

# SCOTTS VALLEY WATER DISTRICT

SCOTTS VALLEY, CALIFORNIA

## CUSTOMER ON-SITE DESIGN MANUAL

FOR

## WATER RECYCLING PROGRAM

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## INTRODUCTION

### **Purpose**

The purpose of this document is to offer Scotts Valley Water District Water Recycling Customers guidance for planning, constructing, and operating a recycled water system. The document covers requirements for both new developments designed for reuse and existing sites that must be retrofit for recycled water, and should give the customer information necessary to meet all applicable regulations. Every effort has been made to ensure that facilities based on the information provided in this document are in compliance with existing codes, laws, statutes and regulations of the State of California, regulatory agencies and local governing bodies, concerning the currently approved use of recycled water. This document is not intended to supersede any existing codes, laws, statutes, or regulations covering the use of recycled water.

### **Background**

This **Customer On-site Design Manual** has been compiled through the efforts of the Scotts Valley Water District Water Recycling Program (Program), the City of Scotts Valley (City), the State of California Department of Health Services (CDHS), and consultants for the Scotts Valley Water District Water Recycling Program.

Customers or individual facilities within the Scotts Valley Water District service area may have additional site-specific requirements. These specifics will be set forth in the individual Recycled Water Use Permit. In addition, the City may have additional requirements or amendments to these requirements that may be imposed by the City's Planning Department.

### **SVWD Water Recycling Policy Statement and Goals**

It is the policy of the District that recycled water shall be used within its jurisdiction whenever feasible, and consistent with legal requirements, preservation of public health, safety and welfare, and the environment. Use of potable water for irrigation and industrial uses, when recycled water use is technically and economically feasible, is an unreasonable use of water as stated in California Water Code Sections 13550, 13551, 13552.2, 13552.4, 13552.6, 13552.8, 13553, and 13554.

The Scotts Valley Water District's Water Recycling Program will:

- Achieve conservation of potable water supplies by using recycled water for current and future demands. Recycled water uses may include:
  - landscape irrigation
  - agricultural irrigation
  - construction use
  - commercial uses (including flushing toilets and urinals)
  - industrial processes
  - landscape and/or recreational impoundments
  - groundwater recharge
- Reduce the discharge of metals to the Pacific Ocean.
- Prevent direct human consumption of recycled water through:
  - Adherence to all applicable laws, rules, regulations, policies, and guidelines.
  - Posting of warning signs at use areas.
  - Pursuing a cross-connection/backflow prevention program.

- Control recycled water runoff by monitoring the installation and operation of all recycled water facilities and use areas.
- Monitor recycled water quality.

Any questions regarding the approved use of recycled water within any specific facility should be referred to the Scotts Valley Water District.

## ABBREVIATIONS

Abbreviations used throughout this document are listed below for reference. Definitions for terms are listed in *Definitions*.

AG	=	Air Gap
AWWA	=	American Water Works Association
CDHS	=	State of California Department of Health Services, Drinking Water Field Operations Branch - Monterey District
CRWQCB	=	California Regional Water Quality Control Board.
City	=	City of Scotts Valley
DC Assembly	=	Double Check Backflow Prevention Assembly
District	=	Scotts Valley Water District
Program	=	Scotts Valley Water District Water Recycling Program
RCWUP	=	Recycle Water Use Permit
RP Device	=	Reduced Pressure Principal Backflow Prevention Device

## DEFINITIONS

Whenever the following terms, or pronouns used in their place, occur in this manual the intent and meaning shall be interpreted as follows:

**Air Gap** - A physical separation between the free flowing discharge end of a water supply pipeline and an open or non-pressure receiving vessel. A approved air gap shall be at least twice the diameter of the water supply pipe measured vertically above the overflow rim of the vessel (in no case less than one inch).

**Applicant** - Any entity which applies for recycled water service under terms of the appropriate regulations. The approved Customer may be a different party than the Applicant but must be specified in the Recycled Water Use Permit.

**Approved Backflow Prevention Assembly** - A device approved by the State of California which is installed to protect any water supply (recycled, potable, public, private, or on-site) from contamination through backflow of a substance containing a potential hazard.

**Approved Use** - An application of recycled water in a manner, and for a purpose, designed in a Recycled Water Use Permit issued by the Program and in compliance with all applicable Regulatory Agency requirements.

**Approved Use Area** - A site with well-defined boundaries, designated on the approved On-Site Recycled Water Service Plans, to receive recycled water for an approved use and acknowledged by all applicable Regulatory Agencies.

**Cross-Connection** - Any physical connection between any part of a water system used or intended to supply water for drinking purposes and any source or system containing water or substance that is -not or cannot be approved as safe, wholesome and potable for human consumption. This includes direct piping between the two systems, regardless of the presence of valves, backflow prevention devices, or other appurtenances.

**Customer** - Any person, persons or firm including any public utility, municipality or other public body or institution issued a Recycled Water Use Permit by the District. The Customer is usually the Owner. The Customer may be the lessee, tenant, or property manager as appropriate upon submission of a completed Assigned Agent form.

**Customer Service Agreement** - An agreement issued by the District to a recycled water service Applicant after the satisfactory completion of the service application procedures. This Agreement forms a service agreement between the Customer and the District that legally binds the Customer to all conditions stated in the Agreement and all applicable Regulatory Agency requirements.

**Customer On-Site Supervisor** - The Customer shall designate a Customer On-Site Supervisor subject to the approval of the District to provide liaison with the Program. This person shall be available to the District at all times, shall have the authority to carry out any requirements of the Program, and shall be responsible for the installation, operation and maintenance of the recycled and potable water systems and also prevention of potential hazards.

