This presentation premiered at WaterSmart Innovations

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Maximizing Conservation Through the Use of Alternate Water Sources

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San Francisco Public Utilities Commission

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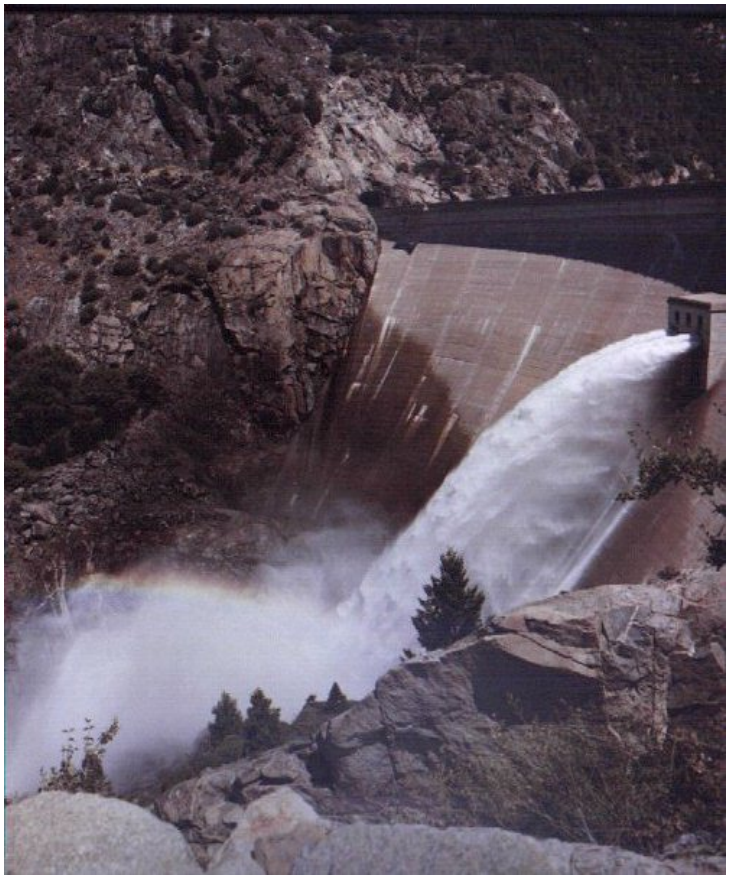
Presentation Outline

- Overview of the SFPUC
- Approach to Water Supply
- Alternate Water Sources
- San Francisco's Non-potable Program



Services We Provide

Regional Water System

Responding to Aging and Vulnerable Infrastructure

- Water System Improvement Program (WSIP)
  - Repair, replace, and seismically upgrade the system's deteriorating pipelines, tunnels, reservoirs, pump stations, storage tanks, and dams
  - $4.6 billion
  - Water Supply Diversification

HETCH HETCHY
WATER SYSTEM
IMPROVEMENT
PROGRAM

Diversifying Water Supply Portfolio

SF commitment to diversifying the water supply portfolio:

- Reducing demands through conservation
- Developing new supplies through groundwater and recycled water

Conservation Program

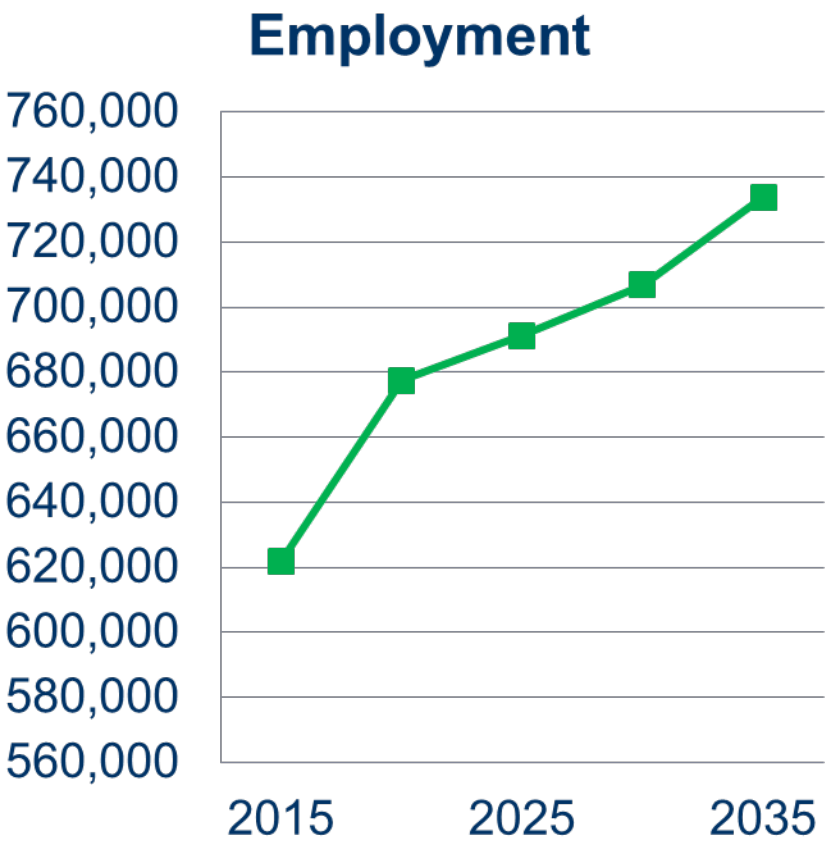
- Requirements
  - Retrofit on Resale
  - Commercial Conservation
  - Landscape Water Budgets
- Incentives
  - Audits (residential, commercial and landscapes)
  - Rebates
  - Grants for Large Landscapes and CII

