



Recycled Water Best Management Practices

May 2012

Table of Contents

1. INTRODUCTION.....	1
2. STATE/LOCAL REGULATIONS.....	1
3. APPLICATION.....	2
4. OPERATIONAL CONTROLS.....	2
4.1 Posting of On-Site Notices.....	3
4.2 Worker/Public Protection.....	3
4.3 General Irrigation Usage.....	5
4.4 Landscape Irrigation	5
4.4.1 Design.....	5
4.4.2 Hardware	6
4.4.3 System Management.....	8
4.5 Impoundments.....	9
4.6 Construction Water Use.....	9
On-Site” Supervisor Do’s and Don’ts	12

List of Tables

Table 1. Minimum Separation Requirements	3
Table 2. Recycled Water Uses Allowed in California - Irrigation	10
Table 3. Recycled Water Uses Allowed in California – Impoundment & Other Uses	11

1. INTRODUCTION

As a purveyor of recycled water, Eastern Municipal Water District ("District") is required to ensure that the District's users are aware of their responsibilities regarding the proper use of recycled water. To ensure that District customers are informed of the proper use of recycled water, the District provides each recycled water user with a copy of "Recycled Water Best Management Practices" ("BMPs"). These BMPs are consistent with those promulgated by the Riverside County Department of Environmental Health ("RCDEH") and the California Department of Public Health ("CDPH") which serve to protect the health of both the public and the employees of recycled water users. The minimum necessary on-site controls are contained in "Guidelines for Use of Reclaimed Water," issued by the CDPH; in the County Public Health Code; and in Title 22 of the California Code of Regulations.

The implementation of BMPs is essential in minimizing soil erosion, overspray concerns, and ponding, as well as ensuring efficient irrigation practices and protecting public health and safety. The guidelines for developing BMPs for efficient irrigation are located in Section 7 of this document.

2. STATE/LOCAL REGULATIONS

To protect the public health and safety, on-site controls for recycled water systems shall meet all of the requirements established by the District, as well as applicable State and local regulatory agencies.

Maximum attainable separation between recycled water lines and domestic water lines should be practiced. Domestic and recycled water transmission and distribution lines shall conform to the "Separation and Construction Criteria" found in Section 6 of the District's "Recycled Water Irrigation Guidelines." Additionally:

- The use area facilities must comply with the regulations relating to cross-connections, Title 17 and Title 22, of the Health & Safety Code of California Code of Regulations, and District Ordinance 68 and 69.
- Plans and specifications for all existing and proposed recycled and domestic water systems shall be submitted to the District for review and approval before the systems are constructed. For more information, please refer to the District's "Recycled Water Irrigation Guidelines".
- Ongoing User Management: i.e. annual inspections, shutdown testing and site supervisor training.

3. APPLICATION

Customer shall:

1. Complete District application for recycled water service.
2. Pay all fees and deposits for recycled water service and any required plan checks.
3. Complete District plan check procedures per the District's "Recycled Water Irrigation Guidelines".
4. Enter into an agreement with the District for the use of recycled water.
5. Obtain all required permits.
6. Designate a recycled water site supervisor ("Site Supervisor"). The Site Supervisor shall be available twenty-four (24) hours per day in case of an emergency. The District must be notified of any Site Supervisor changes within thirty (30) days.
7. Ensure Site Supervisor training within three (3) months of ownership transfer.
8. Schedule a pre-service site inspection to be performed by the District.

4. OPERATIONAL CONTROLS

The use of recycled water shall be confined to the area designated by the user and approved by the District.

The use of recycled water shall not create odors, slime, unsightly deposits and/or a public or private nuisance.

The use area shall be maintained so as to prevent ponding, the breeding of flies, mosquitoes, and/or other vectors.

Customer shall notify the District of any recycled water spills or off-site discharges as soon as discovered by calling the District's Integrated Operations Center ("IOC") at 951-928-3777, extension 6265.

