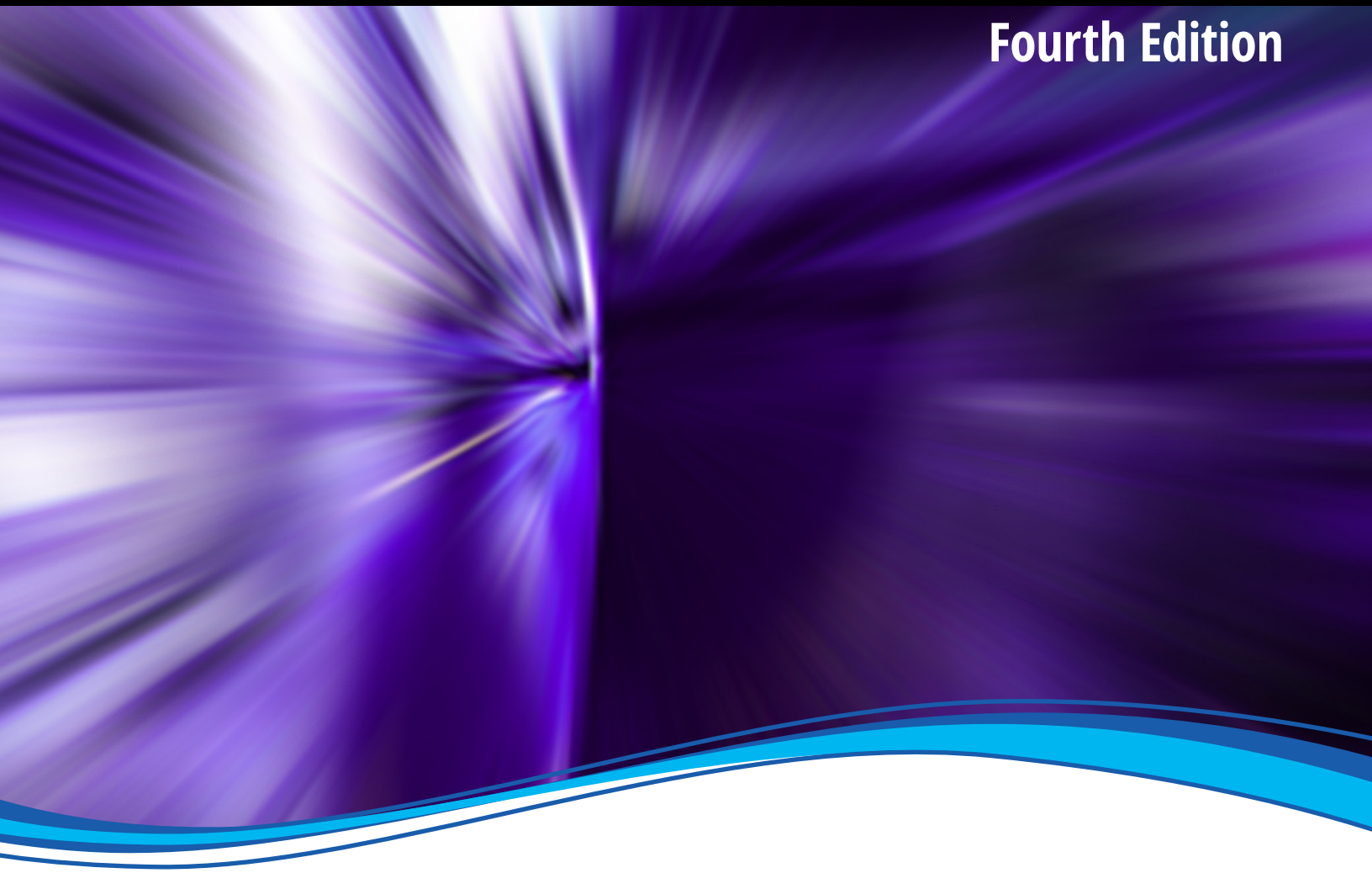
Manual of Water Supply Practices

M24

Planning for the Distribution of Reclaimed Water

Fourth Edition



American Water Works Association

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Preface

This publication is the third revision of the original AWWA Manual M24, *Dual Water Systems*, published in 1983. In the second revision, the title was changed to *Planning for the Distribution of Reclaimed Water* to better represent the content of the manual. This fourth edition builds upon that wholesale change in the manual and provides updates and additional information on the planning and design of dual distribution systems for appropriately treated reclaimed water (nonpotable water) for applications that do not require potable-quality water.

The distribution of reclaimed water using dual water distribution systems—one for potable water and the other for nonpotable water—is now a widely accepted practice. The drivers for the increasing use of reclaimed water are diminishing supplies of high-quality water resources, escalating costs for developing new sources or for treating poor-quality water to potable-water standards, and the increasing costs associated with discharging wastewater to the environment.

