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328400 - Planting Irrigation

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SECTION 32 8400 – PLANTING IRRIGATION

1.1 SUMMARY

A. Section Includes:

1. Piping.
2. Manual valves.
3. Automatic control valves.
4. Automatic drain valves.
5. Sprinklers.
6. Quick couplers.
7. Controllers.
8. Boxes for automatic control valves.

1.2 PERFORMANCE REQUIREMENTS

- A. Irrigation zone control shall be automatic operation with controller and automatic control OR manual operation with manual valves.
- B. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain 100 percent irrigation coverage of areas indicated.
- C. Delegated Design: Design 100 percent coverage irrigation system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- D. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:
 1. Irrigation Main Piping: 200 psig (1380 kPa).
 2. Circuit Piping: 150 psig (1035 kPa).

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.4 PIPES, TUBES, AND FITTINGS

- A. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

- B. Galvanized-Steel Pipe: ASTM A 53/A 53M, Standard Weight, Type E, Grade B.
 - 1. Galvanized-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106/A 106M, Standard Weight, seamless-steel pipe with threaded ends.
 - 2. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
 - 3. Malleable-Iron Unions: ASME B16.39, Class 150, hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface, and female threaded ends.
 - 4. Cast-Iron Flanges: ASME B16.1, Class 125.

- C. Ductile-Iron Pipe with Push-on Joint: AWWA C151, with push-on-joint bell and spigot ends.
 - 1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - a. Gaskets: AWWA C111, rubber.

- D. Soft Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B), water tube, annealed temper.
 - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
 - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.

- E. Hard Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B), and ASTM B 88, Type M (ASTM B 88M, Type C), water tube, drawn temper.
 - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
 - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.

- F. PE Pipe with Controlled ID: ASTM F 771, PE 3408 compound; SIDR 11.5 and SIDR 15.
 - 1. Insert Fittings for PE Pipe: ASTM D 2609, nylon or propylene plastic with barbed ends. Include bands or other fasteners.

- G. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedules 40 and 80.
 - 1. PVC Socket Fittings: ASTM D 2466, Schedules 40 and 80.
 - 2. PVC Threaded Fittings: ASTM D 2464, Schedule 80.
 - 3. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket ends.

- H. PVC Pipe, Pressure Rated: ASTM D 2241, PVC 1120 compound, SDR 21 and SDR 26.
 - 1. PVC Socket Fittings: ASTM D 2467, Schedule 80.
 - 2. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket or threaded ends.

1.5 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick unless otherwise indicated; full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
- F. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

1.6 MANUAL VALVES

- A. Curb Valves:
 - 1. Standard: AWWA C800.
- B. Curb-Valve Casing:
 - 1. Standard: Similar to AWWA M44 for cast-iron valve casings.
- C. Shutoff Rods for Curb-Valve Casings: Furnish one or two steel, tee-handle shutoff rod(s) with one pointed end, stem of length to operate deepest buried valve, and slotted end matching curb valve for Project.
- D. Brass Ball Valves:
 - 1. Manufacturers:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. DynaQuip Controls.
 - d. Flow-Tek, Inc.; a subsidiary of Bray International, Inc.

- e. Hammond Valve.
 - f. Jamesbury; a subsidiary of Metso Automation.
 - g. Jomar International, LTD.
 - h. KITZ Corporation.
 - i. Legend Valve.
 - j. Marwin Valve; a division of Richards Industries.
 - k. Milwaukee Valve Company.
 - l. NIBCO INC.
 - m. Red-White Valve Corporation.
 - n. RuB Inc.
2. Description:
- a. Standard: MSS SP-110.
- E. Bronze Ball Valves:
1. Manufacturers:
- a. American Valve, Inc.
 - b. Conbraco Industries, Inc.; Apollo Valves.
 - c. Crane Co.; Crane Valve Group; Crane Valves.
 - d. Hammond Valve.
 - e. Lance Valves; a division of Advanced Thermal Systems, Inc.
 - f. Legend Valve.
 - g. Milwaukee Valve Company.
 - h. NIBCO INC.
 - i. Red-White Valve Corporation.
 - j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
- a. Standard: MSS SP-110.
- F. Iron Ball Valves:
1. Manufacturers:
- a. American Valve, Inc.
 - b. Conbraco Industries, Inc.; Apollo Valves.
 - c. KITZ Corporation.
 - d. Sure Flow Equipment Inc.
 - e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
- a. Standard: MSS SP-72.
 - b. CWP Rating: 200 psig (1380 kPa).
 - c. Body Design: Split body.
 - d. Body Material: ASTM A 126, gray iron.
 - e. Ends: Flanged.

