



Non-Potable Water Design Guidelines

1. DEFINITIONS

- *Harvested Rainwater* – Rainwater collected from rooftops or other surfaces and stored in cisterns.
- *Non-Potable Water (NPW)* – Non-drinking water from a variety of sources that is allowable for irrigation, toilet flushing, and other specific uses.
- *Reclaimed Water (RCW)* – Highly treated wastewater distributed to UNC-CH by OWASA. Allowable uses, irrigation application rates, labeling and identification requirements, and permitting requirements are regulated by 15A NCAC 02T .0900

2. REGULATIONS

The following regulations apply to Non-Potable Water projects. Their applicability is further described in subsequent sections.

a. North Carolina Administrative Code – Reclaimed Water Regulations

Currently section 15A NCAC 02T .0900. Proposed rule changes would relocate the Reclaimed Water regulations to section 15A NCAC 02U. These rules are administered by the NCDENR DWQ Land Applications Unit.

b. North Carolina Plumbing Code

Currently appendix C-1 addresses rainwater harvesting.

c. OWASA Ordinance for the Control of Backflow and Cross-Connections

The OWASA ordinance and associated Manual implement State level regulations within the OWASA service area. At the State level, the NCDENR DEH Public Water Supply section administers cross-connection control and distribution line extensions.

d. OWASA Rainwater System Requirements and Charges Policy

This policy addresses cross-connection control and sewer charges.

3. PERMITTING

a. All Reclaimed Water Uses

All RCW uses require a site-specific amendment to UNC-CH's utilization permit from the Division of Water Quality Land Application Unit. Contact UNC-CH EHS to review permit submittal requirements and obtain the proper, partially completed form. The Project Designer is responsible for completing the Division of Water Quality application form, providing the required specifications and drawings, obtaining a soil scientist / agronomist report for irrigation projects, and providing the application fee. The draft application materials will be submitted to UNC-CH EHS for internal review, applicant signature, and submittal to DWQ.



b. Extensions to Reclaimed Water Distribution Lines

Any project extending the OWASA reclaimed water distribution lines must submit a Reclaimed Water Distribution System application. This application process will be conducted by the Project Designer and UNC-CH Project Manager with OWASA.

4. DISTRIBUTION LINES

a. OWASA Requirements

Extensions to the OWASA reclaimed water distribution system will be reviewed by OWASA based on the OWASA *Manual of Specifications, Standards, and Design* and the NC Administrative Code (NCAC) – 15A NCAC 02T .0909 requirement for Reclaimed Water distribution systems.

b. UNC-CH Standards

Reclaimed water and combined non-potable water distribution lines to be owned by UNC-CH will follow the OWASA reclaimed water distribution standards unless otherwise specified in this document or by the UNC-CH Energy Services Non-Potable Water Manager.

5. PLUMBING FOR TOILET AND URINAL FLUSHING APPLICATIONS

The UNC-CH design requirements for non-potable water use in indoor plumbing for toilet and urinal flushing rely on several sources described below.

a. Applicability

All new toilet and urinal systems shall be designed with dual plumbing for use of non-potable water.

b. Materials

The following UNC-CH requirements for RCW and NPW systems serve as a further safeguard against cross-connections with potable water and provide greater corrosion resistance.

- i. Pipe material shall be CPVC Schedule 80, Cell Class 24448 (up to 6”) or 23447 (8” or greater).
- ii. Fittings, valves, and other appurtenances shall be CPVC Schedule 80, Cell Class 23447.
- iii. All brass fittings, including flush valves, shall be DZR (dezincification resistant).

c. Pipe Color

The color currently designated for plumbing systems with reclaimed water, harvested rainwater, and blended non-potable waters is purple (Pantone 522).

This color requirement can be found in the NC Administrative Code Reclaimed Water Regulations and the NC Plumbing Code.



d. Labeling

All pipes, fixtures, valves, and other fittings must be labeled per the NC Administrative Code – Reclaimed Water Regulations (RCW only) and the NC Plumbing Code (all NPW). These regulations specify locations, wording, frequency, colors, size, etc.

The University requires the following language to be included in the labeling:

RECLAIMED WATER – DO NOT DRINK – NO TOMAR

or

NON-POTABLE WATER – DO NOT DRINK – NO TOMAR

e. Point of Use Signage

Signs must be placed in every toilet stall and over each group of urinals where NPW is in use. The University has developed standard signage for this purpose that can be produced by the UNC-CH Sign Shop. This fulfills requirements in the NC Administrative Code – Reclaimed Water Regulations.

