3CP 5 – IRRIGATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Special Provisions, and other Technical Specification Sections apply to this Section.

1.02 SUMMARY

A. This Section includes the following for work in the project:

1. Park and Restoration Irrigation
2. Irrigation Installation, Testing, and Coordination between Proposed and Existing City Irrigation at Sungold Park and Dianty Triangle Park
3. Assessment of Existing Irrigation System including but not limited to Point of Connection, Controller, Main Line, Valves, Wiring, and miscellaneous irrigation elements.
4. Purchase, transportation, and installation of all products, either specified, noted on Plans, or required miscellaneous products to complete the Work.
5. Bidder design Restoration Irrigation for all temporary irrigation installed for the Restoration Plants

B. Related Sections include the following:

1. Section "Planting"
2. Section "Aggregate Surfacing"

1.03 DEFINITIONS

A. Owner refers to the Contra Costa County Flood Control and Water Conservation District, which is the lead agency. Owner or Owner's Representative (O.R.) for the project refers to the district engineer, associates, or agents.

B. Finish Grade: Elevation of finished surface of planting soil.

C. Subgrade: Surface or elevation of native subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

D. Plant: Any woody or herbaceous plant specified for the project.

E. Native Soil: Existing site soil

F. Restoration Plants: Plants installed outside of Sungold Park and Dainty Triangle Park. Noted on plans as “Restoration Plants”

G. Park(s) or Park Improvements: Work within City of Brentwood owned and operated parks, including Sungold Park and Dainty Triangle Park.

1.04 SUBMITTALS

A. Submittal Package: All submittals in this specification section (excluding re-submittals) shall be compiled together and submitted to O.R. as one package.

B. Product Data and Samples: For each type of product indicated.

C. Product Certificates: For each type of manufactured product, signed by product manufacturer, and complying with the following:

1. Manufacturer's certified analysis for standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

D. Qualification Data: For irrigation Contractor.

E. Mock-up: Provide two (2) mock-ups, (1) Bubbler Assembly; (2) Pop-up Spray Head; for O.R. review and approval.

F. Irrigation Installation Schedule: Indicating locations, sources of all materials. Schedule shall be a detailed schedule of anticipated installation process and dates.

G. Bidder Design Irrigation Strategy for Restoration Plants: Outline approach, anticipated watering schedule (seasonal and daily durations), zones and irrigation components if applicable.

H. Parks Irrigation System (Existing) Survey: Contractor to perform survey with City of Brentwood staff participation. Survey shall be limited to four (4) hours on-site. Provide results of on-site existing irrigation system survey as legible, handwritten notes marked-up on a full-size set of City as-built Plans and Specifications. Ensure all irrigation changes that resulted from the recent site improvements are noted correctly so that this survey accurately depicts the existing irrigation system condition. Note if any valves need replacement or servicing during the existing system survey.

I. Parks Irrigation Design Submittal: Provide legible mark-up of plans showing irrigation strategy for Sungold (**BASE BID**) and Dainty Triangle Parks (**ADDITIVE BID ITEM NO. 5**) using Irrigation System Survey as a base. Allow three weeks O.R. review time prior to installation.

J. Parks Record (As-Built) Drawings: provide clear, legible, drawing, drafted in AutoCAD 2016 or newer format. Include dimensions and actual installed locations of all irrigation system components (e.g. irrigation main, lateral and sprinkler head locations), show actual flow rates for each controller zone and actual pressure, plant substitutions and plant relocation and calculations demonstrating compliance with MWELO, with licensed landscape architect's wet stamped signature and date. Include existing Sungold Park as-built irrigation as reference in the as-builts. O.R. will provide design files used to develop the bid set in Civil 3D 2016 format.

1. (1) original mylar of As-Built Irrigation and Landscape Plans
2. that reflect as-built conditions, noted plant substitutions, plant relocation, irrigation main, lateral and sprinkler head locations, show actual flow rates for each controller zone and actual pressure,
3. Provide three (3) paper copies within 2 weeks of the approval of the completed irrigation installation.
4. Provide two (2) sets of irrigation plans, reduced to 11"x17", showing color coded and numbered irrigation circuits, plastic laminated.
5. Provide two (2) copies of current backflow certification report, including meter size, serial number, transponder number and location
6. Water audit performed by a certified irrigation water auditor verifying compliance of uniformity and distribution in accordance with the Model Water Efficient Landscape Ordinance (MWELO).

K. Parks Operations and Maintenance Instructions: For Irrigation System, prepare recommended operating procedures to be established by City including, zone schedules, and

maintenance of irrigation system for one calendar year. Submittal is required to complete conditions of Final Completion. For Maintenance Period see Specifications.

