

## **V. RECYCLED WATER SYSTEM DESIGN CRITERIA**

### **A. GENERAL**

Recycled water system improvements proposed for inclusion into the District's service area shall be designed in accordance with the criteria set forth herein, unless otherwise approved in writing by the District.

The design shall take into consideration physical conditions known to exist at the time and place of each installation and the probable operating requirements. Where such conditions render sections of these Specifications inapplicable, alternate methods of design may be submitted to the District, and upon approval thereof, may be incorporated in the plan.

### **B. GENERAL LAYOUT**

1. The system shall be designed as a circulating grid with at least three (3) main line valves at each four way intersection.
2. Each line shall be valved so that any segment not exceeding one block (1,300<sup>±</sup> feet).
3. Dead end mains shall be provided with means of flushing with a blow-off.

### **C. SYSTEM DEMAND**

1. The District reserves the right to determine criteria for each recycled water system or sub-system based upon conditions that may exist for that particular location, anticipated level of development, planned use or other criteria. In general, however, recycled water delivery and conveyance facilities shall be sized to handle the highest demand on the system within the sphere of influence.
2. All flows shall be computed on the basis that the area served by the extension or addition is completely improved to limits imposed by its present zoning or the zoning required to allow construction of the proposed development.
3. The developer is required to provide peak demand data of the landscape irrigation of the development to the District for approval.

### **D. SYSTEM PRESSURE**

### **E. PIPE SIZING CRITERIA**

1. The minimum pipe size shall be 8-inch diameter.

2. Pipeline velocities shall not exceed 5 feet per second during peak flow. Use a "C" value of 120 in the Hazen-Williams formula for flow computations.
3. The District reserves the right to require 12-inch diameter minimum size pipelines in residential areas, with no incremental pipeline diameter upsizing cost to the District, when necessary, as determined by the District.
4. The District may require pipe sizing in excess of the minimum size as determined by the design criteria herein when the systems being constructed will serve, or may be extended to serve, additional lands. If oversizing is required by the District, the District's Board of Directors may authorize participation and payment of increased costs of such pipeline in accordance with District criteria.
5. The minimum steel plate thicknesses utilized for water pipeline shall be as shown in Section VI, The Recycled Water Pipeline Materials Specifications, Section F.2.

#### **F. PIPELINE MATERIALS**

1. All District watermains shall be constructed of cement mortar lined and cement mortar coated welded steel pipe (10 gauge minimum plate thickness). As approved in writing by the District, residential developments may be allowed to use 8" and 12" diameter AWWA C909 PVC pipelines.
2. Pipe shall be provided only from District-approved pipe manufacturers. See list in Appendix J of Section VIII.
3. All pipes installed above or below ground designed to carry recycled water are to be colored purple color Pantone 522C.
4. Warning tape shall be installed 3" above the top of pipe center and shall run continuously for the entire length of all constant pressure main line piping. Warning tape shall be purple plastic with black printing having the words "CAUTION: RECYCLED OR NON-POTABLE WATER - DO NOT DRINK" imprinted in minimum 1" high letters. Imprinting shall be continuous and permanent. The overall width shall be a minimum of 3-inches. Refer to District Standard Drawing No. R/NP-2.

#### **G. PIPELINE LOCATION**

1. On south side or west side of the street and out of the main traveled lanes of the road where possible. Locate 10 feet separation from water main. Location is not to interfere with other existing utilities. Refer to District Standard Drawing No. R/NP-1.
2. Pipeline is to be installed after roads are constructed to final sub-grade, and developer certifies this in writing on District form.

3. Adjacent to existing or proposed potable water lines, installation shall be in accordance with the State Board’s Division of Drinking Water (DDW), or District requirements; whichever is greater. Generally, always cross below potable water lines, preferably with a minimum clearance of 1 foot, and parallel at least 10 feet (O.D. to O.D.) away from potable water lines. Where required by DDW and/or Engineer, water pipe joints shall be fully welded (double pass) and the pipe zone shall be backfilled with a 1 (one) sack cement sand slurry.
4. When minimum cover cannot be provided, concrete encasement or protective slab construction over the pipeline may be substituted. Consult with District staff. Requires special approval.
5. District will require pipeline looping whenever possible. Dead end mains require a blow-off.

**H. VALVES**

1. Location:
  - (a) Large mains (14" and larger): To be determined for each system to meet operational requirements.
  - (b) Small mains (12" and smaller): To provide flexibility of operation, usually located on discharge side of pipe connections; minimum 4 at crosses, 3 at tees and always at beginning of dead end mains. District may require additional valving on critical sections or where proposed valving requires closing more than 3 valves to isolate a section of pipeline.
  - (c) Each main shall be valved so that any segment not exceeding 1,300 feet may be isolated from service.
2. Size & Type:
 

Full line size gate valves through 12-inch (normal pressure rating 200 psi; specify a gate valve rated to a maximum pressure of 250 psi if required). For 14-inch and larger, use full line size butterfly valves (normal pressure rating 150 psi; specify a butterfly valve rated to a maximum pressure of 250 psi if required).
3. Refer to Standard No. R/NP-6 (Gate Valves) and Standard No. R/NP-7 (Butterfly Valves). Valves shall be provided only from District approved manufacturers. See list in Appendix J of Section VIII.

## **I. CORROSIVE SOIL DESIGN**

1. Where pipelines are to be constructed in known or likely corrosive soil conditions, cathodic test stations shall be provided in accordance with District requirements and standards at the locations determined by the District.
2. The District, at its option, may also require cathodic test stations for its transmission mains and major pipelines, regardless of existing soil conditions.
3. In order to determine whether or not unfavorable soil conditions exist, the District may request that soil boring samples and laboratory analysis be provided as part of the project. The analysis shall include an evaluation of the following:
  - PH
  - Redox
  - Sulfide
  - Resistivity
  - Sulfate
4. Under certain circumstances, the District may require special pipe installation procedures or types of pipe, including special protective coatings **or** sheathing for pipe and fittings.

## **J. SERVICE INSTALLATIONS**

1. All services shall be constructed in accordance with the applicable District Standard Drawing.
2. Services shall not be connected to 20-inch or larger mains unless specifically permitted by the District.
3. All commercial/industrial projects shall be required to provide a separate landscape irrigation meter and service, in conformance with District Standards.

## **K. BLOWOFFS**

Appropriately sized blowoffs shall be located at all low points along the pipeline alignment and at all "dead end" locations. Blow-offs on 8-inch diameter waterlines will also be required unless otherwise directed by the District. Additionally, for all pipelines 14" in diameter and greater, a blowoff shall be located on the upgrade side of all mainline valves. All blowoffs shall be constructed per District Standard Drawing No. R/NP-14 and R/NP-15).

## **L. COMBINATION AIR/VACUUM RELEASE VALVES**

Appropriately sized air/vacuum release valves shall be located at all high points along the pipeline alignment and at all "dead ends" that occur at a high point. Additionally, for all pipelines 14" in

diameter and greater, an air/vac valve shall be located on the downgrade side of all mainline valves. All air/vac valves shall be constructed per District Standard Drawing No. R/NP-11, R/NP-12 and R/NP-13.

**M. RECYCLED WATER WARNING SIGN**

Signs shall be placed to inform the public, maintenance staff, and others that recycled water is being used. The location for each recycled water warning sign shall be shown on plan. Warning signs shall be posted, at a minimum, at all entrances to sites, all public entrances, recycled water meters, every 500 feet along the perimeter of recycled water use areas. Warning sign shall be constructed per District Standard Drawing No. R/NP-17.