SECTION 32 84 00
IRRIGATION
Design Standard

PART 1 GENERAL

1.1 PURPOSE:

A. San Mateo County Community College District is committed to providing world-class educational facilities for its faculty, staff and students. This goal would be unfulfilled without emphasizing that the exterior environment is part and parcel to the educational experience. The campus exterior is not just the space left over between the buildings nor is it simply the void between the buildings and the parking lots. The design of the entire campus experience must be thoughtfully considered to achieve this goal.

By standardizing irrigation approaches and equipment, the District can improve water use efficiency, streamline system maintenance, reduce costs, and support larger sustainability goals. Efficient landscape irrigation is a critical part of reducing campus water demand, particularly during drought periods.

PART 2 PRODUCT:

2.1 SYSTEM DESIGN

A. Design irrigation systems that are water conserving, efficient, practical to maintain and manage, and flexible to changes in the campus development pattern.

B. Integrate each irrigation project with the campus-wide irrigation system.

C. All irrigation components shall be commercial-grade products.

D. Utilize the latest technologies in spray and emitter design and monitoring and control systems.

2.2 EMERGENCY WATER CONSERVATION MEASURES

A. Irrigation design must comply with emergency water conservation measures issued by the state Governor, State Water Board, and local water suppliers, while in effect. Presently, these measures allow the use of drip and/or microspray irrigation only for new building construction projects.

B. Until such time that these measures are lifted, new irrigation systems on SMCCCD campuses must rely on drip irrigation, whether delivered by sub-surface, on-surface or point source emitters, or microspray irrigation.

C. Any references made to spray or rotary spray irrigation throughout this document should be disregarded until such time that the measures are lifted.

D. The landscape architect is responsible to ensure that the design meets any additional emergency measures put in place after the writing of this standard.

2.3 WATER USE REQUIREMENTS

A. The landscape architect must ensure that planting and irrigation design comply with all local, regional, state, and federal regulations, as applicable. Local governing agencies are:

1. Cañada College: City of Redwood City Water Services

2. College of San Mateo: California Water Service Company (CalWater)

3. Skyline College: City of San Bruno Water Division

B. Planting and irrigation design at all campuses should meet or exceed water use and irrigation system design requirements of

1. Latest version of LEED-NC WEc1.1. ii. State of California Model Water Efficient Landscape Ordinance AB 1881

2. CALGreen / Title 24

C. Evidence of conformance to these regulations and requirements should be documented in. Design Development and subsequent submittals. In the case of LEED projects, calculations for both the Design Case and Baseline Case for WEc1.1 should be provided with Design Development and subsequent submittals for SMCCCD review.

2.4 CONTROLS

A. If the campus is using a central control computer based system, satellite controller must be specified that integrates with this system. As of this writing, CSM and Skyline campuses have centralized Toro control systems. Cañada does not have a centralized system.

1. CSM and Skyline groundskeepers prefer Toro controllers

2. Cañada groundskeepers prefer Irritrol controllers

B. Irrigation controller should be connected to real-time weather or ET data.

C. Irrigation control and scheduling should be based on plant type, time of year and weather.

D. Locate controller so that it is shielded from public view but easily accessed for maintenance and operations. Wall mount or pedestal is acceptable depending on design conditions.

E. Confirm acceptable controller location with District Project Manager.

1. Indicate size of controller, enclosure and pad, if applicable, on Design Development and subsequent drawings.

F. The Contractor is responsible for programming the controller and adjusting the watering schedule from the completion of installation (system) to the end of their maintenance period.

2.5 CONNECTING TO THE CAMPUS WATER SYSTEM

A. Coordinate new system with existing system operations and performance parameters.

B. None of the campuses has a dedicated irrigation water system; connect to nearest domestic water line. Confirm available pressure for the new system and include this data in the design documents. Pressure reducing valves will be required.

C. None of the campuses has a reclaimed water system; however, the District anticipates transition to the use of reclaimed water for irrigation in the near future. Install purple pipe adjacent to and in parallel to standard irrigation lines. The designer should consider how much of the piping design should be made redundant, and in most cases prioritize pipe that have long runs, pipes that run beneath hardscape or through structure, and primary laterals that connect control valves to planting areas. Coordinate with the District on the extent of this requirement, which may vary depending on the project. The designer will need to indicate on

their Drawings where the reclaimed system pipe should be installed. Please note that code requires a minimum separation of reclaimed water lines form domestic water lines and that future modification to the reclaimed pipe layout (when made operational) may be required. D. Backflow preventers should be housed in enclosures as follows.