**Infiltration Rate** - The rate at which the soil will accept water as applied during irrigation, expressed in inches per hour.

**Inspector** - Any person authorized by the Water District, the Local Authority, the Program or the local health agencies to perform inspections on or off the Customer's site before construction, during construction, after construction and during operation.

**Intermittently Pressurized Line** - Any irrigation line downstream of the last valve.

**Irrigation Period** - The time, from start of water flow to cessation, which a specific area receives recycled water by direct irrigation application, no matter how often the specific area is irrigated - that is length of the duty cycle.

**Irrigation Use** - An approved use of recycled water for landscape irrigation as defined under Title 22, Division 4, Article 4. of the California Administrative Code and in compliance with the Program's Rules and Regulations.

**Landscape Impoundment** - A body of recycled water used for aesthetic enjoyment or which otherwise serves a function not intended to include public contact.

**Nonpotable Water** - Water that has not been treated for human consumption in conformance with the latest edition of the United States Public Health Service Drinking Water Standards, the California Safe Drinking Water Act, or any other applicable standards.

**Off-site** - Designates or relates to recycled water facilities up to and including the water meter.

**On-site** - Designates or relates to facilities owned and operated by a Customer.

**On-Site Personnel** - Any employee of a Customer, whether permanent or temporary, or any contracted worker whose regular or assigned work involves the supervision, operation or maintenance of equipment on any portion of on-site facilities using recycled water.

**On-Site Supervisor** - Any person, persons or firm, who by entering into an agreement with a Customer is responsible for operating on-site facilities.

**Owner** - Any holder of legal title, contract purchaser, or lessee under a lease with an unexpired term of more than one (1) year, for property for which recycled water service has been requested or established.

**Point of connection** - This is the point where the Customer's system ties to the Water District's system. This is usually at the water meter.

**Ponding** - Retention of recycled water on the surface of the ground or other natural or manmade surface for a period following the cessation of an approved recycled water use activity.

**Potable Water** - That water that is pure and wholesome, does not endanger the lives or health of human beings, and conforms to the latest edition of the California Safe Drinking Water Act, or other applicable standards. Potable water includes potable fire service without an approved backflow prevention assembly.

**Program** – The Scotts Valley Water District Water Recycling Program.

**Public** - Any person or persons at large who may come in contact with facilities and/or areas where recycled water is approved for use.

**Rate and Fee Schedule** - The schedule of all rates, charges, fees and assessments to be made concerning the use of recycled water served by the Scotts Valley Water District.

**Recycled Water** - Nonpotable water that is highly treated to the California Administration Code Title 22, Division 4 of the Environmental Health Water Reclamation Criteria and used for approved purposes other than drinking water.

**Recycled Water Use Permit** - A permit issued by the Program to the Customer which outlines monitoring, self-inspection, reporting, and site-specific requirements. This Permit is required by the California RWQCB.

**Reduced Pressure Principal Backflow Prevention Device** - A type of backflow prevention device, usually installed near a water meter, which prevents backflow by a combination of double check valves and a pressure differential relief valve.

**Regulatory Agencies** - Those public agencies legally constituted to protect the public health and water quality, such as the CDHS and the CRWQCB.

**Restrained Joint** - Mechanically restrained. Solvent welded for PVC joints 4 inch diameter and smaller.

**Runoff** - When recycled water is allowed to drain outside the approved irrigation area.

**Service** - The furnishing of recycled water to a Customer through a metered connection to the onsite facilities.

**Standard Pipe Length** - 18 to 20 feet.

**State of California Department of Health Services** - Shall be the State of California Department of Health Services, Drinking Water Field Operations Branch - Monterey District.

**Unauthorized Discharge** - Any release of recycled water that violates the rules and regulations of the Program or all applicable Federal, State or local statues, regulations, ordinances, contracts or other requirements.

**Violation** - Noncompliance with any condition or conditions of the User Agreement by any person, action or occurrence, whether willfully or by accident.

**Water Utility** - The local purveyor of recycled water for the specified service area (public or private). The Water Utility and the Local Authority may be one and the same (public municipal water supply).

**Windblown Spray** - Dispersed, airborne particles of recycled water that can be transmitted through the air to locations other than those approved for the direct application of recycled water.

## SUMMARY OF ON-SITE INSTALLATION REQUIREMENTS

On-Site Installation requirements are described in detail in the Program Rates, Rules and Regulations. However, the following is a summary of the basic requirements.

**No Cross-Connections** - No cross-connections are allowed between the recycled water system and the potable water system.

**Backflow Preventers** - In order to protect the public drinking water system from accidental cross-connections, a reduced pressure principal backflow prevention device is required at all potable meters on a site where recycled water is present.

In most cases, backflow prevention devices are not required on the recycled water system. However, where there is a particular threat to the quality of the recycled water, such as a direct connection to an industrial-process or an impoundment of water, the Program may require a backflow prevention device on the recycled water system.

**No Hose Bibs** - Generally, hose bibs are not allowed on the recycled water system. In most cases, hose bibs can be replaced by quick coupling valves.

**No Runoff** - The irrigation system must be configured and operated to prevent runoff outside the approved use area (the boundaries of the site).

**No Ponding** - The irrigation system must be configured and operated so that ponding does not occur. This does not apply to approved and intended impoundments.

**No Windblown Spray** - The irrigation system must be configured and operated to prevent windblown spray from passing outside the approved use area.

