



San Francisco's Non-Potable Water Program

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San Francisco Public Utilities Commission
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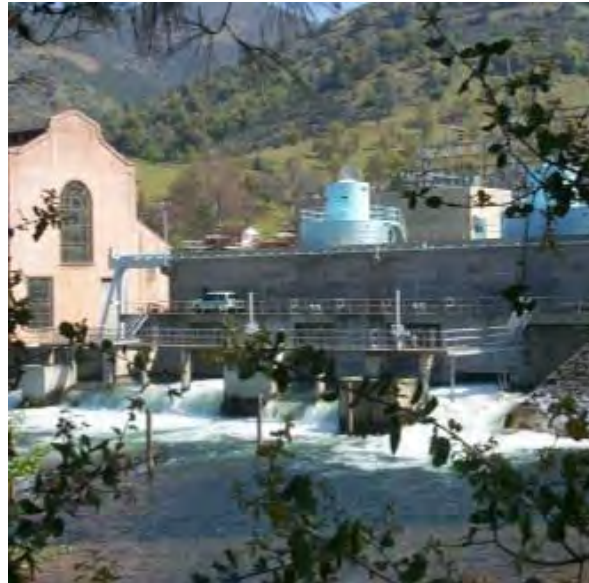




San Francisco Public Utilities Commission



Water: delivering high quality water every day to 2.6 million people



Power: generating clean energy



Wastewater: protecting public health and the environment



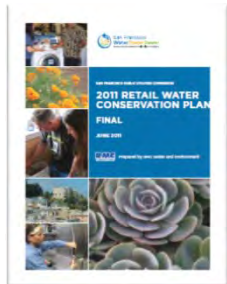
SFPUC Regional Water System





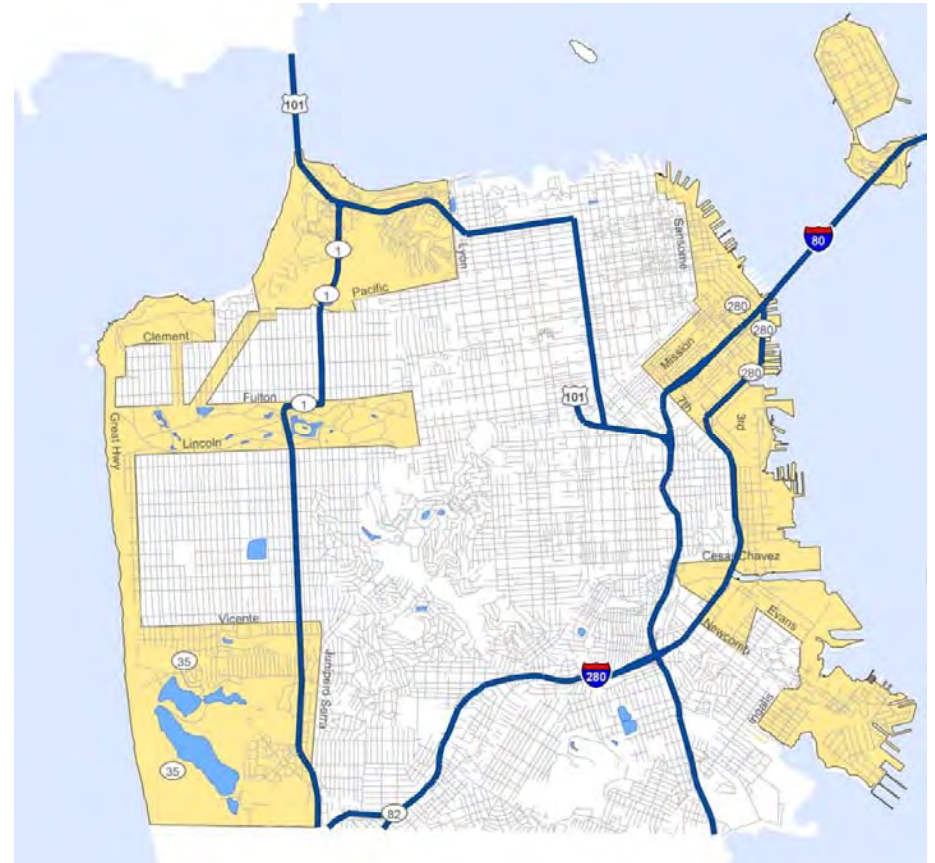
San Francisco's Local Water Program

- **Conservation:** reduce customer demands
- **Groundwater:** pump water for potable purposes during normal and drought years
- **Recycled Water:** provide recycled water for irrigation and toilet flushing
- **Non-potable Water:** collect and treat alternate water sources for non-potable applications within buildings

