TRAINING MANUAL FOR ONSITE OPERATORS: NATIONAL CERTIFICATE PROGRAM & AUSTIN TEST-CASE

DECEMBER 17, 2025

2 – 3 PM ET | 11 AM – 12 PM PT

IN COLLABORATION WITH National Blue Ribbon Commission for Onsite Water Systems

WATEREUSE ASSOCIATION WEBCAST SERIES

ENGAGE.
EDUCATE.
ADVOCATE.

WATEREUSE®

A Few Notes Before We Start…

- Today's webcast is scheduled for 75 minutes, with 15 minutes at the end dedicated to Q&A
- Please type questions for the presenters into the Q&A box located at the bottom of your screen.
- A PDF of this presentation & video recording will be shared with registrants afterwards via email
- There is one (1) Professional Development Hour (PDH) available for this webcast. Please email the PDH form to webcasts@watereuse.org

WATEREUSE® 2026 SYMPOSIUM

LA InterContinental Downtown | March 8-11

watereuse.org/symposium

Keynote Speaker: Philippe Cousteau Jr., Voyacy Regen

Registration is Open!

- Advance Rate: Dec 16 – Feb 18
- Book Your Hotel Stay: Click this Link
- Sign up for a Tour: Click this Link

TODAY'S PRESENTERS

Moderator

Monika Merk
Technical Program Manager
WateReuse Association

Taylor Nokhoudian
Water Resources Program Manager
San Francisco Public Utilities Commission (SFPUC)

Robert Stefani
Environmental Program Coordinator
Austin Water

Maddie Christensen
Engagement Strategist
Water Professionals International (WPI)

Available for Q & A portion:
Ryan Pulley, Director of Water Reuse Operations, Epic Cleantec

Thank You!

Lead Contributors

- Austin Water, Robert Stefani & Katherine Jashinski
- Epic Cleantec, Ryan Pulley
- National Blue Ribbon Commission for Onsite Water Systems (NBRC), Paula Kehoe
- San Francisco Public Utilities Commission (SFPUC), Taylor Nokhoudian
- WateReuse Association, Monika Merk

Review Contributors

- American Rainwater Catchment Systems Association (ARCSA) International
- Biohabitats
- International Association of Plumbing and Mechanical Officials (IAPMO)
- Natural Systems Utilities (NSU)
- Water Professionals International (WPI)
- System Operation Services (SOS)

Taylor Nokhoudian

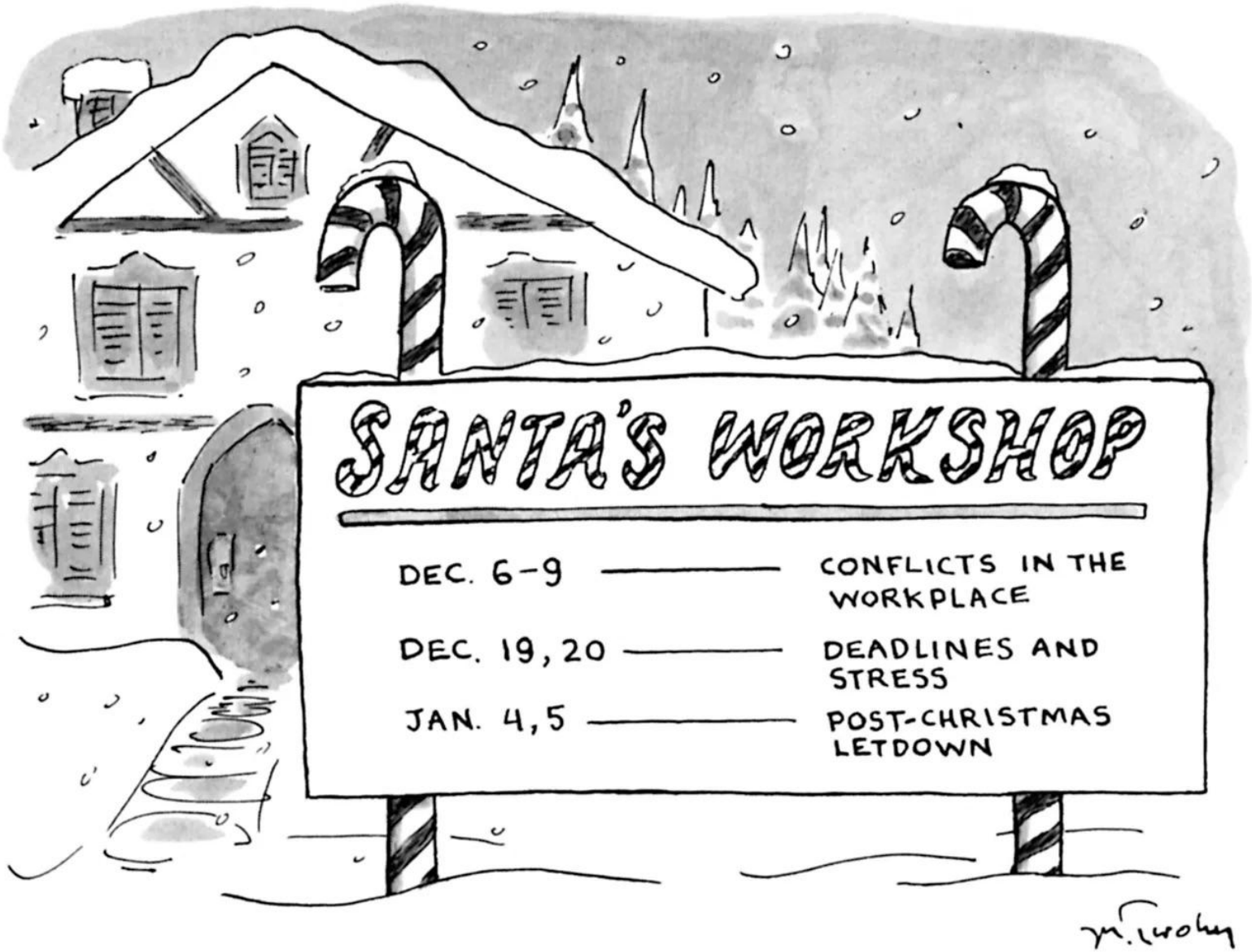
Water Resources Program Manager
San Francisco Public Utilities Commission