1.05 QUALITY ASSURANCE

A. Irrigation Contractor Qualifications: A qualified irrigation Contractor whose work has resulted in successful installation of public agency irrigation system installations. Minimum of five (5) years of experience in each discipline.

1. Field Supervision: Require Contractor to maintain an experienced full-time supervisor on Project site when irrigation work is in progress.

B. Observation: O.R. may observe installation of irrigation components on-site. Irrigation installations which do not meet Plans and Specifications may be rejected or required to be re-installed.

1. Notify O.R. two weeks in advance of the anticipated initiation of the irrigation system.

C. Pre-Irrigation Installation Meeting: Conduct meeting at Project site to comply with specified requirements.

D. Permanent irrigation installed or modified within City of Brentwood parcels must comply with City Standard Plans and Specifications.

E. Installed and modified permanent irrigation must follow current MWELO design requirements. City of Brentwood has adopted the ordinance in full.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store irrigation supplies properly on the site out of full sun and in a manner which preserves the integrity of the materials and prevents damage to piping and irrigation heads.

1.07 COORDINATION

A. Weather Limitations: Proceed with irrigation installation only when existing and forecasted weather conditions permit.

B. Coordinate irrigation connections for water and electrical service with City.

C. Coordinate irrigation controller connections with City.

D. If required, Contractor shall splice new irrigation wires into existing irrigation control wires for irrigation outside of the project limit of work. Connection of irrigation control wires for valves outside Limits of Work to the controller shall be the responsibility of the City.

E. No Planting or Seeding shall be installed prior to the installation of the irrigation system and its approval by O.R.

1.08 WARRANTY

A. Park Irrigation Warranty: 1 Year after Final Acceptance. Warrant against breakage and defects, except for defects resulting from lack of adequate maintenance, neglect, or abuse by the Owner, or incidents that are beyond Contractor's control.

1.09 MAINTENANCE PERIOD

A. Park Irrigation: Maintain Irrigation System until Final Acceptance of park improvements. Coordinate complete turn-over including preparation of Operations and Maintenance Instructions Manual for the irrigation system and as-builts to O.R. prior to Final Acceptance of park improvements.

1. Park Improvements are not subject to the three-year restoration planting maintenance period.

B. Restoration Plant Irrigation: Any irrigation installed by the Contractor for the purposes of watering and maintaining the Restoration Plants must be maintained for the full duration of the project.

PART 2 PRODUCTS

2.01 IRRIGATION MATERIALS

A. Provide commercial-grade irrigation materials for all components. Piping and Sleeving shall be PVC. Mainlines and laterals shall be Schedule 40. Fittings shall be Schedule 40 except at the Point of Connection where all fittings shall be Schedule 80. Sleeving shall be Schedule 40 unless otherwise noted on Plans. Sizes as noted on Plans. Provide concrete thrust blocks per City standards.

B. Tree Bubblers: Hunter brand RZWS-36 (0.5 gpm) with check valve. Two per tree. Install per details.

C. Pop-up Spray heads: Provide for irrigated turf areas of the site as noted on the Plans. Zone all spray heads on separate valves, with matched precipitation 12-inch pop-up style heads with radii and spray patterns as required to provide even and complete coverage. Provide Hunter PROS-12-PRS40-CV series with MP Rotator nozzles per plans.

D. Zone Valves: Provide Commercial grade, plastic, automatic remote-control valves, wired to the centralized controller for the entire project site. Provide Hunter ICV valves, sized as noted on plans. Install valves in rectangular plastic, lockable boxes to match existing, 1 valve per box. Valves shall have pressurized supply line entering upwards with ell inside valve box. Lateral line exiting valve shall continue straight for 3-foot minimum before any fittings are used. All fittings at valves shall be glued; No unions at valves will be permitted. Valves shall be labeled with waterproof numbered tags that match corresponding controller station numbers. Intent is for contractor to re-use existing irrigation valves and supplement with additional valves as required.

E. Irrigation Wiring: Use commercial grade single strand solid copper wire with polyethylene or PVC insulation, sized as appropriate for project conditions (14 AWG Min.). Wires shall be approved for direct burial. Snake wires in trench and loop at sharp turns to allow for slack. Wires shall be bundled together and taped under main line with reinforced tape every 10 ft. Do not tape irrigation wires inside sleeves. All wire splices shall be made using watertight splice connectors, Suresplice or approved equal. All wiring installed under paving shall be inside a PVC sleeve. All wire splices shall be inside valve boxes. Final wire size, type and insulation colors shall be per City of El Cerrito Standards.

