

The Board Of Water Commissioners Denver Water

Engineering Standards Chapter 11 – Recycled Water System

11.01 **GENERAL:**

The purpose of this Chapter is to provide guidelines for planning, designing, constructing, and operating the recycled water system providing water to Denver Water customers within Denver Water's Service Area. These Standards apply to recycled water facilities under the control of Denver Water.

11.02 **OTHER STANDARDS TO APPLY:**

Standards that apply to 4 inch through 12 inch distribution mains, and to 16 inch and 20 inch transmission mains, and 24 inch and larger conduits including meters, valves, service line and backflow prevention and easements shall apply to recycled water systems along with the supplemental requirement and exceptions stated herein. In case of conflict with any other Section, this Chapter shall govern for recycled water.

11.03 **WATER QUALITY:**

Recycled water leaving the recycled water treatment plant shall conform to the water quality regulations established by CDPHE through its WQCD. Denver Water shall maintain a system of records for water quality analyses performed on recycled water. These analyses will confirm compliance with all water quality regulations.

11.04 **POTABLE WATER BACKUP:**

The decision to connect the potable and recycled water systems will be made at the sole discretion of Denver Water. If recycled water is unavailable due to a system malfunction or other reason, potable water may be substituted as a backup only by Denver Water. Lack of adequate recycled supply, shall not be a reason for connection to a potable source. Backup for individual customers will not be provided. Whenever a connection is made between the two systems by Denver Water, the potable water system shall be protected through the use of an approved Denver Water backflow prevention device.

11.05 **CONVERSION FROM A POTABLE TO A RECYCLED LINE:**

Facilities converted from a potable water supply to a recycled water supply shall conform to Denver Water's construction standards. This may mean removal and replacement of existing valves, valve boxes/lids, etc.

11.06 **PROTECTION OF THE POTABLE WATER SYSTEM:**

The potable water system shall be protected from contamination with recycled water through the physical separation of the two systems, which will be inspected by Denver Water.

Premises served with both potable and recycled water shall have installed an approved Denver Water reduced pressure backflow (RPZ) prevention device on the potable water line where it enters the facility. The use of a double check valve assembly or other backflow prevention device is prohibited. All premises that

contain a recycled water system shall install an approved Denver Water air gap backflow protection system or a reduced pressure zone backflow prevention device on the potable water line.

11.07 DISCHARGES FROM THE SYSTEM:

Discharges from blowoff assemblies, or other appurtenances on the recycled water system shall either be contained or discharged in a manner approved by Denver Water and CDPHE. Discharging into a watercourse not specifically approved by Denver Water and CDPHE is prohibited.

11.08 USER PERMITS:

Connections to the recycled water system can only be made after applying for and obtaining a Water Supply License from Sales Administration Section of Denver Water. The license shall be issued in accordance with Denver Water policy and subject to any required approval by the CDPHE.

11.09 SEPARATION FROM SEWER LINES:

Recycled water mains running parallel to a sanitary or storm sewer shall maintain a minimum separation of 10-feet horizontally and one-foot vertically. The elevation of the recycled line shall be above the elevation of the sewer line.

11.10 SEPARATION FROM POTABLE WATER LINES:

Recycled water lines shall cross a minimum of one-foot below potable water lines. Recycled water transmission lines parallel to potable water lines shall be installed at a minimum distance of 10-feet horizontally and one-foot vertically below the potable water line. Any deviation from these requirements will need to be approved by Denver Water. Common trench construction is prohibited.

11.11 RECYCLED WATER CONDUITS:

Recycled water conduits are 24 inch diameter and larger mains carrying recycled water.

It is the policy of Denver Water to design and install 24 inch diameter and larger conduits to ensure a high quality, uninterrupted, low maintenance water service system and when it is in the best interest of Denver Water. In cases where Denver Water determines that the conduit will not be part of its system, Denver Water may allow a Recycled Customer to design and/or install conduits; however, Denver Water must approve the design and installation of these conduits to ensure that sound engineering and construction procedures are followed within the context of Denver Water's Engineering Standards.

Design of the conduit should proceed only after approval to design and/or construct the conduit is received from Denver Water. The concept, size, location, and any other pertinent details shall be reviewed by Denver Water prior to the submittal of Plans and Specifications in accordance with Denver Water's Engineering Standards.

Design and construction of conduits carrying recycled water shall be in accordance with the recycled water and appropriate potable sections of Denver Water's Engineering Standards and following supplementary requirements:

- A.** Piping in the recycled water system shall be identified by an integral Pantone 2577U in color and an embossed or integrally stamped warning reading "**CAUTION: RECYCLED WATER – DO NOT DRINK**". The printing shall be continuous on both sides of the pipe.