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

WateReuse

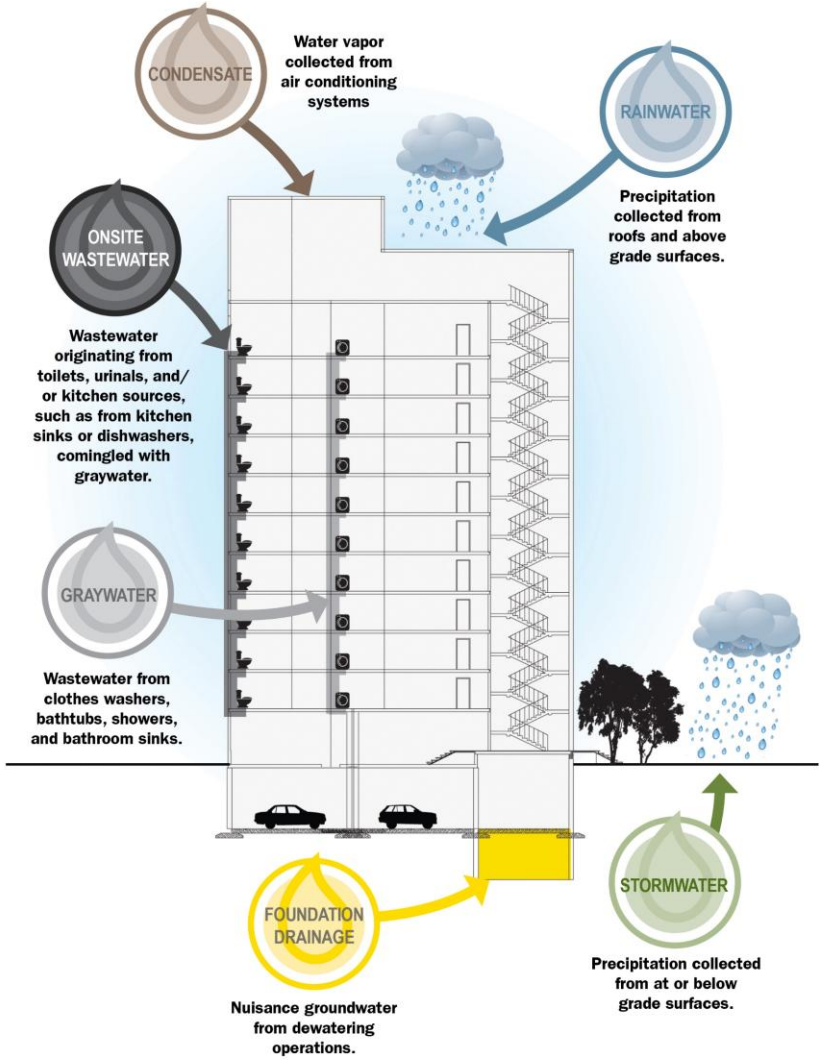
Transforming Water Management with Onsite Water Reuse

Taylor Nokhoudian
San Francisco Public Utilities Commission
December 2025


SANTA'S WORKSHOP
DEC. 6-9 — CONFLICTS IN THE WORKPLACE
DEC. 19, 20 — DEADLINES AND STRESS
JAN. 4, 5 — POST-CHRISTMAS LETDOWN

Opportunity to Re-think & Re-imagine Water Use in Buildings

Onsite Water Recycling – Buildings Are Not Just Consumers But Producers of Water



Onsite Water Treatment Systems Installed Throughout the World

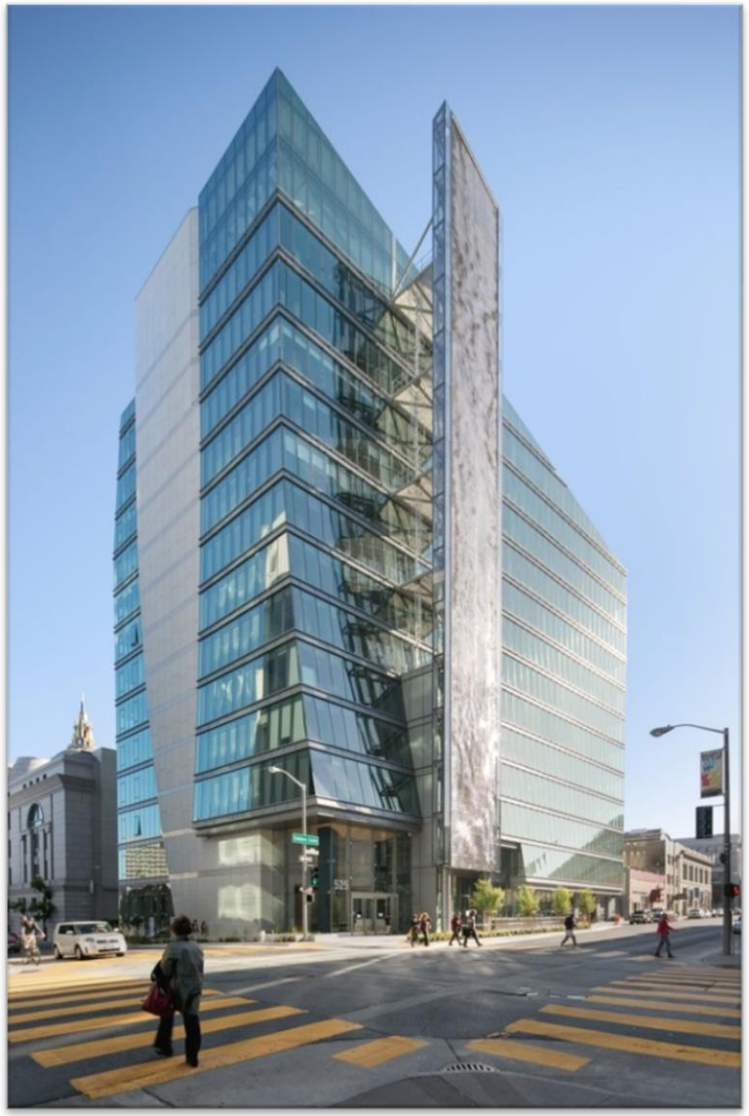
Benefits of Onsite Water Treatment Systems

- Climate resilient water source for households, buildings and neighborhoods
- Systems are flexible and can be installed quickly
- Alleviate water scarcity
- Reduce burden on centralized infrastructure

Biggest Barriers to Wide-Spread Onsite Water Treatment Systems

- Lack of appropriate water quality standards
- Absence of state or federal regulations
- Lack of guidance on oversight and management for ongoing protection of public health

San Francisco Set out to Address Barriers and Change the Paradigm from a Utility Perspective



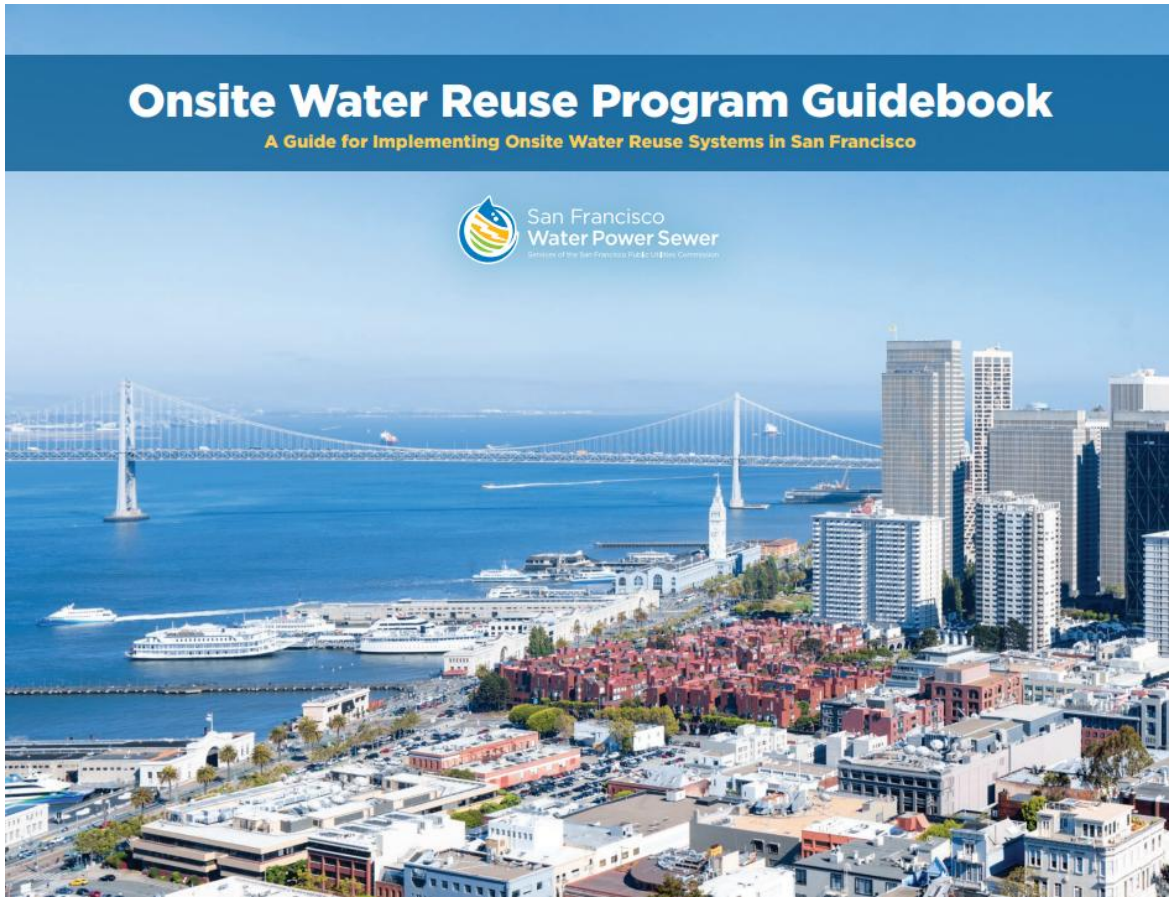
2012 SF Ordinance Established Regulatory Program to Enable Buildings to Install Onsite Treatment Systems

