



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

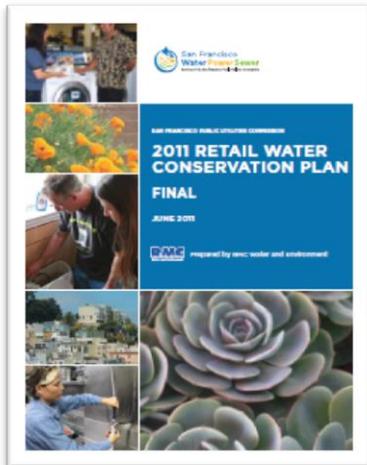
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## San Francisco's Non-potable Water Program

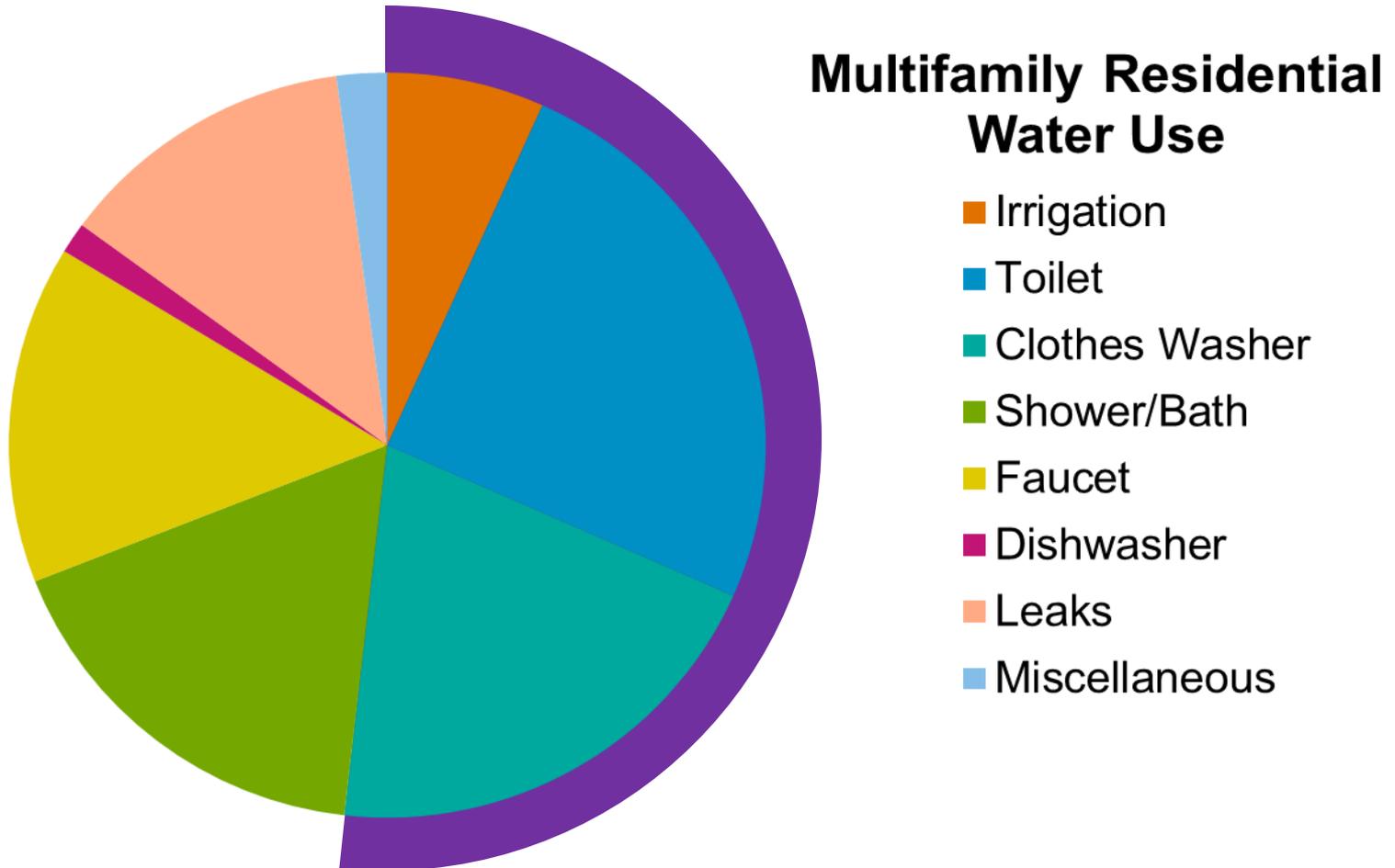
**John Scarpulla, Program & Project Manager, SFPUC**  
**[Jscarpulla@sflower.org](mailto:Jscarpulla@sflower.org)**

# Reduce Demands & Develop New Water Supplies

- Conservation: Reduce customer demands
- Groundwater: pump water for potable purposes during normal and drought years
- Recycled Water: Municipally produced recycled water for irrigation and toilet flushing
- **Non-potable Water: Building and district scale water reuse system**