All recycled water valves and outlets shall be appropriately identified to warn the public and employees that the water is not safe for drinking, and that direct contact should be avoided. All piping, valves and outlets should be color-coded and/or otherwise marked to differentiate recycled water from domestic or other water.

Impoundments and areas irrigated with recycled water must be kept completely separated from domestic water wells as follows in **Table 1**.

Table 1. Minimum Separation Requirements

USE TYPE	DISTANCE FROM	WATER QUALITY	MINIMUM DISTANCE
Irrigation	Domestic Well	Disinfected Tertiary	50 feet*
Impoundment	Domestic Well	Disinfected Tertiary	100 feet*

**Based on proposed Title 22 limitation*

For well protection, Section 17, F. of Riverside County Ordinance No. 682.3 states, “Wells connected to recycled water system, shall be furnished with an approved backflow prevention assembly or a sufficient air gap to insure that a cross-connection with the well does not exist.”

Any exceptions to backflow protection must be approved by the District and appropriate regulatory agencies prior to recycled water use.

Operation of recycled water irrigation systems shall be conducted under the guidance of a certified Site Supervisor.

The minimum necessary operational controls include, but are not limited to:

4.1 Posting of On-Site Notices

Adequate means of notification shall be provided to inform the public, employees and others that recycled water is being used. Such notification shall include the posting of warning signs at adequate intervals, as deemed appropriate by the District, around the use area. Signs shall be a minimum of four inches (4”) high by eight inches (8”) wide, or as determined by the District, and shall be in compliance with CDPH regulations. Signs are available and may be purchased from the District. Signs not purchased from the District shall be approved by the District prior to use. Each sign shall display the universal "DO NOT DRINK" symbol (in English and Spanish as appropriate) as shown in Figure 1.

At golf courses, notices shall be printed on score cards in color stating that recycled water is used. Signs shall be posted at all water ponds containing recycled water. All water appurtenances shall be identified as applicable and appropriate.

Where recycled water is used at recreational impoundments, the owner may need to provide educational materials for the general public as determined by the District.

4.2 Worker/Public Protection

Workers, residents, and the public shall be made aware of the potential health hazards involved with contact or ingestion of recycled water, and should be educated regarding proper hygienic procedures to protect themselves and their families.

1. Workers and others shall be notified that recycled water is in use. Notification shall include the posting of warning signs with the universal "Do Not Drink" symbol (in English and Spanish as appropriate) of sufficient size (see Figure 1).

2. Precautionary measures should be taken to minimize contact with recycled water.
 - a. Workers/public should not be subjected to recycled water sprays.
 - b. Workers should be provided with protective clothing when there will be more than casual contact with the recycled water.



Figure 1

RECYCLED WATER DO NOT DRINK

3. Precautions should be taken to avoid contamination of food taken into recycled water use areas. Food should not be taken into areas still wet with recycled water.
4. Drinking fountains, picnic tables, barbecues, portable water coolers, and other public features shall be protected from any recycled water overspray.

4.3 General Irrigation Usage

Irrigation should be controlled to minimize ponding of recycled water. Any potential runoff of recycled water should be contained and properly disposed.

Irrigation should be done so as to prevent contact by the public with the spray and precautions should be taken to ensure that recycled water will not be sprayed on areas including, but not limited to, walkways, picnic tables, drinking fountains, passing vehicles, buildings, domestic water facilities, or areas not under control of the user.

4.4 Landscape Irrigation

Landscape irrigation is a cost effective and beneficial use of recycled water which requires special attention to ensure that regulatory compliance is met including avoiding run-off and overspray. By maintaining regulatory compliance, irrigation systems will be more likely to operate in a highly efficient manner. The efficiency of an irrigation system is dependent on three key areas: design, hardware and system management. Below are general best practices for each of these areas. For further information, refer to the District's Water Ordinance 72 and "Recycled Water Irrigation Guidelines".