1. Cañada and CSM: solid aluminum box enclosure

2. Skyline: marine-grade aluminum box enclosure

3. Provide thermal insulation cover for use on backflow preventers during winter months; remove for remainder of the year.

D. Provide and install a master valve at the point of connection.

E. Provide and install a flow sensor at each master valve.

F. Provide future integration to an automatic fertilizing system by providing a coupling connector downstream of the backflow.

G. If debris contamination in the existing irrigation main line is an issue, provide and install a primary filter at the point of connection where appropriate.

2.6 SYSTEM INFRASTRUCTURE AND DESIGN

A. Minimize irrigation trenching in areas with slopes greater than 3:1.

B. Locate trenching for irrigation main lines at the bottom of slopes, where possible, if applicable.

C. Prepare irrigation trenches properly to avoid settling of the finish grade. Bed pipe in at least 2” of soil excavated from trench. Backfill on all sides to provide a uniform bearing. Do not lay pipe when there is water in the trench.

D. Permanently label valve box lid by heat branding the designated controller and circuit number onto the lid. Letters to be 2” size.

E. For sleeves under roadways and sidewalks, provide white PVC pipe for irrigation pipes and separate gray PVC pipe for wires.

F. Solvent weld for 3”pipe and smaller; 4” pipe and above to be rubber gasketed with ductile iron fittings

G. Use Schedule 80 for connections to remote control valves.

H. Use Schedule 40 as a minimum thickness of irrigation main lines.

I. In addition to used control wires, add 6 additional pairs of color coded wires for future expansion and adjustments to the system. Utilize a larger conduit for wires, to allow for future expansion.

J. Provide isolation valves (threaded ball valve) upstream from each group of remote control valves for ease of maintenance and for flexibility of future changes or system expansion. K. Install filter and pressure regulator at all drip valves.

K. Lawn areas should be located on separate valves.

L. Stormwater treatment swales and basins shall be on separate valves.

M. Drought tolerant zones should be located on isolated valves so they may be shut off after establishment.

N. Valve flood bubblers separately from spray irrigation.

O. In sloped areas, valve circuits to reflect the difference in water needs for the bottom, intermediate, and top of slope.

P. Install a strong nylon fabric or wire mesh at bottom of valve boxes to prevent gopher intrusion.

Q. Provide a gate valve in a valve box for future main line connection stub outs.

R. Install air vacuum release valve (AVRV)(s) at high point(s) of each subsurface irrigation area.

S. Locate one AVRV per 500' of dripline tubing.

T. Quick couplers to be 3/4" minimum; confirm quantity, spacing, and locations with District Project Manager

2.7 EMISSION TYPES AND DEVICES

A. All irrigation heads on the same valve shall have matched precipitation rates.

B. Irrigate trees with deep watering flood bubblers, two per tree as a supplement to shrubs, groundcover or lawn irrigation.

C. As a general rule, in-line drip (on surface or sub surface) should be used for plants spaced up to 24" on center. Plants spaced 30" on center or more should be irrigated with point source drip or spray. This is a general guide only, and many other factors are involved in the design direction to proceed with: plant type, plant size (1 or 5 gallon), soil type, and layout design. Designers should use best practices and refer to irrigation design manuals available from the manufacturers.

D. Where sub-surface drip irrigation is used, it must include an operation indicator that identifies when the system is operating, such as a pop-up indicator installed at the end of the line.

E. Where on-surface drip is used, it must include an operation indicator that identifies when the system is operating, such as a pop-up indicator installed at the end of the line. The lines can be covered by mulch. Avoid placing drip irrigation in planting areas that pedestrians might cross through, damaging the system.

F. Use Toro or other approved equal spray heads. Use the following size pop-ups:

1. 4"pop-up heads for turf

2. 12" pop-up heads for ground cover and shrubs

3. 12" pop-up heads for no-mow fescue, where used

G. For shrubs and ground cover planting areas, hold spray heads and rotors 8" from edge of paving and 18" from structures to minimize overspray (3" acceptable for turf).

H. In large turf areas, where appropriate, use gear-driven rotors, such as Hunter I-40 rotor or equal.

2.8 OPERATIONS AND MAINTENANCE

A. As part of specifications, contracts shall include a 90-day minimum maintenance period for planting and irrigation projects.

B. Require record drawings in AutoCAD upon project completion.

C. Contractor to provide a zone coverage map with station numbers. The map should be laminated and placed inside the controller enclosure.