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



Source: adapted from Alliance for Water Efficiency

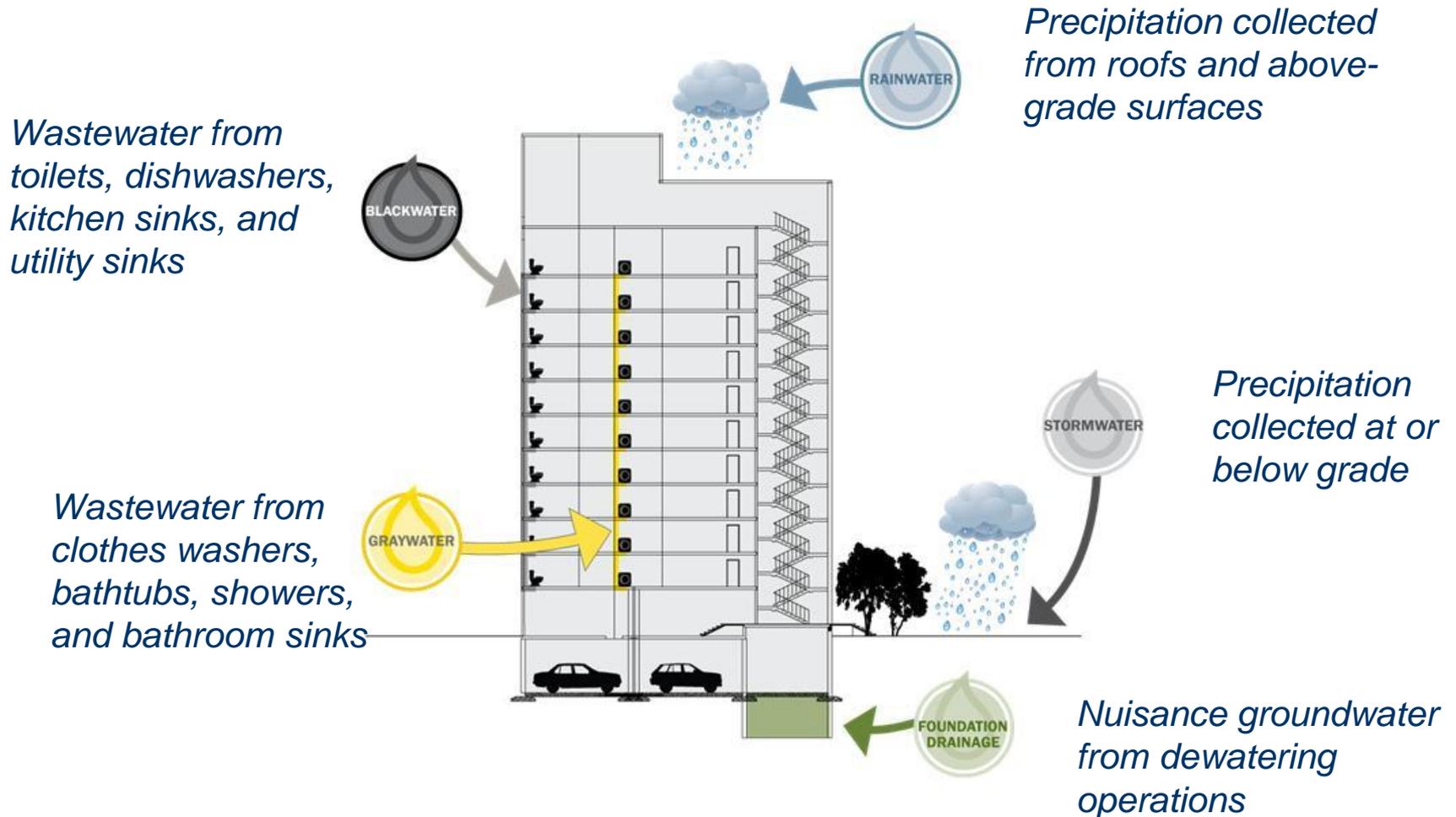
# Up to 95% of Demands are Non-potable in Commercial Buildings



## Office Water Use

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

# Buildings Produce Water





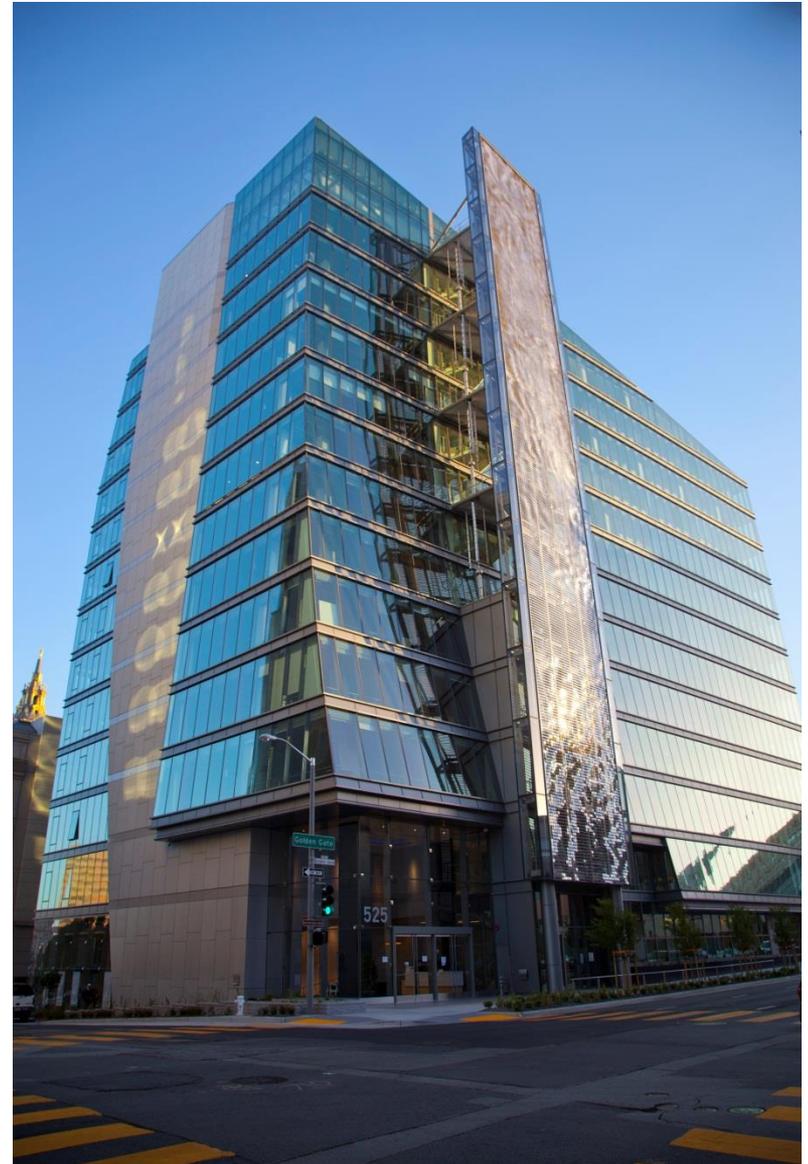
# On-site Non-potable Water Use at Innovative SFPUC Headquarters

## 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



# Tidal Flow Wetland



# Vertical Flow Wetlands





# SFDPH Water Quality Requirements

Measure	Minimum	Average	Maximum
BOD <sub>5</sub>	≥ 85% removal	≤ 30 mg/L	≤ 45 mg/L
Suspended Solids	≥ 85% removal	≤ 30 mg/L	≤ 45 mg/L
pH	6.0 – 9.0		
Turbidity	n/a	5 NTU	10 NTU
Chlorine Residual	0.5 mg/L – 4.0 mg/L		
Total Coliform	n/a	≤ 2.2 MPN/100 mL	≤ 23 MPN/100 mL ≤ 240 MPN/100 mL
Odor	Non-Offensive		

# What about everyone else?



# Integrating On-site Non-potable Water is Challenging

- Regulatory questions:
  - What permits are required for private parties to operate on-site treatment and reuse systems?
  - Who issues permits and oversees ongoing operations?
  - Who sets water quality standards?



