SECTION 41 - WATER DISTRIBUTION SYSTEMS

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SECTION 41 WATER DISTRIBUTION SYSTEMS

41-1 GENERAL

This section shall apply to all potable and non-potable water distribution systems. Specific requirements for non-potable water distribution systems shall comply with Section 41-22, "Recycled Water", of these Specifications.

All water pipe, fittings, gate valves, fire hydrants, blow-offs, and other appurtenances shall be installed in accordance with the requirements of the Plans and Specifications, these Specifications, the American Water Works Association (AWWA), and as recommended by the manufacturer.

Pipe for water mains shall be placed along the horizontal alignment shown on the Plans. The depth of placement of the pipe shall be as specified in Section 41-3, "Excavation", of these Specifications.

All metallic parts shall be encased with eight (8) mil plastic. Encasement shall be performed such that no soil is in direct contact with the metallic parts.

41-2 WATER PIPE

Pipe used for water mains, four inches (4") through twelve inches (12") in diameter shall be made of either ductile iron, or polyvinyl chloride as shown on the Plans. Pipe materials used for water services shall conform to Section 50-40.01, "Water Service Connection Materials", of these Specifications. All pipe shall be the regular product of a firm that has successfully manufactured comparable pipe for at least three (3) years, and shall be certified by the manufacturer. The Contract may indicate a particular type of pipe to be used for water mains or water services. In this case, the use of an alternate type of pipe will not be permitted.

Pipes located between residential homes shall be AWWA C151 Class 350 Ductile Iron Pipe installed with six inches (6") of sand bedding and eight (8) mils of polyvinyl encasement. Backfill with sand to eight inches (8") above the top of the pipe and a six-inch (6") wide warning tape shall be placed eighteen inches (18") above the pipe. The pipe shall be centered within a fifteen-foot (15') wide easement.

41-3 EXCAVATION

Unless otherwise shown or specified in the Contract, trench excavation for water pipe, including water distribution mains, fire hydrant branch leads, and water services shall be as specified in Section 19-1, "Trench Excavation", and these Specifications.

Water mains constructed in fully improved streets with curb, gutter, and sidewalk, and a right-of-way width of fifty feet (50') or greater shall be installed with a minimum cover of thirty-six inches (36") and a maximum cover of fifty-four inches (54"), measured from the flowline of the gutter to the top of the pipe. If the right-of-way width of the fully improved street is less than fifty feet (50'), the minimum depth of cover is thirty inches (30") measured from the flowline of the gutter to the top of the pipe.

Water mains constructed in unimproved areas or in existing streets lacking curb, gutter and sidewalk shall be installed with a minimum cover of fifty-four inches (54") and a maximum cover of sixty inches (60"), measured from the top of the pipe to the existing ground or pavement surface at the centerline of the pipe.

To avoid conflicts with other utilities, particularly at street intersections, it may be necessary to deviate from the above-specified minimum and maximum cover requirements. At locations

where the crossing of water mains with other underground utilities results in grade conflicts, adjustment to the vertical alignment of the water main may be required.

The width of the trench shall be as specified in Section 19-1.02, “Trench Width”, of these Specifications.

Trenches for water mains shall be excavated to a depth of at least four inches (4”) for polyvinyl chloride and six inches (6”) for ductile iron below the outside diameter of the pipe. At locations of joints or couplings the depth of over excavation shall be measured from the outside diameter of the pipe joint or couplings.

Unless otherwise specified in the Special Provisions, trenches shall be excavated only as far in advance of pipe laying as permitted by the Agency and in conformance with the requirements in Section 19-1.04, “Maximum Length of Open Trench”, of these Specifications.

All cut and abandoned pipes within the area of the trench, including existing water mains, that are not removed in accordance with Section 13-2.05, “Abandoned Underground Facilities”, shall be plugged in accordance with Section 15-1.04, “Abandonment of Pipe and Manholes”, of these Specifications.

Isolated lengths of pipe may also be filled with sand or other free flowing granular material, as approved by the Agency.