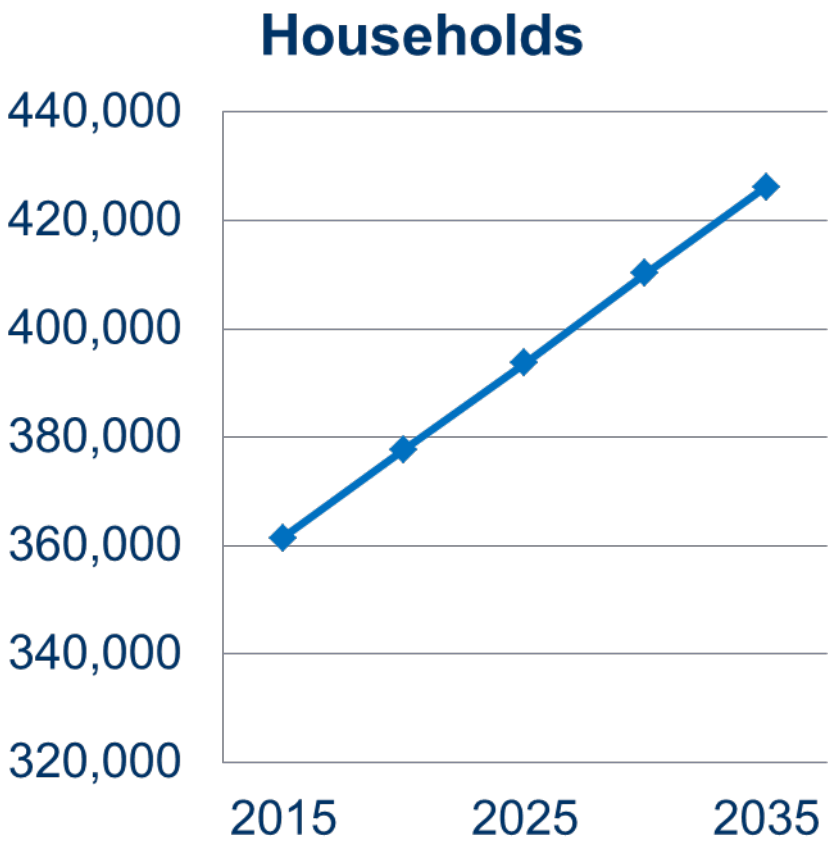



San Francisco Water- Today

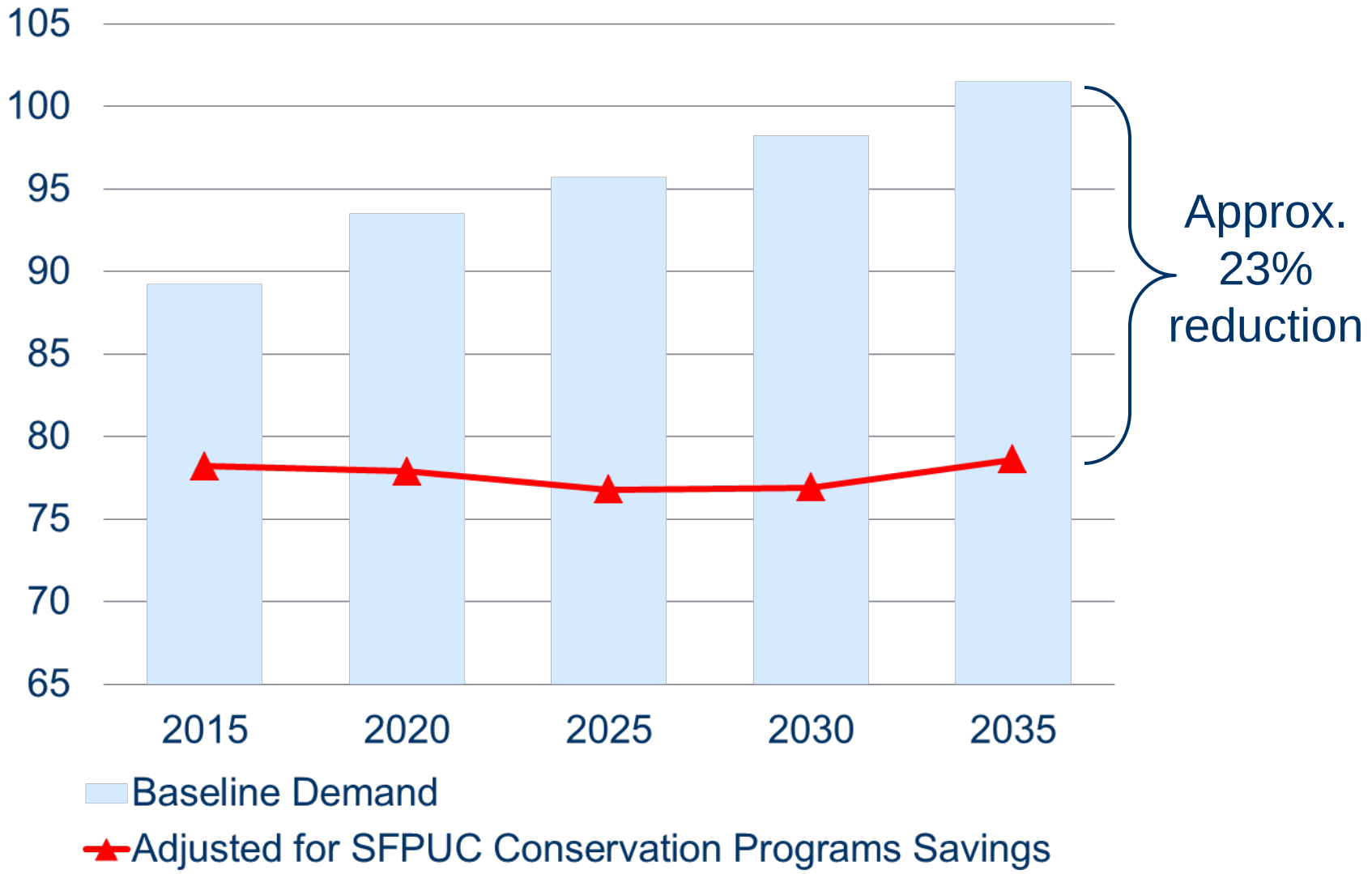
- Demand is 73 mgd
- Approximately 50 gallons per day per resident (approximately 90 gallons gross per capita)
- Import drinking water
- Irrigate GG Park and SF Zoo with groundwater