## CITY ORDINANCE

# Developing SF's Local Oversight

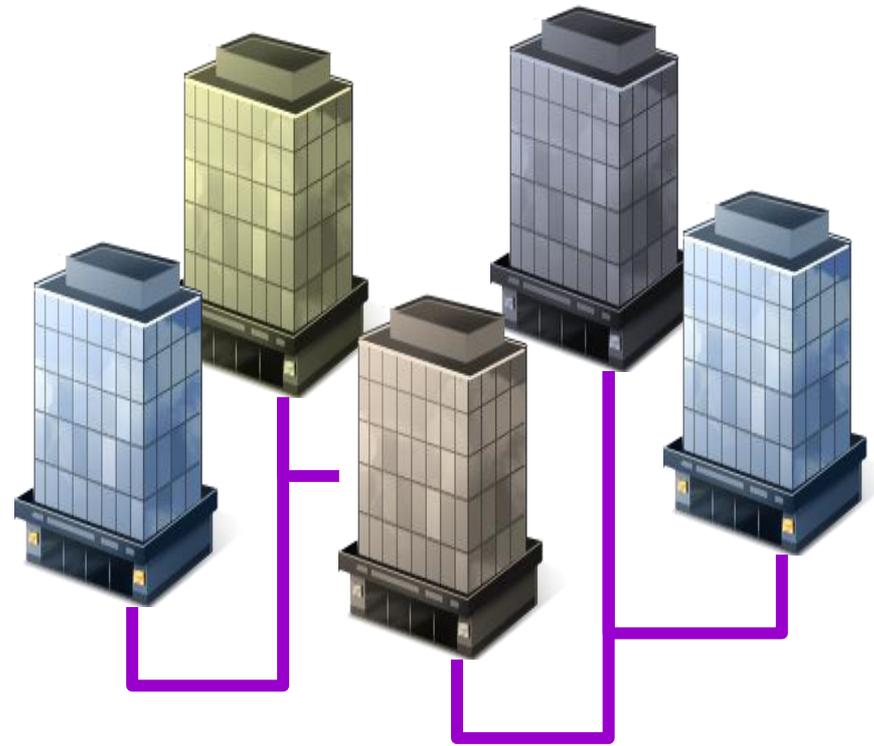
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- 2011: Began talks with SFDBI and SFDPH
- 2012: Extensive stakeholder outreach & Onsite Water Reuse ordinance adopted (Sept)
- 2013: Extensive stakeholder outreach & SFDPH established regulations (Jan)



# Developing SF's Local Oversight

- 2013: Further talks with Developers / Designers
- 2013: Initiate talks with SFDPH, DBI, and DPW.
- 2013: Ordinance amended for district-scale (Oct)