41-4 LAYING WATER PIPES

The Contractor is responsible for sealing open pipe ends at the end of each workday to secure the end of the pipe from animal and human intruders. The seal shall be watertight. At a minimum, the end of the pipe shall be covered with eight (8) mil thick plastic and then plywood placed against the plastic. One (1) piece of plywood shall be big enough to cover the entire pipe opening. The trench at the pipe end shall then be temporarily backfilled by completely covering the pipe seal. Contractor may use a manufactured pipe end plug approved by the Agency to seal pipe instead of plastic and plywood.

Pipe shall be placed in trenches as specified in Section 19, ”Trench Excavation, Bedding and Backfill”, of these Specifications.

Pipe for water mains shall not be placed during inclement weather or when the conditions in the trench will interfere with proper jointing of the pipe. All open ends of water main pipe and fittings shall be adequately and securely closed with watertight plugs whenever the work of placing the water main is discontinued.

All pipes, valves, fittings, and appurtenances shall be installed in accordance with the manufacturer’s recommendations and according to accepted water works practice. Each section of pipe and each fitting shall be thoroughly cleaned out before it is installed. All pipes, valves, fittings, and appurtenances shall be lowered into the trench in such a manner as to prevent any damage, particularly to the pipe lining and coating. When required by the Agency, approved slings shall be used to lower the pipe. Under no circumstances shall pipe or accessories be dropped into the trench.

The pipe shall be laid true and uniform to line and grade, with no visible change in alignment at any joint unless a curved alignment is shown on the Plans, in which case the maximum deflection at any joint shall not exceed two and one-half degrees (2.5°) for ductile iron pipe or one-half of the manufacturer's recommended deflection, whichever is less. Deflection and bending of polyvinyl chloride pipe shall not exceed the limits described in Standard Drawing 8-9.

Where necessary to properly locate valves and fittings, the pipe shall be neatly and squarely cut to length, using methods recommended by the manufacturer.

When field cuts are made in polyvinyl chloride pipe, the cut ends shall be cut square and all burrs removed from the pipe interior. The beveling of the pipe ends shall be as specified by the manufacturer. Guide marks for jointing the pipe, after cutting, shall be made on the pipe in accordance with the manufacturer’s specifications.

On water systems, except for water systems being installed for a new subdivision, no more than three thousand linear feet (3,000 l.f.) of water main shall be installed before starting installation of the water services, with this approximate sequence maintained throughout the Work.

Testing, flushing, placement of first lift of backfill and cleanup shall follow pipe laying and service line construction as a continual operation, or as approved by the Agency, with the provision that these phases of the Work shall be completed no later than fifteen (15) Working Days after starting construction in any portion of the Work.

41-5 UNDERGROUND MARKING TAPE AND LOCATING WIRE

Underground marking tape shall be installed above all water mains.

Underground marking tape shall be twelve inches (12”) wide, minimum four (4) mil thickness low density polyethylene formulated for extended use underground, minimum tensile strength 4100 MD and 3650 TD in accordance with ASTM D882. Tape elongation shall be greater than 550% at break point. Underground marking tape shall be placed eighteen to twenty-four inches (18-24”) above the top of the water main throughout the length of the pipe.

- Marking tape for potable water mains shall be BLUE and marked “WATER MAIN BURIED BELOW.”
- Marking tape for potable transmission mains shall be BLUE and marked “WATER TRANSMISSION MAIN BURIED BELOW.”
- Marking tape for raw water transmission mains shall be GREEN and marked “RAW WATER MAIN BURIED BELOW.”
- Marking tape for nonpotable and recycled water mains shall be PURPLE and marked “RECYCLED/RECLAIMED WATER MAIN BURIED BELOW.”

All water pipes shall be equipped with a locating wire installed on top of the pipe. The locating wire shall be an insulated ten (10) gauge solid, single strand, soft drawn copper locating wire with one-sixteenth-inch (1/16”) PVC insulation along the entire length of the pipe. Locating wire shall extend into each valve box and each service box, and be installed in accordance with Standard Drawings 8-4A and 8-4B. All splices shall be soldered, then shrink-wrapped or taped, and installed on top of the water main along its length. A continuity test shall be conducted on each splice location and after all other utilities are installed prior to paving.

