

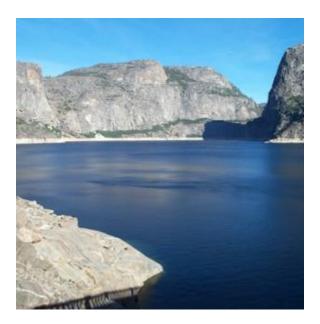
Onsite Water Reuse

Paula Kehoe
Director of Water Resources
San Francisco Public Utilities Commission
January 25, 2019





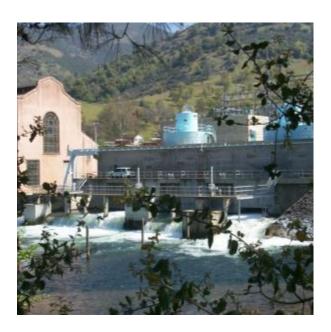
San Francisco Public Utilities Commission



Water: delivering high quality water every day to 2.7 million people



Wastewater: protecting public health and the environment



Power: generating clean energy for vital City and residential services



OneWaterSF Transition from Linear to Circular







San Francisco's Local Water Program

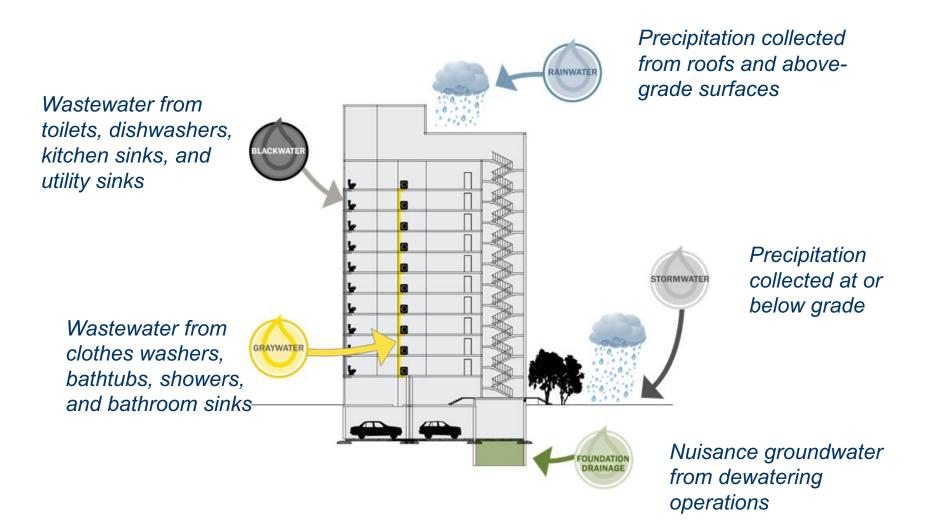
+ LOCAL WATER

Better together.