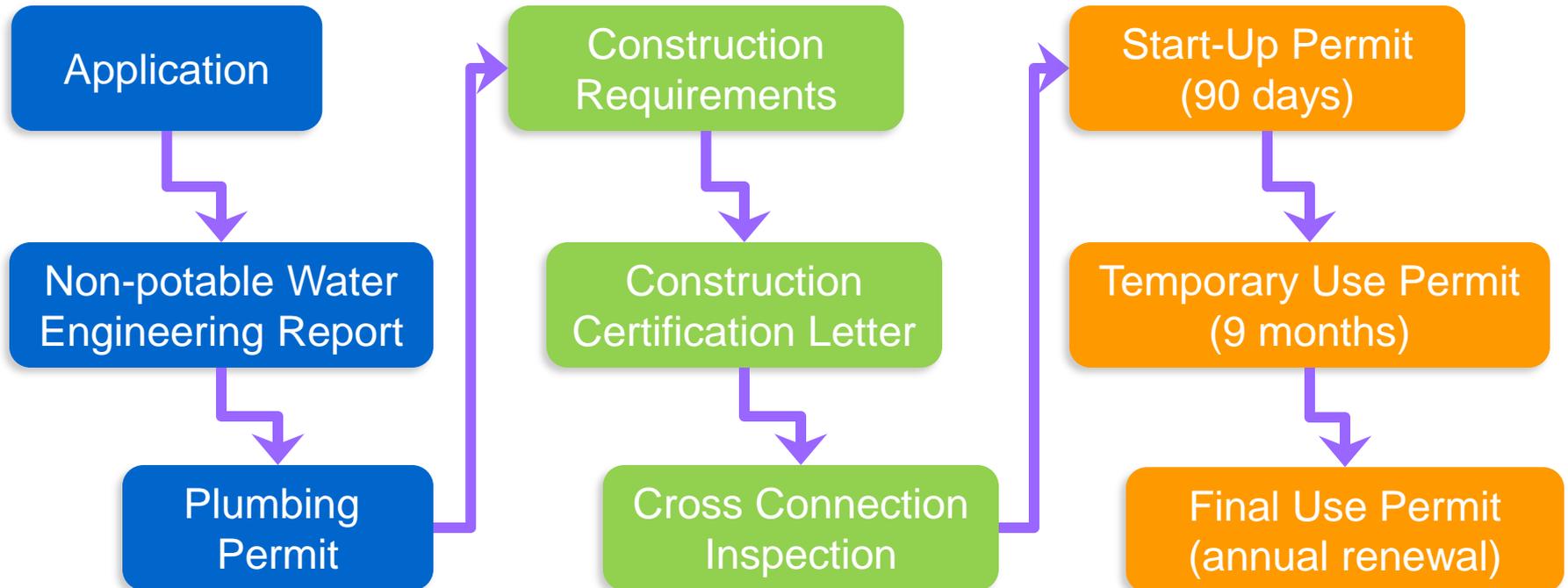




# City Ordinance Codifies Program & Streamlines Process

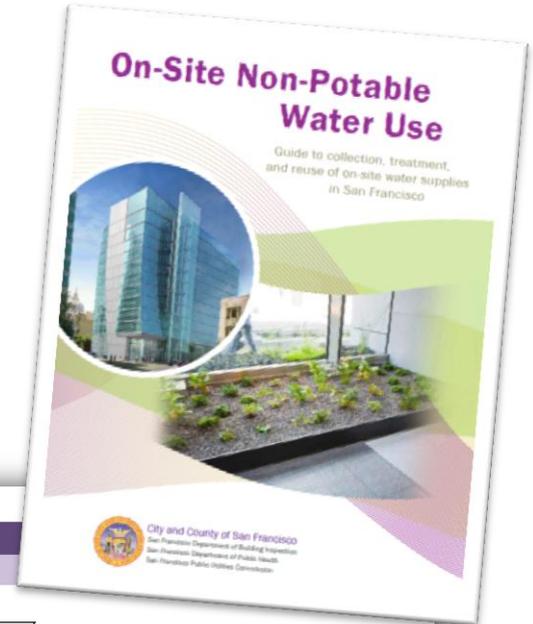
SFPUC	SFDPH	SFDBI	SFDPW
Program Administration	Public Health	Construction	Right of Way and Mapping
<p>Review onsite non-potable water supplies &amp; demands</p> <p>Administer citywide project tracking &amp; annual potable offset achieved</p> <p>Provide technical support &amp; outreach to developers</p> <p>Provide financial incentives to developers</p>	<p>Issue water quality &amp; 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>

# Streamlined Process



# SFPUC Provides Technical Assistance and Financial Incentives

- [www.sfwater.org/np](http://www.sfwater.org/np)
- On-site Non-potable Guidebook
- Non-potable Water Calculator
- Grant program
- Project review meetings



### NON-POTABLE WATER CALCULATOR

#### Step 2 of 7: Calculate Indoor Water Demand (Indoor Fixtures and Fittings)

**Project Name:** ABC Building

**Instructions:**  
Annual indoor water demand is calculated based on water demand from domestic fixtures and fittings, using assumed usage rates based on the building uses and occupancy profiles entered in Step 1.  
**User input is required in Section D at the end of this page.**

**LEGEND:**

User Input	