When faced with the task of developing additional water sources, utility managers and design engineers are increasingly evaluating the potential for distributing reclaimed water to serve their community's needs. Properly treated and distributed nonpotable water, as defined herein, can safely be used for irrigation, industrial applications, and a wide range of other nonpotable urban purposes, including toilet flushing in high-rise commercial and residential buildings. Developing a reclaimed-water distribution system may be less costly and less wasteful than existing practices that use potable water for purposes that do not require such high-quality water. In recent years, there has been a growing interest in smaller dual distribution systems using reclaimed water from distributed water-reclamation facilities within a utility's service area. This concept is introduced in this manual.

National standards for the distribution and use of nonpotable water have not been established; however, the US Environmental Protection Agency (USEPA) updated its Guidelines for Water Reuse in 2012. As of 2018, 22 states have regulated standards for the distribution and use of nonpotable water, and 25 other states have some form of regulation (9) or guidelines (16) related to the production of reclaimed water. The AWWA Water Reuse Committee, which prepared this manual, provides the information in this manual for water systems wishing to distribute reclaimed water. Water utilities should consult state and local regulatory agencies before designing a nonpotable-water distribution system, as state and local regulations may impose requirements that differ from the recommendations in this manual.

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Acknowledgments

This fourth edition of the AWWA Manual M24, *Planning for the Distribution of Reclaimed Water,* was prepared by members of the Water Reuse Committee of the AWWA Water Resources Sustainability Division. Alan Rimer of EnviroTechNovations LLC (retired from Black & Veatch) served as Chair. There were many contributors to this manual. Some wrote full sections, while others contributed extensively by providing materials for the manual and/or through their thorough review of the document. The Chair and AWWA Staff are very grateful for all of the effort that went into the creation of this fourth edition.

Specifically, the following were primarily responsible for various chapters of the manual:

- Chapter 1 *Introduction* – Dr. Alan Rimer, EnviroTechNovations LLC (Black & Veatch Retired), Chapel Hill, N.C.
- Chapter 2 *Water Reuse Regulations and Guidelines* – Craig Riley, Washington State Gov. (retired), Spokane Valley, Wash.
- Chapter 3 *Planning* – Don Vandertulip, Vandertulip WateReusEngineers, San Antonio, Tex.
- Chapter 4 *Engineering Design—Treatment* – Dr. Erin Mackey, Brown & Caldwell, Walnut Creek, Calif.
- Chapter 5 *Engineering Design—Distribution* – Sumon Ghosh, Canada, & Dr. Alan Rimer
- Chapter 6 *Management* – Ane Deister, Shingle Springs, Calif.
- Chapter 7 *Financial/Economic Issues* – Jerry Brown, Contra Costa Water District, Concord, Calif.

David Ammerman, Thomas Bell-Games, Jim Crook, Venkatraman Radhakrishnan, and Peter Rogers provided information and/or editorial guidance on the final document. Many members of the AWWA Water Reuse Committee provided input to the manual along the way.

AWWA staff were most helpful. Sue Weikel took up the project midway through the effort and was instrumental in moving this publication along. Alex Gerling provided technical editorial guidance.

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Chapter 1

Introduction

Since 1983, when the first edition of this American Water Works Association (AWWA) manual was published, many water and wastewater utilities, communities, authorities, states, and countries have implemented dual water distribution systems, particularly in light of the increased emphasis on higher degrees of wastewater treatment. These water-reclamation facilities can significantly increase the availability of reclaimed water for use as described in this manual. They provide reclaimed wastewater to a variety of customers, making the most of all their available water resources. The International Water Association in London lists, in addition to the United States, Australia, and the United Kingdom, 13 other countries that have strong programs in dual water distribution and water reclamation. Assessing the growth of water reclamation and the adoption of dual water distribution systems for communities large and small has been a difficult task as their growth seems to be almost exponential. What is appreciated worldwide is that wastewater reclamation and dual water distribution systems are an important consideration for communities as they search to expand their water supply resource(s).

This manual discusses the planning, design, construction, operation, regulatory framework, and management of community dual water distribution systems, which consist of separate systems for distributing potable water and nonpotable water principally drawn from reclaimed wastewater specifically for use in such dual distribution systems. Increasingly, there is the potential for potable reuse, which is discussed in various locations throughout this manual. Reclaimed water treated to potable-water standards is not distributed in a dual distribution system.

DEFINITIONS

- *Advanced water purification facility (AWPF):* A water purification facility that through a series of unit operations produces a purified potable-water source suitable for use as a potable-water supply from the supply water from a water resource recovery facility (WRRF), a raw water supply, or a combination of both.