**Pipe Identification** - All new recycled water piping below or above grade and all existing piping above grade must be labeled with purple tape with the imprinted words "CAUTION - RECYCLED WATER". Purple colored pipe with the required wording is an acceptable alternative.

New above grade potable water piping used for drinking water systems must also be labeled with blue tape and the words "POTABLE WATER".

**Horizontal Pipe Separation** - Where possible, a minimum horizontal separation of ten feet between parallel buried recycled and potable water pipelines should be maintained. If a ten foot horizontal separation cannot be maintained, then four foot minimum separation is allowed with special construction details. In no case is horizontal separation of less than four feet or same trench construction allowed.

**Vertical Pipe Separation** - Recycled water constant pressure pipelines must be a minimum of 12 inches below the potable water pipelines. Recycled water constant pressure pipelines are allowed over potable pipelines with a minimum of 12 inches vertical separation if a full standard pipe length is centered over the crossing, or the recycled pipeline is sleeved for the same length. Intermittently pressurized recycled water pipelines are allowed over potable pipelines with a minimum of 12 inches vertical separation.

**Signs** - Signs must be posted in conspicuous areas on-site which contain the words "RECYCLED WATER - DO NOT DRINK" indicating that recycled water is used for irrigation (or other) purposes. Generally, signs must be located at all entrances to the facility.

**Warning Tags, Stickers, Labels** - All valve boxes (automatic and manual), quick couplers, recycled water storage tanks, air/vacuum relief valves, pressure reducing valves, pumps, backflow prevention devices, system controller boxes. or other appurtenances on the recycled water system must be labeled with warning tags, stickers or other labels. The labels, tags or stickers must include the words "RECYCLED WATER - DO NOT DRINK" on a purple background.

**Periodic Testing** - In addition to the initial backflow prevention device testing and cross-connection testing, the backflow prevention devices must be tested annually by a certified tester. The annual certification should be sent to the Scotts Valley Water District. Any other periodic testing requirements will be indicated in your Recycled Water Use Permit issued by the Program.

**On-site (Land) Observation Reports** - At least once a year the site must be inspected for the items listed below while the system is in use. The observations must be submitted to the District on a report form. The user may be required to perform this inspection, or, in some cases, the District may perform the inspection. The seven items for inspection are as follows:

1. Is there evidence of runoff of recycled water from the site? Show affected area on a sketch and estimate volume.
2. Is there an odor of wastewater origin at the irrigation site? If yes, indicate apparent source, characterization, direction of travel, and any public use areas or off-site facilities affected by the odors.
3. Is there evidence of ponding of recycled water, and/or evidence of mosquitoes breeding within the irrigation area due to ponded water?
4. Are warning signs, tags, stickers, and above ground pipe markings properly posted to inform the public that irrigation water is recycled water, which is not suitable for drinking.
5. Is there evidence of leaks or breaks in the irrigation system piping or tubing?
6. Is there evidence of broken or otherwise faulty drip irrigation system emitters or spray irrigation sprinklers?
7. What corrective actions are being taken to correct any problems noted above?

You may also be required to conduct a visual inspection of the system during the off-season. Specific requirements will be included in your Recycled Water Use Permit.

**Emergency Cross-Connection Response Plan** - If a cross-connection or backflow incident occurs between the potable and recycled water systems, an emergency response plan must be implemented. This plan must be included with, and be a condition of, the RCWUP.

## **DESIGN, INSTALLATION, AND INSPECTION CRITERIA**

### **New Facilities**

New facilities under construction for recycled water use shall comply with all sections of this Manual unless otherwise specified in the Recycled Water Use Permit.

### **Retrofit of Existing Facilities**

Facilities where the existing buried piping system is converted from potable to recycled water with minimal changes to the existing plumbing shall meet the same requirements as new facilities, with the exception of piping identification and pipe separation. (See *Pipe Identification and Pipe Separation*, pages 15 and 16, respectively). The different requirements for existing piping are specified in the applicable sections. Generally pipe identification and pipe separation requirements are not applicable for existing buried piping. However, any new buried piping at a retrofitted site must meet the identification and separation requirements for new piping. In addition, any existing piping uncovered for any reason must be marked according to pipe identification requirements to the extent feasible.

### **Design Approval**

Before the construction of any new recycled water system, major modifications of an existing recycled water system, or retrofit of an existing system for recycled water use, On-Site Recycled Water Service Plans must be prepared by the Customer and approved by the District and the CDHS. Approval shall be contingent upon evidence that all applicable design requirements, rules and regulations for a recycled water system are satisfied (see *Basis For Plan Review Criteria* on page 12).

### **Required On-Site Recycled Water Service Plans**

Plans must be stamped by a registered landscape architect or civil engineer and include, but not be limited to, the following:

1. Site plan drawn to scale which clearly shows the boundaries of the intended use area, adjacent streets, and locations of all major improvements on the site, water meters (recycled water and potable water), backflow prevention devices, drinking fountains, and all public facilities supplied with recycled or potable water service. Public facilities include but are not limited to restrooms, outdoor eating areas, snack bars, swimming pools, wading pools, decorative fountains and showers. If there are no public facilities located in the defined use area, then a note on the plans must indicate that no public facilities exist. Additionally, any wells, lakes, ponds, reservoirs, or other water impoundments located on site or within 100 feet of the site must be shown on the site plan.
2. Piping plan which shows the complete potable and recycled water systems. All sources of recycled water and potable water must be indicated on the plan. The location and type of all existing and new backflow prevention devices and water meters must be clearly marked on the piping plan. For existing facilities converting to recycled water use, the piping plan must indicate which piping and other devices are existing and which piping and other devices will be installed as part of the retrofit work. The proper separation requirements between potable and recycled water lines (for new piping) must be indicated. The piping plan can be combined with the site plan if space permits.
3. Detail drawings of areas where special installation or retrofit procedures are required, such as cutting and capping to separate potable and recycled systems, installation of backflow prevention devices, special construction where pipe separation criteria cannot be met, etc.
4. Any other items required by the Design, Installation, and Inspection Criteria section of this Manual.

