SECTION 328400 - PLANTING IRRIGATION

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section Includes:
1. Piping.
2. Manual valves.
3. Automatic control valves.
4. Sprinklers.
5. Controllers.
6. Boxes for automatic control valves.

1.3 DEFINITIONS
A. Circuit Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.
B. Main Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.
C. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 PERFORMANCE REQUIREMENTS
A. Irrigation zone control shall be automatic operation with controller and automatic control 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. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated.
1. Irrigation Main Piping: 200 psig .
2. Circuit Piping: 150 psig .

1.5 ACTION SUBMITTALS
A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.6 INFORMATIONAL SUBMITTALS
A. Qualification Data: For qualified Installer.
B. Zoning Chart: Show each irrigation zone and its control valve.
C. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.
D. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS
A. Operation and Maintenance Data: For sprinklers and controllers to include in operation and maintenance manuals.

1.8 QUALITY ASSURANCE
A. Installer Qualifications: An employer of workers that include a supervisor with at least five years of experience on projects of similar size, scope, and budget..
B. 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.

1.9 DELIVERY, STORAGE, AND HANDLING
A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.10 PROJECT CONDITIONS
A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
1. Notify Owner no fewer than two days in advance of proposed interruption of water service.
2. Do not proceed with interruption of water service without Owner's written permission.

1.11 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. 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.
2. Cast-Iron Flanges: ASME B16.1, Class 125.
C. PE Pressure Pipe: AWWA C906, with DR of 7.3, 9, or 9.3 and PE compound number required to give pressure rating not less than 200 psig
D. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedule 40.
1. PVC Socket Fittings: ASTM D 2466, Schedule 40.
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.
E. PVC Pipe, Pressure Rated: ASTM D 2241, PVC 1120 compound, 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.

1.12 PIPING JOINING MATERIALS
A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch 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.

1.13 MANUAL VALVES
A. Plastic Ball Valves:
1. Description:
a. Standard: MSS SP-122.
b. Pressure Rating: 125 psig minimum.
c. Body Material: PVC.
d. Type: Union.
e. End Connections: Socket or threaded.
f. Port: Full.

1.14 AUTOMATIC CONTROL VALVES
A. Plastic, Automatic Control Valves:
1. Description: Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.

1.15 SPRINKLERS
A. General Requirements: Designed for uniform coverage over entire spray area indicated at available water pressure.
B. Plastic, Pop-up Spray Sprinklers:
1. Description:
a. Body Material: ABS.
b. Nozzle: ABS.
c. Retraction Spring: Stainless steel.
d. Internal Parts: Corrosion resistant.
e. Pattern: Fixed, with flow adjustment.
C. Plastic Shrub Sprinklers:
1. Description:
a. Body Material: ABS or other plastic.
b. Pattern: Fixed, with flow adjustment.

1.16 CONTROLLERS
A. 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. Irrigation controller: As indicated on Drawings.
3. Control Transformer: 24-V secondary, with primary fuse.
4. Moisture Sensor: As indicated on Drawings.
5. 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.

1.17 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.
a. Size: As required for valves and service.
b. Shape: Rectangular.
c. Sidewall Material: PE, ABS, or FRP.
d. Cover Material: PE, ABS, or FRP.
1) Lettering: " IRRIGATION."

1.18 EARTHWORK
A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."
B. Install warning tape directly above pressure piping, 12 inches below finished grades, except 6 inches below subgrade under pavement and slabs.
C. Drain Pockets: Excavate to sizes indicated. Backfill with cleaned gravel or crushed stone, graded from 3/4 to 3 inches , to 12 inches below grade. Cover gravel or crushed stone with sheet of asphalt-saturated felt and backfill remainder with excavated material.
D. Provide minimum cover over top of underground piping according to the following:
1. Irrigation Main Piping: Minimum depth of 24-inches below finished grade, or not less than 18 inches below average local frost depth, whichever is deeper.
2. Circuit Piping: 12 inches.
3. Drain Piping: 12 inches.
4. Sleeves: 24 inches.

1.19 PREPARATION
A. Set stakes to identify locations of proposed irrigation system. Obtain Architect's approval before excavation.

1.20 PIPING INSTALLATION
A. Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings.
B. Install piping at minimum uniform slope of 0.5 percent down toward drain valves.
C. Install piping free of sags and bends.
D. Install groups of pipes parallel to each other, spaced to permit valve servicing.
E. Install fittings for changes in direction and branch connections.
F. Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 or larger pipe connection.
G. Install underground thermoplastic piping according to ASTM D 2774.
H. Install expansion loops in control-valve boxes for plastic piping.
I. Lay piping on solid subbase, uniformly sloped without humps or depressions.
J. Install PVC piping in dry weather when temperature is above 40 deg F . Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.
K. Install piping in sleeves under parking lots, roadways, and sidewalks.
L. Install sleeves made of Schedule 40 PVC pipe and socket fittings, and solvent-cemented joints.