4.4.1 Design

1. The recycled irrigation water shall be contained on the recycled water use site.
2. Cross-connections between recycled water and potable water are prohibited.
3. Recycled water irrigation cannot be within fifty feet (50') of potable wells, ponds, pools, or similar bodies of water.
4. Recycled water quick coupler valves cannot be located within fifty feet (50') of food preparation areas, outdoor eating areas, play equipment, swimming pools, or similar surfaces.
5. Hose bibs are prohibited on recycled water systems.
6. Potable quick couplers and potable water hose bibs are not allowed within the recycled water irrigated area.
7. Recycled water irrigation cannot overspray, mist, or intrude, within or onto areas or elements, including, but not limited to:
 - a. Outdoor eating areas, picnic areas, seating areas, playgrounds, recreation equipment, and play equipment.
 - b. Potable water appurtenances, potable water recreation areas, decorative fountains, drinking fountains, ponds, swimming pools, etc.

8. The recycled water pressure may fluctuate depending on the infrastructure of the service area. The design of the irrigation system shall account for the potential pressure fluctuations and may require a booster pump and low/no flow cut-off switch.
9. Potable water services and appurtenances must be separated from the recycled water irrigation use area. The level of separation required is based upon site conditions and shall adhere to CDPH Title 22, applicable rules, ordinances and regulations as well as the District's "Recycled Water Irrigation Guidelines". Examples of separation include, but are not limited to, the following:
 - a. Modify the surrounding grade to drain away from the potable water appurtenance(s).
 - b. Sleeve the recycled irrigation pipe to protect the potable water appurtenance(s).
 - c. Adjust the irrigation spray to avoid overspray onto or water intrusion into the potable water appurtenance(s).
 - d. Install a concrete curb to define the separation of recycled water irrigation use area(s) per meter.
 - e. A 4' (foot) minimum non-irrigated area surrounding the potable water appurtenance.
 - f. A 4' (foot) minimum hardscape, sidewalk, and concrete area surrounding the potable water appurtenance, as requested by the District for the site condition.

4.4.2 Hardware

All irrigation systems must have the proper equipment/hardware for the application. Usually the most difficult and costly of the three components, proper hardware, is essential to an efficient irrigation system. Install irrigation system according to District approved plans.

1. Monitoring of site conditions is required when using recycled water. The minimum irrigation equipment that has been proven to meet this requirement includes the following:
 - a. Normally closed master valve
 - b. Flow sensor
 - c. Rain shut-off sensor
 - d. Wind sensors on typically windy sites where spray or rotor irrigation is used
 - e. Moisture sensors in basins to monitor water collection
 - f. Anti-Drain/Check Valves to eliminate low-head drainage
2. All irrigation components shall operate in a manner which does not discharge, flush, or release recycled water outside of the component and into the atmosphere.
3. A normally closed master valve and flow sensor are required for each Point of Connection.
4. Make sure all sprinkler heads are uniform in brand, model and nozzle size, which ensures uniform irrigation. Where different arcs are needed on the same station, match precipitation rates by changing nozzles.
5. Measure spacing between sprinkler heads. Move heads to manufacturer's recommended spacing, if not already within required distances.

6. Where lower precipitation rates are required, such as on slopes or heavy textured soils, reduced nozzle size and spray angle per manufacturer's recommendations.
7. Install booster pumps to increase pressures where needed. Include a low-flow/low-pressure cut-off switch where necessary. The user shall indemnify and hold the District harmless from any damage caused to or by customer's pump.
8. Install pressure regulators to reduce pressures where needed. Pressure regulators are often used on steep slopes where main lines run downhill.
9. Make sure pipes are sized to transmit/distribute water in the quantity demanded by the systems.
10. Use check valves either in-line or built into the sprinkler head assembly to virtually eliminate low-head drainage after the valve has closed. These devices substantially reduce runoff and ponding from individual sprinkler heads.
11. Use automatic flow control devices that shut down a system if a break or other similar high-flow/low-pressure situation develops during irrigation. These devices can save significant amounts of water and virtually eliminate runoff and ponding in the event of a break.
12. The use of system management devices, including, but not limited to, wind gauges and moisture sensors is recommended.
13. A reduced pressure backflow preventer is required on all potable water meters within a recycled water irrigation site.
14. The District will require notification prior to any addition or modification of the recycled irrigation system, including submission of irrigation drawings per the District's "Recycled Water Irrigation Guidelines".