When pipe runs exceed six hundred feet (600') between valves, a locating wire station shall be installed midway between the valves in accordance with Standard Drawing 8-4B. The maximum distance from valve to station or from station to station shall be six hundred feet (600'). The spacing shall be equidistant between valves and stations when two or more stations are required.

41-6 THRUST BLOCKS AND RESTRAINED JOINTS

Thrust blocks or pipe-restraining devices shall be supplied for and installed at all pipe deflections greater than five degrees (5°) in accordance with Standard Drawings 8-3A and 8-3B.

41-7 SETTING FIRE HYDRANTS

Fire hydrants shall conform to material requirements of Section 50-37, “Fire Hydrants”, of these Specifications.

Only ductile iron or polyvinyl chloride pipe shall be used as branch leads that connect fire hydrants to water mains.

- In streets where the sidewalk is contiguous with curb and gutter, fire hydrants shall be placed behind the sidewalk within the public utility easement.
- In streets where the sidewalk is separated from the curb and gutter by a planter or park strip, or at locations where there are to be curbs and gutters but no sidewalks, fire hydrants shall be placed three feet (3') behind the curb and gutter. A two-foot (2') wide by four-inch (4") thick concrete pad shall be placed between the back of curb and the two-foot (2') square concrete pad surrounding the fire hydrant

In streets that are paved but lack curbs, gutters and sidewalks, new and relocated fire hydrants shall be placed at a location not to exceed ten feet (10') from the edge of pavement. A two-foot (2') wide by four-inch (4") thick concrete pad shall be placed between the back of curb and the two-foot (2') square concrete pad surrounding the fire hydrant. For fire hydrant installation details, see Standard Drawings 8-2A and 8-2B. In no case shall a fire hydrant be installed within three feet (3') of a building or any other structure that would limit access. Fire hydrants shall stand plumb with the hex nut for the pumper outlet a minimum of twenty inches (20") above the sidewalk or concrete pad surrounding the hydrant.

Where the Plans indicate that existing fire hydrants are to be removed and salvaged, the salvaged hydrants shall be removed intact and delivered undamaged to the Agency Corporation Yard location as directed by the Agency.

Fire hydrants placed at street intersections shall be installed at the beginning or end of curb returns.

All fire hydrants shall be set such that:

- On standard hydrants, the four and one-half-inch (4-1/2") nozzle or outlet shall lie on a line perpendicular to the centerline of the street.
- On double pumper hydrants, a line bisecting the angle between the two (2) four-and-one-half-inch (4-1/2") nozzles or outlets shall be perpendicular to the centerline of the street.

41-8 SETTING GATE VALVES

All gate valves shall meet the requirements of Section 50-38.01, "Gate Valves", in these Specifications.

Gate valves which connect directly to elbows, tees, or cross fittings shall be provided with flanged joints.

41-9 BACKFLOW PREVENTION ASSEMBLIES

Backflow prevention devices shall conform and be installed in accordance with Standard Drawings 8-8A, 8-8B or 8-8C, depending on the size of the assembly.

Backflow prevention devices shall be installed in lawn or planter areas. If conflicts occur, location must be approved by Agency personnel prior to installation.

The Reduced Pressure, Double Check Detector, or Reduced Pressure Detector Assemblies shall be tested by a certified backflow prevention assembly tester at the time of installation.

41-10 FIRE PROTECTION SERVICE ASSEMBLY

Fire protection service assemblies shall conform to and be installed in accordance with Standard Drawing 8-7, and shall include a valve, detector check valve with by-pass meter, utility vault, and piping. Fire protection service assembly piping shall be flanged ductile iron Class 53 conforming to Section 50-25, "Ductile Iron Pipe (DIP), and Cast Iron Pipe and Ductile Iron Fittings", of these Specifications.

Water valve shall be as specified in Section 50-38, “Valves”, of these Specifications. Valves shall be furnished with flanged ends.

Detector check valves shall be listed by Underwriters Laboratories, Incorporated and approved by Associated Factory Mutual.

