

SECTION 02442 - UNDERGROUND SPRINKLER SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to Work specified in this Section.

1.2 EXTENT OF WORK

- A. It is intended that the Contractor provide the design, all labor, materials and equipment required to construct a complete and operational automatic irrigation system.
- B. Specifications related to this part of the project are a Performance Specification to give the Contractor guidelines to follow in designing the project irrigation system.
- C. The automatic irrigation system shall be designed to irrigate all grass and planted areas as shown in the Drawings. Care should be taken in the irrigation design to ensure that no water is sprayed on the walkways or paved areas.

1.3 SYSTEM WATER COVERAGE

- A. Equivalent to 1-inch rain per week.

PART 2 - PRODUCTS

2.1 PIPE

- A. All pipe shall be Class 200, NSF, PVC, bell-end, solvent weld, with factory chamfered male ends, conforming to Cell Class 2345B, SDR21.

2.2 PVC FITTINGS

- A. All fittings used for joining PVC pipe shall be Schedule 40 (except threaded nipples shall be Schedule 80 PVC) NSF, PVC, solvent weld, with factory imprint showing size and type.

2.3 FLEXIBLE RISER FITTINGS

- A. All flexible riser assembly fittings shall be the same size as the sprinkler inlet thread. Flexible riser shall be low-density polyethylene pipe; connections shall be spiral barb elbows.

2.4 SPRINKLER HEADS

- A. Pop-up spray sprinklers shall be constructed of heavy-duty plastic and have a wiper seal, an under-nozzle strainer, a stainless-steel retract spring and a machined brass nozzle. The nozzle shall have an adjusting screw.
- B. Minimum Pop-up Height: 2 inches; ½-inch FPT inlet. Precipitation rates of full-circle and part-circle sprinklers shall be compatible when valved together.
- C. Rotor pop-up sprinklers shall have a heavy-duty plastic case, a stainless-steel retraction spring, a wiper seal. Minimum pop-up height shall be 1.5 inches. Precipitation rates of full-circle and part-circle sprinklers shall be compatible when valved together. Part-circle models shall be field-adjustable from 50-degree arc to 320-degree arc. All sprinkler components shall be removable from the case without removing the case from the ground.

2.5 ELECTRIC REMOTE CONTROL VALVES

- A. Electric remote control valves shall be of all brass construction, with a throttling stem and a manual vent. The solenoid shall be fully encapsulated 24 volt.

2.6 VALVE ACTUATION WIRE

- A. Wire shall be No. 14 UF, UL approved, 600-volt rated; RED for control, WHITE for common.

2.7 WIRE SPLICES

- A. Wire splicing shall be done with Pen-tite type available from Spears, Rain Bird or Toro.

2.8 GATE VALVES

- A. Gate valves shall be all brass construction; wheel handle, screwed ends, line size, 150-pound rated, American-made.

2.9 VALVE ACCESS BOXES

- A. Valve access boxes shall be constructed of high-strength, impact-resistant thermoplastic material. Valve box lid shall be of the locking type. All valve access boxes shall be rectangular shape.

2.10 IRRIGATION CONTROLLER

- A. Irrigation controller shall be electronic and shall electrically start the irrigation cycle and automatically time the individual stations. The controllers shall have 117V ac input and 26V ac 60-cycle output; a 14-day programming capability; a 0-60-minute station timing; an automatic rapid advance shall provide for continuous watering without time lapse between omitted stations. All pins shall be captive type. Reset circuit breakers shall protect the controller from excessive current draw or voltage surge. The electrical panel shall be hinged to the cabinet and shall swing out for easy access. The controller cabinet shall have a key lock feature.

2.11 RAIN SENSOR

- A. Rain sensor shall automatically interrupt the watering cycle and keep the sprinklers from starting or continuing when rainfall exceeds a preselected amount. Adjustable sensing probes shut system off with as little as 1/8-inch of rainfall. System shall automatically return to watering schedule when water in collection pan evaporates.

2.12 DRAIN VALVES

- A. Manual drain valves shall be bronze construction, angle pattern. The valve seat shall be rubber and shall be connected to the stem. The valve shall have a cross handle. Automatic ball check drains are permitted.

2.13 SHRUB SPRAY SPRINKLERS

- A. Shrub spray sprinklers shall be of heavy-duty plastic construction, one piece, screw adjustable, incorporating low-angle or flat-spray trajectories.

2.14 PIPE SLEEVES

- A. Pipe sleeves shall be PVC Class 200 and shall be a minimum 2 full sizes larger than the pipe being sleeved.

2.15 BACKFLOW PREVENTION

- A. This device shall be selected to comply with all local codes. A backflow prevention device shall be installed at all points of connection between the potable water system and the landscape irrigation system.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install equipment in compliance with all applicable local and state codes.

3.2 PVC PIPE

- A. PVC pipe shall be laid in a dry, rock-free trench. Main-line pipe at 24-inch soil cover; lateral-line pipe at 12-inch soil cover. Use PVC primer on all solvent weld surfaces. The leading edge of all pipe to be solvent welded shall be chamfered. Solvent weld joints shall sit 12 hours before moving or pressure testing. All main lines shall be flushed prior to backfilling and installation of remote control valves. Backfill in 6-inch lifts--mechanically tamp or water in each lift, restoring all backfill areas to original soil density. Backfill only with rock-free material.