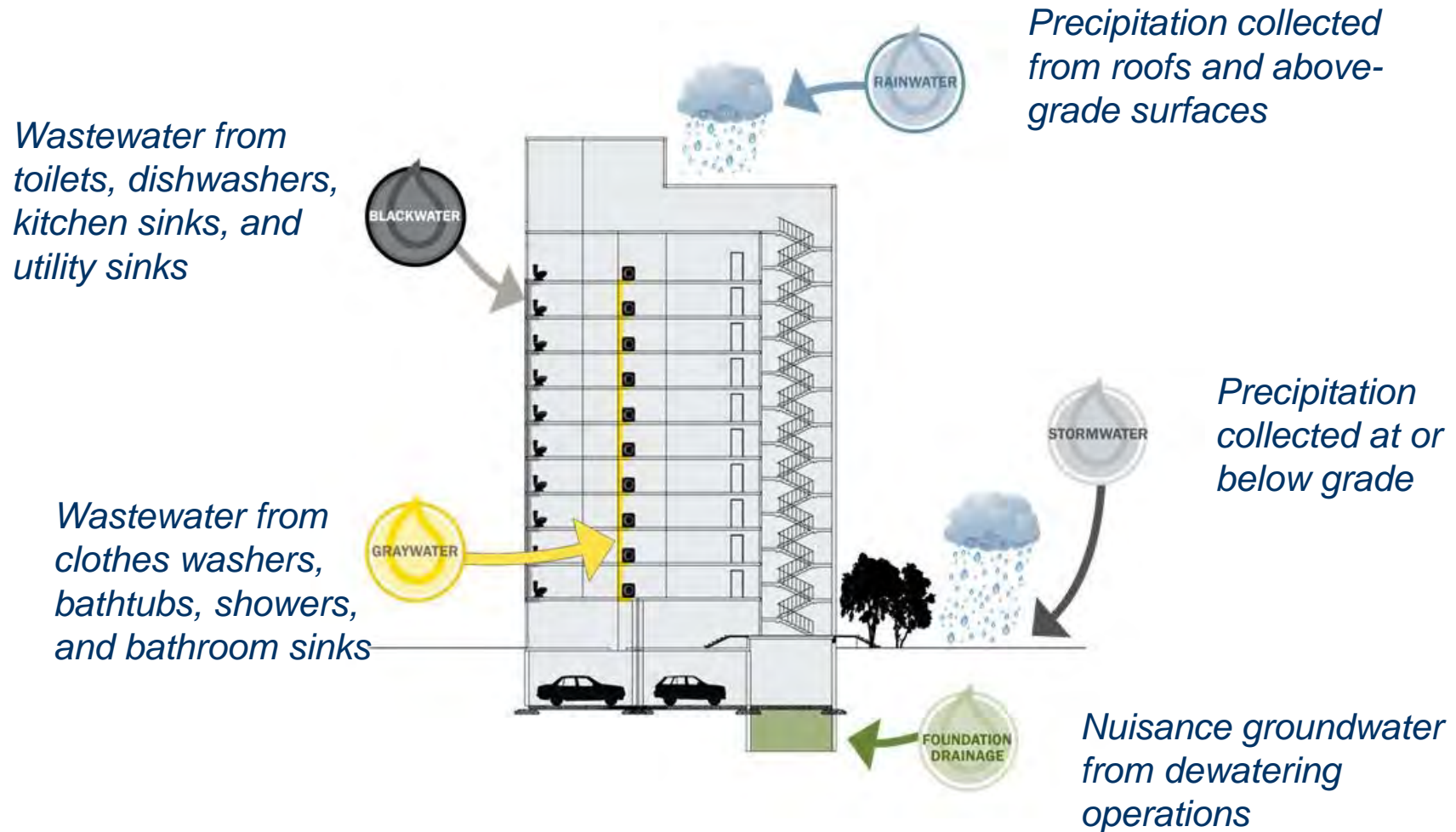


San Francisco's Recycled Water Ordinance

- Requires ***dual plumbing*** for toilet/urinal flushing and cooling in new developments & major alterations over 40,000 SF
- Irrigated landscapes over 10,000 sf