By-pass water meter shall be five-eighths-inch (5/8”) by three-quarter-inch (3/4”), all copper alloy body conforming to AWWA C700. A bronze check valve shall be installed downstream of the by-pass meter. Bronze ball or gate valves shall be installed to allow removal of the by-pass meter without affecting the fire protection system. All piping shall be Type “K” copper.

Utility vaults for the detector check valve shall be thirty-inch by forty-eight-inch (30” x 48”) pre-cast utility boxes of reinforced concrete extended from the bottom of the detector check valve to the surface. Utility vault shall be fitted with a two-piece one-quarter inch (¼”) thick checker plate steel cover with two (2) self-closing ten-inch (10”) diameter reading lids and a one and three-quarters inch (1-3/4”) hole for touch read module in one of the pieces.

The utility vault shall be installed over the by-pass meter in such a manner that the meter may be easily read through the reading lid of the vault cover. The utility vault shall be installed and supported in such a manner as to prevent undue stress or loading on the meter, detector check valve or piping. The top of the utility vault shall be set no lower than the highest finish grade immediately surrounding the box and supported to maintain that setting.

Fire protection service vaults shall be installed in lawn or planter areas. If conflicts occur, location must be approved by Agency personnel prior to installation.

41-11 BLOW-OFFS

Four-inch (4”) blow-offs shall conform to and be installed in accordance with Standard Drawings 8-13A, 8-13B or 8-13C. Temporary two-inch (2”) blow-offs shall conform to and be installed in accordance with Standard Drawing 8-12.

41-12 PIPE BEDDING AND BACKFILLING OF TRENCHES

Pipe bedding and backfill for water mains, fire hydrant branch leads, and water services shall be furnished and placed according to the requirements in Section 19-2, “Pipe Bedding and Backfilling of Trenches”, of these Specifications.

41-13 REPAVING WATER PIPE TRENCHES

Repaving of trenches for water mains, fire hydrant branch leads, and water services shall be as specified in Section 14, “Restoration of Surfaces”, of these Specifications.

41-14 WATER SERVICES

Materials for services shall meet the requirements specified in Sections 50-40, “Water Service Connection Materials”, and 50-38, “Valves”, of these Specifications, and shall be installed in accordance with Standard Drawings 8-1, and 8-6A, 8-6B, or 8-6C depending on the size and type of service.

Gate valves for water services three inches (3”) through twelve inches (12”) in diameter shall be installed within a box and riser. Boxes and risers shall be as specified in and installed in accordance with Standard Drawing 8-5.

Service saddles shall be bronze.

No fitting (tee, ell, etc.) shall be tapped to accommodate a service.

Water Service Lines shall be one inch (1”) in diameter unless otherwise specified. All underground copper services shall be protected from corrosion by wrapping or sleeving in eight (8) mil plastic.

Where the curb and gutter exists, or is to be constructed concurrently with the improvements, the location of each service shall be permanently indicated by inscribing the letter "W" in the curb directly above the line when the service is perpendicular to the street centerline. Otherwise, the "W" mark for a skewed or angling service shall be placed at a right angle to the end of the service. When water services are installed in a street with existing curb, the curb mark shall be placed at the time the services are installed to assure proper location. In new subdivisions when the services are installed before the curb is constructed, it is the Contractor's responsibility to establish the exact location of each service and to ensure that the "W" is placed in the curb after it is poured. In no case shall the "W" be placed more than six inches (6") from the service.

41-15 WATER METERS AND METER BOXES

Immediately prior to water meter installation, the water service line shall be thoroughly flushed.

A meter box at the property line or easement line is required for all services.

Water meters and appurtenances shall be installed in accordance with and of the material, type and brand described in Standard Drawings 8-6A, 8-6B, or 8-6C, depending on the size of the water meter. The size and type of meter (positive displacement, turbine, or compound) shall be as described on the Plans.

Water meter boxes shall be installed in lawn or planter areas. If conflicts occur, location must be approved by Agency personnel prior to installation.

41-16 DISINFECTION OF WATER MAINS

Newly constructed water mains and water distribution systems shall be disinfected following these procedures:

- Prevent contaminating materials from entering the water mains during construction, and flush the water mains after construction to remove any contaminants that may have entered the water mains.
- Disinfect any residual contamination that may remain.
- Determine the bacteriological quality by laboratory testing after disinfection.