Conservation
Groundwater
Recycled Water
Onsite Water Recycling

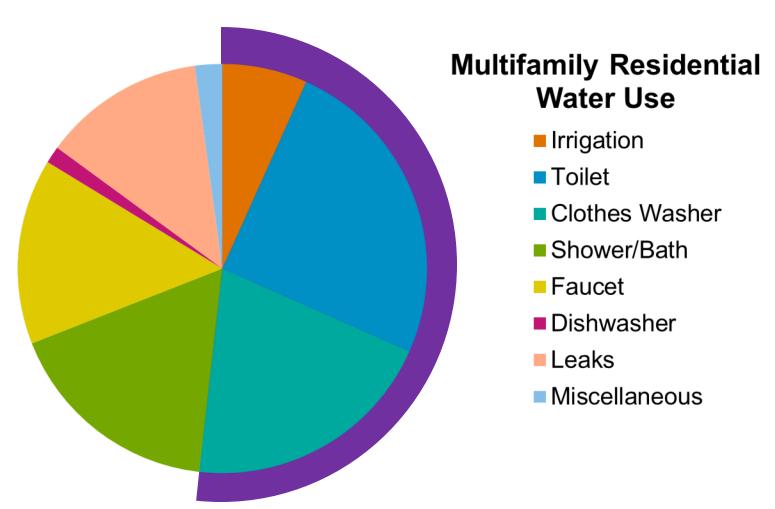


Buildings Produce Alternate Water Sources





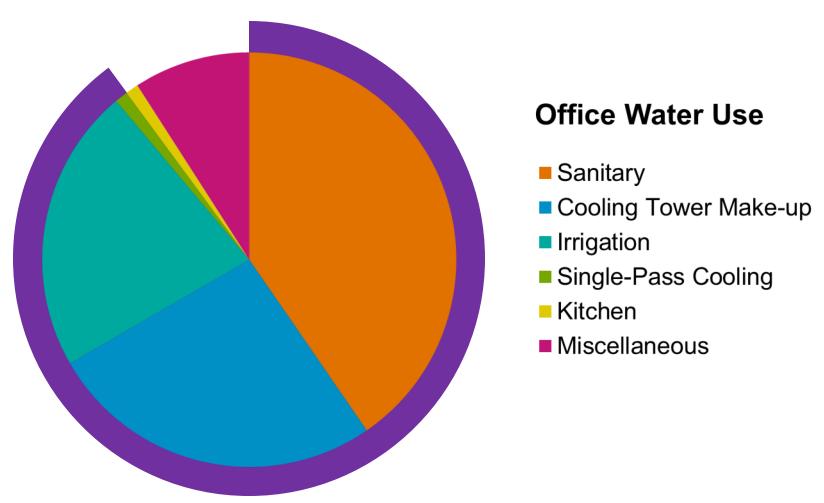
Up to 50% of Demands are Non-potable in Multi-family Residential Buildings



Source: adapted from Alliance for Water Efficiency



Up to 95% of Demands are Non-potable in Commercial Buildings



Source: USEPA



Innovative Onsite Water Use at SFPUC Headquarters

Rainwater Harvesting System

- 25,000 gallon cistern
- Reuse for irrigation

Wetland Treatment System

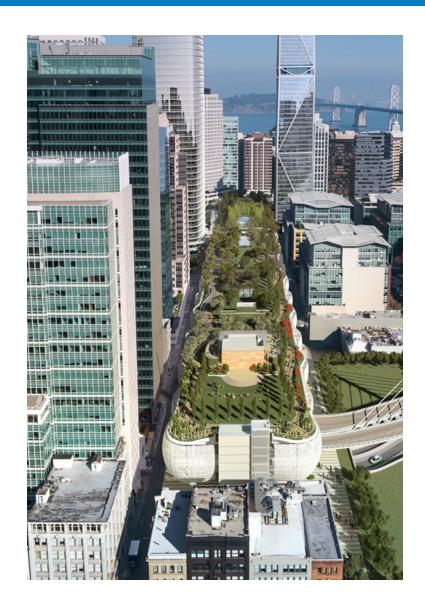
- Collects and treats building's wastewater
- Reuse for toilet flushing
- 5,000 gpd capacity
- 60% potable water offset







Developers Interested in Collecting & Treating Water Onsite







Regulatory Oversight for Onsite Water Systems

- Who should set water quality standards?
- Who should issue permits and provide operational oversight?
- What type of on-going monitoring and reporting should be implemented?













California Plumbing Code

- Graywater and Rainwater Uses & Water Quality
 Standards
- Provides Construction Requirements
- Includes Purple Pipe and Signage Requirements
- No Oversight and Management



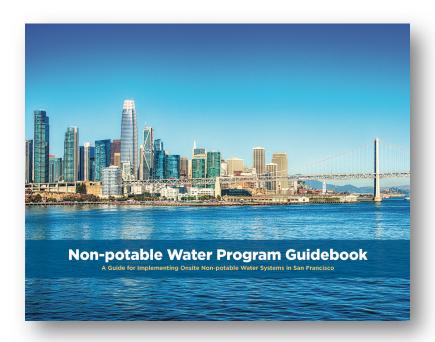


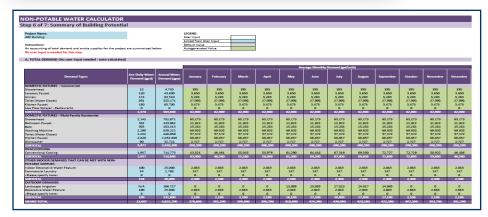
San Francisco Ordinance & Roles and Responsibilities

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 &	Issue water quality & monitoring requirements Review and approve nonpotable 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)