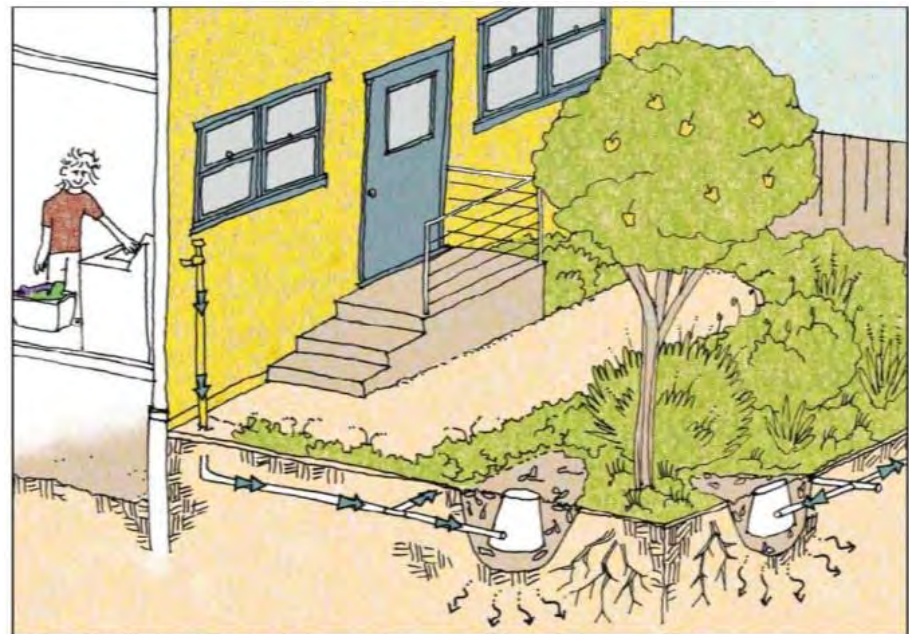


Types of Alternate Water Sources for Non-potable Applications



Residential Programs

- Rainwater Harvesting Program
- Graywater Program



SAN FRANCISCO
graywaterdesignmanual
for OUTDOOR IRRIGATION

SFPUC Incorporates Onsite Water Systems

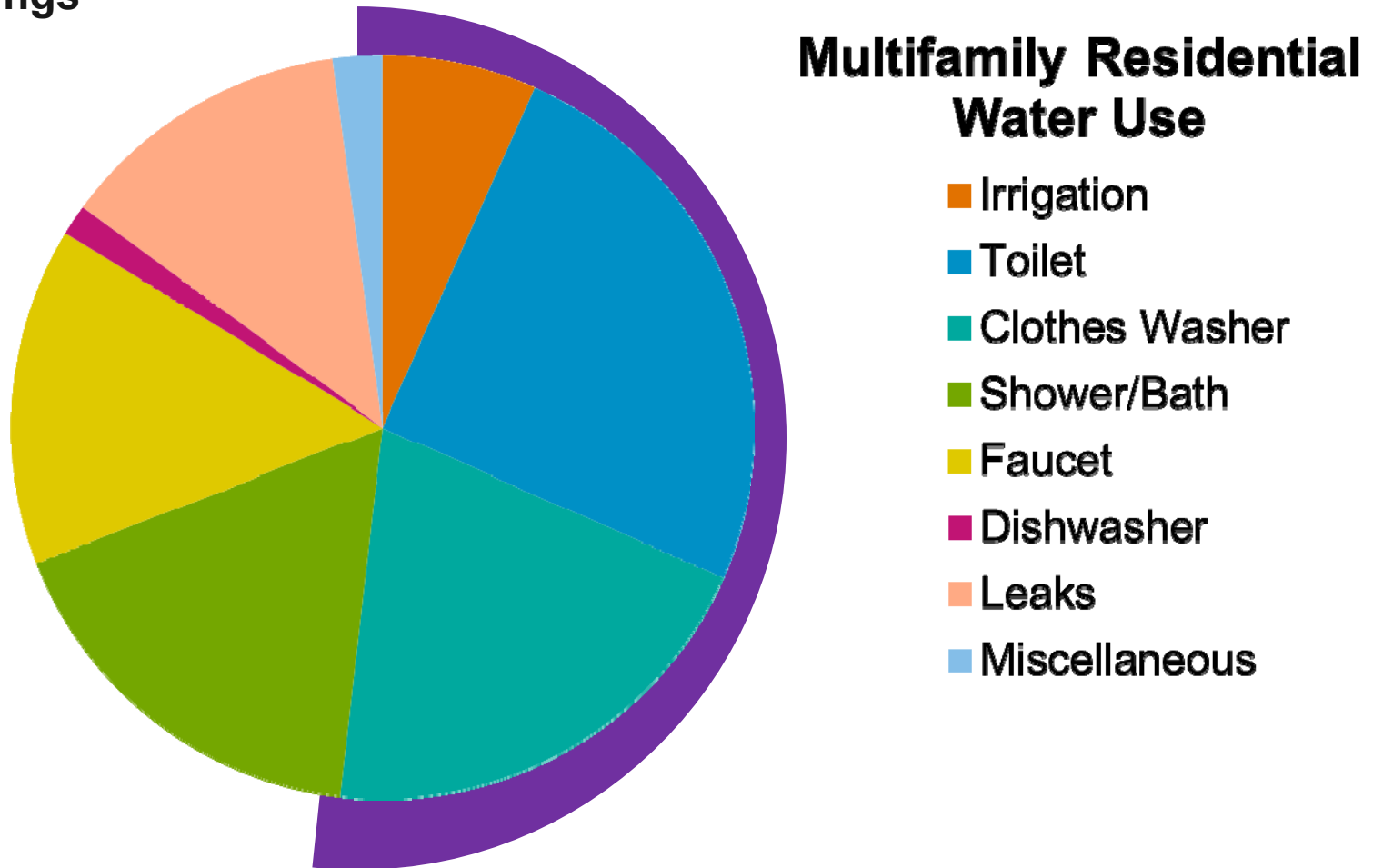


Interest from Building Community



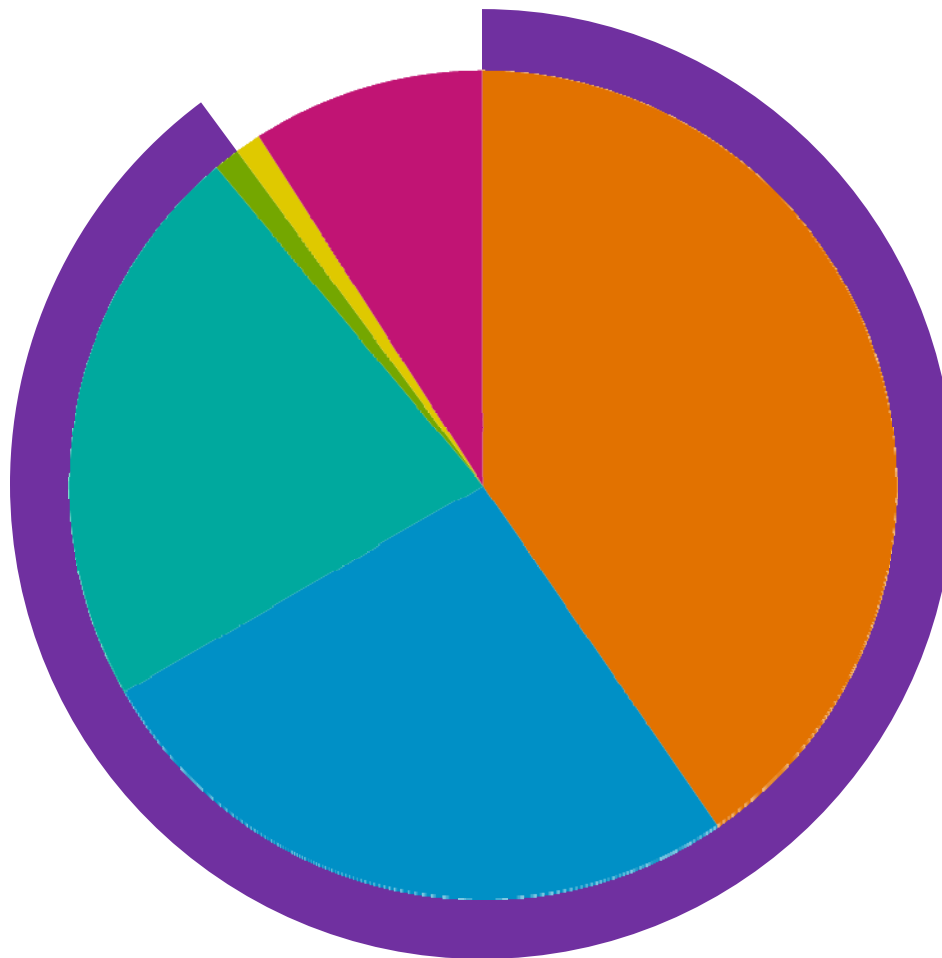
Interest from SFPUC

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



Source: adapted from Alliance for Water Efficiency

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



Office Water Use

- Sanitary
- Cooling Tower Make-up
- Irrigation
- Single-Pass Cooling
- Kitchen
- Miscellaneous

Source: USEPA



Regulatory Questions Related to 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?





2013 California Plumbing Code Updates

- Based on 2012 Uniform Plumbing Code
- Expanded onsite graywater uses & water quality standards
- Included onsite rainwater uses & water quality standards
- Provides construction requirements





2012 Ordinance Amends San Francisco Health Code



- Provides regulatory oversight and management of onsite water systems in San Francisco
- Establishes permitting requirements
- Sets application fees & annual fees
- Provides ability to impose penalties