1.21 JOINT CONSTRUCTION
A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
D. Flanged Joints: Select rubber gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
E. PE Piping Fastener Joints: Join with insert fittings and bands or fasteners according to piping manufacturer's written instructions.
F. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
1. Plain-End PE Pipe and Fittings: Use butt fusion.
2. Plain-End PE Pipe and Socket Fittings: Use socket fusion.
G. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
3. PVC Nonpressure Piping: Join according to ASTM D 2855.

1.22 VALVE INSTALLATION
A. Aboveground Valves: Install as components of connected piping system.
B. Throttling Valves: Install in underground piping in boxes for automatic control valves.

1.23 SPRINKLER INSTALLATION
A. Install sprinklers after hydrostatic test is completed.
B. Install sprinklers at manufacturer's recommended heights.
C. Locate part-circle sprinklers to maintain a minimum distance of 4 inches from walls and 2 inches from other boundaries unless otherwise indicated.

1.24 AUTOMATIC IRRIGATION-CONTROL SYSTEM INSTALLATION
A. Equipment Mounting: Install interior controllers on wall.
1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
B. Install control cable in same trench as irrigation piping and at least 2 inches below or beside piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

1.25 CONNECTIONS
A. Comply with requirements for piping specified in Section 221113 "Facility Water Distribution Piping" for water supply from exterior water service piping, water meters, protective enclosures, and backflow preventers. Drawings indicate general arrangement of piping, fittings, and specialties.
B. Install piping adjacent to equipment, valves, and devices to allow service and maintenance.
C. Connect wiring between controllers and automatic control valves.

1.26 IDENTIFICATION
A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.
1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.
B. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches. See Section 312000 "Earth Moving" for warning tapes.

1.27 FIELD QUALITY CONTROL
A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
B. Tests and Inspections:
1. Leak/Hydrostatic Test: After installation, charge system at 150% of operating pressure continuously for 2 hours with open trenches and observe for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
C. Any irrigation product will be considered defective if it does not pass tests and inspections.
D. Prepare test and inspection reports.

1.28 STARTUP SERVICE
A. Perform startup service.
1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that controllers are installed and connected according to the Contract Documents.
3. Verify that electrical wiring installation complies with manufacturer's submittal.

1.29 ADJUSTING
A. Adjust settings of controllers.
B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.
C. Adjust sprinklers and devices, except those intended to be mounted aboveground, so they will be flush with, or not more than 1/2 inch above, finish grade.

1.30 CLEANING
A. Flush dirt and debris from piping before installing sprinklers and other devices.

1.31 DEMONSTRATION
A. Train Owner's maintenance personnel to adjust, operate, and maintain automatic control valves and controllers.

1.32 PIPING SCHEDULE
A. Install components having pressure rating equal to or greater than system operating pressure.
B. Piping in control-valve boxes and aboveground may be joined with flanges or unions instead of joints indicated.
C. Underground irrigation main piping, NPS 4 and smaller, shall be one of the following as indicated on Drawings:
1. Schedule 40, PVC pipe and socket fittings, and solvent-cemented joints.
2. SDR 21, PVC, pressure-rated pipe; Schedule 80, PVC socket fittings; and solvent-cemented joints.
D. Circuit piping, NPS 2 and smaller, shall be one of the following as indicated on Drawings:
1. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.
2. SDR 21, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.
3. SDR 26, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.
E. Underground Branches and Offsets at Sprinklers and Devices: Schedule 80, PVC pipe; threaded PVC fittings; and threaded joints.
1. Option: Plastic swing-joint assemblies, with offsets for flexible joints, manufactured for this application.

PANDA EXPRESS, INC.
1683 WALNUT GROVE AVE.
ROSEMEAD, CALIFORNIA 91770
TELEPHONE: 626.799.9898
FACSIMILE: 626.372.8288

REVISIONS:

ISSUE DATE:

PLAN CHECK	03-08-23
BID	XX-XX-XX
CONSTRUCTION	XX-XX-XX

DRAWN BY: LDC, WAS DESIGN, INC.

PANDA PROJECT #: D24956
PANDA STORE #: TBD
CIVIL PROJECT #: 220148

WAS DESIGN landscape architects
landscape architecture
land planning
placemaking
Foley, Alabama
P. 251.948.7181
Mobile, Alabama
P. 251.344.4023
Jackson, Mississippi
P. 601.790.0781
www.was-design.com

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 2239 SHARED LANE, ACT
04.06.23

IRRIGATION SPECIFICATIONS

L02.2

PANDA HOME REV4