4.4.3 System Management

When recycled water is used, the following practices are recommended for proper system management:

1. The controller run times shall be scheduled during the hours of 9 p.m. and 6 a.m., unless otherwise approved by the District. Run times shall be scheduled to allow for proper infiltration of the irrigation water into the soil profile without run-off or ponding.
2. Adjust sprinkler heads so that they achieve 80% head to head coverage throughout the intended arc. There should be no obstruction or hindrance, such as tall grass, shrubs, trees, or signs, that would interfere with the free rotation and smooth operation of any sprinkler. The system should be routinely tested during the daytime when workers are present so adjustments can be made.
3. Adjust valves or pressure regulators so that the systems are optimally operating to prevent misting. Test pressures as needed to maintain pressure levels required by the sprinklers and/or emitters.
4. Routinely test accuracy of time clocks with a stopwatch. This is also a time to check if valves are opening and closing properly. Repair broken or faulty valves and have time clock calibrated/repared if not functioning properly.
5. Repair or replace broken risers, sprinklers, valves, etc. as soon as they are discovered. When replacing equipment such as sprinklers and emitters, use correct color, manufacturer and model number so that system uniformity is maintained.
6. Routinely check backflow prevention devices, pumps and other appurtenances for leaks and other conditions that might impact the irrigation system. Test, repair and replace as needed.
7. Routinely clean screens and backwash filters to keep systems operating optimally.
8. Routinely check micro-irrigation systems for clogged, broken or faulty emitters. Repair or replace as needed. Clogged emitters cause non-uniform irrigation that result in over and under watering conditions. Plant material can suffer both aesthetically and/or yield decreases from changes in watering conditions, and water bills can rise.
9. Irrigation shall be scheduled during periods when the ground will have the maximum opportunity to dry before use by the public, unless provisions are made to have Site Supervisor or designee present during and after application of recycled water to restrict access.
10. Irrigate in the evening or early morning, avoiding the hot and/or windy parts of the day. This will reduce evaporation losses and minimize windblown spray going to areas not intended to receive irrigation water.

4.5 Impoundments

The customer shall maintain a minimum of a two foot (2') freeboard on all impoundments containing recycled water.

RECREATIONAL IMPOUNDMENTS:

All recycled water recreational impoundments use and conditions must be approved by the District and CDPH.

OPERATIONAL IMPOUNDMENTS:

Adequate cautionary measures, such as signage and/or barriers shall be utilized to inform and prevent body contact activities, such as wading or swimming, at landscape and irrigation impoundments containing recycled water including but not limited to agricultural holding ponds and golf course ponds

4.6 Construction Water Use

Developers/Contractors shall inform employees and sub-contractors on the proper use of recycled water, including:

1. Conducting and documenting routine communication with all personnel regarding use of recycled water.
2. Identification of water trucks, hoses, drop tanks, or other objects, as containing water not suitable for human consumption. Recycled water warning signs shall be painted or otherwise affixed to equipment used for recycled water.
3. Preventing the use of trucks, water trailers and other equipment for purposes involving human consumption or potable water applications after that equipment has been used for recycled water.
4. Preventing connection between equipment containing recycled water and any part of a potable water system.
5. Ensuring all vehicles traveling on public roadways do not leak or discharge the recycled water.