As an acceptable alternative, the ductile iron pipe shall be wrapped in purple polywrap and steel pipe shall have a purple polyurethane exterior or purple tape wrap exterior. Cathodic protection approved by Denver Water is required. Identification tapes also needed shall be black printing on a purple

field and contain the warning stated above. The warning tape shall be a minimum of 3 inches wide.

Identification tapes shall be installed one foot above the top of the pipe longitudinally and shall be centered.

- B. Valve boxes in the recycled water system shall be fitted with triangular lids cast with the words "Denver Water Recycled Water". The covers shall be coated with epoxy coating, Pantone 2577U in color.
- C. Valves in the recycled water system shall open in a counter-clockwise direction. Valves or valve operators located in vaults shall be tagged as belonging to the recycled water system and shall be coated with epoxy, Pantone 2577U in color.
- D. Appurtenances located in vaults, including valves, valve operators, air-vacuum relief valves, blowoffs and meters shall be coated with epoxy, Pantone 2577U in color and labeled as belonging to the recycled water system. The labels shall be inert plastic formulated for prolonged exposure and shall be prepared with black printing on a white field having the words "**RECYCLED WATER FACILITIES**". The minimum height of the letters shall be 1/2 inch. The labels shall be attached with heavy duty nylon fasteners.
- E. Manhole covers in the recycled water system shall be fitted with covers cast with the words "Denver Water Recycled Water" the covers shall be coated with epoxy, Pantone 2577U in color.
- F. Cement-mortar lining of pipe shall not be allowed.
- G. Six inch minimum diameter blowoff valves shall be installed on dead-end mains.
- H. HDPE fiberoptic conduit shall be installed parallel to conduits as specified by Denver Water. This location is generally 3-feet off the centerline of the pipe and 3-feet deep. Hand hole spacing shall be determined by Denver Water. Tracer wire is required for non-metallic pipe.

11.12 **RECYCLED WATER TRANSMISSION MAINS:**

Recycled water transmission mains are either 16- or 20 inch diameter mains.

Design and construction of transmission mains carrying recycled water shall be in accordance with the recycled water and appropriate potable sections of Denver Water's Engineering Standards and following supplementary requirements:

- A. Piping in the recycled water system shall be identified by an integral Pantone 2577U in color and an embossed or integrally stamped warning reading "**CAUTION: RECYCLED WATER – DO NOT DRINK**". The printing shall be continuous on both sides of the pipe.

As an acceptable alternative, the ductile iron pipe shall be wrapped in purple polywrap and steel pipe shall have a purple polyurethane exterior or purple tape wrap exterior. Cathodic protection approved by Denver Water is required. Identification tapes also needed shall be black printing on a purple field and contain the warning stated above. The warning tape shall be a minimum of 3 inches wide.

Identification tapes shall be installed one foot above the top of the pipe longitudinally and shall be centered.

- B. Valve boxes in the recycled water system shall be fitted with triangular covers cast with the words "Denver Water Recycled Water". The covers shall be coated with epoxy coating, Pantone 2577U in color.

- C. Valves in the recycled water system shall open in a counter-clockwise direction. Valves or valve operators located in vaults shall be tagged as belonging to the recycled water system and shall be epoxy, Pantone 2577U in color.
- D. Appurtenances located in vaults, including valves, valve operators, air-vacuum relief valves, blowoffs and meters shall painted Pantone 2577U in color and labeled belonging to the recycled water system. The labels shall be inert plastic formulated for prolonged exposure and shall be prepared with black printing on a white field having the words "**RECYCLED WATER FACILITIES**". The minimum height of the letters shall be 1/2 inch. The labels shall be attached with heavy duty nylon fasteners.
- E. Manhole covers in the recycled water system shall be fitted with covers cast with the words "Denver Water Recycled Water", the covers shall be coated with epoxy, Pantone 2577U in color.
- F. Cement-mortar lining of pipe shall not be allowed.
- G. Blowoff valves shall be installed on dead-end mains and sized to allow a minimum of 2.5 fps in the transmission main.

11.13 **RECYCLED WATER DISTRIBUTION MAINS:**

Recycled water distribution mains are either 4 inch, 6 inch, 8 inch or 12 inch diameter installed in the recycled water distribution systems.