Precautions shall be taken to protect pipe interiors, fittings, and valves against contamination during the construction of the water distribution system.

Water distribution mains up to and including twelve inches (12”) in diameter shall be disinfected using the Tablet Method. The Tablet Method shall employ the use of a sufficient number of five (5) gram calcium hypochlorite tablets as a disinfectant to yield an average chlorine dose of approximately twenty-five (25) milligrams per liter. The five (5) gram calcium hypochlorite tablets shall contain at least sixty-five percent (65%) available chlorine by weight. The tablets, six to eight (6 to 8) to the ounce, are designed to dissolve slowly in water. These tablets shall meet the requirements of AWWA B-300 standard for hypochlorites.

Because preliminary flushing cannot be performed when tablets are used, cleanliness must be exercised during construction of the water main.

The calcium hypochlorite tablets shall be placed in each section of pipe and in hydrants, hydrant branches, and other appurtenances. They shall be attached by an adhesive at the top of the pipe. If the tablets are fastened before the pipe section is placed in the trench, their position shall be marked on the section to assist in keeping the tablet's position at the top of the pipe.

The adhesive shall be Permatex No. 1, or approved equal. There shall be no adhesive on the tablet except on the broad side next to the surface to which the tablet is attached. The tablets shall be fastened to the pipe to prevent washing to the pipe end.

The number of calcium hypochlorite tablets required for main disinfection is shown in the following Table 41-1.

TABLE 41-1

REQUIRED 5 GRAM CALCIUM HYPOCHLORITE TABLETS*

Pipe Diameter (inches)	Length of Pipe Section (feet)				
	13 or less	18	20	30	40
4	1	1	1	1	1
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5
12	3	4	4	6	7
16	4	6	7	10	13

*Based on 3.25 grams of available chlorine per tablet. Any portion of tablet rounded to next higher number.

When the installation of the water distribution system has been completed, the water mains shall be filled with water at a velocity of less than one foot per second (1 fps). During filling, air shall be released from all high points in the line. The Contractor shall provide a corporation stop at high points to provide air vents and insure that all air is released.

In addition, as the chlorinated water flows past tees and crosses, related valves and hydrants shall be operated so as to disinfect appurtenances.

The chlorinated water shall be allowed to stand in the pipeline at least twenty-four (24) hours. At the end of this period the chlorinated water shall be flushed from the pipeline until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the existing distribution system, or less than one mg/l total residual chlorine.

Before the water main is placed in service as part of the existing distribution system, the Contractor shall take the number of samples required by Agency personnel. Bacteriological examination of the samples shall meet the following criteria:

1. Total Coliform less than 1 per 100 milliliters
2. Total Plate Count less than 500 bacteria per milliliter
3. If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated as directed by the Agency.

The water shall also meet State and Federal drinking water standards; Title 22, California Administrative Code, and the 1986 Amendments to the Safe Drinking Water Act of 1974, as issued by the United States Environmental Protection Agency (EPA).

New water mains shall not be connected to the existing system until the Agency has determined that the new water main has been disinfected.

41-17 PRESSURE TESTING WATER MAIN INSTALLATIONS

After disinfection of the system and prior to making connections, the entire system shall be pressure tested by the Contractor independent of the existing system or systems to be connected.

In no case shall there be placement of permanent pavement prior to successful completion of the test. Joints and fittings must be backfilled to the horizontal diameter of the pipe and the

pipe between joints backfilled to a depth necessary to hold the line securely during the test, but in no case less than eighteen inches (18”). Thrust blocks shall have been in place for at least thirty-six (36) hours if high-early-strength cement was used or at least seven (7) days if standard cement was utilized.

