

## DIVISION 2 – EARTHWORK

### Section 02810: Irrigation

#### **SECTION 02810: IRRIGATION**

##### PART 1 –GENERAL

###### 1.01 SCOPE

This Section specifies all work the Contractor shall provide for construction of irrigation systems including furnishing all labor, materials, equipment, and services necessary for a functional irrigation system as shown on the Drawings and specified herein.

###### 1.02 SYSTEM PERFORMANCE REQUIREMENTS

- A. Layout of the system as shown on Drawings is schematic. Follow as closely as possible. Modify locations as required by plant materials, utilities, and other obstructions.
- B. Full and complete head to head irrigation coverage is required. Make adjustments to layout, irrigation zone pressure, or as needed, to achieve full coverage of irrigated areas without overspray onto roadways, sidewalks, or buildings.

###### 1.03 SUBMITTALS

- A. Submit Product Data a minimum of 30 working days before beginning work, unless otherwise approved. Include data for all products to be installed in these systems. Include material showing manufacturer's name, catalog numbers, catalog cuts, technical data manufacturers' installation, operation, and maintenance instructions for each product.
- B. Schedule: Thirty days prior to beginning work, submit a work schedule to include dates, location, and type of work to be performed.
- C. Point of Connection Water Pressure Test: Test water pressure at the Irrigation System point of connection prior to beginning work. Submit results of test to Engineer/Landscape Architect.

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- D. Site Inspection Report: Submit statement confirming a site inspection has been conducted, noting discrepancies between ground measures and plans, and hazards or site conditions, which will interfere with installation or operation of the system prior to beginning of work.
- E. Record Drawings
  - 1. Maintain a complete set of record Drawings, corrected daily, to show design and specification changes, and location of system components. Submit copies as requested.
  - 2. At completion, submit reproducible Mylar plan at the same scale as the construction plans, indicating the elevations of mainlines, valves, backflow preventers, zone outlines, and other system elements. Indicate locations with dimensions from building, curb lines, or other fixed site features.
- F. Submit three sets of keys, hose swivels, quick coupler operating keys, and unique tools or devices needed to access, operate, adjust, or maintain the system. Obtain receipt indicating location and custodian of each set.
- G. Operating and Maintenance Data
  - 1. Submit the name and address of permanent service organizations maintained or trained by the manufacturers that will render service within eight hours of receipt of notification of service request.
  - 2. Zone Map: Submit an irrigation plan for the site indicating, by varying colors, the area of coverage for each control valve. Indicate the number and location of the valve. The number is to correspond to that on the controller for that zone.

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3. Submit controller timing schedule indicating on a weekly basis the day, time, and duration of watering for each control valve.
4. Provide the zone map and controller timing schedule, folded into a plastic envelope, of a size capable of being installed in the door of the controller.
5. Submit operating and maintenance guides for the entire system and for each piece of equipment in the system. Instructions for system winterization are to be included.

#### 1.04 QUALITY ASSURANCE

- A. Comply with requirements of utility supplying water for prevention of backflow and back siphonage.
- B. Comply with requirements of authority with jurisdiction for irrigation systems.
- C. Installer Qualifications: Engage an experienced Installer who has completed irrigation systems similar in material, design, and extent to that indicated for projects that have resulted in construction with a record of successful in-service performance.

#### 1.05 PROJECT CONDITIONS

- A. Environmental Requirements: Perform work under environmental conditions suitable for the tasks being undertaken.
- B. Existing Conditions:
  1. Visit the site and note conditions which affect work under this Section.
  2. Locate all utilities, lines, and piping in the work area. Provide adequate protection during all phases of work.

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3. Repair utilities, lines, piping, and paving damaged by this work to the satisfaction of the Owner of the line, at no change in Contract Price.
4. Notify Engineer/Landscape Architect of unsatisfactory conditions. Proceed with work only after conditions have been corrected.
5. Field Measurements: Take field measurements of irrigated areas to determine if differences occur between plans and ground dimensions. Notify Engineer/Landscape Architect of differences before proceeding with work.
6. Irrigation is not permitted during the following conditions:
  - a) When the temperature is less than 35° F or greater than 90° F.
  - b) When planting area soil is saturated, frozen, or dry.
  - c) When wind velocities are greater than 30 mph.

#### 1.06 SEQUENCING AND SCHEDULING

Complete irrigation system installation and make fully operational before landscape seeding and sodding takes place.