San Francisco Projections





Demand Flat Despite Growth
More Efficient Use of Water



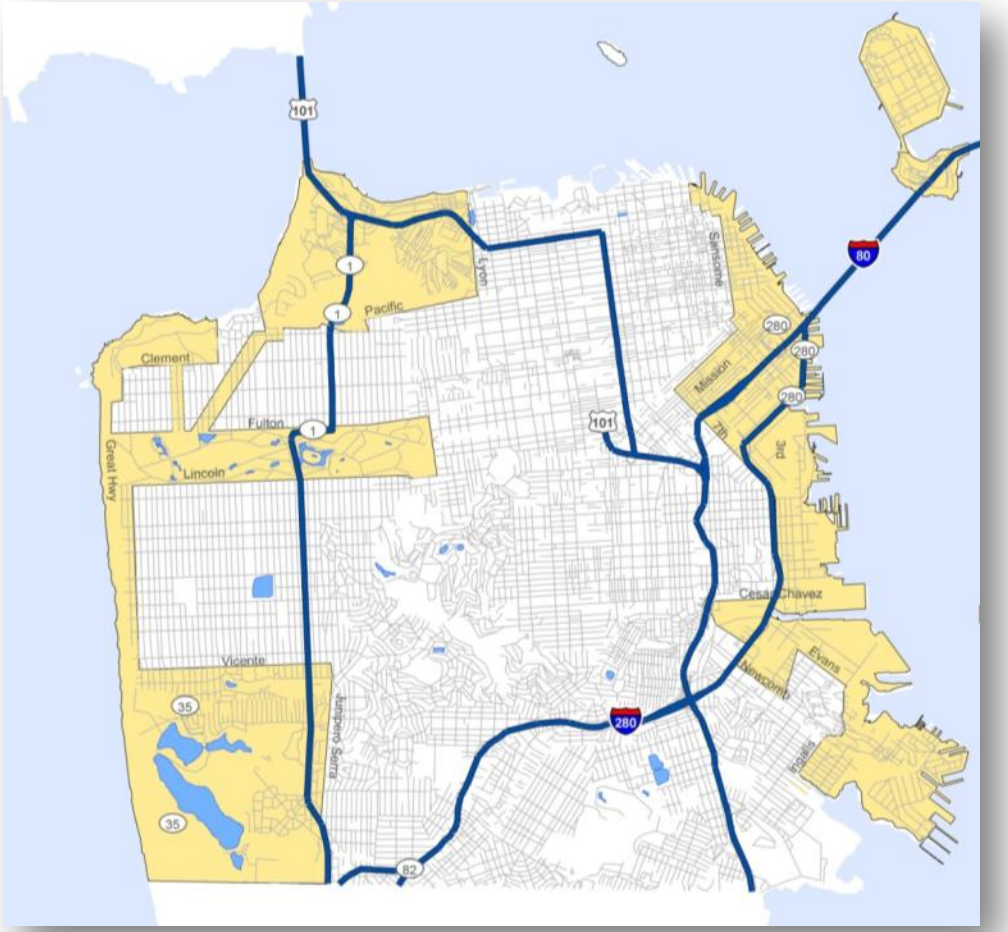
Developing New Water Supplies

- Groundwater: pump water for potable purposes during normal and drought years

- Recycled Water: produce water for irrigation and toilet flushing

Recycled Water Ordinance

- New developments & major alterations over 40,000 SF
- Irrigated landscapes over 10,000 sf
- Requires recycled water systems for toilet/urinal flushing, irrigation, & cooling.