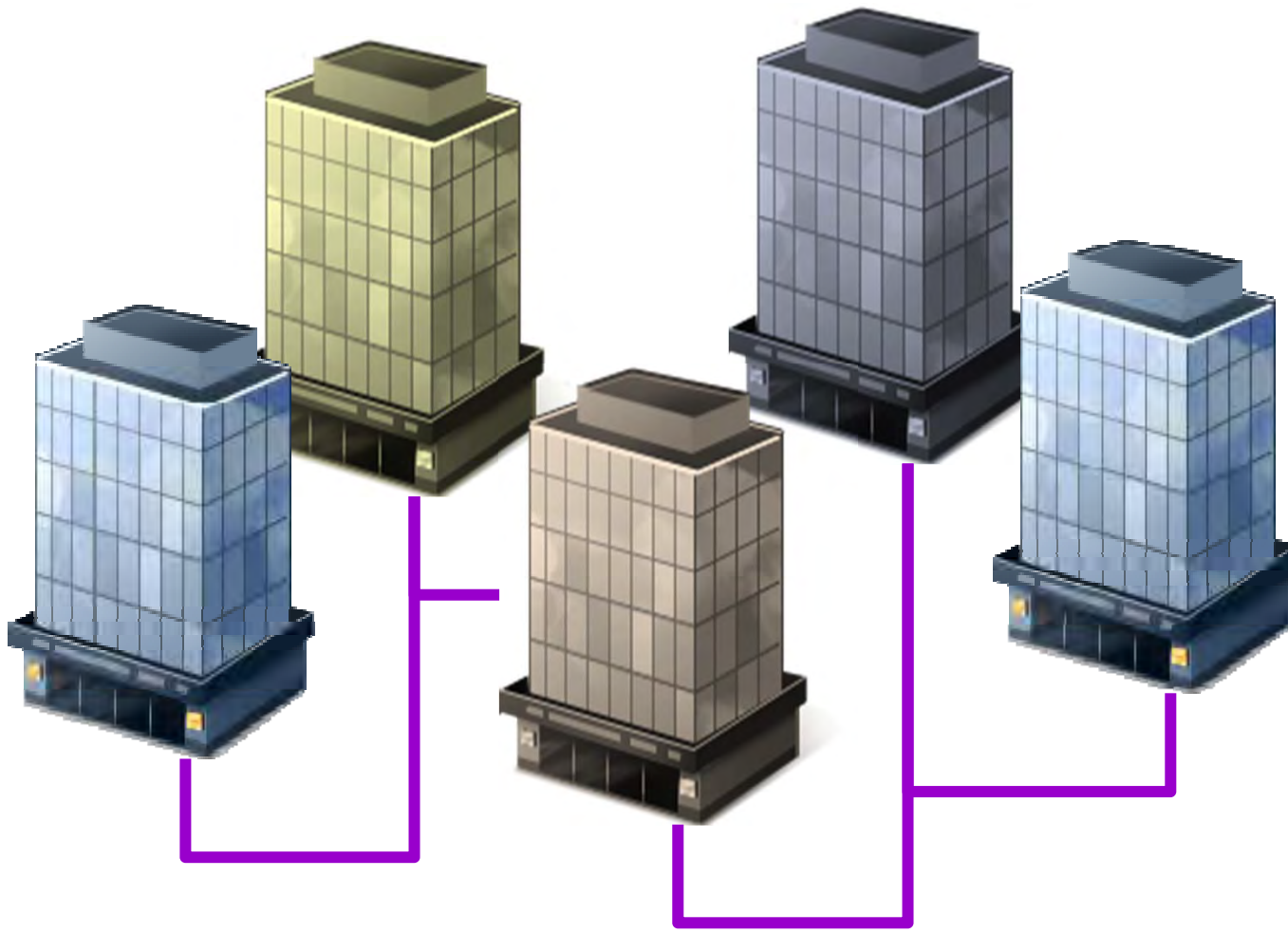


Overview of Roles & Responsibilities

SFPUC	SFDPH	SFDBI
Program Administration	Public Health	Construction
<p>Review onsite non-potable water supplies & demands</p> <p>Administer citywide project tracking & annual potable offset achieved</p> <p>Provide technical support & outreach to developers</p> <p>Provide financial incentives to developers</p>	<p>Issue water quality & monitoring requirements</p> <p>Review and approve non-potable engineering report</p> <p>Issue permit to operate onsite systems</p> <p>Review water quality reporting</p>	<p>Conduct Plumbing Plan check and issue Plumbing Permit</p> <p>Inspect and approve system installations</p>



2013 Amended SF Health Code for District Scale Water Systems





Overview of Roles & Responsibilities

SFPUC	SFDPH	SFDBI	SFDPW
Program Administration	Public Health	Construction	Right of Way and Mapping
<p>Review onsite non-potable water supplies & demands</p> <p>Administer citywide project tracking & annual potable offset achieved</p> <p>Provide technical support & outreach to developers</p> <p>Provide financial incentives to developers</p>	<p>Issue water quality & monitoring requirements</p> <p>Review and approve non-potable engineering report</p> <p>Issue permit to operate onsite systems</p> <p>Review water quality reporting</p>	<p>Conduct Plumbing Plan check and issue Plumbing Permit</p> <p>Inspect and approve system installations</p>	<p>Issue Encroachment Permits as needed for infrastructure in the Right-of-Way (if needed)</p> <p>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)</p>



Water Quality Criteria – Consistent with State Codes

Alternate Water Source	Regulation
Blackwater	Title 22
Graywater	California Plumbing Code - NSF-350
Rainwater	California Plumbing Code - Table
Stormwater	No state codes - SFDPH established
Foundation Drainage	No state codes - SFDPH established

SFDPH will permit onsite systems and require monitoring and reporting



Water Quality Monitoring & Reporting

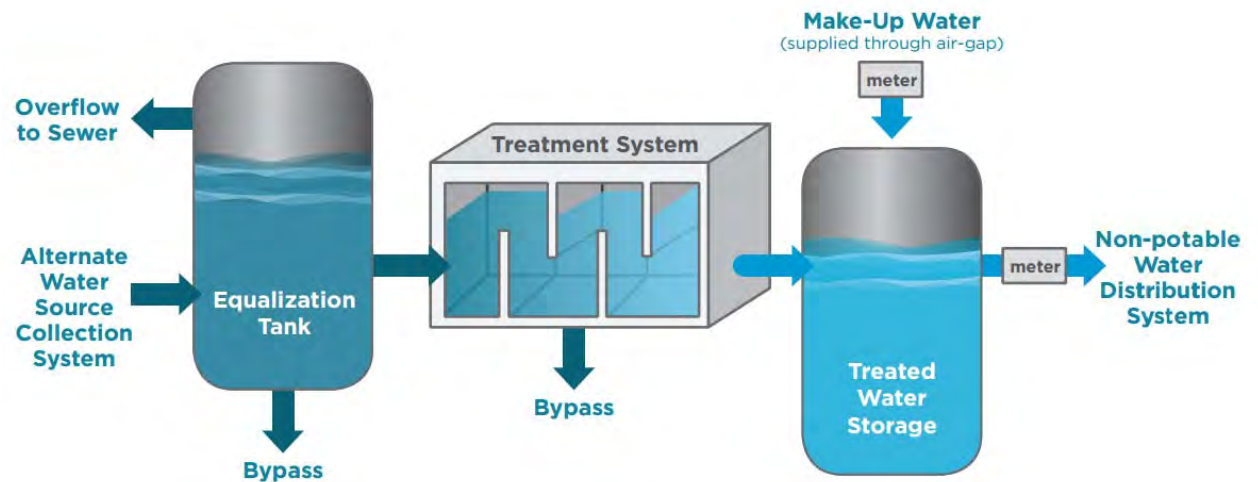
Water Source	Conditional Start-Up		Final Use	
	Monitoring	Reporting	Monitoring	Reporting
Rainwater	W/M*	M	M	Y
Stormwater	W	M	M	Y
Graywater	W	M	M	Y
Foundation Drainage	W	M	M	Y
Blackwater	D	M	D	M

D = daily
 W = weekly
 M = monthly
 Y = yearly

** Rainwater systems with a chlorine residual = monthly; Rainwater systems without a chlorine residual = weekly*

Basic Design for Onsite Systems

- Key Requirements:
 - Water and Sewer Connections
 - Backflow Protection Requirements
 - Cross Connection Test