Linked from User Input	
Default Value	
Autogenerated Value	

**A. COMMERCIAL WATER DEMAND (No user input needed - auto-calculated from Step 1 inputs)**

Total Water Demand (gpd) = (Flow Rate x Duration x Ave Daily Use x No. of FTEs) + (Flow Rate x Duration x Ave Daily Use (Transient FTE) x No. of Transient FTEs)

Fixture Type	Flow Rate	Unit	Duration	Unit	Ave Daily Use	No. of FTEs	Ave Daily Use (Transient) <sup>(6)</sup>	No. of Transient FTEs	Total Water Demand (gpd)	Allowable End Use for Non-Potable?
Showerhead <sup>(1)(2)</sup>	2	gpm	5	min	0.65	2	0	0	13	No
Lavatory Faucet <sup>(2)</sup>	0.4	gpm	0.25	min	3	400	0.5	0	120	No
Urinals <sup>(2)(3)</sup>	0.5	gpf	1	flush	1.74	200	0.4	0	174	Yes
Toilet (Water Closet) <sup>(2)(3)</sup>	1.28	gpf	1	flush	1.74	400	0.5	0	891	Yes
Kitchen Faucet <sup>(2)(4)</sup>	1.8	gpm	0.25	min	1	400	0	0	180	No
Low Flow Sprayer - Restaurants <sup>(5)</sup>	82.51	gal/emp/day	1	-	1	0	0	0	0	No
<b>TOTAL</b>									<b>1,378</b>	

# San Francisco Non-potable Projects

- 34 Projects since program inception
- SFPUC Collects data on costs, drivers, potable water offsets, and end use applications



## San Francisco's Non-potable Water System Projects

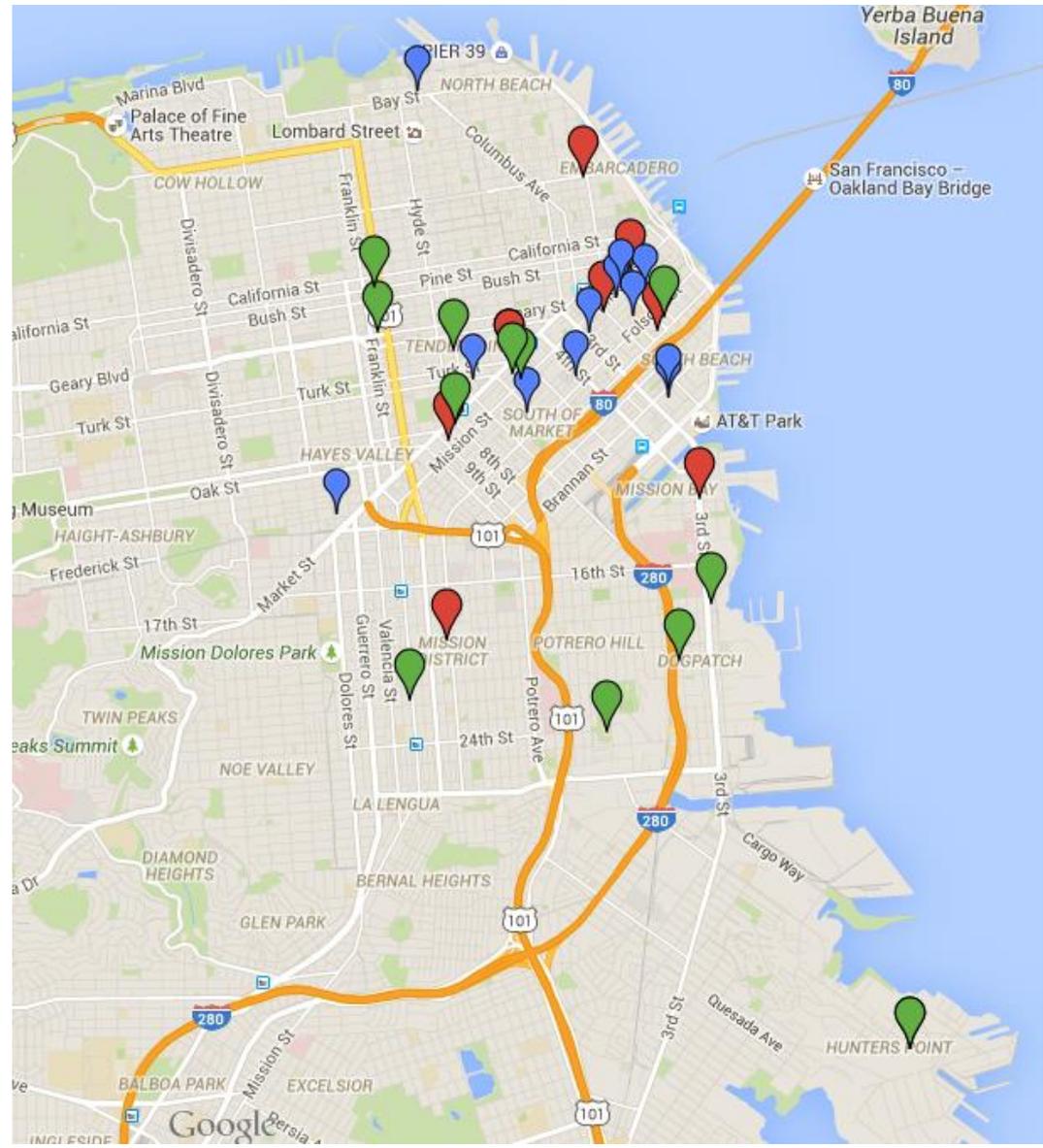
San Francisco Public Utilities Commission  
April, 2014

