

**Section 32 8423  
Irrigation System**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pop-up rotor systems

**1.02 DESCRIPTION**

- A. Provide all material, labor, equipment transportation, and services necessary for the furnishing and installation of the complete automatic sprinkler irrigation system as shown on the drawings and as specified herein. The work includes, but is not limited to:
  - 1. Trenching, stockpiling excavation materials and refilling trenches.
  - 2. Providing a complete system including piping, valves, fittings, backflow prevention device(s), rotors, sprinklers, automatic controls, dripline, and emitters and final adjustment of heads to ensure complete coverage.

**1.03 REFERENCE STANDARDS**

- A. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2015.
- B. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2012.

**1.04 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Handling of PVC Pipe and Fittings: The Contractor is cautioned to exercise care in handling, loading, unloading, storing and installation of PVC pipe and fittings. All PVC pipe shall be transported in a vehicle that allows the length of pipe to lie flat so as not to subject it to undue bending or concentrated external load at any point. Any section of pipe that has been dented or damaged will be discarded and, if installed, shall be replaced with new piping.

**1.05 JOB CONDITIONS**

- A. The Contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that obstructions, grade differences or discrepancies in area dimensions exist that might not have been considered in engineering. Such obstructions or differences should be brought to the attention of the Architect. In the event this notification is not performed, the irrigation Contractor shall assume full responsibility for any revision necessary.

**1.06 REGULATORY REQUIREMENTS**

- A. Requirements of Regulatory Agencies: All work and materials shall be in full conformance with the latest rules and regulations of the California Plumbing and Electric codes.

- B. Manufacturer's Directions: Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturers of articles used in this contract furnish directions covering points not shown in the drawings and specifications.

**1.07 INSTALLATION MEETINGS**

- A. Contractor shall be responsible for notifying the District in advance for the following observation meetings, according to the time indicated: (Certain meetings may be grouped if prior approval is granted).

- 1. Coordinate one week prior to commencing work of this Section.
  - 2. Coverage test: 48 hours.
  - 3. Final site review: 5 days.

- B. When observations have been conducted by other than the Architect or Designated Representative, show evidence in writing of when and by whom these observations were made.

- 1. Final Observation:
    - a. The Contractor shall operate each system in its entirety for the District at time of final observation. Any items deemed not acceptable by the District, or not in compliance with these specifications and drawings, shall be reworked to the complete satisfaction of the District.

**1.08 COORDINATION**

- A. Coordinate the work with site backfilling, landscape grading and delivery of plant life.

**PART 2 PRODUCTS**

**2.01 IRRIGATION SYSTEM**

- A. Manufacturers:
  - 1. As shown on plans.

**2.02 OUTLETS**

- A. Manufacturer:
  - 1. As indicated on the drawings.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify location of existing utilities.
- B. Verify that required utilities are available, in proper location, and ready for use.

### **3.02 PREPARATION**

- A. A pre-construction meeting with the General Contractor and District is required for discussion and clarification of the following:
  - 1. Site and job conditions
  - 2. Safety
  - 3. Scope of work
  - 4. Trenching and backfill operations
  - 5. Pipe laying, inspection, and testing requirements
  - 6. Certification, submittals and acceptance requirements
  - 7. Protection of existing improvements and utilities
  - 8. Repair of existing improvements not scheduled for removal
  - 9. Disposal of surplus earth materials to approved disposal site(s)
- B. Drawings are generally diagrammatic and indicative of the work to be installed. Due to the scale of drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., which may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan accordingly, furnishing such fittings, etc., as may be required.
- C. All scaled dimensions are approximate. The Contractor shall check and verify all size dimensions and receive District's approval prior to proceeding with work under this section.
- D. Coordinate installation of irrigation system, including pipe, so there will be NO interference with utilities or other construction or difficulty in planting trees, shrubs, and ground covers. The Contractor shall carefully check all grades to satisfy him/her that he may safely proceed before starting work on the irrigation system.
- E. Layout and stake locations of system components.

### **3.03 INSTALLATION**

- A. Assemblies:
  - 1. Install pipe, valves, controls, and outlets in accordance with manufacturer's instructions.
  - 2. Install all assemblies specified herein in accordance with respective detail. In absence of detail drawings or specification pertaining to specific items required to complete work, perform such work in accordance with best standard practice, with prior approval from Architect or Designated Representative.
  - 3. PVC pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before installation. Installation and solvent welding methods shall be as recommended by the pipe and fitting manufacturer.
  - 4. On PVC to metal connections, the Contractor shall work the metal connections first. Teflon tape or approved equal shall be used on all threaded PVC to PVC, and on all threaded PVC to metal joints. Light wrench pressure is all that is required. Where threaded PVC connections are required, use threaded PVC adapters into

which the pipe may be welded.

B. System Flush: After piping is installed, but before outlets are installed and backfilling commences, open valves and flush system with full head of water.