F. Shut-off Valves for Each Valve Manifold: Add (1) plastic shut-off valve at each valve to allow for isolating all valves for replacement and maintenance purposes. Commercial grade, Rainbird or Irritrol brand shut-off valves, sized to match adjacent Zone Valves and main line. Install in 10-inch round, black plastic, lockable Carson boxes or approved equal. Box lid shall have “GV” engraved on the top.

G. Controller is existing controller, sized to accommodate all new proposed irrigation zones. Condition is operational. Contractor is only responsible for ensuring irrigation valves are connected to Controller. Contractor to provide City with all documentation regarding wiring to this existing Controller.

H. Provide complete O+M Manual for the new irrigation equipment and system use and maintenance.

I. Water: Contractor pays for water through Final Acceptance for water used for construction and Restoration Plant establishment. City of Brentwood will continue to pay for irrigation

within their parks. Park water shall not be used for construction purposes not directly related to irrigation for park plants.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas to receive irrigation for compliance with requirements and conditions affecting installation and performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Schedule a pre-irrigation meeting with O.R. on-site to coordinate any changes to irrigation layout, locations, equipment, prior to initiating irrigation work.

C. Ensure all proposed changes to existing irrigation or new irrigation are coordinated and integrated into a complete, seamless connection between existing and new irrigation systems, as part of this Work.

3.02 IRRIGATION AREA PREPARATION

A. Do not install irrigation system without prior approval of the O.R. that site conditions are ready for the installation of the irrigation system.

B. Protect structures, utilities, sidewalks, pavements, and other facilities, and existing plants from damage caused by irrigation installation.

C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

D. Lay out irrigation installation (Mock-up) for review by O.R. Stake locations and adjust locations when requested. Obtain O.R. acceptance of irrigation layout before installing irrigation system. Make minor adjustments as required, at no cost to Owner.

3.03 EXISTING IRRIGATION

A. Existing Irrigation Survey: Contractor shall survey with City on-site the existing irrigation system prior to initiating the Work. Survey shall locate and assess condition existing Controller and Point of Connection (POC). Level of effort is noted in Specifications, 1.4 Submittals.

B. Note: Contractor shall not be responsible for existing irrigation system, zones, or individual components which are found to be broken or not functioning at the time of the Irrigation Survey. Contractor responsibility shall be limited to new irrigation components and their proper operation via existing controller and POC. City shall be responsible for controller and POC.

C. Contractor shall carefully disconnect existing irrigation equipment as required to complete the new system. Comply with current commercial industry standards and details for irrigation installation, testing, and tolerances.

3.04 NEW IRRIGATION

A. Install the complete, approved irrigation system per Plans and Specifications. Comply with City of Brentwood standard plans and specifications and current commercial industry standards and details for irrigation installation, testing, and tolerances.

B. Provide sleeves at prescribed burial depths for pipe requiring the sleeve. Extend sleeves 6-inches beyond paving edges. See plans for locations.

C. City shall coordinate and provide all necessary electrical power and water connections.

D. Layout of proposed irrigation system shall be field staked and reviewed and approved by O.R. prior to installation. Contractor shall be responsible for adjustments to the approved system in the field to provide complete irrigation coverage. Ensure irrigation system layout and operation accommodates revegetation efforts and effectively irrigates all areas per plan.

E. Bubblers: Install per plans. Ensure entire assembly is installed below grade, with top flush to finish grade.

F. Install heads and valve boxes flush and plumb to adjacent features as directed by O.R. Group valves and quick couplers in neat, level, evenly spaced rows.

G. Provide O.R. with pressure test on all mainline and lateral sections from Point of Connection to valves, prior to covering pipe. System shall hold 125 psi for one hour.

H. Provide coverage test prior to plant installation.

3.05 RESTORATION PLANTS IRRIGATION

A. Irrigate all restoration plants installed from containers through the Three-Year Maintenance Period, See Section 32-90-00 Planting.

B. Plants must be watered by hand or other means determined by the Contractor and approved by the O.R. via submittal. The following evapotranspiration rates are provided as a general guide to aid in devising an irrigation approach. Actual evapotranspiration rates may vary significantly from the averages provided below. Contractor must anticipate this variation and develop a final irrigation plan that successfully enables the final performance criteria to be met.

	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
Brentwood	1.0	1.5	2.9	4.5	6.1	7.1	7.9	6.7	5.2	3.2	1.7	0.7	48.3

Required Performance: Water plants the minimum amount necessary to ensure <5% plant mortality due to irrigation related stress after 3 years.

3.06 CLEANUP AND PROTECTION AND DISPOSAL

A. During irrigation installations keep adjacent pavements and improvements clean and the work area in an orderly condition.

B. Protect irrigation installations from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged irrigation components.

C. Disposal: Remove surplus soil, and waste materials, including excess subsoil, unsuitable soil, irrigation debris, and general debris, and legally dispose of off-site.