Preparation of On-Site Recycled Water Service Plans does not exempt the Applicant from submitting other on-site improvement plans normally required by the Local Authority. Other improvement plans required by the Local Authority must still be submitted in accordance with the Local Authority's standard procedures.

### **Basis for Design Review Criteria**

Review of On-Site Recycled Water Service Plans conducted by the District and the CDHS will consist of checking for conformance with various regulations and guidelines governing distribution of recycled water. Even though the District and the CDHS perform a plan check, the applicant is not relieved of responsibility to meet all requirements. A brief description of the criteria is provided below.

**California Code of Regulations (CCR), Title 22, Division 4, Chapter 3, "Water Reclamation Criteria"** - These regulations are written by the CDHS and specify the approved uses and use area requirements, such as hose bib restrictions, prohibition of irrigation near wells, etc. The regulations govern both the District's distribution system as well as the Customer's on-site system.

**California Code of Regulations, Title 17, "Drinking Water Supply - Backflow Prevention"** - Title 17 specifies requirements intended to protect the public drinking water supply from contamination. Some requirements specified in Title 17 include backflow prevention devices, designation of a Customer Supervisor, and cross-connection testing requirements.

**American Water Works Association (AWWA), California-Nevada Section, Guidelines For Distribution of Nonpotable Water** - This document provides recommended guidelines for planning, designing, constructing, and operating nonpotable water systems, including recycled water systems. The guidelines themselves are not regulations but many agencies have adopted them as general requirements. The document covers both installation of the recycled water distribution systems and on-site use systems.

**International Association of Plumbing & Mechanical Officials (IAPMO) Uniform Plumbing Code, Appendix, J** - Appendix J of the Uniform Plumbing Code sets forth requirements when recycled water is used within buildings in a dual-plumbed system for nonpotable domestic uses such as toilet and urinal flushing. This section of the Uniform Plumbing Code does not apply to irrigation sites, where the recycled water system is located outside buildings, or industrial sites, where the recycled water is used for non-domestic industrial purposes. In addition, the pipe separation regulations indicated in this Manual are different than and take precedence over the Appendix J requirements

### **Summary of Design Review Criteria**

Although the plan review conducted by the District and the CDHS may include checking for compliance with any of the existing regulations or guidelines referenced above, the following summaries are provided to give the designer of a recycled water system a general idea of the major items which will be checked during plan review. The summary is compiled as a "punchlist" so that it can easily be referenced by the plan designer. However, compliance with every item on the punchlist does not guarantee that the plans will be approved without comment since regulations and policies may change and some sites may require special provisions. In addition, even though the District and the CDHS perform a plan review, the Applicant is still responsible for meeting all applicable requirements, even if those requirements are not shown on the approved plans. Please note that the plan requirements are slightly different for new facilities and existing facilities converting to recycled water use.

### **Plan Review Punchlist**

- Do plans include a site piping plan and are details of connection points as indicated under *Required Plans*?

- ❑ Are all items listed under *Required Plans* shown on the site/piping and detail plans?
- ❑ Is the use area shown on the site an approved use area?
- ❑ Is the total recycled water irrigation area included to the nearest tenth of an acre?
- ❑ At **new facilities**, are all on-site recycled water pipelines located ten feet horizontally from potable water pipelines where possible (minimum of four foot horizontal separation allowed if special construction details are incorporated)?"
- ❑ At **new facilities**, where recycled and potable water lines cross or ten foot horizontal separation is not maintained, are the pressurized recycled water pipelines located at least one foot below the potable water lines?
- ❑ At **existing facilities** converting to recycled water use, does all new piping meet the potable/recycled water pipeline separation criteria indicated above?
- ❑ Do the plans indicate that the recycled water and potable water systems are completely separated and there is no common trenching?
- ❑ At **existing facilities** converting to recycled water use, are all locations where future recycled water piping must be separated from the potable water piping clearly indicated on the plans?
- ❑ Are the proper backflow prevention devices shown in the proper location for protection of the public potable water system? Reduced pressure (RP) principal backflow prevention assemblies should be shown located as close as possible to all potable water meters and at least 12 inches above grade.
- ❑ If the on-site recycled water system is interconnected-with industrial process piping, fertilizer injection systems, or a non-potable drinking water source (such as an irrigation water storage pond), is the proper backflow protection device shown in the proper location for protection of the public recycled water distribution systems In such cases, usually an RP device is required at the recycled water meter, at least 12 inches above grade.
- ❑ Are the proper backflow prevention devices shown in the proper locations for protection of on-site potable water supply per standard UPC and Title 17 requirements? Though not specifically related to recycled water, these devices should be shown on the plans. Backflow prevention devices are required at non air-gap points of connection to ponds, wading pools, swimming pools, fountains, etc., where the impoundment is supplied by the potable water on-site piping. Usually atmospheric vacuum breakers located near the point of connection are adequate, unless there is valving downstream of the protection device, in which case pressure vacuum breakers are required.
- ❑ If there are wells located on-site or near the use site, are the wells separated from all recycled water irrigation use areas by at least 50 feet and from all recycled water impoundments by at least 100 feet?
- ❑ If plans are used for construction, do plans show all necessary details to properly construct the system?
- ❑ Do plans identify that materials are appropriate for recycled water use? (For example: purple pipe, proper signing and tagging, etc.)
- ❑ Do plans identify works requiring inspection by the Program representatives?
- ❑ Do plans include a detail for air gap if a backup source is used?
- ❑ Do plans specify no hose bibs on the recycled water system.
- ❑ Is the recycled water use permit application complete and attached?