3.3 FLEXIBLE RISER FITTINGS

- A. Install a flexible riser assembly at each sprinkler head. Each flexible riser shall provide for complete movement in all directions. Use spiral barbed pipe connections from PVC to flexible pipe.

3.4 SPRINKLER HEADS

- A. Lawn Pop-ups: Install 6 inches from curbs, walks, drives, mowing strips, and 12 inches from building foundations. Firmly tamp backfill around sprinkler to prevent settling.
- B. Shrub Sprays: Install 12 inches from curbs, walks, drives, mowing strips, and 18 inches from building foundations. Firmly tamp backfill around sprinkler riser to prevent settling.
- C. Rotor Pop-ups: Install 6 inches from curbs, walks, drives, mowing strips, and 12 inches from building foundations. Initial installation at 4 inches above grade, lower to grade after first mowing. Firmly tamp final backfill to prevent settling.

3.5 ELECTRIC REMOTE CONTROL VALVE

- A. Install only one valve per valve box. Valve handle-top at 8 inches below finish grade. Use PVC 45-degree elbows down to lateral line depth. Make wire splice completely waterproof and wrap each wire 18 times around ½-inch pipe and leave within valve access box. Use only threaded connections between the main-line pipe and the valve inlet.

3.6 VALVE ACTUATION WIRE

- A. Install under the main-line pipe at all possible locations. Bundle and tape at 50-foot intervals. Install within pipe sleeves at all locations where pipe is sleeved. Install within a PVC pipe sleeve where unable to place under system pipe. Wire splicing not permitted between controller and electric remote control valve.

3.7 WIRE SPLICES

- A. Make all wire splices in accordance with manufacturer's specifications; make waterproof; and place within valve access box.

3.8 GATE VALVES

- A. Install at pipeline depth. Place 6-inch PVC pipe around handle of valve and bring to within 3 inches of bottom of access box lid. Backfill around 6-inch pipe. Install only one gate valve per valve box.

3.9 RAIN SENSOR

- A. The rain sensor shall be installed in a location where it will be exposed to the weather and not shielded by the building. Irrigation Contractor shall coordinate with the Owner as to mounting location.

3.10 VALVE ACCESS BOXES

- A. Place an 18-inch-long cedar 2 x 4 board under each long side of the valve box to stabilize. Bring lid to finish grade. Firmly tamp backfill to prevent settling. Place 2 cubic feet of gravel within each valve box, under the contained valve.

3.11 IRRIGATION CONTROLLER

- A. The irrigation controller shall be installed at a location shown on the Drawings. Electrical service to the controller shall be installed within conduit. Wall-mount units shall be installed at eye level.
- B. The Irrigation Contractor shall coordinate with the General Contractor as to the locations of sleeves through walls for the irrigation control wire and the location of an electrical outlet for operating the irrigation controller.

3.12 DRAIN VALVES

- A. Install manual drain valves or automatic drain valves at locations which will facilitate the complete drainage of the entire irrigation system for winterization. Install manual drain valve handle within a 2-inch PVC sleeve with a locking-type valve marker. Place a 5-cubic-foot gravel sump under each drain valve (manual or automatic) to facilitate drainage.

3.13 PIPE SLEEVES

- A. Install at required locations at specified pipe depth. All pipe under walks, drives, through-walls, shall be sleeved. Extend all sleeves 3 feet beyond the edge of the sleeved surface.

3.14 BACKFLOW PREVENTION

- A. Install this unit so that no part of the device will be submerged and there shall be access for testing and maintenance. Installation shall comply with all local codes.

3.15 TESTING

- A. Prior to installing sprinkler heads, thoroughly flush all pipe lines, cap all risers and sequentially test each zone at the intended system operating pressure. Repair all defective components and joints.

3.16 OPERATIONAL TESTING

- A. After the hydrostatic test, sprinkler heads shall be installed and the system completed and tested to demonstrate functional efficiency. The Contractor shall balance and adjust all components to perform as designed.

3.17 GUARANTEE

- A. Guarantee complete system, all labor and materials, for one year from date of acceptance of the system by the Owner. Correct all problems arising within this time period at no additional expense.

3.18 SYSTEM OPERATION TRAINING

- A. The Contractor shall instruct a designated Owner Representative in the operation of the irrigation system. This instruction shall include proper method for winterization of the system. Also, the Contractor shall provide the Owner with a ring binder that has typewritten operation instructions included along with manufacturer information for all pieces of equipment used in the irrigation system.

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Wichita, Kansas

3.19 CLEANUP

- A. The Contractor shall remove all rocks, excess dirt and debris, and equipment from the site at the completion of the work.

3.20 EXTRA MATERIALS

- A. The Contractor shall furnish to the Owner at project completion two of each key necessary to open and/or operate all pieces of irrigation equipment.

END OF SECTION 02442