# Project Locations

**Red:**  
2012-13  
Projects

**Blue:**  
2013-14  
Projects

**Green:**  
2014-2015  
Projects



- Source: Rainwater & Bay Water
- End Uses: Toilet and Urinal Flushing & Heating and Cooling System



# St. Anthony's Building



- Source: Rainwater
- End Use: Toilet & Urinal Flushing



# San Francisco Public Safety Building

- Sources: Graywater, Rainwater, Condensate Drainage
- End Uses: Toilet Flushing, Cooling Tower Make-up and Irrigation



# James R. Herman Cruise Terminal - Pier 27

- Sources: Rainwater
- End Uses: Toilet & Urinal Flushing and Irrigation



# Transbay Transit Center

- Sources: Rainwater & Graywater
- End Uses: Toilet & Urinal Flushing and Irrigation
- Status: Under Construction



# 181 Fremont Mixed Use Development

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



- District Project
- Source: Foundation Drainage
- End Use: Steam Heating Loop
- Status: Pre-design



# On-site Water Systems Worldwide – It's Happening Now!





# Innovation in Urban Water Systems

*San Francisco • May 2014*



*Hosted by*



San Francisco  
**Water**  
**Power**  
**Sewer**

Services of the San Francisco Public Utilities Commission

*with funding support from*

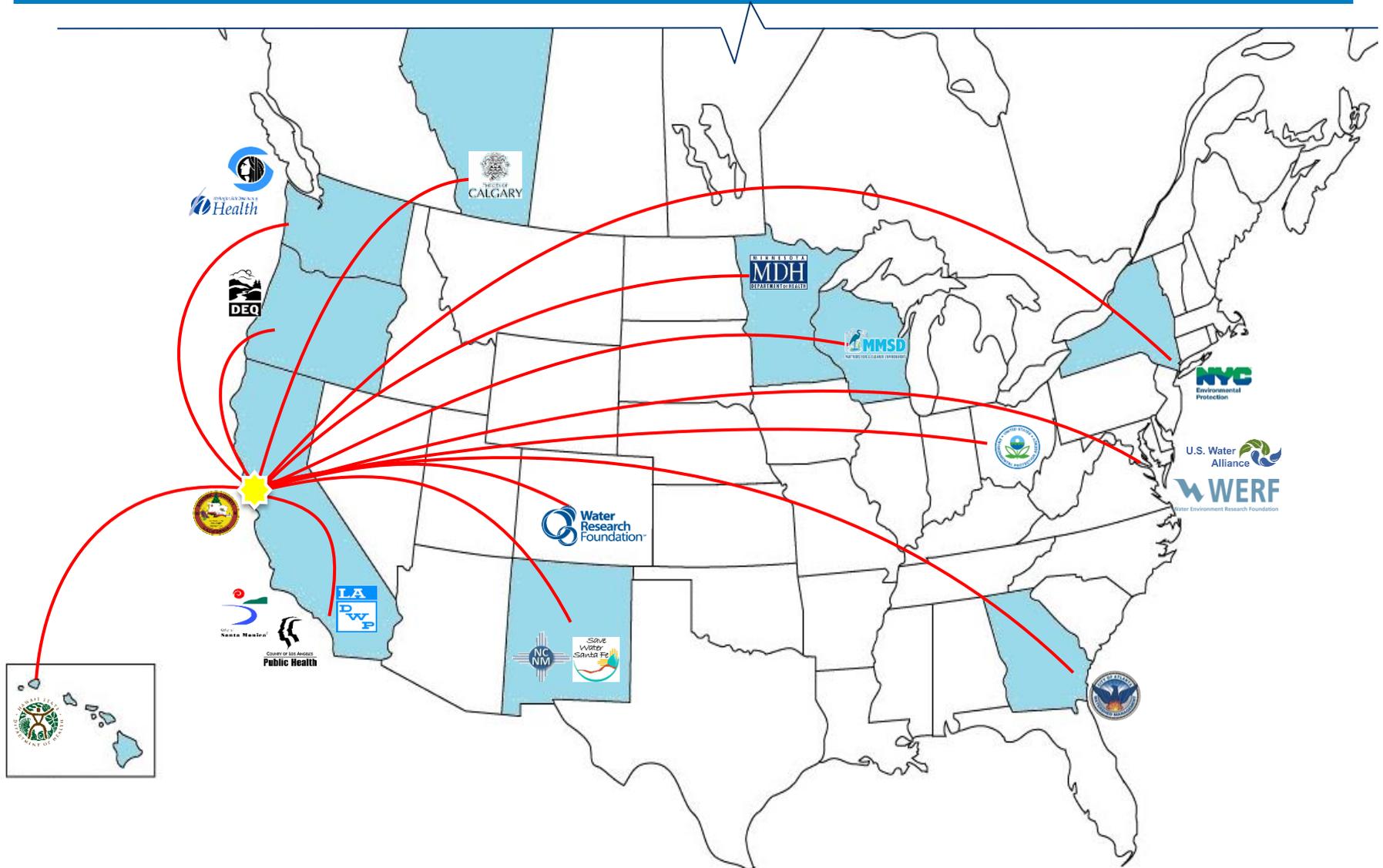


**Water**  
**Research**  
**Foundation**<sup>SM</sup>



Water Environment Research Foundation

# Nationwide Representation





# Key Messages from Participants

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- **Local management programs are needed**
  - Endorsing onsite systems through a policy or plan can bolster acceptability
  - Offering incentives can help generate interest
  - Water quality and monitoring are needed to protect public health

# **BLUEPRINT** for Onsite Water Systems

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





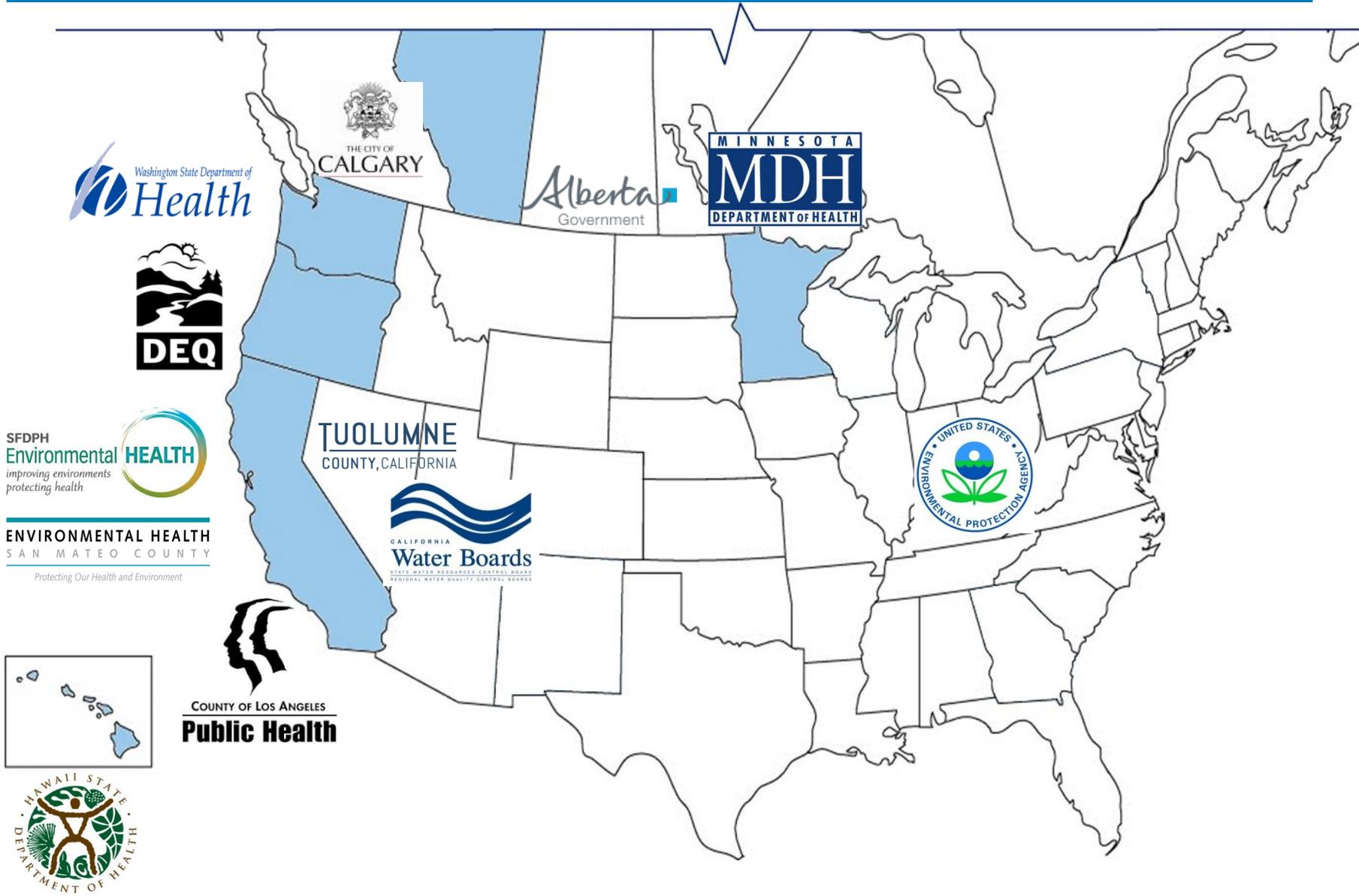
# 10 Steps for Developing a Local Program

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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.