C. Sprinkler Heads:

1. Install the sprinkler heads as designated on the drawings and in accordance with their respective detail.

### **3.04 FIELD QUALITY CONTROL**

A. Upon completion, entire system shall be tested and adjusted to meet site requirements.

### **3.05 BACKFILLING**

A. Backfill trench and compact to specified subgrade elevation. Protect piping from displacement.

B. Buried pipe in trenches shall be center loaded only until all required tests are performed. Trenches shall be carefully backfilled with the excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand or other approved materials, free from large clods of earth or stones. Backfill shall be mechanically compacted in landscaped areas to a dry density equal to adjacent undisturbed soil in planting areas. Backfill will conform to adjacent grades without dips, sunken areas, humps or other surface irregularities.

C. A fine granular material backfill will be initially placed on all lines. No foreign matter larger than 1/2 inch in size will be permitted in the initial backfill.

D. Flooding of trenches will be permitted only with approval of the Architect or Designated Representative.

E. If settlement occurs and subsequent adjustments in pipe, valves, sprinkler heads, lawn or planting, or other construction are necessary, the Contractor shall make all required adjustments without cost to the District.

### **3.06 TEMPORARY REPAIRS**

A. The District reserves the right to make temporary repairs as necessary to keep the sprinkler system equipment in operating condition. The exercise of this right by the District shall not relieve the Contractor of his responsibilities under the terms of the warranty as herein specified.

### **3.07 SYSTEM STARTUP**

A. Adjust control system to achieve time cycles required.

**3.08 GUARANTEE**

- A. Warranties, either implied or written, by the manufacturer, do not relieve the Contractor of his/her responsibility for the guarantee period.

**3.09 MAINTENANCE PERIOD**

- A. The entire sprinkler irrigation system shall be under full automatic operation for a period of seven days prior to any planting.
- B. Maintenance Walk-Through: Prior to a release of responsibility at the end of the maintenance period, the Contractor shall schedule a walk-through with the District.

**3.10 CLEANUP**

- A. Cleanup shall be performed as each portion of the work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be broomed or washed down, and any damage sustained to the work of others shall be repaired and work returned to its original condition.

**3.11 OPERATING INSTRUCTIONS**

- A. The Contractor shall be required to train District's maintenance personnel in proper operation of all major equipment. Provide written evidence of the person or persons so trained to the Architect or Designated Representative.

**3.12 CLOSEOUT ACTIVITIES**

- A. Instruct District's personnel in operation and maintenance of system. Use operation and maintenance material as basis for demonstration.
- B. Irrigation Schedule: See Submittal Requirements above.

**Section 32 9300  
Plants**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Preparation of subsoil and topsoil
- B. Topsoil bedding
- C. New plants

**1.02 RELATED REQUIREMENTS**

- A. Section 32 8200 – Irrigation

**1.03 DEFINITIONS**

- A. Weeds: Any plant life not specified or scheduled.
- B. Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

**1.04 REFERENCE STANDARDS**

- A. ANSI/ANLA Z60.1 - American National Standard for Nursery Stock; 2004.
- B. ANSI A300 Part 1 - American National Standard for Tree Care Operations -- Tree, Shrub and Other Woody Plant Maintenance -- Standard Practices; 2008.

**1.05 SUBMITTALS**

- A. See Article 9 of the General Conditions for submittal procedures.
- B. Submit list of plant life sources.

**1.06 QUALITY ASSURANCE**

- A. Nursery Qualifications: Company specializing in growing and cultivating the plants with three years documented experience.
- B. Installer Qualifications: Company specializing in installing and planting the plants with five years experience.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer. Store fertilizers and amendments, bark mulch, soil mixes, and other materials which could stain concrete and similar surfaces in such a manner that staining does not occur.

- B. Plants: Maintain all plant material in a healthy growing condition prior to and during planting operations. Protect plants at all times from sun and drying winds. Plants that cannot be planted immediately upon delivery shall be kept in the shade, well protected and watered.

**1.08 SUBSTITUTIONS, ADDITIONS, DELETIONS**

- A. General: Submit proposals for substitutions. Acceptance by the District is required prior to proceeding with the work under this Section.

**1.09 FIELD CONDITIONS**

- A. General: Become familiar with the anticipated growing conditions prior to commencement of work. Notify the Inspector immediately in writing of any conditions which will prevent the proper execution of the warranty responsibilities specified. Failure to notify the Inspector constitutes acceptance of the growing conditions. Any removal, repair or replacement of plant material required by unsuitable conditions found after work has begun shall be done at no additional cost to the District.
- B. Do not install plant life when ambient temperatures may drop below 35 degrees F or rise above 90 degrees F.
- C. Do not install plant life when wind velocity exceeds 30 mph.

**1.10 WARRANTY**

- A. Plant Material: Warrant that all plants under this Contract for a period of 30 days.
- B. Replacements: Without cost to the District, in a timely manner and as directed by the Inspector, replace all plants not meeting the requirements above throughout the course of the warranty period. Replacements shall closely match adjacent specimens of the same species in size and shall comply with all requirements of this specification.
- C. Species: Replace all plant material determined by the District within two years following the final acceptance of the project, to be untrue to the species, clone and/or variety specified, to the equal condition of adjacent plants at the time of replacement, at no additional cost to the District.