SFPUC	SFDPH-EH	SFDBI	SFPW
Program Administration and Cross-Connection Control	Public Health	Construction	Right of Way and Mapping
Review onsite non-potable water supplies & demands Administer citywide project tracking & annual potable offset achieved Provide technical support & outreach to developers Manages Cross-Connection Control Program	Issue water quality & monitoring requirements Review and approve non-potable engineering report Issue permit to operate onsite systems Review water quality reporting	Conduct Plumbing Plan check and issue Plumbing Permit Inspect and approve system installations	Issue Encroachment Permits as needed for infrastructure in the Right-of-Way (if needed) Includes condition on a subdivision map or a parcel map requiring compliance with the Non-potable Ordinance prior to approval and issuance of said map (if applicable)

Streamlined Permitting Process

10 Steps for Successful Implementation of an Onsite Water Reuse System

1. **Submit a Water Budget Application to SFPUC-WRD**
2. **Submit a Non-potable Implementation Plan to SFPUC-WRD** (district-scale projects only)
3. **Submit Application for Permit to Operate to SFDPH-EH**
4. **Obtain Encroachment Permit from SFPW** (if applicable)
5. **Obtain Plan Check Approval from SFDBI-PID and SFDPH-EH and Complete System Construction**
6. **Conduct a Cross-Connection Test with SFPUC-WQD and Complete Post-Construction Inspection**
7. **Submit Documentation for a Permit to Operate from SFDPH-EH**
8. **Obtain a Permit to Operate from SFDPH-EH**
9. **Operate in Conditional Startup Mode**
10. **Operate in Final Use Mode with SFDPH-EH Approval**

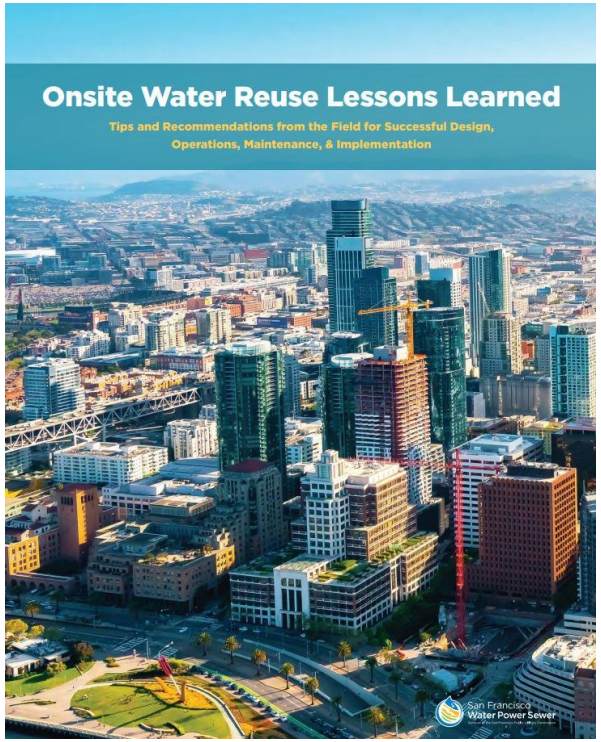


SF Integrating Decentralized and Centralized Infrastructure at the Building/Neighborhood Scale