Pipes, Identification & Signage

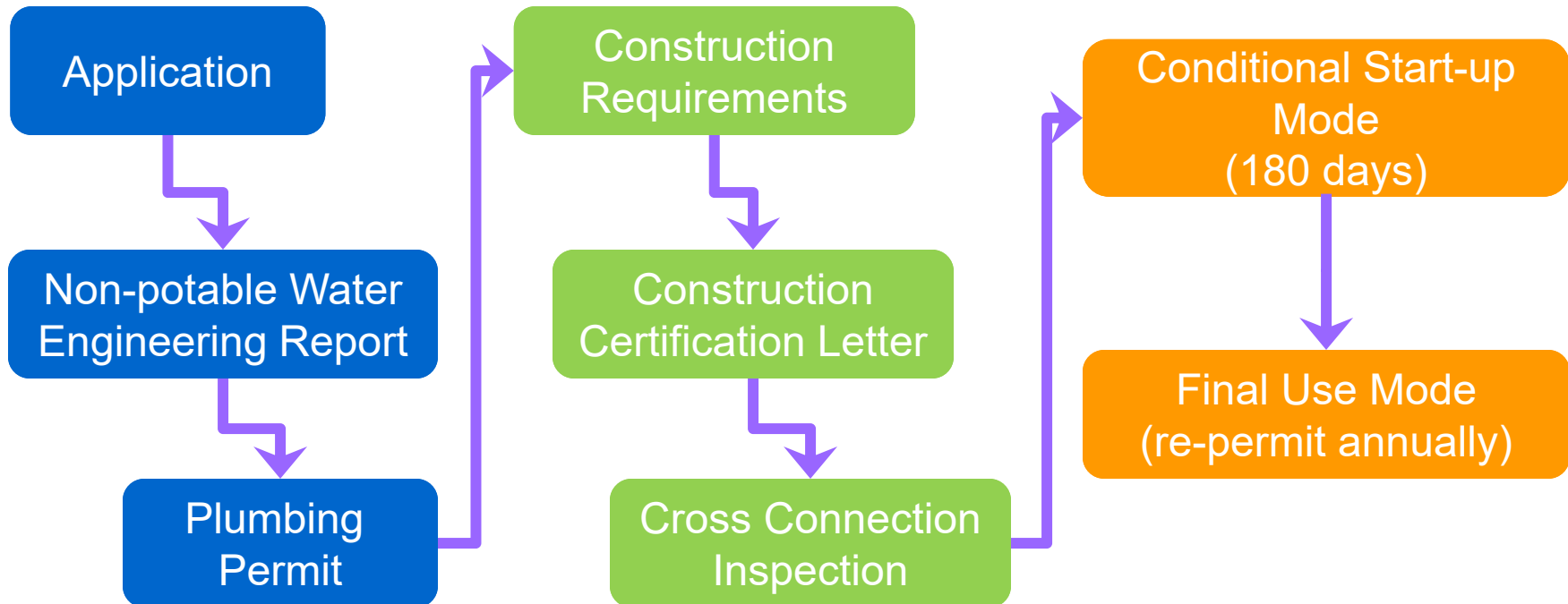
- Program requirements comply with California Plumbing Code:
 - Purple pipe
 - Label to identify water source
 - Signage



CAUTION
RECYCLED WATER, DO NOT DRINK. DO NOT CONNECT TO DRINKING WATER SYSTEM.

NOTICE
CONTACT BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK ON THIS WATER SYSTEM.

Step by Step Process



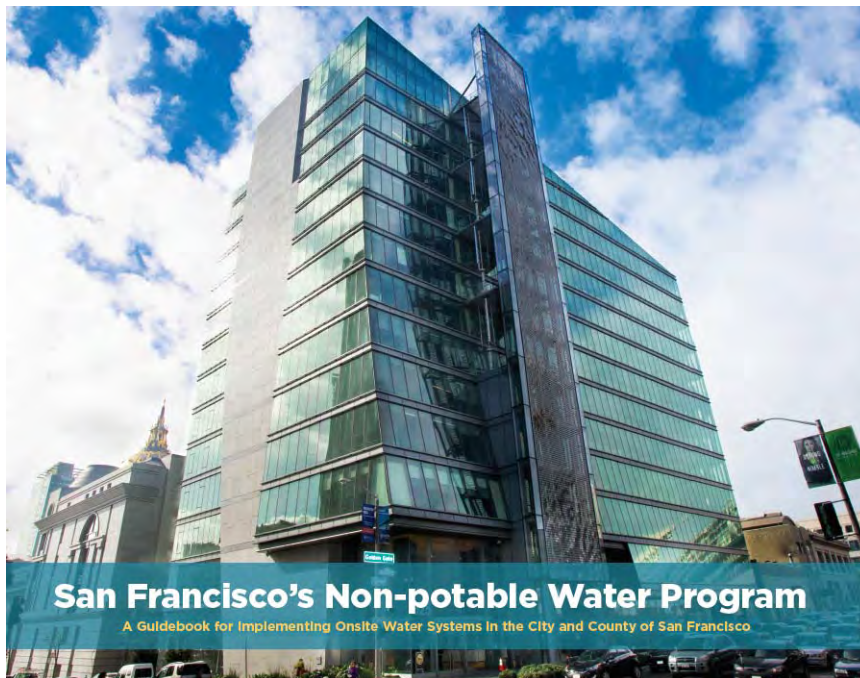
Design

Construction

Operation



SFPUC Technical Assistance



NON-POTABLE WATER CALCULATOR
 Step 6 of 7: Summary of Building Potential

Project Name: **LEGEND:**
 User Input
 Calculated from User Input
 Default Value
 Auto-generated Value

Information:
 An accounting of total demand and onsite supplies for the project are summarized below.
 No user input is needed for this step.