Table 2. Recycled Water Uses Allowed in California - Irrigation

IRRIGATION	Treatment Level			
	Disinfected Tertiary Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Secondary-23 Recycled Water	Undisinfected Secondary Recycled Water
Food crops where recycled water contacts the edible portion if the crop, including all root crops	Allowed	Not allowed	Not allowed	Not allowed
Parks and playgrounds	Allowed	Not allowed	Not allowed	Not allowed
School Yards	Allowed	Not allowed	Not allowed	Not allowed
Residential Landscaping	Allowed	Not allowed	Not allowed	Not allowed
Unrestricted access golf courses	Allowed	Not allowed	Not allowed	Not allowed
Any other irrigation uses not prohibited by other provisions of the California Code of Regulations	Allowed	Not allowed	Not allowed	Not allowed
Food crops where edible portion is produced above ground and not contacted by recycle water	Allowed	Allowed	Not allowed	Not allowed
Cemeteries	Allowed	Allowed	Allowed	Not allowed
Freeway landscaping	Allowed	Allowed	Allowed	Not allowed
Restricted access gold courses	Allowed	Allowed	Allowed	Not allowed
Ornamental nursery stock and sod farms	Allowed	Allowed	Allowed	Not allowed
Pasture for milk animals	Allowed	Allowed	Allowed	Not allowed
Nonedible vegetation with access control to prevent use as a park, playground or school yard	Allowed	Allowed	Allowed	Not allowed
Orchards with no contact between edible portion and recycled water	Allowed	Allowed	Allowed	Allowed
Vineyards with no contact between edible portion and recycled water	Allowed	Allowed	Allowed	Allowed
Non-food bearing trees, including Christmas trees not irrigated less than 14 days before harvest	Allowed	Allowed	Allowed	Allowed
Fodder crops (e.g. alfalfa) and fiber crops (e.g. cotton)	Allowed	Allowed	Allowed	Allowed
Seed crops not eaten by humans	Allowed	Allowed	Allowed	Allowed
Food crops that undergo commercial pathogen-destroying processing before consumption by humans	Allowed	Allowed	Allowed	Allowed
Ornamental nursery stock, sod farms not irrigated less than 14 days before harvest	Allowed	Allowed	Allowed	Allowed

Note:

- 1) Source: This chart is an informational summary of the uses allowed based on the California Department of Health Services Title 2.2, Article 4 Code of Regulations' June 2001 version.
- 2) With "conventional tertiary treatment." Additional monitoring for two years or more is necessary with direct filtration.
- 3) Drift eliminators and/or biocides are required if public or employees can be exposed to mist.
- 4) Refer to Groundwater Recharge Guidelines