Design and construction of distribution mains carrying recycled water shall be in accordance with the recycled water standards and appropriate potable sections of Denver Water's Engineering Standards and following supplementary requirements:

- A. Piping in the recycled water system shall be identified by an integral Pantone 2577U in color and an embossed or integrally stamped warning reading "**CAUTION: RECYCLED WATER – DO NOT DRINK**". The printing shall be continuous on both sides of the pipe.
 As an acceptable alternative, the pipe may be installed with a continuous purple identification tape or purple polyethylene vinyl wrap. Identification tapes shall be black printing on a purple field and contain the warning stated above. The warning tape shall be a minimum of 3 inches wide.
 Identification tapes shall be installed one-foot above the top of the pipe longitudinally and shall be centered. The identification tape shall be continuous in its coverage of the pipe and shall be fastened to each pipe with plastic adhesive tape banded around the pipe. Taping attached to sections of pipe before placement in the trench shall have flaps sufficient for continuous coverage.
- B. Valve boxes in the recycled water system shall be fitted triangular with covers cast with the words "**DMWW RECYCLED**". The covers shall be coated with a fusion bonded epoxy coating, Pantone 2577U in color. Both the top and bottom surfaces of the cover shall be coated.
- C. Valves in the recycled water system shall open in a counter-clockwise direction which is opposite of valves in the potable system. Valves or valve operators located in vaults shall be tagged as belonging to the recycled water system and shall be coated with epoxy and painted Pantone 2577U in color.
- D. Appurtenances located in vaults, including valves, valve operators, air-vacuum relief valves, blowoffs and meters shall painted Pantone 2577U in color and labeled as belonging to the recycled water system. The labels shall be inert plastic formulated for prolonged exposure and shall be prepared with

black printing on a white field having the words "**RECYCLED WATER FACILITIES**". The minimum height of the letters shall be 1/2 inch. The labels shall be attached with heavy duty nylon fasteners.

- E. Manhole covers in the recycled water system shall be fitted with covers cast with the words "**DMWW RECYCLED**", the covers shall be coated with epoxy, Pantone 2577U in color.
- F. Line valves shall be spaced no more than 1,000 feet apart.
- G. Cement-mortar lining of pipe shall not be allowed.
- H. Blowoff valves shall be installed on dead-end mains.

11.14 **RECYCLED WATER SERVICE LINES AND APPURTENANCES:**

Recycled water service lines are for conveying water from mains to the plumbing of licensed premises by service lines and their appurtenances.

Design and construction of service lines and appurtenances carrying recycled water shall be in accordance with the recycled water standards and appropriate potable sections of Denver Water's Engineering Standards and the following supplementary requirements:

- A. Service lines conveying recycled water shall be placed in a trench separate from the potable water service trench and the sanitary sewer trench. A minimum separation of 10 horizontal feet and one vertical foot shall be maintained between the recycled service line and the potable water elevation above that of the sanitary sewer and below that of the potable water line.
- B. As a condition of being issued a license to use recycled water, Denver Water shall require the installation of signs at the point of use and a commitment from the user that hose bibb connections will not be installed in the user facilities or quick couplers shall be used if those connections are necessary. Fittings shall be such that interconnection cannot be made between potable and recycled systems, nor shall hoses be interchanged between them. Signs shall be used to identify the recycled water quick coupling connections.
- C. Covers for curb stop boxes and meter pits in the recycled water system shall be cast with the words "**RECYCLED WATER**". The covers shall be coated with a fusion bonded epoxy, Pantone 2577U in color and painted top and bottom and be triangular in shape. Four inch roadway type covers shall be used.
- D. Type of meters and strainers used in the recycled water system shall be approved by Denver Water's Meter Shop prior to installation. They shall be coated with epoxy, Pantone 2577U in color. The location and type shall be approved by Denver Water.
- E. Meters and control valves may be installed in the same vault per Denver Water approval. Vaults shall have locking, metal door-type hatches coated Pantone 2577U in color.
- F. Recycled water service lines shall be required to have purple identification tape one-foot above service line stating "**CAUTION: RECYCLED WATER - DO NOT DRINK**". The warning tape shall be a minimum of 3 inches wide.
- G. Irrigation sprinklers used in on-site recycled water systems shall have an exposed surface colored purple to associate them with recycled water use. The exposed surface may be colored purple through the use of dyed plastic or rubber, or weatherproof paint. Sprinklers unable to meet these Specifications shall be identified with purple recycled warning tags.