The standard signage for toilet and urinal flushing sites uses the following language:

UNC-CH CONSERVES DRINKING WATER BY
FLUSHING THESE TOILETS AND URINALS WITH NON-POTABLE WATER
DO NOT DRINK – NO TOMAR

f. Cross-Connection Control

Connections between potable and non-potable water systems are not permitted. The OWASA ordinance and State regulations require an air gap between potable and non-potable water distribution lines. If a potable back-up without an air gap is deemed necessary and is acceptable to UNC-CH Facilities and EHS, then an application for a site-specific alternative cross-connection measure must be submitted to NCDENR DEH Public Water Supply.

g. Meters

For accurate billing for sanitary sewer utilization, the OWASA Rainwater System Requirements and Charges Policy requires measurement of NPW entering the building.

If the building uses reclaimed water only, the OWASA reclaimed water meter will be used to bill for sewer charges.

If the building uses rainwater only or a combination of reclaimed water with other non-potable water sources, an OWASA meter measuring NPW entering the building will be used to bill for sewer charges from OWASA.

The OWASA meters will also be used to bill for NPW usage.



6. IRRIGATION SYSTEMS

The UNC-CH design requirements for irrigation systems utilizing non-potable water rely on several sources described below.

a. Applicability

Irrigation systems planning for reclaimed water utilization must meet the NC Administrative Code Reclaimed Water Regulations for set-backs from wells and surface waters.

It is recommended that all new irrigation systems use pipe and other components meeting non-potable water standards to prevent future costs associated with retrofits.

b. Pipe and Fixture Color

The color currently designated for irrigation systems with reclaimed water, harvested rainwater, and blended non-potable waters is purple (Pantone 522).

This color requirement can be found in the NC Administrative Code Reclaimed Water Regulations.

c. Sprinkler Heads

The NC Administrative Code considers sprinkler heads to be part of the distribution system that must be color-coded and labeled.

d. Spigots and Hose Bibs

Per the NC Administrative and NC Plumbing code spigots, hose bibs/connections, and other outlets must either:

- i. Be located in locked, below grade vaults and labeled.
- ii. Require operation with a tool that permits operation by authorized personnel only and be labeled.



e. Labeling

All pipes, sprinkler heads, fixtures, valves, and other fittings must be labeled per the NC Administrative Code – Reclaimed Water Regulations. UNC-CH requires that all NPW irrigation systems utilize the labeling in this regulation. These regulations specify locations, wording, frequency, colors, size, etc.

The University requires the following language to be included in the labeling:

RECLAIMED WATER – DO NOT DRINK – NO TOMAR

or

NON-POTABLE WATER – DO NOT DRINK – NO TOMAR

f. Irrigation Area Signage

Signs must be placed at every site where Reclaimed Water is in use for irrigation. The University has developed standard signage for this purpose that can be produced by the UNC-CH Sign Shop. This fulfills requirements in the NC Administrative Code – Reclaimed Water Regulations.

The standard signage for irrigation sites uses the following language:

UNC-CH CONSERVES DRINKING WATER BY
IRRIGATING WITH NON-POTABLE WATER IN THIS AREA.
DO NOT DRINK – NO TOMAR

g. Cross-Connection Control

Connections between potable and non-potable water systems are not permitted. The OWASA ordinance and State regulations require an air gap between potable and non-potable water distribution lines. If a potable back-up without an air gap is deemed necessary and is acceptable to department maintaining the irrigation system and to UNC-CH EHS, then an application for a site-specific alternative cross-connection measure must be submitted to NCDENR DEH Public Water Supply.

h. Meters

A meter is required at each new NPW Irrigation site. Meters will be used to fulfill record keeping requirements under the UNC-CH Reclaimed Water Utilization Permit. Meters will also be used to bill for NPW usage.

If a site is served by RCW only, the OWASA RCW meter will serve the above purposes if the meter serves the irrigation use only.

If a site is served by rainwater only or a combination of reclaimed water with other non-potable water sources, a separate UNC-CH NPW meter is required for measuring the combined NPW utilized for irrigation only. The UNC-CH NPW meters will conform to OWASA meter standards unless otherwise approved by UNC-CH Energy Services Non-Potable Water Manager.



7. CONDENSATE RECOVERY

Use of condensate in non-potable water systems is allowed and may be blended with rainwater when the provision of the NC Plumbing Code and the following UNC-CH Requirements are followed:

- a. Only condensate from UV treated air handling units accepted.
- b. A valve on the condensate drain line must be provided to divert coil cleaning wastewater to sanitary sewer drain.
- c. A raised drain to the storm/roof drainage system is necessary to prevent accidental collection of any wastewater.
- d. Signage indicating “No Biocide – Drains to Storm” must be placed on the air handler access doors.

8. RAINWATER HARVESTING

Further design guidance on harvested rainwater treatment and cisterns is forthcoming. The following are minimum standards.

- a. Harvested Rainwater for Indoor toilet and urinal flushing uses is required by the NC Plumbing Code to be filtered and disinfected. UNC-CH requires UV as the disinfection method.
- b. Filtering prior to distribution within the irrigation system is recommended to protect irrigation heads.