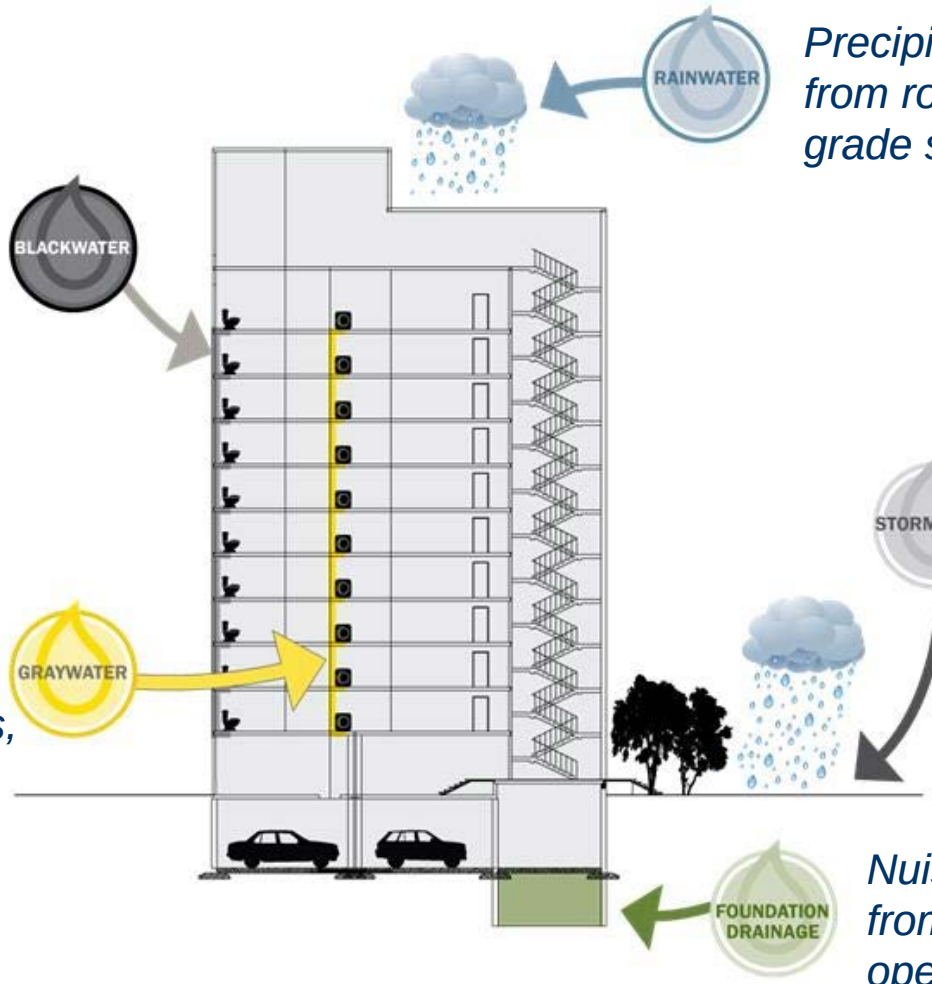


SFPUC Recycled Water Projects

- Harding Park Golf Course
- Sharp Park Golf Course
- Westside Recycled Water
- Eastside Recycled Water

Re-think Building Design & Re-imagine How We Use Water

Buildings Generate Water Resources



Precipitation collected from roofs and above-grade surfaces

Wastewater from toilets, dishwashers, kitchen sinks, and utility sinks

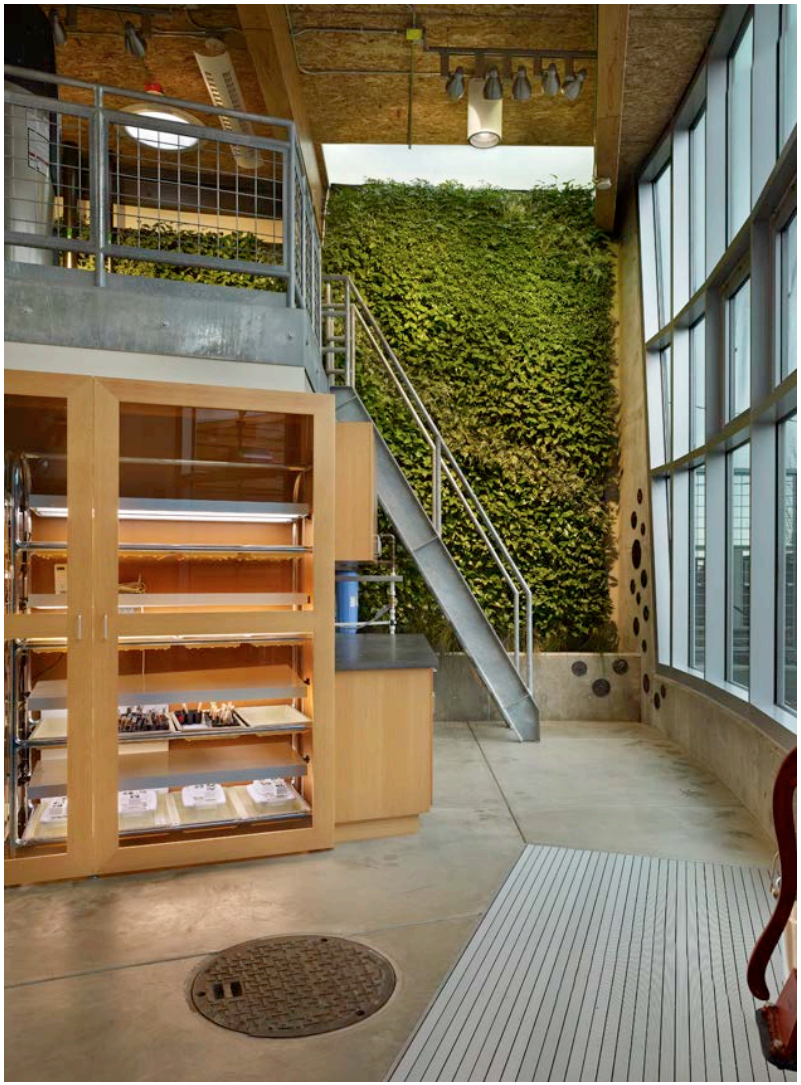
Precipitation collected at or below grade