A. TOTAL DEMAND (No user input needed - auto-calculated)

Demand Type	Avg. Daily Water Demand (gpd)	Annual Water Demand (gpy)	Average Monthly Demand (gpm)												
			January	February	March	April	May	June	July	August	September	October	November	December	
DOMESTIC USES - Commercial															
Showerhead	13	4,745	395	395	395	395	395	395	395	395	395	395	395	395	395
Sanitary Fixture	120	42,000	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600
Urinals	174	63,540	5,293	5,293	5,293	5,293	5,293	5,293	5,293	5,293	5,293	5,293	5,293	5,293	5,293
Toilet (Water Closet)	294	101,174	27,986	27,986	27,986	27,986	27,986	27,986	27,986	27,986	27,986	27,986	27,986	27,986	27,986
Women Fixture	100	40,700	3,475	3,475	3,475	3,475	3,475	3,475	3,475	3,475	3,475	3,475	3,475	3,475	3,475
Men Fixture	67	24,259	2,022	2,022	2,022	2,022	2,022	2,022	2,022	2,022	2,022	2,022	2,022	2,022	2,022
Auto-Flush Sanitary - Restaurants	1,278	465,906	42,360	42,360	42,360	42,360	42,360	42,360	42,360	42,360	42,360	42,360	42,360	42,360	42,360
DOMESTIC USES - Multi-Family Residential															
Showerhead	2,345	798,075	65,674	65,674	65,674	65,674	65,674	65,674	65,674	65,674	65,674	65,674	65,674	65,674	65,674
Restroom Fixture	360	143,962	11,802	11,802	11,802	11,802	11,802	11,802	11,802	11,802	11,802	11,802	11,802	11,802	11,802
Pen	360	133,443	13,264	13,264	13,264	13,264	13,264	13,264	13,264	13,264	13,264	13,264	13,264	13,264	13,264
Washing Machine	2,289	328,222	49,935	49,935	49,935	49,935	49,935	49,935	49,935	49,935	49,935	49,935	49,935	49,935	49,935
Water (Water Closet)	3,222	1,046,039	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172
Washer Fixture	2,829	1,034,468	36,857	36,857	36,857	36,857	36,857	36,857	36,857	36,857	36,857	36,857	36,857	36,857	36,857
Dishwasher	80	33,721	3,373	3,373	3,373	3,373	3,373	3,373	3,373	3,373	3,373	3,373	3,373	3,373	3,373
Water Heater	1,647	5,401,396	215,300	215,300	215,300	215,300	215,300	215,300	215,300	215,300	215,300	215,300	215,300	215,300	215,300
INDOOR COOLING															
Commercial Cooling	1,937	714,774	43,024	46,491	39,502	33,879	41,390	44,418	47,319	49,306	52,217	52,729	50,922	46,028	46,028
Residential	1,937	714,774	43,024	46,491	39,502	33,879	41,390	44,418	47,319	49,306	52,217	52,729	50,922	46,028	46,028
OTHER INDOOR DEMANDS THAT CAN BE MET WITH NON-POTABLE SUPPLIES															
Indoor Recreational Water Feature	390	25,090	2,063	2,063	2,063	2,063	2,063	2,063	2,063	2,063	2,063	2,063	2,063	2,063	2,063
Commercial Laundry	90	3,780	347	347	347	347	347	347	347	347	347	347	347	347	347
Office Space Fixture	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Office Space Fixture	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OUTDOOR DEMANDS															
Sanitary Fixture	N/A	196,727	0	0	0	0	13,899	23,093	27,613	24,827	14,899	0	0	0	0
Decorative Water Feature	300	12,000	2,003	2,003	2,003	2,003	2,003	2,003	2,003	2,003	2,003	2,003	2,003	2,003	2,003
Office Space Fixture	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Office Space Fixture	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL	37,967	14,873,798	1,146,669	1,213,289	1,043,300	760,749	1,033,066	1,114,311	1,227,000	1,262,000	1,322,000	1,322,000	1,262,000	1,114,311	1,043,300

SFPUC Track Projects



- Overview of onsite water system
- Water sources collected and treated
- End use applications
- Costs

St. Anthony's Building

- Source: Rainwater
- End Use: Toilet & Urinal Flushing
- Status: System Constructed



PG&E Office Building Retrofit

- Source: Foundation Drainage
- End Uses: Toilet & Urinal Flushing
- Status: System Constructed



- Source: Rainwater
- End Uses: Toilet & Urinal Flushing and Irrigation
- Status: System Constructed





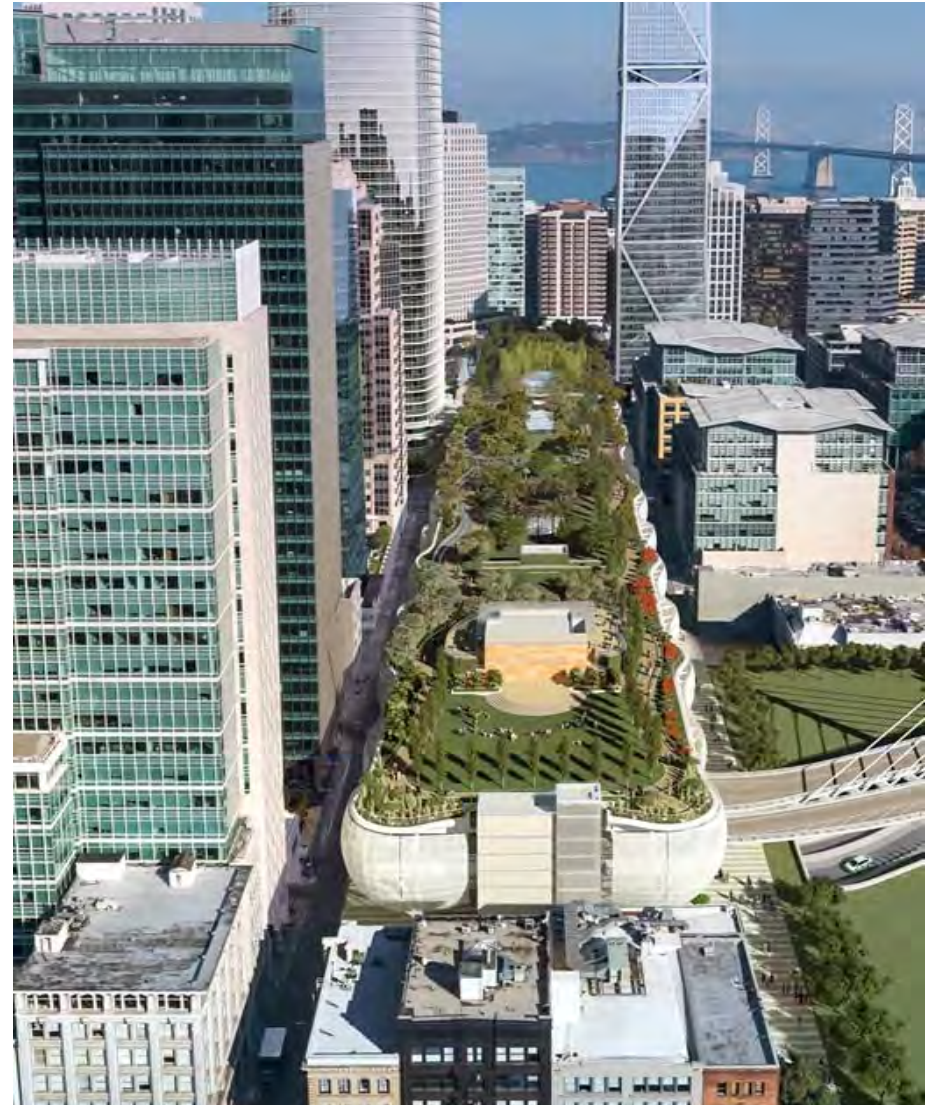
San Francisco Public Safety Building

- Sources: Rainwater, Stormwater, & Graywater
- End Uses: Toilet & Urinal Flushing and Irrigation
- Status: System Constructed



Transbay Transit Center

- Sources: Rainwater & Graywater
- End Uses: Toilet & Urinal Flushing and Irrigation
- Status: Final Design