Technical and Financial Assistance





Grant Assistance for Large Alternate Water Source Projects

Grant Assistance for Large Alternate Water Source Projects

Grant Guidelines and Terms



Grant Assistance Overview

The SFPUC's Grant Assistance for Alternate Water Source Projects (Grant Assistance) is a program designed to encourage retail water users to implement the on-site treatment and use of non-potable water including but not limited to rainwater, stormwater, granywater, foundation drainage, and blackwater. The goal is to maximize the use of nonpotable water for totled flushing, irrigation, and other non-potable user. The SFPUC has approximately \$1,000,000 in funding available for two types of non-potable water projects; 1) district-scale projects that consist for two or more parcels that share treated alternate water sources or 2) building-scale projects that include any residential or non-residential building of at least 100,000 square feet or more. Grants will be awarded to those applicants who demonstrate they will significantly and permanently reduce or offset the use of existing drinking water supplies for non-potable applications.

Types of activities considered for funding include the installation of harvesting or collection systems for onesite sources, readment systems to improve the water quality of on-site sources for beneficial resus, and/or storage of the treated water. The SFPUC anticipates funding multiple projects. The deadline for applications for Calendar Year 2014 is December 31, 2014. Provision of grant funding is based on the eligibility of the proposed activity and availability of funds. Each applications will be reviewed and evaluated on a case-by-case basis. Grant funding is available on a first come, first serve basis and is limited to \$250,000 per on-site project and \$500,000 per district-scale Grant Assistance may not apply for Building-scale Grant Assistance.

Grant assistance will support customer efforts to implement sustainable water use practices in San Francisco. In addition to advancing water supply reliability, this grant assistance will support the SFPUC's Phased Water System Improvement Program Variant (WSIP) goals adopted by Resolution No. 08-200 on October 30, 2008. The WSIP included a goal of developing an additional 10 million gallons per day (mgd) of locally available water resources.

Definition

Terms used in this grant application package have the meanings described below

Alternate Water Source - Non-potable source of water that includes graywater, stainwater, stamwater, stomwater, foundation dramage, and blackwater. The level of treatment and quality of the alternate water source shall be approved by the City's Department of Public Health and comply with all applicable federal, state, and local resultations.

Applicant – property owner that is a retail water customer of the SFPUC, proposing the installation of a building-scale or district-scale treatment system on their property, and is seeking grant funds from the SFPUC for an alternate water source project, pursuant to the instructions and guidelines set forth in this application package.

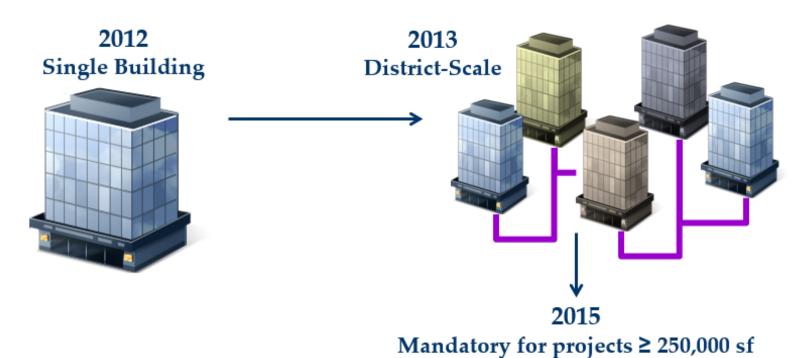
Award – the decision by the SFPUC to provide grant funds, following the review and evaluation of a completed application. An award is made through a Grant agreement.

Blackwater – wastewater containing bodily or other biological wastes, as from toilets, dishwashess, kitchen sinks and utility sinks. Because of plumbing configurations, blackwater, leaving a building generally includes graywater.