Table 3. Recycled Water Uses Allowed in California – Impoundment & Other Uses

SUPPLY FOR IMPOUNDMENT	Treatment Level			
	Disinfected Tertiary Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Secondary-23 Recycled Water	Undisinfected Secondary Recycled Water
Non-restricted recreational impoundments, with supplemental monitoring for pathogenic organisms	Allowed ²	Not allowed	Not allowed	Not allowed
Restricted recreational impoundments and publicly accessible fish hatcheries	Allowed	Allowed	Not allowed	Not allowed
Landscape impoundments without decorative fountains	Allowed	Allowed	Allowed	Not allowed
Supply for cooling air conditioning	Disinfected Tertiary Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Secondary-23 Recycled Water	Undisinfected Secondary Recycled Water
Industrial or commercial cooling or air conditioning involving cooling tower, evaporative condenser, or spraying that creates a mist	Allowed ³	Not allowed	Not allowed	Not allowed
Industrial or commercial cooling or air conditioning not involving cooling tower, evaporative condenser, or spraying that creates a mist	Allowed	Allowed	Allowed	Not allowed
OTHER USES	Disinfected Tertiary Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Secondary-23 Recycled Water	Undisinfected Secondary Recycled Water
Groundwater recharge	Allowed under special case permits by RWQCBs ⁴			
Flushing toilets and urinals	Allowed	Not allowed	Not allowed	Not allowed
Priming drain taps	Allowed	Not allowed	Not allowed	Not allowed
Industrial process water that may contact workers	Allowed	Not allowed	Not allowed	Not allowed
Structural fire fighting	Allowed	Not allowed	Not allowed	Not allowed
Decorative fountains	Allowed	Not allowed	Not allowed	Not allowed
Commercial laundries	Allowed	Not allowed	Not allowed	Not allowed
Consolidation of backfill material around potable water pipelines	Allowed	Not allowed	Not allowed	Not allowed
Artificial snow making for commercial outdoor uses	Allowed	Not allowed	Not allowed	Not allowed
Commercial car washes not done by hand & excluding the general public from washing process	Allowed	Not allowed	Not allowed	Not allowed
Industrial process water that will not come into contact with workers	Allowed	Allowed	Allowed	Not allowed
Industrial boiler food	Allowed	Allowed	Allowed	Not allowed
Nonstructural fire fighting	Allowed	Allowed	Allowed	Not allowed
Backfill consolidation around nonpotable piping	Allowed	Allowed	Allowed	Not allowed
Soil compaction	Allowed	Allowed	Allowed	Not allowed
Mixing concrete	Allowed	Allowed	Allowed	Not allowed
Dust control on roads and streets	Allowed	Allowed	Allowed	Not allowed
Cleaning roads, sidewalks and outdoor work areas	Allowed	Allowed	Allowed	Not allowed
Flushing sanitary sewers	Allowed	Allowed	Allowed	Allowed

Note:

1) Source: This chart is an informational summary of the uses allowed based on the California Department of Health Services Title 2.2, Article 4 Code of Regulations' June 2001 version.

2) With "conventional tertiary treatment." Additional monitoring for two years or more is necessary with direct filtration.

3) Drift eliminators and/or biocides are required if public or employees can be exposed to mist.

4) Refer to Groundwater Recharge Guidelines

On-Site” Supervisor Do’s and Don’ts

Do’s

- Install and maintain signs at all points of entry, both pedestrian and vehicular, and replace faded or damaged signs when needed
- Install and maintain labels and tags on recycled water sites
- Maintain proper separation between potable and non-potable systems
- Operate irrigation system:
 - Between 9:00 p.m. and 6:00 a.m. if automatically controlled, unless other restrictions apply
 - At times other than between 9:00 a.m. and 6:00 p.m., if manually controlled and someone is present to actively supervise, make sure the recycled water doesn’t come in contact with the public
 - At any time, if use site is restricted from use by the general public
- Use quick couplers instead of hose bibs
- Contact the District if any modifications to the potable or recycled water system are anticipated
- Immediately contact the District if either of the following has occurred:
 - A recycled water line break, that results in a spill or off-site discharge of recycled water
 - A cross-connection between the recycled and potable water systems
- Educate/train site workers on safe use and restrictions of recycled water
- Keep records and as-built drawings up-to-date and accessible
- Assist and cooperate during periodic visual inspections
- Assist and cooperate during periodic cross-connection testing

Don’ts

- Don’t drink recycled water
 - Don’t use recycled water to wash hands or any other part of the body
 - Don’t remove or alter recycled water identification signs, tags or labels
 - Don’t cross-connect any recycled water system to any other type of water system (i.e. potable water, raw water, sewer, etc.)
 - Don’t allow recycled water overspray onto drinking fountains or eating or playing areas
 - Don’t allow recycled water to pond or puddle
 - Don’t allow recycled water to runoff the use site property
 - Don’t use recycled water on an unapproved site
 - Don’t put hose bibs on recycled water systems
 - Don’t use equipment, such as quick couplers or tools, used on recycled water systems on domestic water systems
 - Don’t modify any water systems without prior approval of the District
-