Wastewater from clothes washers, bathtubs, showers, and sinks

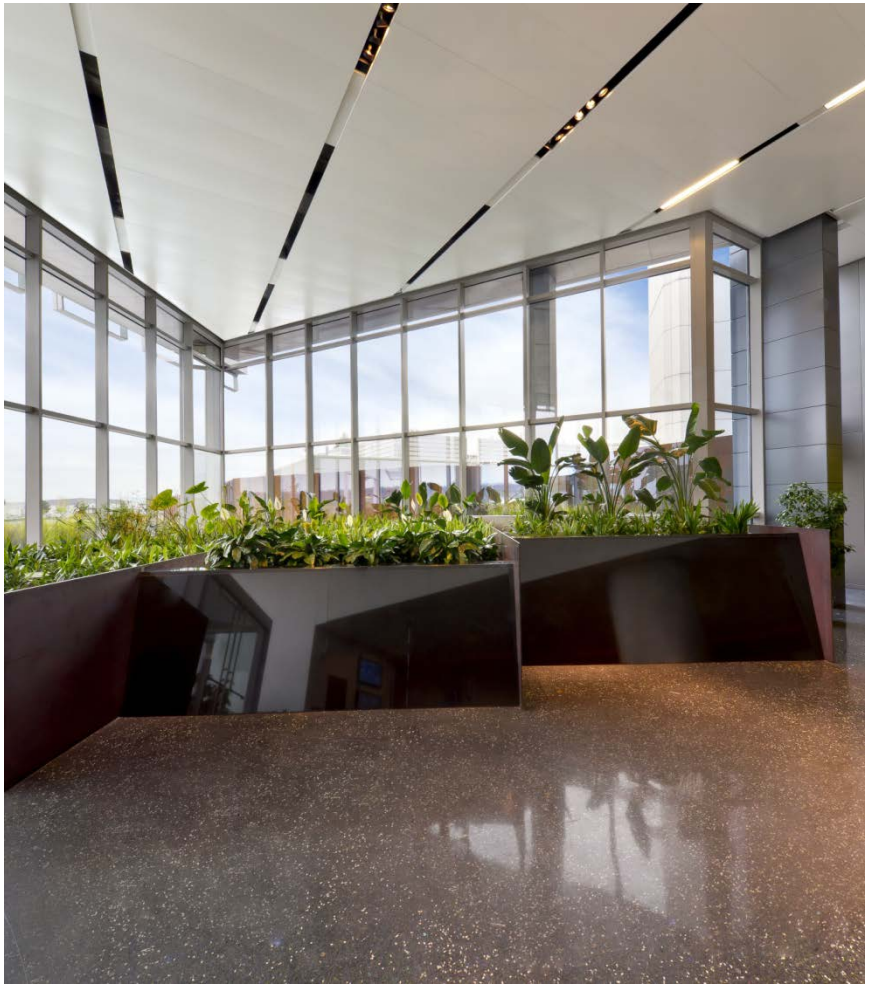
Nuisance groundwater from dewatering operations

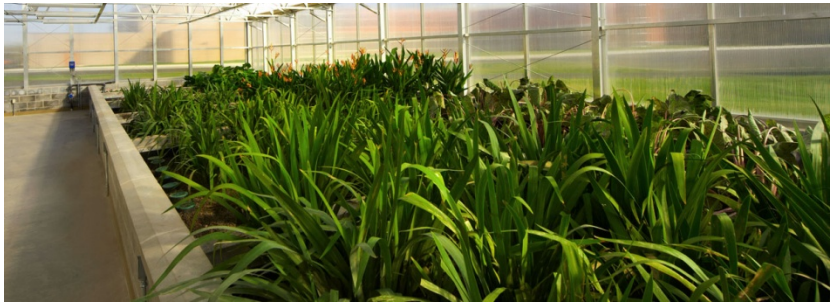
On-site Water Systems Worldwide – It's Happening Now!