1



An Evolving Non-potable Water Program











181 Fremont Graywater and rainwater for toilet flushing and irrigation





Salesforce Tower Blackwater for flushing, cooling and irrigation





Chase Center

Rainwater, stormwater, graywater and condensate for flushing and irrigation





Moscone Convention Center

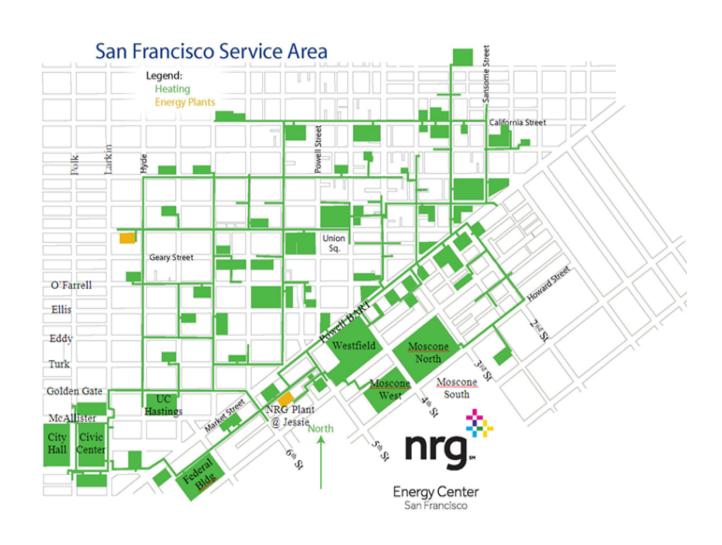
Foundation Drainage for flushing, irrigation, and street sweeping





NRG-BART Project

Foundation Drainage for underground steam loop





Key Utility Considerations

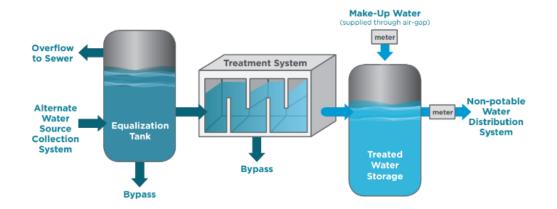
- Water and sewer connections
- Wastewater flows and odors
- Revenue impacts
- Capacity charge adjustments
- Enforcement
- Cultural shift





Key Program Considerations

- Backflow protection requirements
- Cross-connection test prior to operation
- Interagency collaboration
- Operator capacity
- Policy synergies





Expanding Non-potable Water Program

- Expanding focus to include brewery process water onsite treatment and reuse
- Developed chemical and pathogen strategy to protect public health
- Contact and non-contact uses



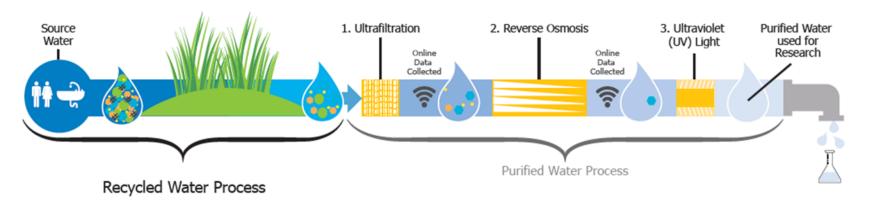
Grant opportunities



Piloting Purified Water Project

- Produce purified water from recycled water at SFPUC headquarters
- Research project including additional treatment and real time monitoring
- Community outreach and public education