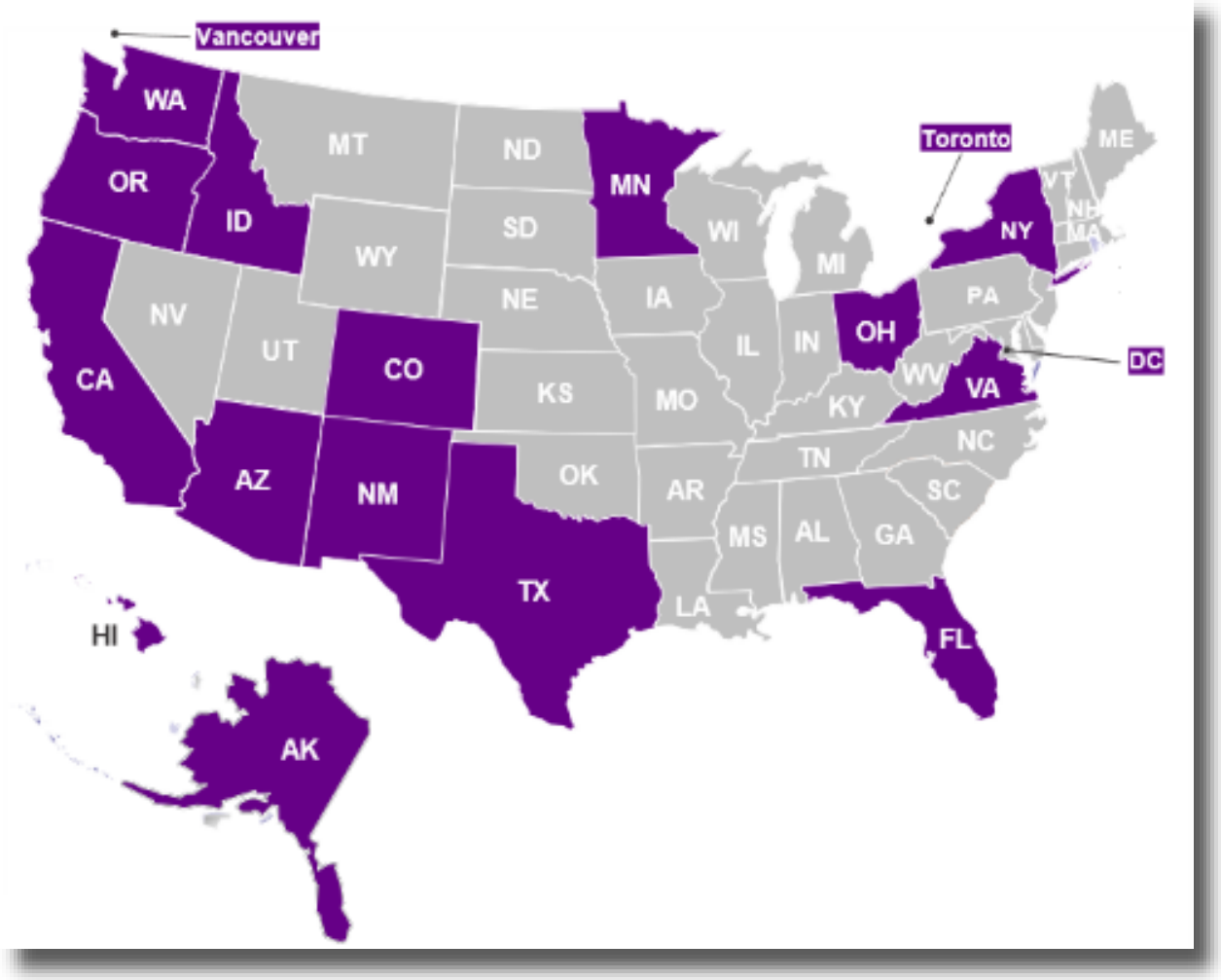
58 permitted systems

SF's Lessons Learned

- Water and sewer connections
- Backflow protection requirements & cross connection
- Blackwater collection rather than graywater in commercial buildings
- Interagency collaboration, dedicated staff for oversight and management & partnership with private sector
- Operator capacity



Expand Collaboration and Establish NBRC for Onsite Water Systems



In 2016, formalized partnership:

- Public health regulators
- Water and wastewater utilities
- US EPA and US Army
- WateReuse Association, Water Research Foundation, and US Water Alliance

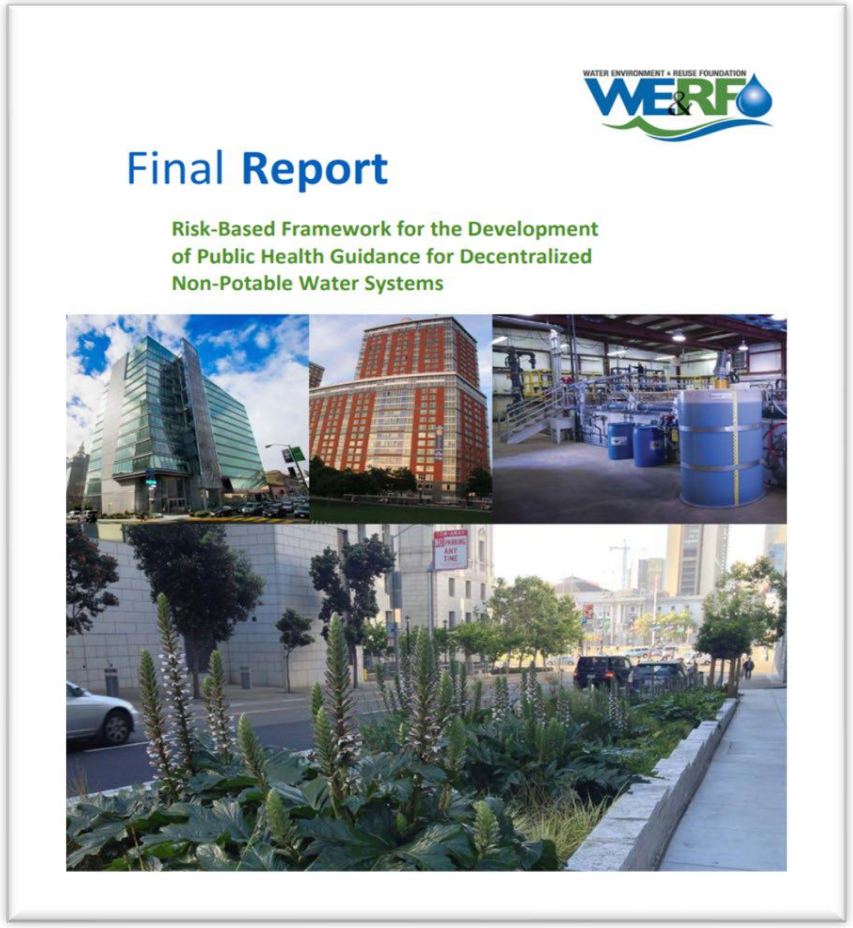
National Blue Ribbon Commission for Onsite Water Systems

NBRC Goals

- Establish Appropriate Water Quality Standards and Promote Consistency among States
- Encourage Oversight and Management Programs
- Develop Technical and Policy Documents for Regulators, Designers, Operators, and Water/Wastewater Utilities
- Forum for Peer- to- Peer Learning

National Blue Ribbon Commission for Onsite Water Systems

Establishment of Health Risk-based Benchmarks to Protect Public Health in 2017



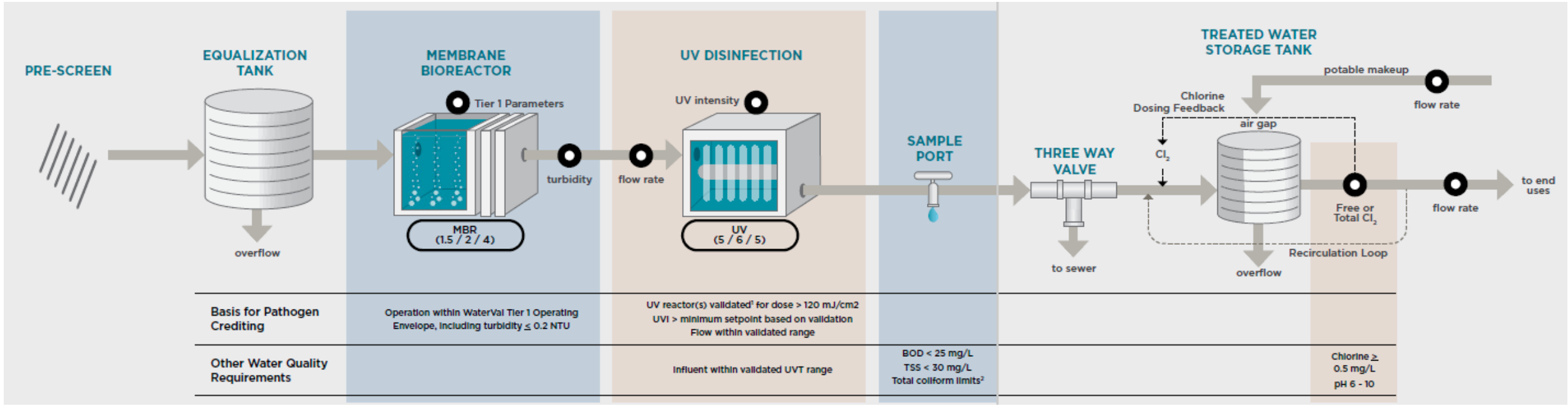
Address pathogens of greatest concern to human health:

- Bacteria
- Protozoa
- Virus

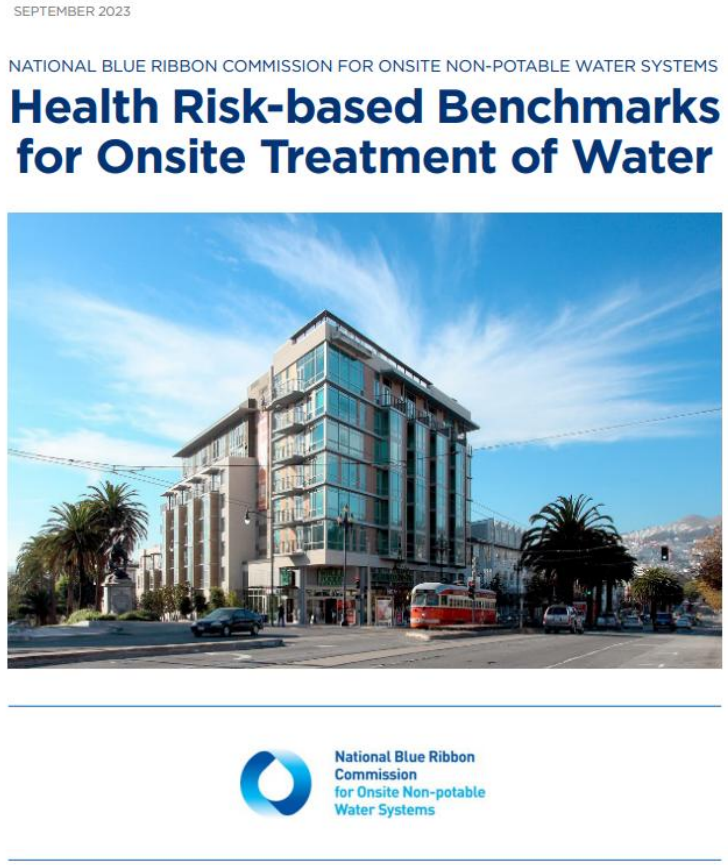
Pathogen Log Reduction Targets for Various Water Sources & End Uses

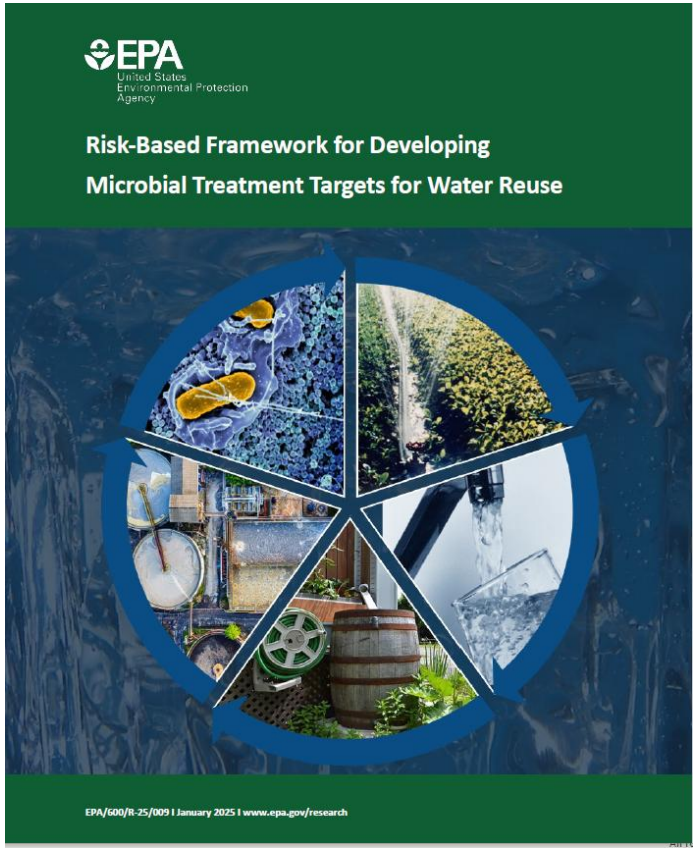
	Enteric Viruses	Parasitic Protozoa	Enteric Bacteria
Blackwater			
Outdoor use	8.0	7.0	6.0
Indoor use	8.5	7.0	6.0
Graywater			
Outdoor use	5.5	4.5	3.5
Indoor use	6.0	4.5	3.5
Roof Runoff			
Outdoor use	N/A	N/A	3.5
Indoor use	N/A	N/A	3.5
Stormwater			
Outdoor use	3.0	2.5	2.0
Indoor use	3.5	3.5	3.0

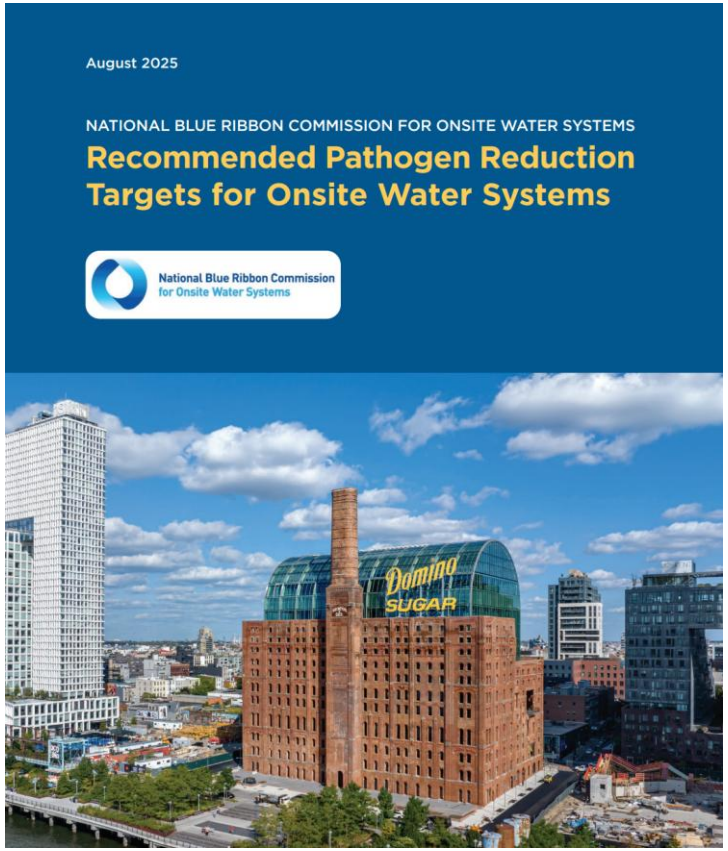
Example Graywater Treatment Train for Indoor Use



Updated Science and Research of Health Risk-based Benchmarks







Opportunities to Accelerate

- Balance public health needs with other impacts, including affordability
- Technology innovation and holistic, integrated solutions are needed (onsite heat recovery, nature-based solutions, and much more)
- Expand operator training programs
- Clearly articulate the benefits, challenges, and lessons learned
- Expand global partnerships via BILD