Bertschi School – Seattle, WA
100% of Water Collected and Treated



Port of Portland – Portland, OR
75% Reduction in Potable Water Use



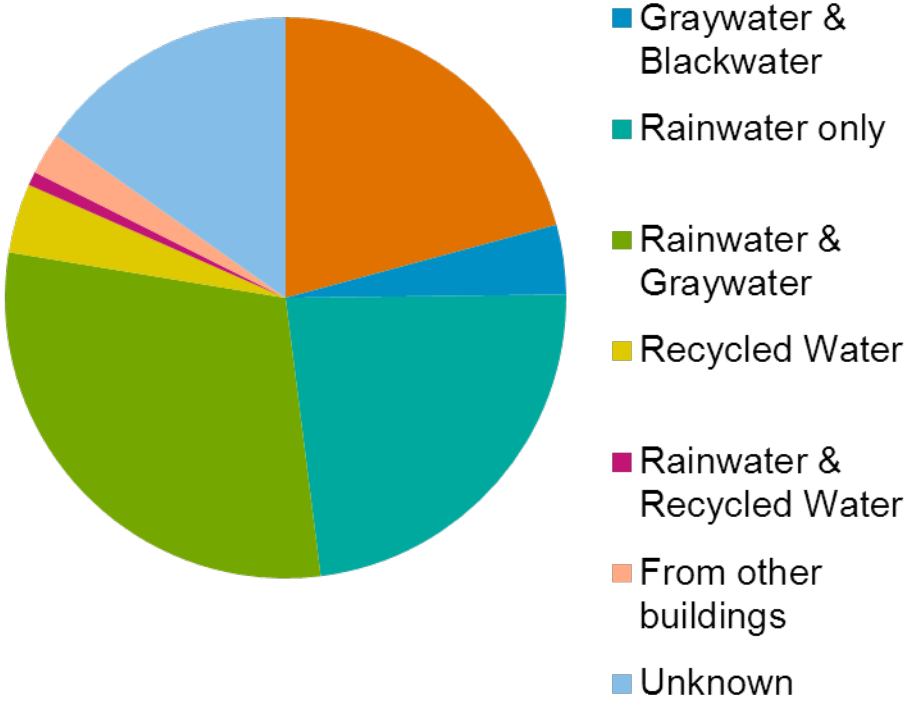


Solaire– Battery Park, NYC
50% Reduction in Potable Water

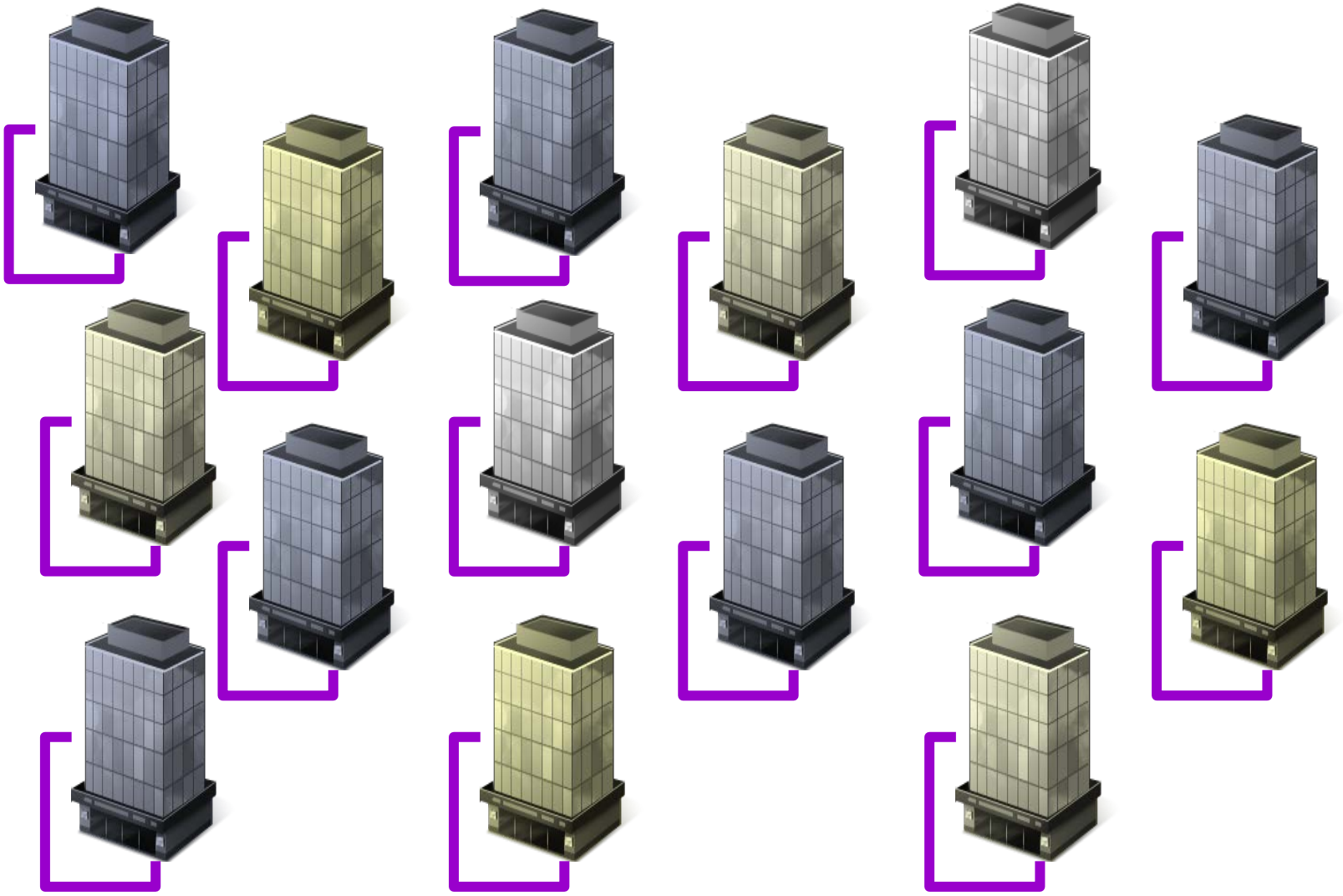
Dockside Green – Victoria, Canada
65% Reduction in Potable Water