- Rainwater harvesting for potable purposes
- Atmospheric water generation

 Follow Alaska's lead on graywater

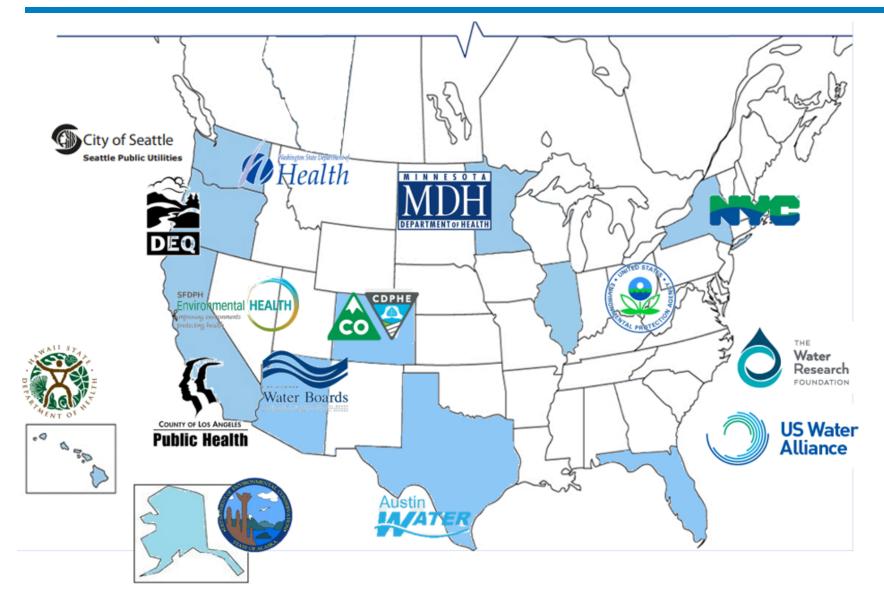








National Blue Ribbon Commission for Onsite Non-potable Water Systems





Solaire & Verdesian – Battery Park, NYC 45% Reduction in Potable Water







Hassalo on Eighth – Portland, OR 45,000 GPD







WATERHUB, Emory University- Atlanta, GA 40% Reduction in Potable Water





1 Bligh Street- Sydney, Australia 6M GPY Potable Water Offset







Dockside Green – Victoria, Canada 65% Reduction in Potable Water







Identifying Common Issues and Research Needs

- Oversight and management programs are needed on the local level; and
- Utilities and public health departments are looking for guidance on appropriate water quality standards to govern onsite water reuse.





New Technical Guidance for Onsite Water Systems



Final **Report**

Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems



- Report provides utilities and health departments guidance on appropriate water quality standards
- Current standards are not health risk based
- Risk-based pathogen Log Reduction Targets (LRTs) reduce exposure to potential health risks associated with potential exposure to viruses, protozoa, and bacteria
- LRT methodology already widely used in potable reuse and drinking water



Multiple Barrier Approach

Combine common treatment processes into a multiple barrier **treatment train**

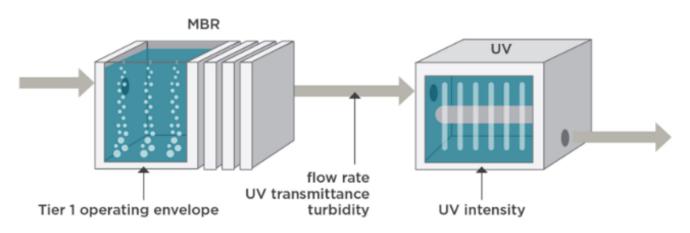
- Microfiltration (MF) / Ultrafiltration (UF)
- Membrane biological reactor (MBR)
- Ultraviolet light (UV) disinfection
- Chlorine and Ozone disinfection



A properly designed treatment train can be used to achieve **pathogen reduction credits** based on accepted **crediting frameworks**.



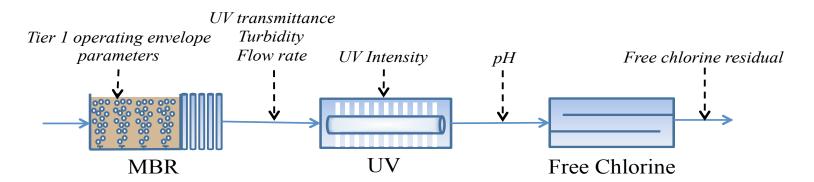
Example Graywater Treatment Train



			Total	Required
Virus Credit	1.5	6	7.5	6
Protozoa Credit	2	6	8	4.5
Bacteria Credit	4	6	10	3.5



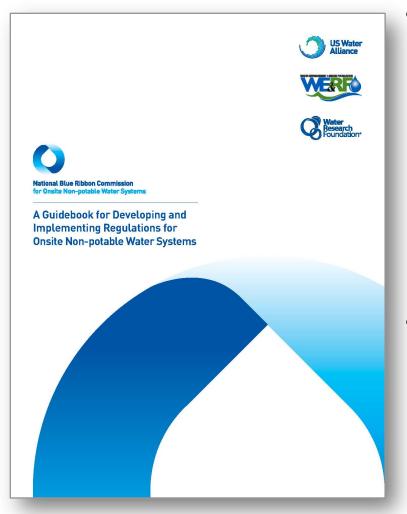
Example Blackwater Treatment Train



				Total	Required
Virus Credit	1.5	3.5	5	10	8.5
 Protozoa Credit	2	6	0	8	7
Bacteria Credit	4	3.5	0	7.5	6



Guidebook for Developing and Implementing Policies for ONWS

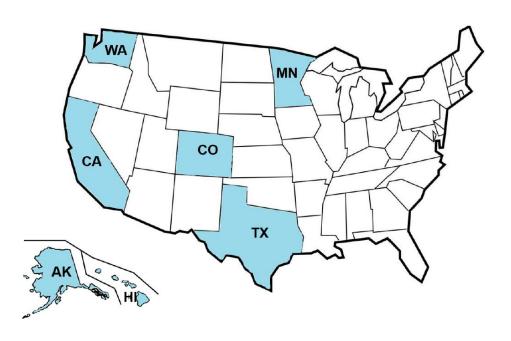


- Guidebook includes:
 - Model State Regulation
 - Model Local Ordinance
 - Program Rules to be implemented with state reg or local ordinance
- Intended to create nationally consistent treatment standards and management approaches