Robert Stefani

Environmental Program Coordinator

Austin Water

Austin Water

WateReuse

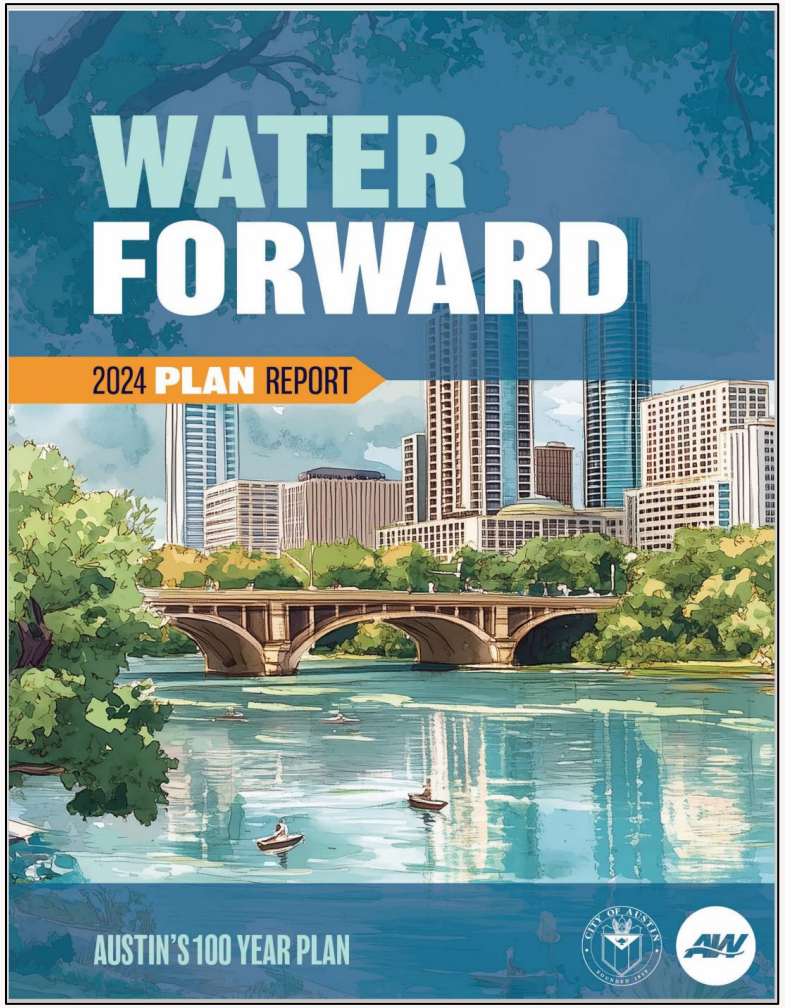
Austin Water

Austin

Austin Water | 12/17/2025

O&M Manual Development Drivers

- Austin Water's Water Forward Plan
  - 100-year planning horizon
  - No new traditional water supplies
- Acknowledged lack of system operators
  - EPA Water Reuse Action Plan (WRAP)
  - National Blue-Ribbon Commission (NBRC) 2024 Action Plan
- Austin Code requirement
  - City of Austin Land Development Code 25-9-413
  - Mandatory installation on Onsite Reuse Systems in MF/Com. development over 250k square feet.



Local O&M Manual Deployment

- Manual will be provided as free resource to local industry
  - Assist in local development of Operators
- Training resource for successful OWRS operation
  - Critical for realizing Water Supply Augmentation goals
- Promotion of manual
  - Prominent placement on Austin Water Website
  - Inclusion into 2026 Austin Water Webinar series

O&M Manual Contents

- Sixteen sections
- Broad and specific topics related to successful system operation
- Comprehensive overview of successful O&M of Onsite Water Reuse System
- Local content embedded
- Self check questions
- Content developed by small group including AW, SFPUC, NBRC, WateReuse, and Epic Cleantec
- Content reviewed by larger group including ARCSA, IAMPO, NSU, WPI, SOS, and Biohabitats

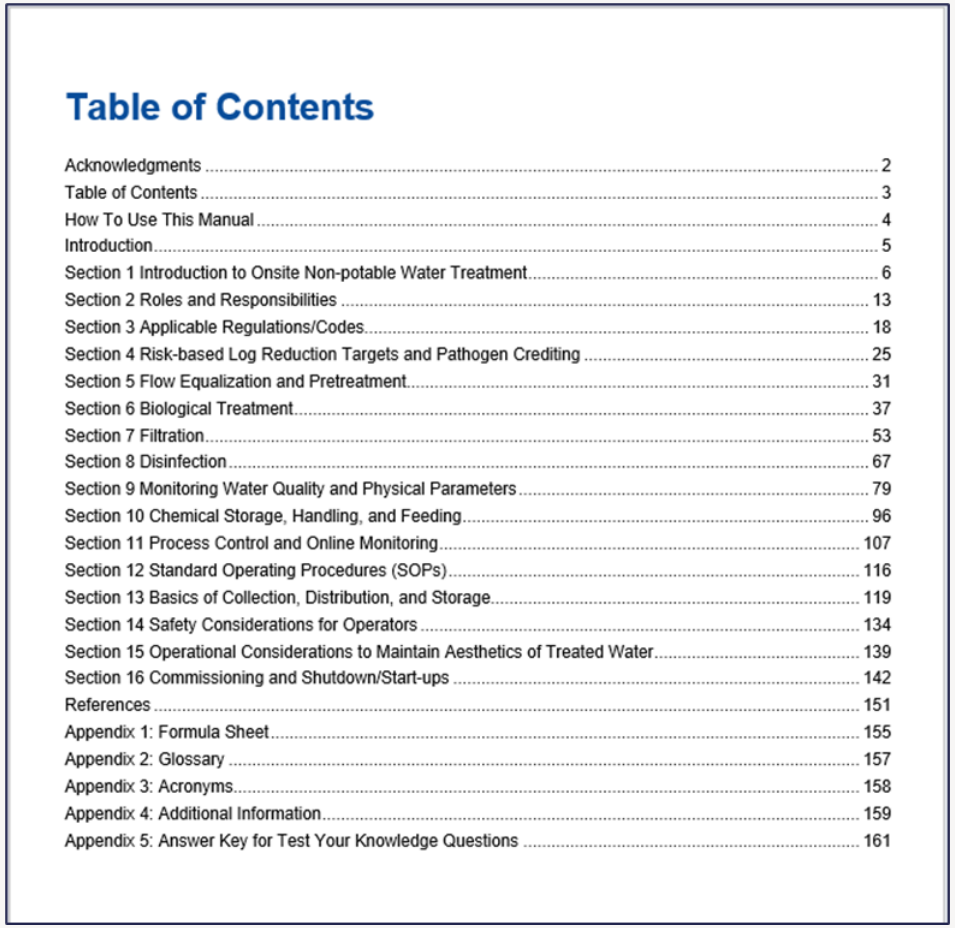
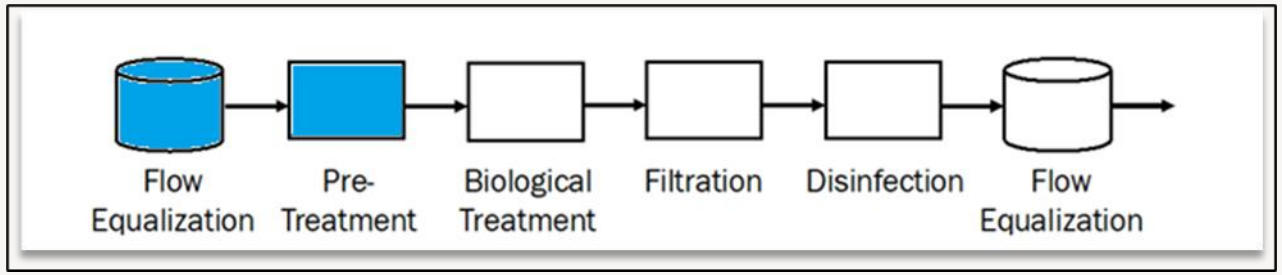


Table of Contents

Acknowledgments 2
Table of Contents 3
How To Use This Manual 4
Introduction 5
Section 1 Introduction to Onsite Non-potable Water Treatment 6
Section 2 Roles and Responsibilities 13
Section 3 Applicable Regulations/Codes 18
Section 4 Risk-based Log Reduction Targets and Pathogen Crediting 25
Section 5 Flow Equalization and Pretreatment 31
Section 6 Biological Treatment 37
Section 7 Filtration 53
Section 8 Disinfection 67
Section 9 Monitoring Water Quality and Physical Parameters 79
Section 10 Chemical Storage, Handling, and Feeding 96
Section 11 Process Control and Online Monitoring 107
Section 12 Standard Operating Procedures (SOPs) 116
Section 13 Basics of Collection, Distribution, and Storage 119
Section 14 Safety Considerations for Operators 134
Section 15 Operational Considerations to Maintain Aesthetics of Treated Water 139
Section 16 Commissioning and Shutdown/Start-ups 142
References 151
Appendix 1: Formula Sheet 155
Appendix 2: Glossary 157
Appendix 3: Acronyms 158
Appendix 4: Additional Information 159
Appendix 5: Answer Key for Test Your Knowledge Questions 161