### **Cross-Connections**

Cross-connections between the recycled water system and the potable water system are strictly prohibited at all times. A cross-connection is defined as any physical connection between any part of a water system used or intended to supply water for drinking purposes and any source or system containing water or substance that is not or cannot be approved as safe, wholesome and potable for human consumption. This includes direct piping between the two systems, regardless of the presence of valves, backflow prevention devices, or other appurtenances.

### **Design Pressure Criteria**

If the expected recycled water service pressure is greater than the maximum requirements of the Customer's recycled water system, then the Customer must install a pressure regulating valve downstream of the recycled water meter, set at a pressure which is compatible with the Customer's system. If the recycled water service pressure does not meet the Customer's minimum requirements, then the Customer is responsible for providing booster pumping downstream of the meter. Any pumping of recycled water must be specified in the Recycled Water Use Permit. The District may be contacted for site specific anticipated delivery pressure.

### **Backflow Prevention Assemblies**

Backflow prevention assemblies required on potable or recycled water systems as specified below must be a type approved by the CDHS and installed according to approved plans. Backflow prevention assemblies must be maintained to assure satisfactory operating condition. This includes periodic testing and inspection of backflow prevention assemblies and the keeping of accurate records as specified below. Backflow prevention assemblies required on recycled water systems must be conspicuously labeled with warning tags or stickers with the wording, "RECYCLED WATER - DO NOT DRINK" and "AVISO, AGUA IMPURA - NO TOMAR" (see *Warning Tags and Stickers*, page 20). Backflow testing equipment used for recycled water must not be reused on potable water systems.

### **Protection of Public Potable Water Systems – Backflow Prevention**

At premises where both recycled water and potable water are present in separate piping systems with no interconnection, a reduced pressure (RP) principal backflow prevention device must be located downstream of the potable water meter as close as possible to the meter.

All RP devices must be inspected quarterly and tested at least annually. The Customer is responsible for the coordinating the testing. The device testing must be done by an AWWA certified backflow prevention device tester. Test reports must be provided to the District. Records must be maintained for a minimum of three (3) years.

### **Backup Water Source**

If potable water is to be used to supplement or backup the recycled water system, then an air-gap is required where the potable water system connects to the Customer's recycled water system. Plans must show details of the proposed potable back-up to the Recycled system. An air gap is required at this location. This is permitted only with approval of the CDHS, Drinking Water Field Operations Branch - Monterey District, and the District.

### **Fire Protection Service Connections**

Some recycled water use sites may also have separate potable water service connections for dedicated fire protection systems. If the fire service connections serve only Class 1 or 2 building fire sprinkler systems inside buildings and recycled water is used only for irrigation outside the buildings, then single detector check valves are adequate. However, if the fire service connections serve Class 3 or above fire protection systems, then DCDA assemblies are required at the fire service line point of connection. The DCDA assemblies shall be tested and inspected according to the same schedule as the RP assemblies.

### **Thermal Expansions Control Devices**

If an RP device is installed at the meter for an onsite domestic system with thermal expansion potential, such as when storage water heating equipment is located on site, then a thermal expansion control device per IAPMO Uniform Plumbing Code (1997 or latest version) Section 608.3 shall be provided.

**Other Locations** - The District may require the use of backflow prevention devices in other situations.

### **Protection of the Public Recycled System**

Since the recycled water is not used for drinking purposes, backflow protection is not normally necessary on the recycled water system at irrigation sites. However, the District must ensure that the quality of the recycled water distribution system is not compromised by any Customer. Therefore, the District will require backflow protection on the Customer's recycled water system if it is determined that there is a backflow hazard on-site which threatens the integrity of the distribution system. Examples of sites which would require backflow protection devices are industrial sites where the recycled water is installed on (without-air-gap) industrial process lines, irrigation sites where chemical fertilizer injection systems are installed on the irrigation system, or irrigation sites where a non-approved source of water, such as a storage pond, is added to the recycled water in such a manner that a backflow hazard exists. In such cases, backflow prevention devices might be required at the recycled water service connection or at specific, on-site locations as appropriate to the situation. Backflow prevention assemblies must be shown on plans and a type approved by CDHS. It will be the responsibility of the Applicant to provide test reports for on-site backflow prevention devices.

Devices must be properly maintained, inspected quarterly and tested at least annually. Backflow prevention assemblies, when required on recycled water systems, must be conspicuously labeled. Test equipment must be dedicated for use with recycled water. Backflow testing equipment used for recycled water must not be reused on potable water systems.

### **Protection of On-Site Drinking Water Systems**

Compliance with public system backflow prevention requirements listed above does not exempt the Customer from compliance with requirements for protection of the on-site drinking water facilities from on-site hazards. All applicable plumbing codes and requirements not related to recycled water service must still be met.

### **Protection of Aquifers**

Irrigation with recycled water within 50 feet or impoundment of recycled water within 100 feet of any domestic water supply well is prohibited. Proposed irrigation with recycled water within 50 feet or impoundment of recycled water within 100 feet of a non-potable water well requires the approval of the Program and the CDHS.