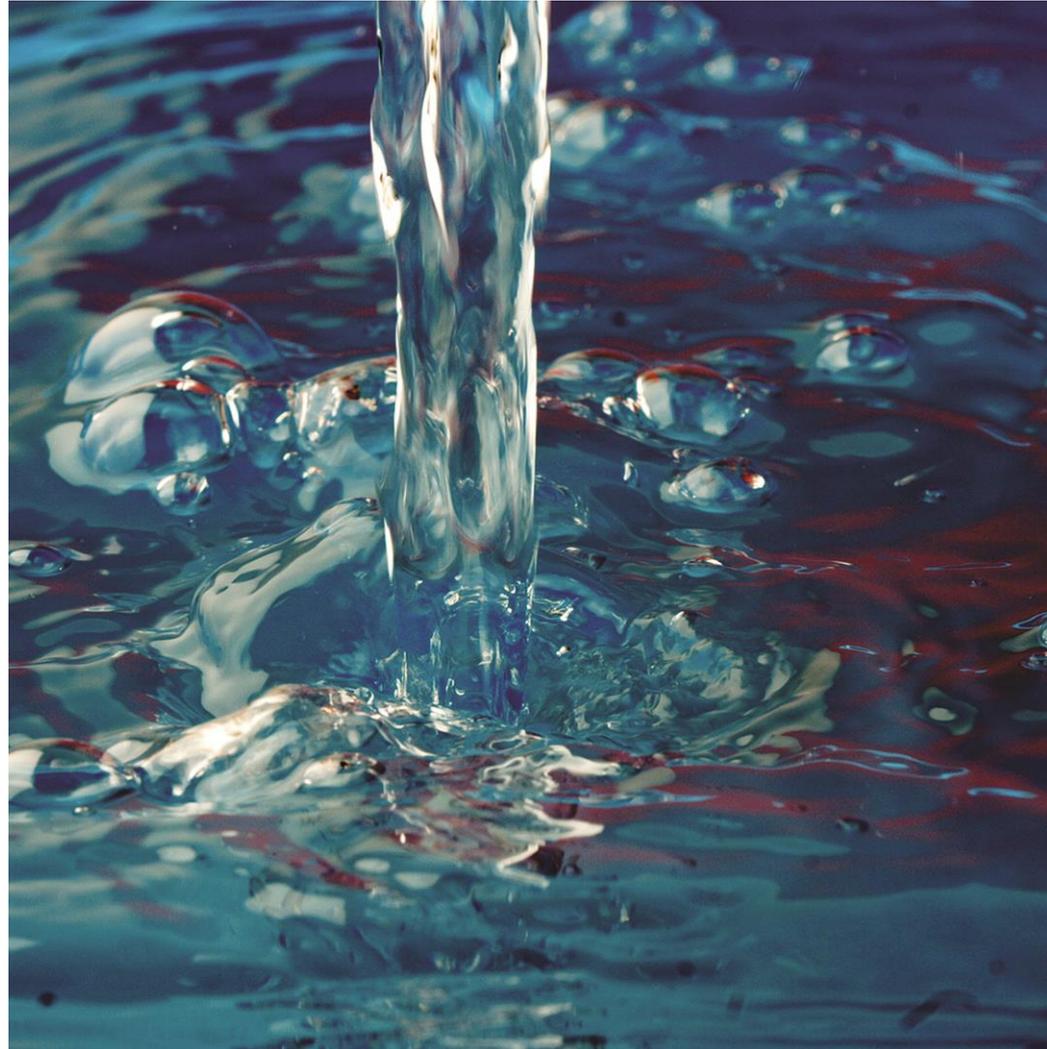
# Public Health Collaborative



# Technical Guidance for Public Health Standards for Onsite Water Systems

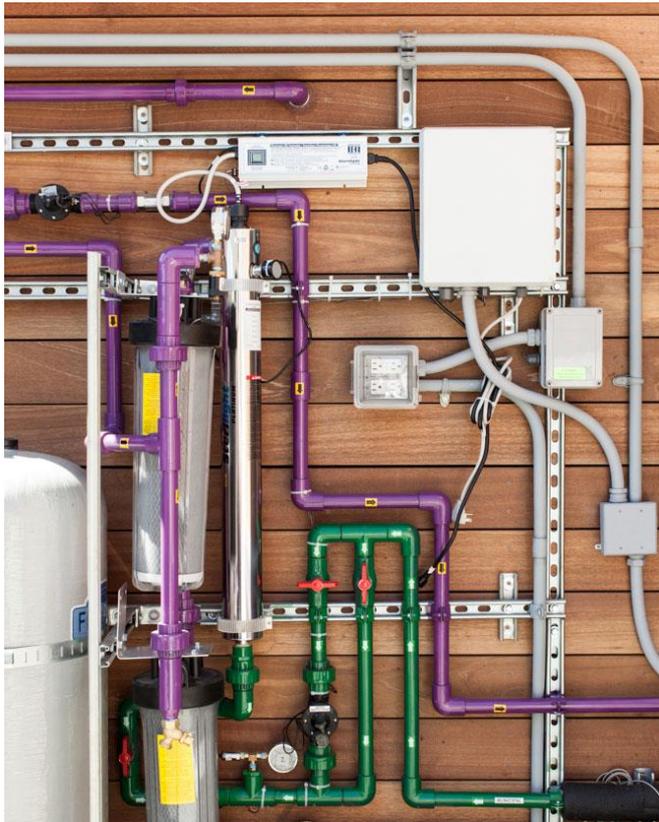
Obtain Consensus:

- Water Quality Parameters
- Monitoring Parameters
- Technical Guidance
- **Final report**