D. Contractor is to provide an Operation and Maintenance Manual. The manual shall contain complete enlarged drawings, diagrams, and spare parts list of all equipment installed showing manufacture's name. In addition, each service manual shall contain the following:

1. Copy of the landscape irrigation audit.

2. Copy of the irrigation schedule and estimate of annual water consumption.

3. Copies of equipment warranties and certificates.

4. List of equipment with names, address and telephone numbers of all local manufacturer representative.

5. Complete operating and maintenance instructions.

6. Parts list of all equipment such as controllers, valves and heads.

7. Contractor's address, phone number and guarantee statement.

2.9 STANDARD IRRIGATION EQUIPMENT

A. Satellite Controller and Point of Connection:

1. Cañada College prefers Irritrol Rain Master controllers

2. CSM: Must be compatible with centralized Toro controller

3. Skyline: Must be compatible with centralized Toro controller

4. When applicable, use stainless steel for controller enclosures

5. Primary filter if needed: automatic hydraulically actuated backwash, in enclosure

6. Flow sensor: inline, non-magnetic impeller type, size as required

B. Valves:

1. Isolation valve: bronze, normally closed

2. Remote control valve: cast-iron body or glass filled nylon body, diaphragm-type valve

3. Quick-coupling valve: two piece

4. B Emitter flush valves: automatic flush

5. Ball valve: Brass or Schedule 40 PVC

C. Piping:

1. Mainline pipe – 3” and smaller: Schedule 40 PVC with Schedule 40 fittings
2. Mainline pipe – 4” and larger: Class 200 PVC ring tite gasketed pipe and ductile iron fittings.
3. Lateral line pipe: Schedule 40 PVC
4. Sleeve: Schedule 40 PVC

D. Shrub Rotor Heads:

1. Shrub rotator-side strip, corner end strip, 0.5” precipitation rate, 12” pop height, matched precipitation rate, 80% D.U. minimum
2. Stream nozzles
3. 30’ radius, 21’ radius, or 15’ radius

E. Turf Rotor Heads:

1. Similar to Shrub Rotor Heads except with 4” pop height.

F. Shrub Spray Heads:

1. 1” precipitation rate, 12” pop height, matched precipitation rate, 70% D.U. minimum
2. Stream nozzles
3. 15’ radius, 12’ radius, 10’ radius, 8’ radius, or 4’ x 9’ radius

G. Turf Spray Heads:

1. 10’ radius
2. 1” precipitation rate, 6” pop height, matched precipitation rate, 70% D.U. minimum

2.10 APPROVED MANUFACTURERS

A. Toro

B. Irritrol

PART 3 EXECUTION

3.1 SUBSTITUTIONS

A. These District Standards have been approved by SMCCCD as Guidelines. Any deviation from the Standard must be approved by the District Project Manager.

3.2 ASSOCIATED DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS

32 84 00 Irrigation Construction Specifications

32 84 00 Irrigation Construction Details

32 90 00 Planting Design Standard

32 90 00 Planting Construction Specifications

32 90 00 Planting Construction Details

32 00 00 Cañada College Campus Exterior Design Standard

32 00 00 College of San Mateo Campus Exterior Design Standard

32 00 00 Skyline College Campus Exterior Design Standard

01 81 13 Sustainability Design Standard

San Mateo County Community College District is strongly committed to promoting sustainability throughout their campus projects. Section 01 81 13 Sustainability of the Design Standard provides guidelines and recommendations for implementing sustainability strategies. Where relevant, specific sustainability criteria is noted in this section; however, each project team should review and cross reference that front section while developing the specific project and its documentation. Each discipline shall confirm that specific performance and manufacturer information provided in the specification section is in alignment with code requirements, LEED criteria, and any other goals for sustainability.

3.3 ASSOCIATED CONSTRUCTION DETAILS

A. Reduce Pressure Backflow Preventer

B. Backflow Assembly Enclosure

C. Controller – Pedestal Mounted

D. Controller – Wall Mounted

E. Trenching

F. Valve Box Layout

G. Gate Valve

H. Master Valve

I. Flow Sensor

J. Remote Control Valve

K. Remote Control Valve – Drip

L. Manual End Flushing Valve

M. Quick Coupling Valve

N. Air Vacuum Relief Valve

O. Deep Watering Tree Bubbler

P. Tree and Shrub Bubbler

Q. Pop-Up Sprinkler

R. Rotary Sprinkler

S. Drip Tubing Emitter Placement

T. Dripline Operation Indicator

U. Inline Drip Center Feed Layout

V. Inline Drip End Feed Layout

W. Inline Drip End Island Layout

END OF SECTION