### **Pipe Identification**

All new piping, whether for a new or retrofitted system, shall be installed according to the approved plans and marked as required below to clearly distinguish between recycled water and potable water systems.

### **Below Grade Identification of Recycled Water Lines**

All new buried recycled water lines (pressure/non-pressure) shall be identified by continuous lettering on three inch (3") minimum width, purple tape with one inch black or white-contrasting lettering bearing the continuous wording "CAUTION - RECYCLED WATER" permanently affixed at ten-foot intervals atop all horizontal piping, laterals and mains. Identification tape shall extend to all valve boxes and/or vaults and exposed piping.

The use of purple colored pipe with continuous wording "CAUTION - RECYCLED WATER" printed on opposite sides of the pipe is an accepted alternative to warning tape for identification of new below grade recycled water piping. .

Existing Below Grade - Existing below grade piping which will be converted to recycled water use need not be marked unless the piping becomes exposed, such as during-installation of new pipeline or maintenance of existing pipe. The exposed section shall be marked as indicated above for new piping.

### **Above Grade Identification of Recycled Water Lines**

All above grade recycled water pipelines, whether new or existing, must be labeled with the words "CAUTION RECYCLED WATER - DO NOT DRINK" and color coded purple to differentiate recycled water pipelines from potable water pipelines. If purple warning tape is used to label the pipe and/or color code the pipe, the tape must be adhesive, permanent, and resistant to environmental conditions. Purple bands may also be painted around the circumference of the pipe at ten foot intervals for color coding. Purple PVC pipe is not an acceptable alternative for color coding because the purple color will fade when exposed to sunlight. For above grade recycled water piping at industrial sites, the color coding and labeling schemes must be clearly indicated in the engineering report for the site. Flexible conduits or hoses shall be clearly marked "CAUTION RECYCLED WATER" with each adapter or fitting painted purple.

### **Above Grade Identification of Potable Water Lines**

Where new or existing potable water piping is located near a recycled water system, the potable water piping must be labeled with the words "POTABLE WATER" and color coded blue. If blue tape is used to label the pipe and/or color code the pipe the tape must be adhesive, permanent, and resistant to environmental conditions. Blue bands may also be painted around the circumference of the pipe at ten foot intervals for color coding. For above grade potable water piping at industrial sites, the color coding and labeling schemes must be clearly indicated in the engineering report for the site.

### **Pipe Protection**

PVC pipe is subject to degradation due to exposure to sunlight. In addition, purple PVC pipe will fade when exposed to sunlight. As a result, all PVC pipe must be protected from sunlight while stored at the job-site prior to installation.

### **Pipe Class**

All buried PVC pipe shall be as specified in the UPC IS 8 Section 301.1.1 Application Standards.

### **Pipe Depth of Cover**

The top of the pipe shall be a minimum of 12 inches below finished grade for all on-site recycled pipelines.

### **Pipe Separation**

All new buried piping, whether for a new system or an existing facility converting to recycled water use, must be installed in accordance with the pipe separation requirements indicated below.

### **Horizontal Separation, Buried Recycled and Potable Water Pipelines**

Where possible, a minimum ten foot separation between parallel buried recycled and potable water pipelines should be maintained. If a ten foot separation cannot be maintained, then a special construction detail to minimize cross-connection and contamination potential must be Included with the On-Site Recycled Water Service Plans and is subject to approval of the District and the CDHS. In no cases is horizontal separation of less than four feet allowed between buried recycled and potable water pipelines. Potable and recycled water pipelines shall not be installed in the same trench.

### **Vertical Separation, Buried Recycled and Potable Water Pipelines**

Constant pressure recycled water pipelines must be located a minimum of 12 inches below the potable water pipelines. Recycled water constant pressure pipelines are allowed over potable pipelines with a minimum of 12 inches vertical separation of a full standard pipe length is centered over the crossing, or the recycled pipeline is sleeved for the same length. Intermittently pressurized recycled water pipelines are allowed over potable pipelines with a minimum of 12 inches vertical separation.

**Pipeline Separation, Buried Recycled Water and Sewer Pipelines**

The same vertical separation requirements indicated above also apply to buried recycled water and sewer pipelines, except that the sewer pipeline must be located a minimum of 12 inches below the recycled water pipeline where vertical separation is required. A minimum of 12 inches horizontal separation is required.

For recycled water use within buildings, recycled water, in relation to sanitary sewer lines, will be treated as potable water under current UPC separation requirements.

**Summary of Separation and Special Construction Requirements**

<b>Horizontal Separation – Pressurized Recycled Water / Potable Water</b>			
<1’	1’ – 4’	4’-10’	>= 10’
Not allowed	Not allowed	Solvent welded PVC pipe on recycled water system. Restrained PVC pipe for recycled or potable if larger than 4”. Soldered copper pipe on recycled water system. Sleeve potable pipe. Sleeve recycled pipe.	No special construction required.
<b>Horizontal Separation – Non-Pressurized Recycled Water/Potable Water</b>			
<1’	1’ – 4’	4’-10’	>= 10’
Not allowed	No special construction required	No special construction required	No special construction required
<b>Vertical Separation – Pressurized Recycled Water/Potable Water</b>			
<1’ under potable	>= 1’ under potable	<1’ over potable	>= 1’ over potable
Not allowed	No special construction required	Not allowed	Depth of cover requirement has to be satisfied. A full standard pipe length is centered over the crossing, or the recycled water pipe is sleeved for the same length.
<b>Vertical Separation – Non-Pressurized Recycled Water/Potable Water</b>			
Not allowed	No special construction required	Not allowed	No special construction required

**Drinking Fountains/Public Facilities**

Drinking fountains and other public facilities. (outdoor eating areas, snack bars, etc.) located within the approved use area designated by the On-Site Recycled Water Service Plans shall be protected from contact with recycled water. Lack of protection, whether by design, construction practice, or system operation, is strictly prohibited. Protection may be accomplished by relocating drinking fountains or other facilities, modifying the irrigation system, constructing or installing protective shields for drinking fountains, or a combination thereof.