181 Fremont Mixed Use Development

- Source: Graywater & Rainwater
- End Use: Toilets & Irrigation
- Status: Under Construction





Moscone Convention Center Expansion

- Source: Foundation Drainage & Rainwater
- End Uses: Toilet and Urinal Flushing, Irrigation & Street Sweeping
- Status: Design



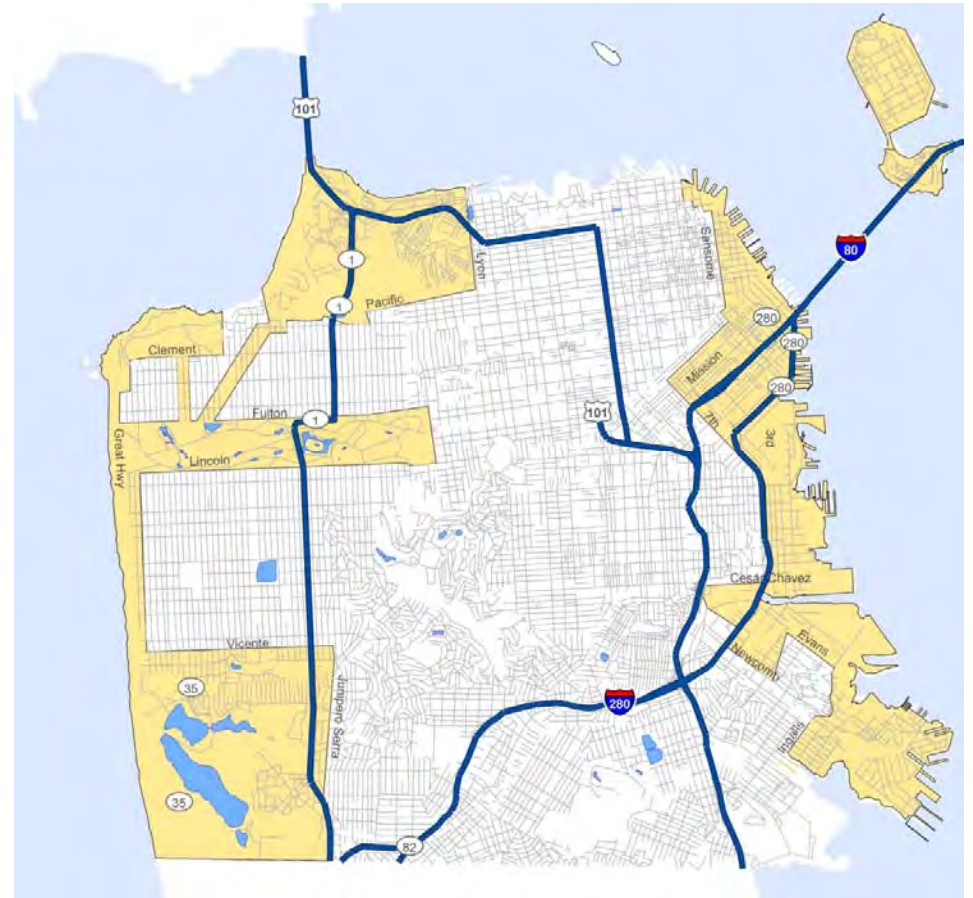
- Source: Foundation Drainage
- End Uses: Street Cleaning, Irrigation, and Fountain Make-up
- Status: Design





Non-Potable Water Program Mandatory in 2015

- San Francisco requires onsite water systems in new buildings over 250,000 square feet
- Assessment of water sources and non-potable end uses in buildings over 40,000 square feet
- Does not require reuse of Blackwater.



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, graywater, foundation drainage, and blackwater. The goal is to maximize the use of nonpotable water for toilet flushing, irrigation, and other non-potable uses. The SFPUC has approximately \$1,000,000 in funding available for two types of non-potable water projects:

- 1) district-scale projects that consist of 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 on-site sources, treatment systems to improve the water quality of on-site sources for beneficial reuse, 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 application 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 project. Projects that meet the Grant eligibility criteria for 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.

Definitions

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

Alternate Water Source – Non-potable source of water that includes graywater, rainwater, stormwater, foundation drainage, 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 regulations.

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, dishwashers, kitchen sinks and utility sinks. Because of plumbing configurations, blackwater leaving a building generally includes graywater.



Modify Grant Program

- Grant not applicable to projects under mandatory requirements
- Encourage district water systems
- Install onsite water systems in existing dual plumbed buildings



Graywater Treatment Systems

- \$250,000- \$500,000
(1,200 gpd-5,000 gpd)

Blackwater Treatment Systems

- \$400,000 - \$2.3 M
(5,000 gpd- 50,000gpd)

