in full for performing all operations herein described and for all other items incidental to the work included in this Specification.
* Specify polyethylene waterline diameter(s).

13.3 Supply and Installation of Sprinkler Assemblies

Supply and installation of sprinkler assemblies will be paid for at the Contract Unit Price for "Sprinkler Assemblies", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

13.4 Supply and Installation of Manual Gate Valves and Valve Enclosure

Supply and installation of manual gate valves and valve enclosure will be paid for at the Contract Unit Price for "Manual Gate Valves and Valve Enclosure", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

13.5 Removal of Irrigation Pipe and Sprinkler Heads

Removal of irrigation pipe and sprinkler heads will be paid for at the Contract Unit Price per metre for "Removal of Irrigation Pipe and Sprinkler Heads", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

13.6 Removal of Existing Box Enclosure

Removal of existing box enclosure will be paid for at the Contract Unit Price for "Removal of Existing Box Enclosure", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.