**Hose Bibs**

Hose bibs on the recycled water system are prohibited.

## Valves

### Quick Coupling Valves

New quick coupling valves shall be made specifically for recycled water use. New quick coupling valves shall be 3/4-inch or one-inch nominal size and of brass construction with a maximum working pressure of 150 psi. The covers on all new quick coupling valves shall be permanently attached and made of purple rubber or vinyl with the words "RECYCLED WATER" imprinted on the cover, and shall be provided with a lock. To prevent unauthorized use, the valve shall be operated only with a special coupler key for opening and closing the valve. New quick-coupling valves shall be installed approximately 12 inches from walks, curbs, headboards or paved areas. All quick coupling valves used in the recycled water system shall be installed in a valve box and a warning tag shall be permanently attached to the inside of the box so that it is clearly visible when the box lid is removed.

Any wands, sprinkler heads, fittings, or other attachments used in conjunction with the quick coupling valves must be labeled with the words, "RECYCLED WATER - DO NOT DRINK." Attachments used in a recycled water system must not be used in a potable water system.

The installation of quick coupling valves on a potable water system in the vicinity of a recycled water irrigation system should be avoided to prevent accidental cross-connection or contamination by accidentally interconnecting or interchanging attachments. If quick coupling valves are installed in conjunction with a potable water system, or if there are any existing quick coupling valves on the retrofitted potable water system, then the valves must be of or converted to a different type of those used on the recycled water system so that keys and attachments will not be interchangeable. Retrofitted potable water system quick coupling valves will be modified to meet standards for new recycled water quick coupling valves.

### Gate Valves

New and existing gate valves shall be installed in a marked valve box with a warning tag on the valve operator.

### Remote Control Valves

New and existing remote control valves shall be installed in a marked valve box with a warning tag on the operator. For each valve system, remote control valves shall be adjusted so the most remote sprinkler heads operate at the pressure recommended by the manufacturer giving a uniform distribution of water.

### Valve Boxes

All gate valves, manual control valves, electrical control valves, pressure reducing valves for onsite recycled water systems shall be installed below grade in a valve box.

Electrical and manual control valve boxes shall have a warning label permanently molded into or affixed onto the lid with rivets, bolts, etc. Warning labels shall be constructed of a purple weatherproof material with the warning permanently stamped or molded into the label. The warning shall contain the wording, "RECYCLED WATER - DO NOT DRINK" and "AVISO, AGUA IMPURA - NO TOMAR", and shall have the international "Do Not Drink" symbol.

### Sprinkler Heads

New sprinkler heads shall be of the size, type, pressure, radius of throw and discharge as indicated on the design plans. All new sprinkler heads, permanent or temporary, shall create a minimum amount of atomization. To minimize the chance of airborne mist traveling outside the use area, impact type sprinkler heads shall not be used adjacent to the periphery of the use area. Drainage through sprinkler heads is prohibited. An anti-drain valve shall be installed in the sprinkler riser as needed. Anchors on

sprinkler risers shall be provided as needed and maintained. Sprinkler heads shall be kept in good repair at all times.

### **System Control Devices**

New system controllers shall be automatic with multiple start/stop times for any 24 hour period and installed according to the approved plans and local codes. Two, color coded, diagrams shall be prepared for the station and system for each controller (new and existing). Each diagram shall be sealed in plastic with one copy placed in the controller box and the other given to the Customer Supervisor. All controllers shall be marked with the words "RECYCLED WATER" and "AGUA IMPURA" in black one-inch high letters on a purple background.

### **Storage Tanks**

All storage tanks used for recycled water, stationary or portable, shall be structurally sound and free from leaks. Each tank shall be conspicuously marked with signs with the words "RECYCLED WATER - DO NOT DRINK" -and "AVISO, AGUA IMPURA - NO TOMAR" in black letters two-inches high on a purple background. The "Do Not Drink" symbol shall be present on all recycled water storage tanks. If the recycled water is not added to the storage tank via an air gap, then a RP backflow prevention device is required just upstream of the tank fill line.

### **Other Devices**

All air/vacuum relief valves, valves, pressure reducing valves, pumps, pump control valves, etc., shall be tagged or labeled indicating whether the devices are on the recycled water or potable water system.

### **Warning Tags and Stickers**

Recycled water warning tags and stickers shall have a purple background with black lettering stating "RECYCLED WATER - DO NOT DRINK" and "AVISO, AGUA IMPURA - NO TOMAR". The "Do Not Drink" symbol shall be present on all tags and stickers. Warning tags and stickers should be durable, such as plastic or plastic coated.

Potable water tags or labels shall have a blue background with "POTABLE WATER" and "AGUA POTABLE" in white lettering.