Each section of the pipe to be tested shall be slowly filled with water, and all air shall be expelled from the pipe. The release of the air can be accomplished by opening fire hydrants and service line cocks at the high points of the system and blow-offs at all dead ends. The valve controlling the admission of water into the section of pipe to be tested should be opened wide before shutting the hydrants or blow-offs. After the system has been filled with water and all air expelled, all the valves controlling the section to be tested shall be closed and the line remain in this condition for a period of not less than twenty-four (24) hours. This twenty-four (24) hour period shall follow guidelines as set forth in Section 41-16, “Disinfection of Water Mains”, in this Section of these Specifications.

The pipe shall be refilled, if necessary and a pressure test of one hundred fifty pounds per square inch (150 psi) shall be applied and held for a period of one (1) hour for each section of the system to be tested. If possible, pressure testing should take place prior to flushing of chlorinated water and sample testing as outlined in Section 41-16, “Disinfection of Water Mains”. The Contractor shall provide the necessary pump and a clean calibrated container for measurement of make-up water required to replace leakage during this one (1) hour period.

For acceptance of the water system, each test section shall not exceed the allowable make-up water as determined in accordance with the following formula:

$$L=SDT/10,876$$

Where:

L = the maximum allowable make-up water in gallons
S = the length of the test section in feet
D = the diameter of the pipe in inches
T = the test time period in hours

No leakage is allowed for welded steel pipe with welded joints.

All defective items discovered during the pressure test shall be repaired or replaced. The test shall be repeated after any repair until the system meets the above leakage requirement. Even if the leakage is less than the allowable, all observed leaks shall be repaired. The test will be witnessed by the Agency.

The Contractor shall take all necessary precautions to prevent any joints from drawing while the pipe lines and their appurtenances are being tested. Any damage to the pipes and their appurtenances, or to any other structures, resulting from or caused by these tests, shall be repaired by the Contractor at the Contractor’s expense.

41-18 CONNECTIONS TO EXISTING WATER MAINS

All opening and closing of valves on Agency water systems will be performed by representatives of the Agency.

All tapping sleeves shall be approved by the Agency prior to beginning work. All work shall be done by the Contractor.

In general, shutdowns will be made only at times when there will be the least interference with consumer service. Connections shall be made only after complete and satisfactory preparation for such work has been made, in order that the shutdown may be of as short duration as possible. Unless otherwise specified in the Special Provisions, the Agency will notify affected Fire Districts and consumers concerning the interruption of water service.

41-19 REGULATION RELATING TO SANITARY HAZARDS

All construction shall conform to applicable regulations relative to safeguarding the public health, particularly the regulations relating to cross connections as established by the California Code of Regulations, Title 17 Public Health, Chapter 5 Sanitation (Environmental), Sections 7583-7622.

In designing the distribution system, it was intended that ten feet (10') be the minimum horizontal distance between parallel water and sanitary sewer lines and services, and that the water main be at least twelve inches (12") higher. No field changes shall be made that conflict with this requirement without the prior approval of the Agency. When crossing a sanitary sewer force main, the water main shall be a minimum of three feet (3') above the sewer line and shall be encased in Class "B" concrete conforming to the requirements in Section 50-5, "Portland Cement Concrete", of these Specifications. Encasement shall extend ten feet (10') on each side of the force main, or as otherwise specified or directed by the Agency.

41-20 SETTING, ADJUSTING AND LOCATING VALVE BOXES

Prior to construction, the Contractor shall furnish locations or swing ties to all existing valves within the streets to be resurfaced. A copy of the valve location measurements shall be provided for the Agency prior to any street construction or resurfacing.

For all new water valves installed, the Contractor shall furnish and install valve boxes, covers, drop caps, and risers in accordance with Standard Drawing 8-5. Unless otherwise shown or specified in the Contract, in construction areas involving elevation changes or where existing valve boxes or risers are disturbed, or as indicated on the Plans, the Contractor shall furnish and adjust to final grade all existing valve boxes in accordance with Standard Drawing 8-5. Existing valve boxes that comply with Standard Drawing 8-5 in undamaged condition may be reused by the Contractor when approved by the Agency.

All water valve boxes removed for subsequent reinstallation to allow reconstruction of existing streets shall be temporarily replaced with a protective metal container such as five (5) gallon bucket or pail. The temporary metal container shall cover the riser over the valve and will assist in keeping the location of the valves visible during street reconstruction activities. The risers at each valve shall be kept free of debris and the valve operating nut left exposed.