ROI: 6-15 years

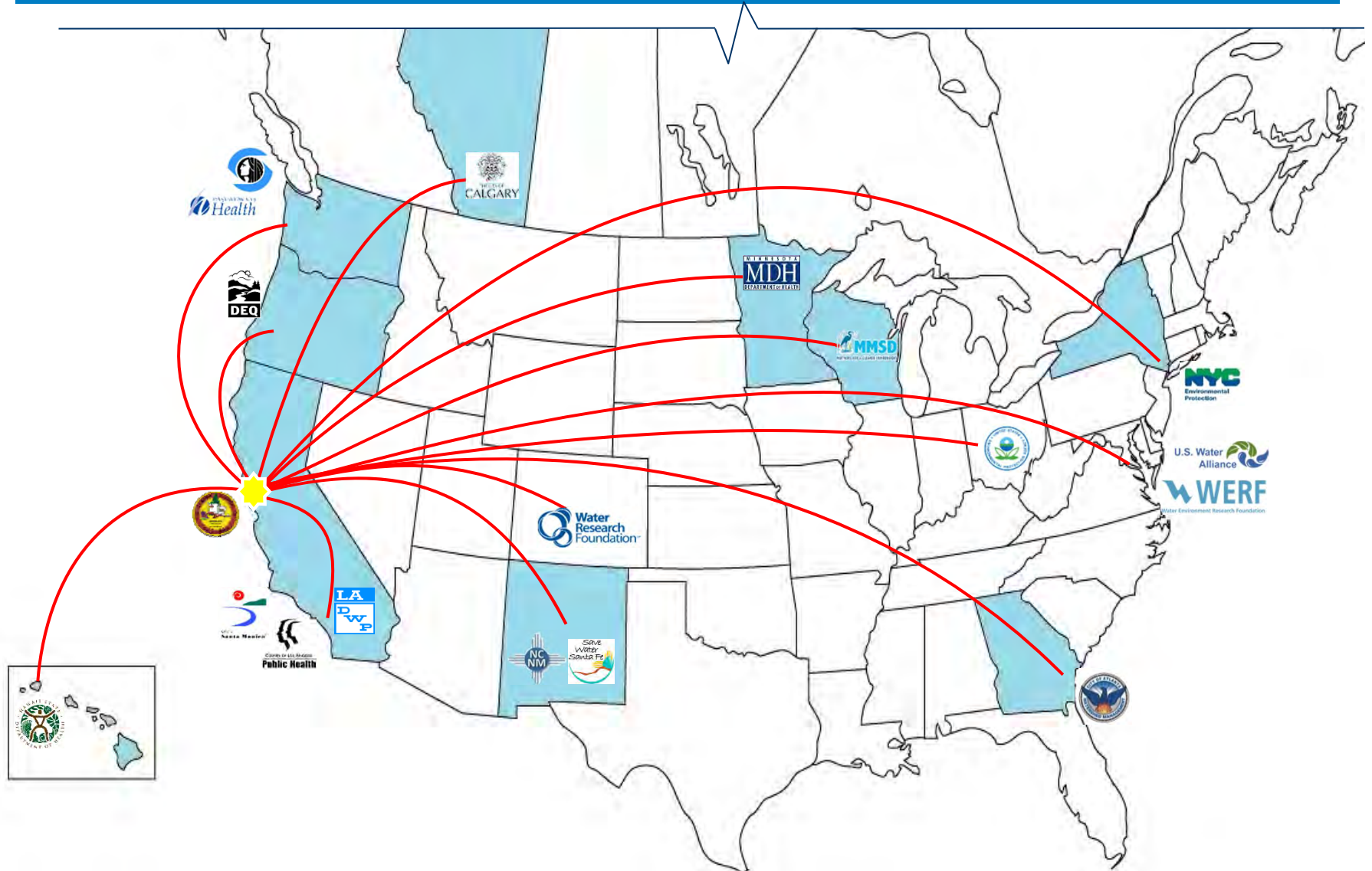


Innovation in Urban Water Systems

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Nationwide Representation





Multiple Public Agency Sectors

Municipal Water and Wastewater Agencies



Public Health Officials



Research Agencies





Key Outcomes from Meeting

- Local management programs are needed
- Water quality parameters and monitoring are needed to protect public health

Innovation in Urban
Water Systems

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BLUEPRINT for Onsite Water Systems

A Step-by-Step Guide for Developing a Local Program to Manage Onsite Water Systems





10 Steps for Developing a Local Program

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.

- 1 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.
- 4 Establish Water Quality Standards**
Establish water quality standards for each alternate water source and/or end use.
- 5 Identify and Supplement Local Building Practices**
Integrate your program into local construction requirements and building permit processes.
- 6 Establish Monitoring and Reporting Requirements**
Establish water quality monitoring and reporting requirements for ongoing operations.
- 7 Prepare an Operating Permit Process**
Establish the permit process for initial and ongoing operations for onsite water systems.
- 8 Implement Guidelines and the Program**
Publicize the program to provide clear direction for project sponsors and developers.
- 9 Evaluate the Program**
Promote best practices for onsite water systems.
- 10 Grow the Program**
Explore opportunities to expand and encourage onsite water systems.



Public Health Collaborative





Technical Guidance for Public Health Standards for Onsite Water Systems Project

Obtain Consensus on Key Recommendations for:

- Water quality parameters/performance standards
- Monitoring
- Permitting





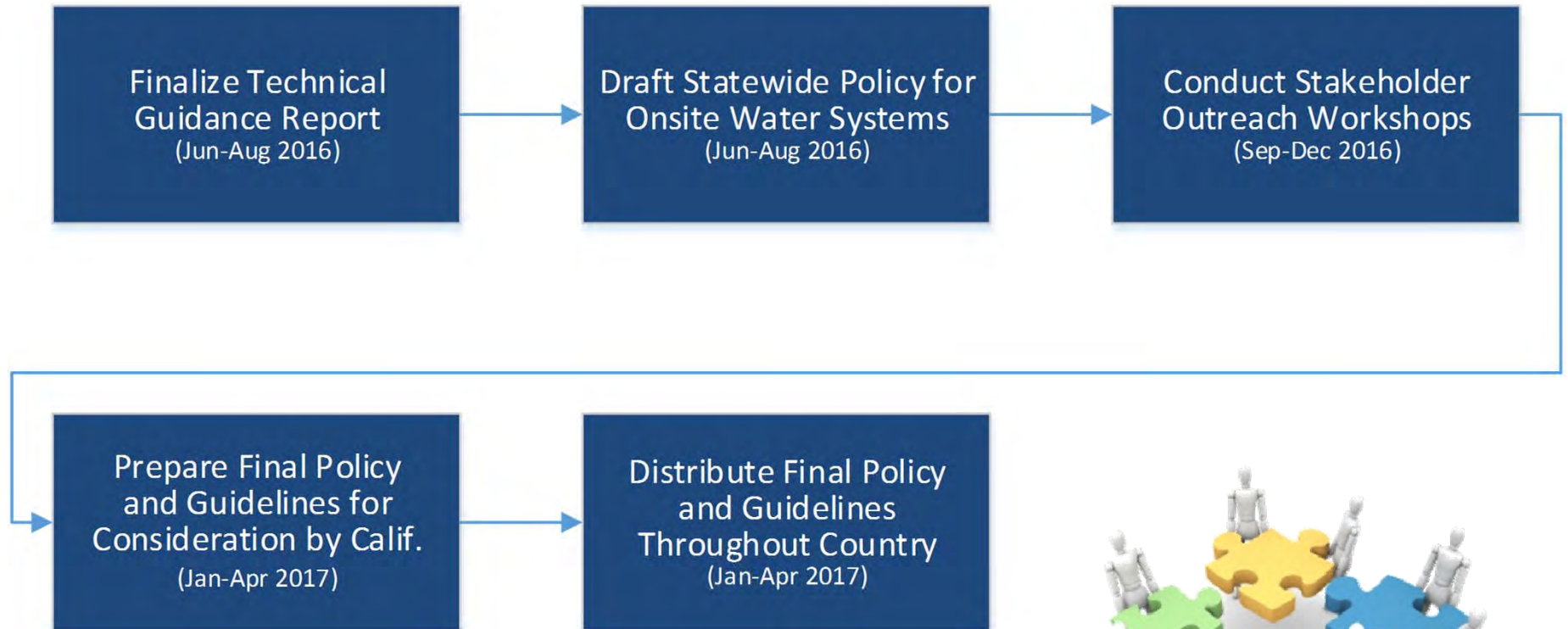
Public Health Standards for Onsite Water Systems Project Overview

- 5 Member Expert Panel
- Stakeholder Advisory Committee comprised of local and state public health officials
- Interactive workshops
- Final report available June 2016



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W I N N E R

Policy Development





THANK YOU
sfwater.org/np
sfwater.org/np/iuws