### **Posting Approved Use Area**

At fenced facilities, signs indicating the use of recycled water shall be required at all entrances to the Customer's facility. Additional signing may be required by the Program on a case by case basis. At facilities which are not surrounded by fences, the Program will determine the appropriate locations for signs on a case by case basis. Typical locations for signs are baseball field backstops, ponds or other impoundments, building walls, and at the property line near crosswalks or driveway entrances. The signs must include the words "RECYCLED WATER - DO NOT DRINK" and must indicate the purpose for which the recycled water is used (irrigation, industrial processes, etc.). At irrigation sites, the sign should clarify that "Do Not Drink" applies to the irrigation system to avoid any confusion that it might not be safe to drink from the domestic system. The Program may also require the label to include translations into foreign languages) if appropriate, as specified in the Recycled Water Use Permit. In addition, all signs shall bear the "DO NOT DRINK" symbol. The lettering on the signs shall be a minimum of 1/2-inch in height and shall be black or white on a purple background. The signs shall be placed where they can be easily seen.

### **Preliminary Cross-Connection Test – Existing Sites**

At all existing sites that are converting to recycled water use, a preliminary cross-connection test shall be coordinated by the Customer prior to retrofit work or construction. The Customer must notify the District prior to the cross-connection test so that the District inspectors can be present. The preliminary cross-

connection test should follow the general cross-connection testing guidelines outlined below. The purpose of the test is to determine if there are any unknown connections between the existing irrigation system and the domestic water system prior to construction. If unknown connections are discovered, then further testing or potholing must be conducted in order to determine where the connections are located. The retrofit plans must be revised to reflect any changes required to eliminate the connections, and the revised plans must be resubmitted to the District for review.

At new development sites, a preliminary cross-connection test is generally not necessary since the systems have been designed for recycled water use.

### **Construction Inspection**

The CRWQCB requires that the District, or designated representatives conduct on-site inspections during the construction phase to ensure that materials, installation and procedures are in accordance with the approved plans, specifications, and all applicable regulations. Accordingly, the Customer shall notify the District of the schedule for all phases of planning, construction and start up so that inspections can be scheduled.

### **Field Testing and Inspection**

All systems shall conform to the requirements of the UPC Sections 103.5.1 through 103.5.4.2 except intermittent pressure piping. During the coverage test with recycled water, the irrigation system will be inspected for proper use of full, half, and quarter sprinkler heads, proper atomizing, and irrigation spray on non-approved use areas.

### **Temporary Connection to Potable Service**

A jumper to the potable system is allowed up to and during the final cross-connection test. At that time the jumper shall be replaced by the recycled water meter. **Jumpers providing water from the public recycled water system into the on-site recycled water system are prohibited at all times.**

### **Final Cross-Connection Test**

The Customer must conduct a final cross-connection test before connecting the Customer's recycled water system to the District's recycled water system at any use-site where both recycled and potable water are present in separate piping systems. This test is to ensure the absolute separation of the recycled and potable water systems. The Customer must notify the District at least 48 hours prior to the test so that the District's Inspector may be present. The cross-connection test shall be done under the supervision of the District representatives by an AWWA-certified cross-connection control specialist. The Customer's On-Site Supervisor (see *Designation of On-Site Supervisor*) must be present at the test. Periodic testing must be performed after that (See *Periodic Cross-Connection Testing Program*). A written report documenting the test results shall be submitted by the certified cross-connection control specialist to the On-Site Supervisor and the District following completion. The following are general test guidelines and may be modified with the approval of the District.

### **General Cross-Connection Test Procedures**

Cross-connection tests shall be performed as specified in the UPC Appendix J 8 (2) and J 8 (3), with the exception that intermittent piping will not be activated and pressurized as specified in Appendix J 8 (2) (vi), and that the required pressurization time will be one (1) hour or as otherwise specified by the cross-connection specialist.

### **Final Inspection**

The CDHS requires a final on-site inspection to be conducted by the District or its designated representatives. Accordingly, a final inspection will be performed by the District or its designated representatives before the recycled water system is connected to ensure all requirements have been met.

This inspection will be coordinated with the final cross-connection test so that the inspection' can be done with potable water charging the irrigation system at recycled water pressure prior to connection of recycled water. The District's inspector will check to see that the proper equipment was used and that all required tags, labels, and signs are In place. This inspection shall precede the coverage test which will be performed with recycled water. This will allow the inspector to determine if conditions which create runoff or windblown spray outside the approved use area or ponding within the use area do not exist. Spray patterns will be checked to see they do not encroach upon public facilities such as drinking fountains, outside eating areas, or areas outside the approved use area.

### **Final Approval**

Final approval must be granted by the District before recycled water can be supplied to the site. Final approval will be granted when construction has been completed in accordance with approved plans and specifications, all cross-connection tests have been performed, a final on-site inspection has been conducted, and all requirements have been met satisfactorily. After the Recycled Water Use Permit is finalized by the District, the Water Service Agreement is approved by the District, and all applicable fees have been paid, the District will authorize the Installation of the recycled water meter. (The coverage test will be performed after the meter has been set) the CDHS will be forwarded a copy of all test and inspection reports as well as notification that recycled water service has started. During the lifetime of the recycled water system, the District will periodically inspect the recycled water system to ensure compliance with all applicable rules and regulations (see *Annual Inspection*). Additionally the Customer shall conduct a cross-connection test every four years as required by the Recycled Water Use Permit (see *Periodic Cross-Connection Control Test*).

### **Record Drawings**

All conceptual or major design changes shall be approved before implementing the change in the construction contract. Record drawings shall be prepared to show the recycled system as constructed and shall include all changes in work constituting departures from the original contract drawings including those involving both constant pressure and intermittent-pressure lines and appurtenances.