41-21 ADJUSTING AIR RELEASE VALVES

The Contractor shall install new, or adjust to grade existing, air release valve boxes or manholes and covers in accordance with Standard Drawing 8-14A or 8-14B.

41-22 RECYCLED WATER

41-22.01 General

The County has a recycled water system and raw water system used for irrigation purposes. The terms "recycled water", "reclaimed water", and "nonpotable water" are considered interchangeable for the purposes of these Specifications. The requirements for recycled water and raw water are the same as for potable water systems as discussed in this Section 41 and Section 20, "Landscaping", of these Specifications, except as discussed in the latest edition of "Rules and Regulations for Recycled Water Use and Distribution, County of Sacramento" (Recycled Regulations) and the latest edition of the "County of Sacramento Public Works Agency Improvement Standards" (Standards). The latest edition of Recycled Water Notes required to be shown on Plans using recycled water is available from the Sacramento County Water Agency (SCWA).

The disinfection of recycled water pipes is not required unless specifically called out in the Contract or if the Agency requests disinfection due to special circumstances. The standard pressure test is required as discussed in this Section.

41-22.02 Offsite

Offsite facilities include all recycled water and raw water pipes and associated appurtenances upstream of and including the water meter.

41-22.03 Pipes

The use of purple colored pipe, with the words "CAUTION: RECYCLED WATER – DO NOT DRINK" or "CAUTION: RECLAIMED WATER - DO NOT DRINK" and "PELIGRO: AGUA IMPURA – NO BEBER" or "PELIGRO: AGUA IMPURA – NO TOMAR" embossed or integrally stamped/marked on the pipe is the preferred method of identification. Adhesive tape or continuous sleeves are not acceptable alternatives to the colored pipe. The warning should be stamped on opposite sides of the pipe, repeated every three feet (3').

A warning tape with non-metallic backing shall be installed with all new recycled water pipe. The tape shall have black printing on a purple field with the words, "CAUTION: RECYCLED WATER - DO NOT DRINK" or "CAUTION: RECLAIMED WATER - DO NOT DRINK" and "PELIGRO: AGUA IMPURA – NO BEBER" or "PELIGRO: AGUA IMPURA – NO TOMAR". The overall width shall be a minimum of three inches (3"). The tape shall be installed eighteen inches (18") above and shall run continuously along the entire length of the pipe. All valve risers shall be installed within eight inch (8") C900 purple colored pipe.

A 10-foot horizontal separation from the recycled water pipe shall be maintained at all times between a potable water pipe and/or a parallel sanitary sewer pipe. If a ten-foot (10') horizontal separation is not possible, the approval for special construction requirements shall be obtained from the SCWA and the State Department of Health Services prior to commencement of construction. Common trench construction shall not be permitted. In any event, a horizontal separation less than four feet (4') shall not be allowed.

On new systems, potable water, recycled water, and sewer should be located from the ground surface in order of descending quality at all times. Potable water shall be above recycled water, which should be above the sewer. Minimum vertical separation should be one foot (1') between the top and bottom surfaces of pipes.

41-22.04 Valve Boxes and Covers in Non-Traffic Areas

Valve boxes shall have a purple polyethylene face. The face shall be etched, have an ultraviolet inhibitor, and be anchored in the concrete.

Valve box covers shall be cast iron with the words "NONPOTABLE WATER" or "RECLAIMED WATER" or "RECYCLED WATER" stamped or welded into the face. Cover does not need to be purple.

41-22.05 Valve Boxes and Covers in Traffic Areas

Valve boxes and covers within traffic areas shall be painted purple according to the manufacturer's recommendations and as stated in Section 41-22.04, "Valve Boxes and Covers in Non-Traffic Areas".

41-22.06 Meter Boxes and Meter Box Covers

Meter boxes shall be reinforced concrete and have a purple polyethylene face. The face shall be etched, have an ultraviolet inhibitor, and be anchored in the concrete.