- f. Seats: PTFE or TFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel.
- i. Port: Full.

G. Plastic Ball Valves:

1. Manufacturers:

- a. American Valve, Inc.
- b. Asahi/America, Inc.
- c. Colonial Engineering, Inc.
- d. Fischer, George Inc.
- e. Hayward Flow Control Systems; Hayward Industrial Products, Inc.
- f. IPEX Inc.
- g. Jomar International, LTD.
- h. KBI (King Bros. Industries).
- i. Legend Valve.
- j. NIBCO INC.
- k. Sloane, George Fischer, Inc.
- l. Spears Manufacturing Company.
- m. Thermoplastic Valves Inc.
- n. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Standard: MSS SP-122.

H. Iron Gate Valves, Resilient Seated:

1. Standard: AWWA C509.

I. Iron Gate Valve Casings:

1. Standard: AWWA M44 for cast-iron valve casings.

J. Operating Wrenches for Iron Gate Valve Casings: Furnish one or two steel, tee-handle operating wrench(es) with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut for Project.

1.7 AUTOMATIC CONTROL VALVES

A. Bronze, Automatic Control Valves:

1. Manufacturers:

- a. Buckner; a division of Storm Manufacturing Group Inc.
- b. Ceres Products Company.
- c. Champion Irrigation Products.
- d. Netafim USA.
- e. Superior Controls Co., Inc.
- f. Toro Company (The); Irrigation Division.

- g. Weathermatic.
- 2. Description: Cast-bronze body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.
- B. Plastic, Automatic Control Valves:
 - 1. Manufacturers:
 - a. Buckner; a division of Storm Manufacturing Group Inc.
 - b. Ceres Products Company.
 - c. Champion Irrigation Products.
 - d. Dig Corporation.
 - e. Greenlawn Sprinkler Company.
 - f. Hit Products Corporation.
 - g. Hunter Industries Incorporated.
 - h. Irritrol Systems.
 - i. Nelson, L. R. Corporation.
 - j. Netafim USA.
 - k. Olson Irrigation Systems.
 - l. Orbit Irrigation Products, Inc.
 - m. Rain Bird Corporation.
 - n. Superior Controls Co., Inc.
 - o. Toro Company (The); Irrigation Division.
 - p. Weathermatic.
 - 2. Description: Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.

1.8 AUTOMATIC DRAIN VALVES

- A. Description: Spring-loaded-ball type of corrosion-resistant construction and designed to open for drainage if line pressure drops below 2-1/2 to 3 psig (17 to 20 kPa).

1.9 SPRINKLERS

- A. General Requirements: Designed for uniform coverage over entire spray area indicated at available water pressure.
- B. Plastic, Exposed, Impact-Drive Rotary Sprinklers:
 - 1. Manufacturers:
 - a. Champion Irrigation Products.
 - b. K-RAIN Manufacturing Corporation.
 - c. Nelson, L. R. Corporation.
 - d. Orbit Irrigation Products, Inc.
 - e. Senninger Irrigation, Inc.

2. Description:
 - a. Construction: ABS and corrosion-resistant metals.
 - b. Mounting: Aboveground, exposed on riser.
- C. Plastic, Pop-up, Gear-Drive Rotary Sprinklers:
 1. Manufacturers:
 - a. Buckner; a division of Storm Manufacturing Group Inc.
 - b. Champion Irrigation Products.
 - c. Hunter Industries Incorporated.
 - d. Irritrol Systems.
 - e. K-RAIN Manufacturing Corporation.
 - f. Nelson, L. R. Corporation.
 - g. Rain Bird Corporation.
 - h. Toro Company (The); Irrigation Division.
 - i. Weathermatic.
 2. Description:
 - a. Body Material: ABS.
 - b. Nozzle: ABS or Brass.
 - c. Retraction Spring: Stainless steel.
 - d. Internal Parts: Corrosion resistant.
- D. Plastic, Pop-up, Impact-Drive Rotary Sprinklers:
 1. Manufacturers:
 - a. Buckner; a division of Storm Manufacturing Group Inc.
 - b. Ceres Products Company.
 - c. Champion Irrigation Products.
 - d. Nelson, L. R. Corporation.
 - e. Toro Company (The); Irrigation Division.
 2. Description:
 - a. Case: ABS.
 - b. Pop-up Height: Approximately 3 inches (75 mm).
 - c. Sprinkler Construction: ABS and other corrosion-resistant metals.
- E. Plastic, Surface Spray Sprinklers:
 1. Manufacturers:
 - a. Ceres Products Company.
 - b. Champion Irrigation Products.
 - c. Hit Products Corporation.
 2. Description:

- a. Body Material and Flange: ABS.
 - b. Pattern: Fixed, with flow adjustment.
- F. Plastic, Surface, Pop-up Spray Sprinklers:
- 1. Manufacturers:
 - a. Ceres Products Company.
 - b. Champion Irrigation Products.
 - c. Hit Products Corporation.
 - 2. Description:
 - a. Body Material and Flange: ABS.
 - b. Pattern: Fixed, with flow adjustment.
- G. Plastic, Pop-up Spray Sprinklers:
- 1. Manufacturers:
 - a. Buckner; a division of Storm Manufacturing Group Inc.
 - b. Ceres Products Company.
 - c. Champion Irrigation Products.
 - d. Hit Products Corporation.
 - e. Hunter Industries Incorporated.
 - f. K-RAIN Manufacturing Corporation.
 - g. Nelson, L. R. Corporation.
 - h. Orbit Irrigation Products, Inc.
 - i. Rain Bird Corporation.
 - j. Toro Company (The); Irrigation Division.
 - k. Weathermatic.
 - 2. Description:
 - a. Body Material: ABS.
 - b. Nozzle: ABS or Brass.
 - c. Retraction Spring: Stainless steel.
 - d. Internal Parts: Corrosion resistant.
 - e. Pattern: Fixed, with flow adjustment.
- H. Plastic Shrub Sprinklers:
- 1. Manufacturers:
 - a. Buckner; a division of Storm Manufacturing Group Inc.
 - b. Ceres Products Company.
 - c. Champion Irrigation Products.
 - d. Dig Corporation.
 - e. Hunter Industries Incorporated.
 - f. Orbit Irrigation Products, Inc.
 - g. Senninger Irrigation, Inc.

- h. Toro Company (The); Irrigation Division.
- i. Weathermatic.

2. Description:

- a. Body Material: ABS or other plastic.
- b. Pattern: Fixed, with flow adjustment.

1.10 QUICK COUPLERS

- A. Description: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.

1.11 CONTROLLERS

A. Manufacturers:

- 1. Buckner; a division of Storm Manufacturing Group Inc.
- 2. Champion Irrigation Products.
- 3. Hit Products Corporation.
- 4. Hunter Industries Incorporated.
- 5. Irritrol Systems.
- 6. K-RAIN Manufacturing Corporation.
- 7. Nelson, L. R. Corporation.
- 8. Netafim USA.
- 9. Orbit Irrigation Products, Inc.
- 10. Rain Bird Corporation.
- 11. Superior Controls Co., Inc.
- 12. Toro Company (The); Irrigation Division.
- 13. Weathermatic.

B. Description:

- 1. Controller Stations for Automatic Control Valves: Each station is variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each station.
- 2. Exterior Control Enclosures: NEMA 250, Type 4, weatherproof, with locking cover and two matching keys; include provision for grounding.
 - a. Body Material: Enameled-steel sheet metal, Stainless-steel sheet metal or Molded plastic.
 - b. Mounting: Freestanding type for concrete base or Surface type for wall.
- 3. Interior Control Enclosures: NEMA 250, Type 12, dripproof, with locking cover and two matching keys.

- a. Body Material: Enameled-steel sheet metal, Stainless-steel sheet metal or Molded plastic.
 - b. Mounting: Freestanding type for concrete base or Surface type for wall.
4. Control Transformer: 24-V secondary, with primary fuse.
 5. Timing Device: Adjustable, 24-hour, 14-day clock, with automatic operations to skip operation any day in timer period, to operate every other day, or to operate two or more times daily.
 - a. Manual or Semiautomatic Operation: Allows this mode without disturbing preset automatic operation.
 - b. Nickel-Cadmium Battery and Trickle Charger: Automatically powers timing device during power outages.
 - c. Surge Protection: Metal-oxide-varistor type on each station and primary power.
 6. Moisture Sensor: Adjustable from one to seven days, to shut off water flow during rain.
 7. Wiring: UL 493, Type UF multiconductor, with solid-copper conductors; insulated cable; suitable for direct burial.
 - a. Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers.
 - b. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves; color-coded different from feeder-circuit-cable jacket color; with jackets of different colors for multiple-cable installation in same trench.
 - c. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.
 8. Concrete Base: Reinforced precast concrete not less than 36 by 24 by 4 inches (900 by 600 by 100 mm) thick, and 6 inches (150 mm) greater in each direction than overall dimensions of controller. Include opening for wiring.

1.12 BOXES FOR AUTOMATIC CONTROL VALVES

A. Plastic Boxes:

1. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.

B. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4 inch (19 mm) minimum to 3 inches (75 mm) maximum.

END OF SECTION 32 8400