#### 1.07 WARRANTY

- A. Refer to the General and Supplementary General Conditions.
- B. Additional Requirements:
  1. Repair settling of trenches. Include complete restoration of plantings, mulch, grades, pavements, or other improvements.
  2. Correct irrigation system problems or damage within five working days of notice until the final acceptance of the Irrigation System.

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PART 2 –PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. As shown on the Drawings or specified herein. Alternate materials will be acceptable if approved in writing by Engineer/Landscape Architect.
- B. Other Manufacturers: Submit substitution request in accordance with the requirements of the General Conditions.

2.02 MATERIALS

- A. Mainline (pressure pipe) and lateral line (circuit/zone pipe): As indicated on Drawings. Schedule 40 PVC.
- B. Poly Pipe and Fittings: Thick walled polyethylene pipe specifically designed for connection of irrigation sprinklers to lateral lines.
- C. Sleeves: ASTM D1783, NSF61 approved, PVC Schedule 40.
- D. Pipe Fittings:
  - 1. For plastic pipe solvent welded socket type fitting, ASTM D2466, PVC pipe fitting, Schedule 40.
  - 2. For plastic pipe threaded fitting, ASTM D2464, PVC pipe fitting, Schedule 80. No female adapters.
- E. Jointing Materials:
  - 1. PVC solvent cement, NSF61 approved solvent for PVC through 4-inch, meeting requirements of ASTM D2564.
  - 2. PVC primer and cleaner, compatible for use with PVC pipe.
  - 3. Teflon tape sealer, 1/2-inch wide, of Teflon Dope, use at all threaded joints.
- F. Valves:

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1. Manual Drain valves shall be the non-lubricated type, capable of sealing in either flow direction, with true union end connections and lever type operator. PVC ball valves shall be constructed using a PVC body and ball, Teflon seats and FPM (viton) o-rings. Provide PVC ball valves from Asahi America, Chemtrol Division, NIBCO Inc., or approved equivalent.
  2. Electric Latching Solenoid Valves shall be Rainbird PEB Series electric solenoid valves. Replace standard solenoids with Rainbird model TBOSPSOL potted latching solenoids.
  3. Gate Valves shall be Brass, line size, WATTS WGV X, Pegler 1068, or approved equivalent.
  4. Pressure Reducing Valve: Wilkins model 510YSBRSC 1-1/2" size for below-ground applications.
- G. Valves Boxes: Carson Standard or Jumbo vaults, as detailed.
- H. Backflow Preventer: Double Check Type, Febco 850U, or approved equivalent.
- I. Automatic Controller: One Rainbird TBOS4CMUS 4-station battery-operated buriable controllers, with one Rainbird TBOSFTUS field transmitter.
- J. Spray Heads: Acceptable Manufacturer, Rain Bird 1800-SAM-PRS Series.
- K. Low Voltage Control Wire and Connectors:
1. Wire, solid copper, UL listed for direct burial in ground, minimum size #14 AWG. Increase size as needed for length of wire run.
  2. Connectors, 3M DBY electrical connectors.
- L. Other Materials:

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1. Drain Rock: Washed, round river pea gravel, no fines.
  2. "Air Compressor" Valve: Size to fit quick coupling valve keys.
  3. Swing Joints: LASCO schedule 80 three-way assembly or approved alternate.
  4. Quick Coupling Valve: Bronze, two piece construction, size as noted on the Drawings. Rainbird 44LRC.
  5. Valve Keys, 3-feet long (minimum), with tee handle and key end to fit manual valves.
  6. Quick coupler keys and hose swivel ells, brass, size, and type to fit quick coupler shown on the Drawings.
- M. Provide other materials, not specifically described but required for a complete and proper installation, as selected by Contractor subject to the approval of the Owner.

## PART 3 –EXECUTION

### 3.01 EXAMINATION

Investigate and determine available water supply pressure and flow characteristics. Report results of pressure test at point of connection in writing to Engineer/Landscape Architect before beginning installation work.

### 3.02 PROTECTION

- A. Provide protection for system components at all times. Keep rock, gravel, debris, and all other foreign materials from entering piping, valves, and other equipment
- B. Provide barriers, crossings, markers, and other devices necessary to protect materials and pedestrians at open trenches, holes, stockpiles, etc.