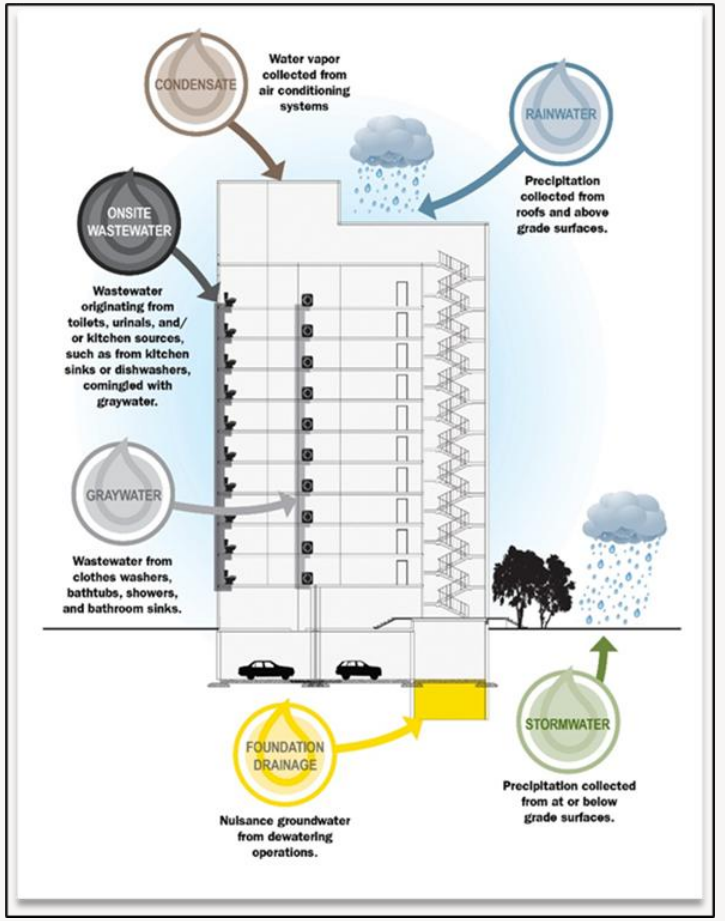
O&M Manual Sections

- Sect. 1: Introduction to Onsite Non-potable Water Treatment
- Sect. 2: Roles and Responsibilities
- Sect. 3: Applicable Regulations/Codes
- Sect. 4: Risk-based Log Reduction Targets and Pathogen Crediting
- Sect. 5: Flow Equalization and Pretreatment
- Sect. 6: Biological Treatment
- Sect. 7: Filtration
- Sect. 8: Disinfection



O&M Manual Sections Continued

- Sect. 9: Monitoring Water Quality and Physical Parameters
- Sect. 10: Chemical Storage, Handling, and Feeding
- Sect. 11: Process Control and Online Monitoring
- Sect. 12: Standard Operating Procedures (SOPs)
- Sect. 13: Basics of Collection, Distribution, and Storage
- Sect. 14: Safety Considerations for Operators
- Sect. 15: Operational Considerations to Maintain Aesthetics of Treated Water
- Sect. 16:Commissioning and Shutdown/Startups



Local Implementation of Onsite Water O&M Certificate

- Certificate required by code
  - Utility Regulations 15-13-51
- Partnership with local educational institutions and non-profits
  - Interest from academia and workforce development community
- Integration into existing Austin Water training opportunities
  - Model after current water/wastewater operator training program
- Will complement existing certificate/certification requirements
  - State License required where applicable

Questions?

Robert Stefani

Environmental Program Coordinator

(512) 974-9302

robert.stefani@austintexas.gov

Maddie Christensen
Engagement Strategist
Water Professionals International (WPI)

WATER PROFESSIONALS INTERNATIONAL

WATEREUSE

WATER PROFESSIONALS INTERNATIONAL

The Associated Boards of Certification

ABC TO WPI: 50 YEARS IN THE MAKING

ABC Association of Boards of Certification ™

The Association of Boards of Certification has been assisting states and provinces with environmental certification programs since 1972.

WATER PROFESSIONALS INTERNATIONAL:
SUPPORTING THE INDUSTRY THROUGH MULTIPLE CHANNELS

STANDARDIZED EXAM DEVELOPMENT

EXAM ADMINISTRATION – TESTING SERVICE

CUSTOMIZED EXAM PROGRAMS

VOLUNTARY CERTIFICATION PROGRAMS

PROFESSIONAL OPERATOR PROGRAM

PARTNERSHIPS WITH EDUCATIONAL ORGANIZATIONS

WATER PROFESSIONALS INTERNATIONAL

The Associated Boards of Certification

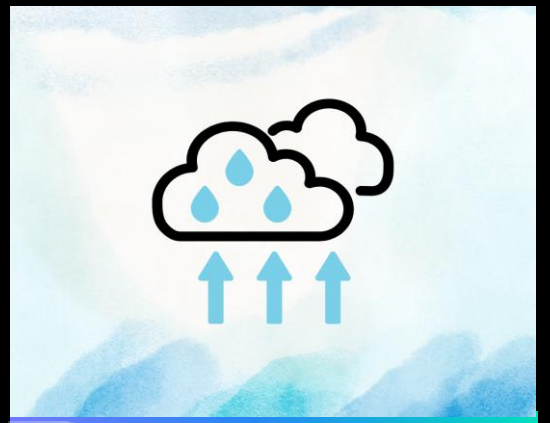
WATER PROFESSIONALS INTERNATIONAL

The Associated Boards of Certification

ONWS EXAMS

We will be creating two exams:

Graywater/ Blackwater/ Stormwater

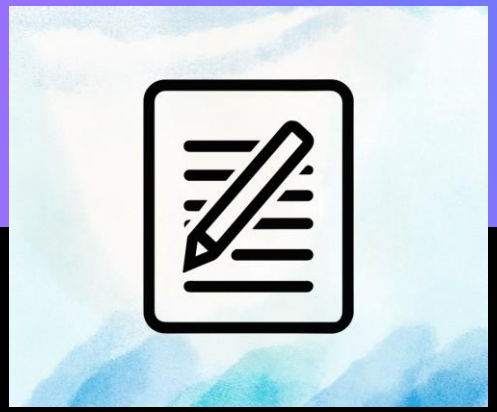


Rainwater/ Condensate

WATER PROFESSIONALS INTERNATIONAL

The Associated Boards of Certification

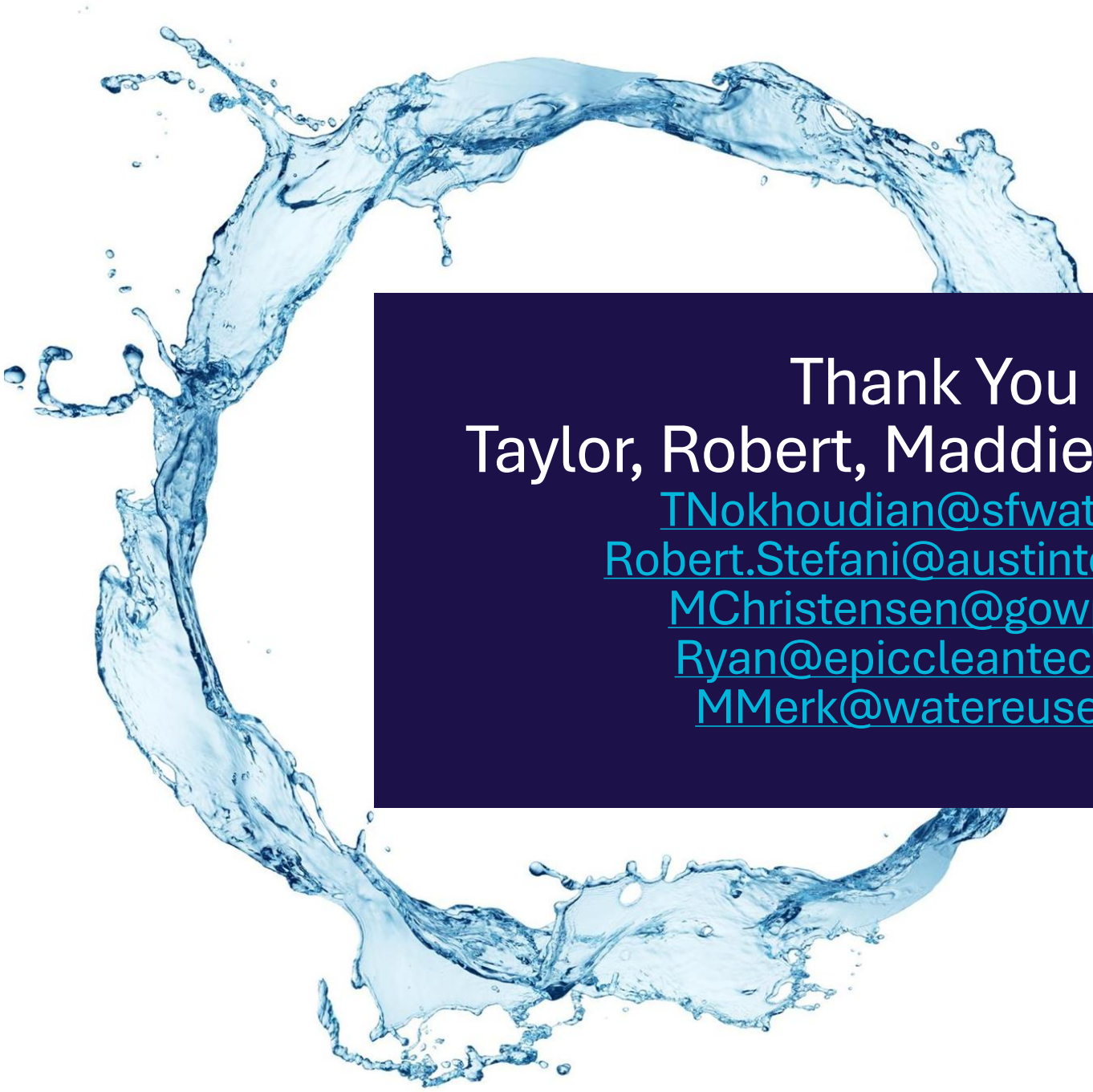
EXAM DETAILS



Certificate Program

60 items (50 scored and 10 pretest)

90 minutes to take exam



Thank You
Taylor, Robert, Maddie, and Ryan!

TNokhoudian@sfwater.org
Robert.Stefani@austintexas.gov
MChristensen@gowpi.org
Ryan@epiccleantec.com
MMerk@watereuse.org

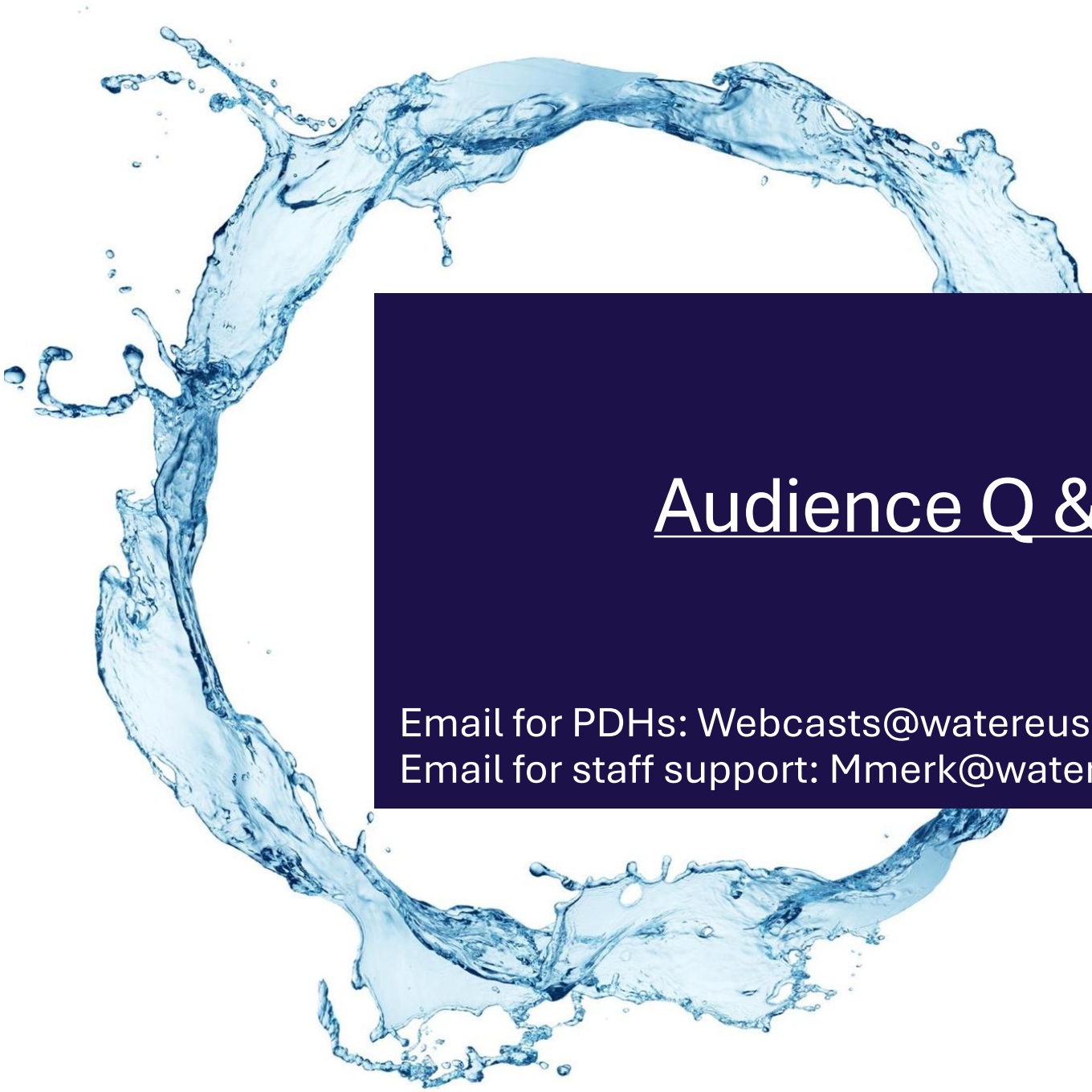
Austin Water

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

WPI WATER PROFESSIONALS INTERNATIONAL

epiccleantec

WATEREUSE



Audience Q & A

Email for PDHs: Webcasts@watereuse.org
Email for staff support: Mmerk@watereuse.org

WateReuse