- H. All on-site recycled water facilities shall have restricted public access so that the general public cannot draw water from the system. Facilities, such as wash down hydrants, blowoff hydrants, blowoffs on strainers and other such facilities shall be restricted from public access. These facilities, both above and below grade, shall be housed in an approved locking container colored purple. A sign with black lettering on a purple field reading "**CAUTION: RECYCLED WATER - DO NOT DRINK**" shall be installed on the container. Its size must be approved by Denver Water.
- I. On-site recycled water pumping and storage systems are not allowed except as approved and systems permitted by Denver Water.
- J. Service piping in the recycled water system shall be spirally wrapped with warning tape reading "**CAUTION: RECYCLED WATER - DO NOT DRINK.**"
- K. Backflow prevention devices may be required on recycled systems if there is a risk of damage to the system or potential water quality concerns as determined by Denver Water.
PRVs in service lines may be required as determined by Denver Water.
Modifications to the potable water service line may be necessary when a new recycled water irrigation system is installed or modified.

11.15 **RECYCLED WATER CUSTOMERS GUIDELINES:**

A Recycled Water Customer must comply with any applicable State and Local regulations regarding the use of recycled water including CDPHE Regulation 84. Additionally, the following guidelines for using recycled water are presented:

- A. The Recycled Water Customer shall designate an on-site supervisor who will be responsible for compliance with all regulations regarding the use of recycled water.
- B. The Recycled Water Customer shall prepare and keep current record drawings showing all recycled water facilities and make them available to Denver Water. This shall include but not be limited to the location of all piping, valves, backflow prevention devices and system controllers. Also, a record of any expansion of or additional piping and the operating schedules for each system controller shall be maintained. A copy of the appropriate operation schedule and area of coverage shall be included in each controller box in a waterproof container.
- C. Denver Water will assign and the customer will adhere to a specific watering schedule.
- D. The Recycled Water Customer must adjust and maintain the adjustment of all irrigation spray heads to eliminate over spray. This includes, but is not limited to sidewalks, streets or public areas. Food preparation, drinking fountains and picnic areas must also be protected from overspray or windblown spray.
- E. System operation shall be adjusted to minimize pooling, ponding or excessive runoff.
- F. The Recycled Water Customer shall monitor and maintain the on-site recycled system to mitigate uncontrolled releases of water. Leaking pipes, broken sprinkler heads and unreliable valves shall be repaired immediately.
- G. The Recycled Water Customer shall educate all maintenance personnel of the presence of recycled water and of the safety practices that must be followed when working with a recycled water supply.

- H. The Recycled Water Customer shall obtain prior approval for proposed changes or modifications to any on-site facilities that may impact Denver Water facilities. Changes to facilities must be in compliance with CDPHE Regulation 84 and made available to Denver Water for review.
- I. The Recycled Water Customer shall install signs or labels in the areas irrigated with recycled water indicating that recycled water is being used. The signs shall contain black lettering on a purple field with the words "**CAUTION: RECYCLED WATER - DO NOT DRINK**".
- J. Signs at locations where Recycled Water is used: In locations where Denver Water serves Recycled Water to a customer, signs in the dominant language(s) expected to be spoken at the site shall be posted. Signs shall read, "Nonpotable Recycled Water Used for Irrigation...Do Not Drink From the Sprinklers!...No Tome de la Sistema de Irrigacion!" or similar language approved by Denver Water.
 - 1. Where recycled water is used for industrial or commercial uses, there shall be one sign near any vault or valve that provides recycled water or access to recycled water piping. Each sign shall be at least 12 inch X 15 inch.
 - 2. Where recycled water is used for irrigation at a park, school yard or similar area, there shall be one sign at each parking lot or surfaced entry (vehicular or pedestrian) to the area. There shall also be one sign for every 5,000 feet of perimeter of the area. There shall be at least one sign per area. A single sign may be used to fulfill more than one of these requirements. Each sign shall be at least 10 inch x 13.5 inch.
 - 3. Where recycled water is used for irrigation at a golf course, there shall be one sign each at the first and tenth tees, near entrances to any driving ranges, and near any practice putting greens. Each sign shall be at least 12 inch x 15 inch.

The Recycled Water Customer shall ensure that the on-site recycled water facilities remain in compliance with regulations promulgated by the State of Colorado and the guidelines established by Denver Water. Failure to comply with any of the standards or guidelines may result in the termination of service until the appropriate corrective steps have been taken.

11.16 **METERING:**

Denver Water shall meter all users of nonpotable water. The meter shall be of the size and type specified by Denver Water. Meters and meter installations shall conform to Denver Water Engineering Standards, Details and Materials Specifications. Meters shall be identified as nonpotable water and shall be painted purple before being used for nonpotable service.