Meter box covers shall be reinforced concrete with a hinged cast iron lid and a one and three-quarter inch (1-3/4") pre-cast hole located opposite the identification label. The identification label shall state "NONPOTABLE WATER" or "RECLAIMED WATER" or "RECYCLED WATER". Covers do not need to be purple.

41-22.07 Blow-Off and ARV Boxes and Covers

Blow-off and ARV boxes and covers shall be painted purple according to the manufacturer's recommendations and shall conform to Standard Drawing 8-16.

41-22.08 Locating Wire Stations

If the distance between valves exceeds six hundred feet (600'), locating wire stations shall be placed in conformance with Section 41-5, "Placing Locating Wire With Water Main Pipe", in this Section of these Specifications. The locating wire stations shall conform to Standard Drawing 8-4B. The locator station shall be constructed with a traffic-rated valve box and cover painted purple per the manufacturer's recommendations.

41-22.09 Onsite (Non County)

Onsite facilities include all pipe, pumps, and any other associated appurtenances with recycled water downstream of the water meter.

41-22.10 Backflow Devices

Backflow devices are not required for recycled water irrigation systems except for unusual circumstances as outlined in the Recycled Regulations. If a backflow device is required, it shall meet the requirements of Section 41-9, "Backflow Prevention Assemblies", in this Section of these Specifications.

41-22.11 Valves

Valves shall have visible identifying purple tags mechanically attached to the valve body by wire or snap tie or other approved device and have the words "WARNING Reclaimed Water Do Not Drink" and "AVISO AGUA IMPURA NO TOMAR" (T. Christy RC1P2 or equal).

41-22.12 Valve Boxes and Covers

41-22.12.A Concrete Boxes and Covers

Valve boxes made of reinforced concrete shall have a purple polyethylene face. The face shall be etched, have an ultraviolet inhibitor, and be anchored in the concrete. Valve box covers made of reinforced concrete shall have the words "NONPOTABLE WATER" or "RECLAIMED WATER" or "RECYCLED WATER" stamped into the face. The cover is not required to be purple.

41-22.12.B Rigid Plastic or Composite Boxes and Covers

Rigid plastic or composite valve boxes discussed in Section 50-39, "Valve Boxes, Covers, Drop Caps, and Service Valve Boxes", of these Specifications shall be purple. Valve box covers shall be made of the same material as the valve box, may be purple, and shall have the words "NONPOTABLE WATER" or "RECLAIMED WATER" or "RECYCLED WATER" stamped into the face. The valve box covers shall not be blue.

41-22.13 Hose Bibs

Hose bibs are prohibited under any circumstances to be connected to the recycled water system.

41-22.14 Quick Coupling Valves

See Section 50-43.21, "Quick Coupling Valves", of these Specifications.

41-22.15 Sprinklers

All sprinklers shall have manufacturer-recommended purple identifiers approved by SCWA.

41-22.16 Warning Signs

Warning signs shall meet the requirements of Standard Drawing 8-16 of these Specifications. Placement of signs shall meet the requirements outlined in the Recycled Regulations and as directed by SCWA.

41-22.17 Special Cross Connection Test

A special cross connection test is required for any site using recycled water. The cross connection test will be performed by a SCWA or Sacramento County Environmental Management Department (EMD) representative after the recycled water, potable water, and fire systems are completely installed and have passed the required pressure testing and disinfection testing. The site shall complete and pass the test prior to site occupancy. The test may require the domestic system to be shut down for twelve (12) hours and the irrigation system shut down for twenty-four (24) hours.

41-23 PAYMENT

Unless otherwise specified in the Special Provisions, payment for the water distribution system will be by lump sum.

The lump sum price paid for water distribution system includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the water distribution system, including cutting, trenching, laying, blocking, making connections, disinfecting, testing, backfilling, as shown or specified in the Contract, in these Specifications, and as directed by the Agency.

The unit price paid for fire hydrants includes excavation, furnishing and placing the tee in the main, the six-inch (6”) lateral to the hydrant, the gate valve, the fittings, and the hydrant, all as detailed on the Plans. Also included in the unit price are blocking, backfill, restoration of street surfaces, and all other labor, equipment and material necessary for installing the fire hydrant in accordance with the Contract.