**PART 2 PRODUCTS**

**2.01 PLANTS**

- A. Quality: Plants shall be superior in form, compactness, and symmetry; sound, healthy and vigorous, well branched and densely foliated when in leaf; free of disease, insect pests, eggs or larvae, and free from physical damage or adverse conditions that would prevent thriving growth.

## **2.02 SOIL MATERIALS**

- A. General: All soils to be used in areas to be planted on the project shall be free of rocks over one inch in diameter, and free of foreign debris. Soil shall be free from sub-base/aggregate, refuse, plants or roots, clods, weeds, viable weed seeds, sticks, solvents, petroleum products, concrete, base rock, or other deleterious or extraneous material. Soil shall be free of soil-borne diseases, and capable of sustaining healthy plant life.

## **PART 3 EXECUTION**

### **3.01 ORDERING, REVIEW AND ACCEPTANCE OF PLANT MATERIAL**

#### A. Ordering:

1. Within 30 days after award of contract, submit written certification to the District of the quantity and species of plant material ordered, and the nursery(s) supplying the material.
2. The Contractor is responsible for providing all plant material in the quantities and sizes specified on the drawings, and for making all arrangements in advance that may be required to obtain these materials. If any material specified will be unavailable at the time of planting, submit written verification to the District along with the bid.

- B. Review of Plant Material: Before planting operations begin, all plant materials shall be reviewed for conformance to the design intent of the Contract Documents by the District. Submit written request for review of plant material at least 10 days prior to commencement of planting operations. Review by the District does not waive the right of rejection during planting or any time thereafter.

- C. Rejection of Material: The District reserves the right to review and reject plant material at any time, and at the place of growth, for nonconformance to the Specifications. Do not install plant material which has not been reviewed at the project site by the District.

### **3.02 EXAMINATION**

- A. Verify that prepared subsoil and planters are ready to receive work.
- B. Saturate soil with water to test drainage.

### **3.03 GRADING**

- A. General: All areas to be planted on the project shall be free of rocks over one inch in diameter to a depth of 8" minimum below finish grade, and free of foreign debris, subsoil, refuse, plants or roots, clods, weeds, sticks, solvents, petroleum products, concrete, base rock, or other deleterious or extraneous material. Areas to be planted shall be free of soil-borne diseases and capable of sustaining healthy plant life. Do all work necessary to bring site soil, import soil and planter backfill to compliance with these requirements. Remove from the project site and dispose of in a legal manner any soils and material not meeting these requirements. Subject to acceptance of the



District, all soil and material not meeting these requirements shall be the property of the Contractor.

1. Surface Drainage: Contractor is responsible for proper surface drainage of planted areas. Report in writing to the District any discrepancies in the Contract Documents, obstructions on the site, or any other conditions, which the Contractor feels prevent establishing proper drainage, and obtain the Inspector's instructions prior to proceeding with the work affected.
2. Final Contouring:
  - a. Handle and place the soil to depths required. Remove all rocks and clods over one inch in diameter. Provide for surface drainage and cut all necessary drain swales.
  - b. Work soil sufficiently so that after rolling and after full settlement has occurred, the site will be graded to within  $\pm 0.10$  of a foot from the lines, grades and elevations shown, and as may be directed by the Inspector. Finished surface shall be smooth and uniform and shall be free of depressions that retain standing water or any surface irregularities that would impede proper drainage. Unless otherwise noted, all soil finish grades shall be 1-1/2 inches below finish grade of adjacent walks, pavements and curbs, and top of wall elevations.
3. Erosion Repair: Repair all erosion damage that occurs until Final Acceptance. Take all measures necessary to prevent erosion occurring during work under this Section. Provide and amend replacement soil in accordance with this Section.

### **3.04 PREPARATION OF SUBSOIL**

- A. Amend subsoil as indicated on plans.

### **3.05 FERTILIZING**

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after initial raking of topsoil.
- C. Lightly water to aid the dissipation of fertilizer.

### **3.06 PLANTING**

- A. General: Do not plant any material that has not been reviewed by the Inspector upon delivery to the project site or that has been rejected for any reason. Do not plant under unfavorable weather conditions.
- B. Place plants for best appearance.

### **3.07 LAYOUT OF PLANT MATERIAL**

- A. General: The District will review for conformance to the design intent of the Contract Documents locations of all plants in the field prior to planting. Notify the District and schedule layout review sufficiently in advance of planting to allow for review and adjustment without disrupting construction schedule.

- B. Adjustments: The District reserves the right to make minor adjustments in the layout of all plant material; adjust irrigation system as necessary.

**3.08 CLEANUP**

- A. Sweep site clean of all excess materials used in these operations. Excess soils shall be swept up and removed off site. Do not wash excess materials into adjacent drainage facilities.