Jurisdictions Moving Forward with Risk-Based Approach

- San Francisco
- California, SB 966
- Colorado, Regulation #84
- Minnesota
- Oregon, Washington and Hawaii



Texas



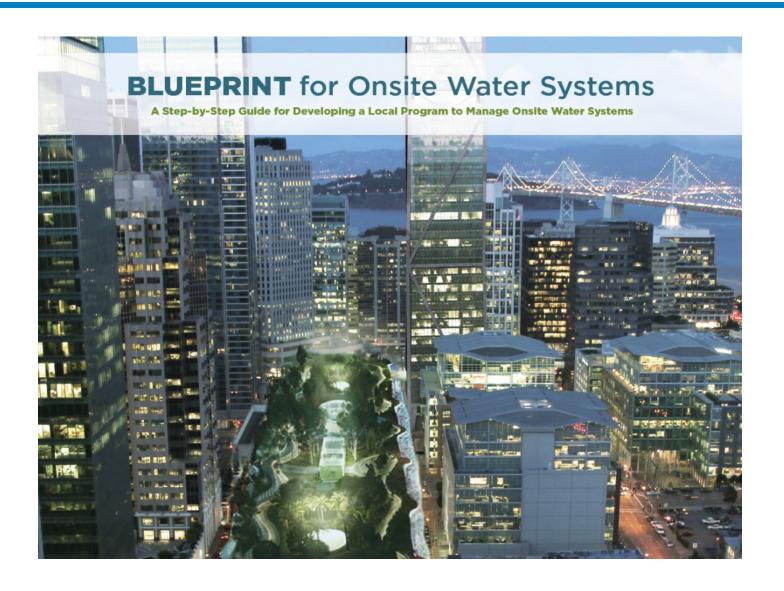
Making the Utility Case for ONWS



- Benefits and Drivers
 Behind Onsite Non potable Reuse
- How Utilities Addressed Potential Challenges
- Best Practices for Ongoing Operation of Onsite Non-potable Water Systems



Developing Oversight and Management Programs





Developing Oversight and Management Programs

Developing a local program to manage onsite water systems offers a proactive way to increase water resiliency and promote green building practices while protecting public health. The development of a program should follow a sequence of steps and associated actions, which will inform critical decisions regarding the scope, structure, and implementation of the program.

- Convene a Working Group

 Establish a small working group to guide the development of the local program.
- 2 Select the Types of Alternate Water Sources

 Narrow the specific types of alternate water sources
 covered in the program.
- 3 Identify End Uses
 Classify specific non-potable end uses for your program.
- Establish Water Quality Standards

 Establish water quality standards for each alternate water source and/or end use.
- Identify and Supplement Local Building Practices
 Integrate your program into local construction requirements and building permit processes.

Establish Monitoring and Reporting Requirements

Establish water quality monitoring and reporting requirements for ongoing operations.

- Prepare an Operating Permit Process

 Establish the permit process for initial and ongoing operations for onsite water systems.
- Publicize the program to provide clear direction for project sponsors and developers.
- Promote best practices for onsite water systems.
- Grow the Program

 Explore opportunities to expand and encourage onsite water systems.

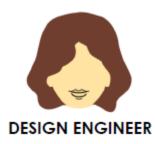




- Research and understand existing codes and regulations
- 2. Form a stakeholder advisory committee
- 3. Engage with local and state regulators (public health, utilities, building department)
- 4. Formalize roles and responsibilities
- 5. Adopt local ordinance or state regulation for permitting and oversight of onsite water systems



Training Manual for Engineers, Operators, Utilities and Regulators









- Developing a guidance manual and training materials to identify the skills and knowledge required to design and permit treatment systems that meet the risk-based water quality standards
- Estimated completion early 2019



National Blue Ribbon Commission for Onsite Non-potable Water Systems





Operator
 Certificate/Certification

 Program

 Continue research and data for alternate water sources





THANK YOU

sfwater.org/np