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#### 3.03 INSTALLATION

##### A. Trenches:

1. Excavate trench bottoms with uniform slopes, 4 inch minimum width. Bottoms shall be smooth and free of rocks or other objects which might damage pipe.
2. Make trenches wide enough to allow for tamping around pipe.
3. Excavate trenches to a depth allowing for pipe slopes to drains, sand setting bed, and the following minimum coverage depths:
  - a) Non-Pressure Laterals: 18-inch depth minimum.
  - b) Pressure Mainlines: 24-inch depth minimum.
  - c) Pressure Mainlines Under Paving: 24-inch depth minimum.
  - d) Common and Control Wire: Install below mainlines or 18 inches where wire not in trench.
4. Do not lay pipe on unstable materials in wet trench or when trench or other conditions are unsuitable.

##### B. Pipe:

1. Lay pipe and make connections in accordance with irrigation industry standard practices and manufacturer's recommendations.
2. Solvent weld all non-threaded joints. Use Teflon tape to seal all threaded joints. Do not weld in temperatures below 35° F. Weld under cover in rainy conditions.
3. Clean interior of pipe before installation. Keep pipe clean during and after laying by plugs or other means.
4. No fittings are to be closer than 6 inches apart.

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5. Set lines in common trenches whenever possible, side by side, two lines maximum per trench.

#### C. Sleeves:

1. Install sleeves in all locations where piping and control wiring pass under paved areas and curbs or through walls. Extend sleeve 12 inches beyond edge of paving, curb, or wall. Cap and mark the location with temporary 2 inch x 4 inch Fir stake 18 inches above grade. Remove stake once pipe and wires have been routed through sleeves.
2. Set top of sleeve 18-inch minimum below top of sub-grade, and below paved, mulched, gravel, or other surfaces. Fill three inches below, around, and above pipe, to top of trench with mason's sand. Compact to density required for pavement subgrade.

#### D. Backfill

1. Backfill trenches after inspection of pressure test as part of the work of this Section, observation of the results by Engineer/Landscape Architect. Place sand 3 inches below and 6 inches above all pipe. Fill the rest of the trench with clean excavated site soil. Thoroughly compact to give support to the pipe and prevent subsidence of backfill materials.
2. Fill piping with water at approximately 25 pounds per square inch (psi) during backfilling operations.
3. Backfill to finish grade, place backfill carefully around and over piping. Lay and compact in layers not over 6 inches thick.
4. Remove all excess excavated material from the project site.

#### E. Control Wire

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1. Route red control and white common wires from controller to control valves and make connections at each end.
2. Splice only at the valves, not between valves or between valve and controller.
3. Route wire below main line wherever possible. Where not routed below mainline, install 4-6 inch wide yellow plastic warning tape six inches above the control wire.

#### F. Automatic Control Valves

1. Install complete with valve boxes as shown on Drawings, no closer than 24 inches apart, two valves per valve box maximum.
2. Thoroughly flush supply lines before installing valves.

#### G. Sprinkler Heads

1. Install as shown on Drawings and as recommended by manufacturers.
2. No head shall be closer than 4 inches from walk, curb, or wall.
3. Make minor changes in head location as necessary to achieve full head to head coverage. Adjust spray patterns and pressure to achieve coverage and eliminate over-spray onto pavements or buildings.
4. Flush line before installing sprinklers.

### 3.04 FIELD QUALITY CONTROL

#### A. Testing:

1. Notify Engineer/Landscape Architect in writing at least three work days prior to all tests and inspections. Inspection and reports must be made for all tests.

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2. Thoroughly flush piping before testing and installation of sprinklers.
3. Test all exposed piping, valves, joints and fittings at 100 psi for one hour prior to inspection by Engineer/Landscape Architect. If pressure loss occurs, inspect the entire system, make watertight, and retest until no pressure loss occurs for a one-hour testing period. Control valves to be tested with isolation valves open, and flow control in operating position.
4. Pressure test must show no pressure loss for the specified period and be approved by the Engineer/Landscape Architect before backfill of trenches will be allowed.

B. Inspection: Upon completion of the installation and adjusting of the irrigation system, notify the Engineer/Landscape Architect for a system inspection. At that time present the following:

1. Zone by zone system demonstration.
2. Location of major system components.
3. Winterization and maintenance procedures.
4. Procedures for setting the controller.
5. Location of Zone Map and Controller Schedule.

#### 3.05 ADJUSTING AND TIMING

- A. Adjust and balance irrigation system to provide uniform coverage and prevent overspray onto pavements and structures.
- B. Set timing on irrigation controller before final inspection. Obtain recommendations of landscaping work installer before setting timing.

#### 3.06 CLEAN UP

- A. Area shall be kept free of debris during the course of this project.

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- B. Remove all debris, dirt, and rock. Sweep and wash walls and roadways upon completion of work daily.

**END OF SECTION 02810**