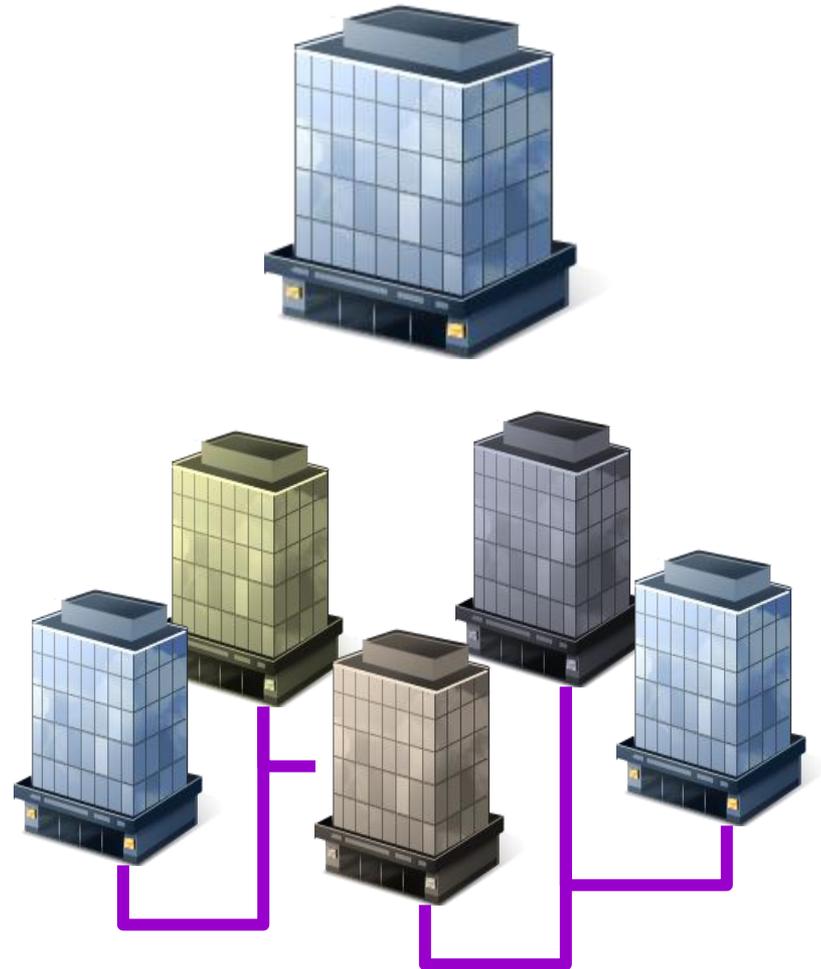
# Updates for SF Program - 2015

- Legislation Mandating Onsite Water Systems
- Potable Rainwater Pilot Project

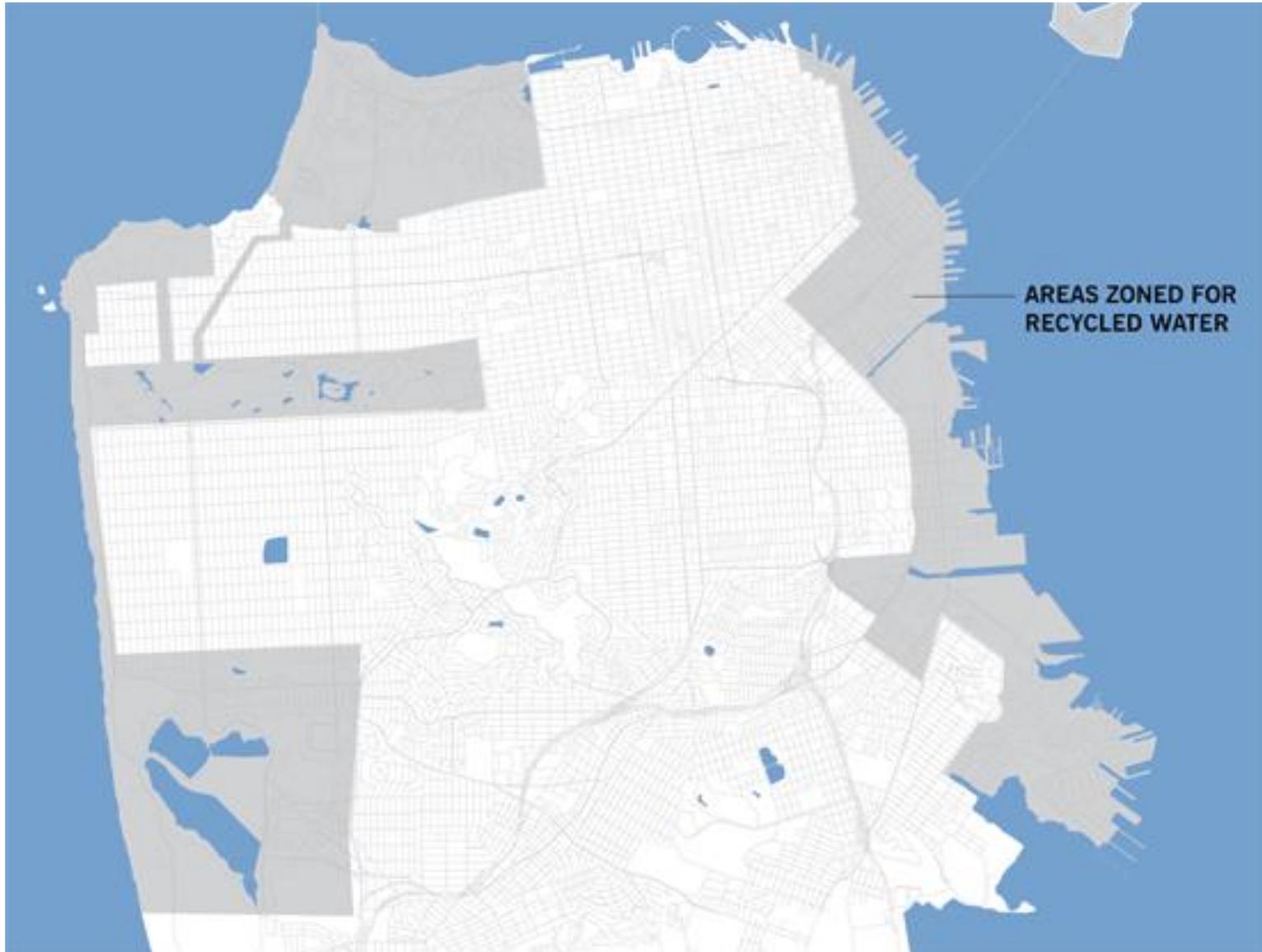


# Non-potable Ordinance UPDATE

- **July 2015: Ordinance amended to mandate onsite water reuse for toilet flushing and irrigation in all new developments greater than 250,000 square feet.**
- Beginning Nov. 1, **2015** for all projects within Recycled Water Zone.
- Beginning Nov. 1 **2016** for all projects City-wide.



# Recycled Water Zone



# Grant Updates

- Generally, SFPUC Grant Programs do not provide funding to grantees to comply with requirements mandated by a City Ordinance

<b>Eligibility Criteria for \$250,000 Grant</b>	<b>Eligibility Criteria for \$500,000 Grant</b>
The proposed activity is estimated to replace at least 1,000,000 gallons of potable water per year for at least 10 years.	The proposed activity is estimated to annually replace at least 3,000,000 gallons of potable water for at least 10 years.

**Projects must meet one of the following Eligibility Criteria:**

- The project is a new site that is voluntarily installing a non-potable water reuse system; or
- The project is an existing site that is voluntarily installing a non-potable water reuse system; or
- The project is a site that is voluntarily connecting to a district-scale non-potable water reuse system.

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[www.sfgov.org/np](http://www.sfgov.org/np)