Japan is a Leader in Urban On-site Reuse & 60% of Non-potable Demand in Tokyo is Met by Reuse

On-site Reuse Strategies

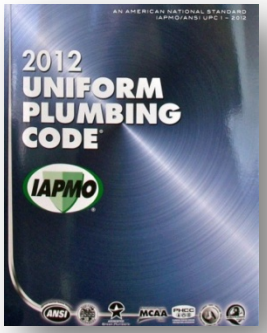


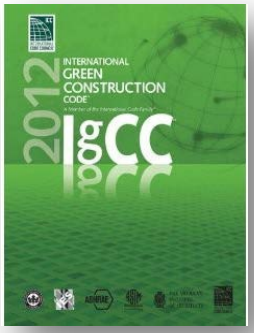
Can On-site or District Water Reuse Become Commonplace?



On-site Reuse is Starting to Reach a Larger Audience

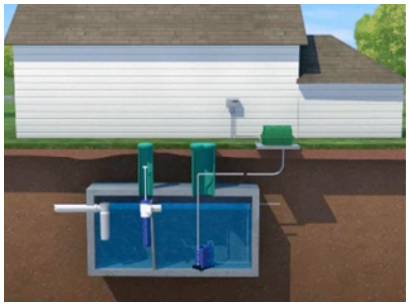
- Codes and standards are in place

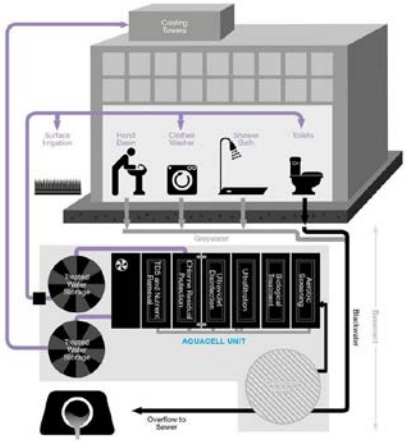




NSF®

- Technologies have been developed





Change Our Perceptions

SFPUC is Leading By Example – 60% Water Use Reduction

- Living Machine
  - Collects and treats buildings graywater and blackwater
  - Reuse for toilet flushing
  - 5,000 gpd system capacity
- Rainwater Harvesting
  - 25,000 gallon cistern

However, Integrating On-site Non-potable Water Is Challenging

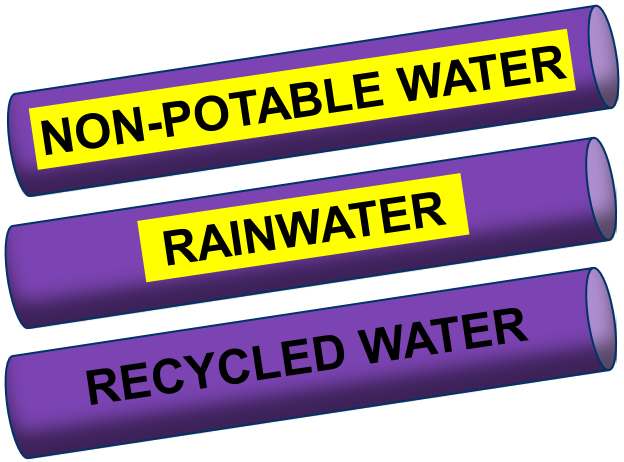
- Regulatory questions:
  - Who should set water quality standards?
  - Who should issue permits and provide operational oversight?
  - What type of on-going monitoring and reporting should be implemented?

Crafted City Ordinance to Streamline Permitting Process

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

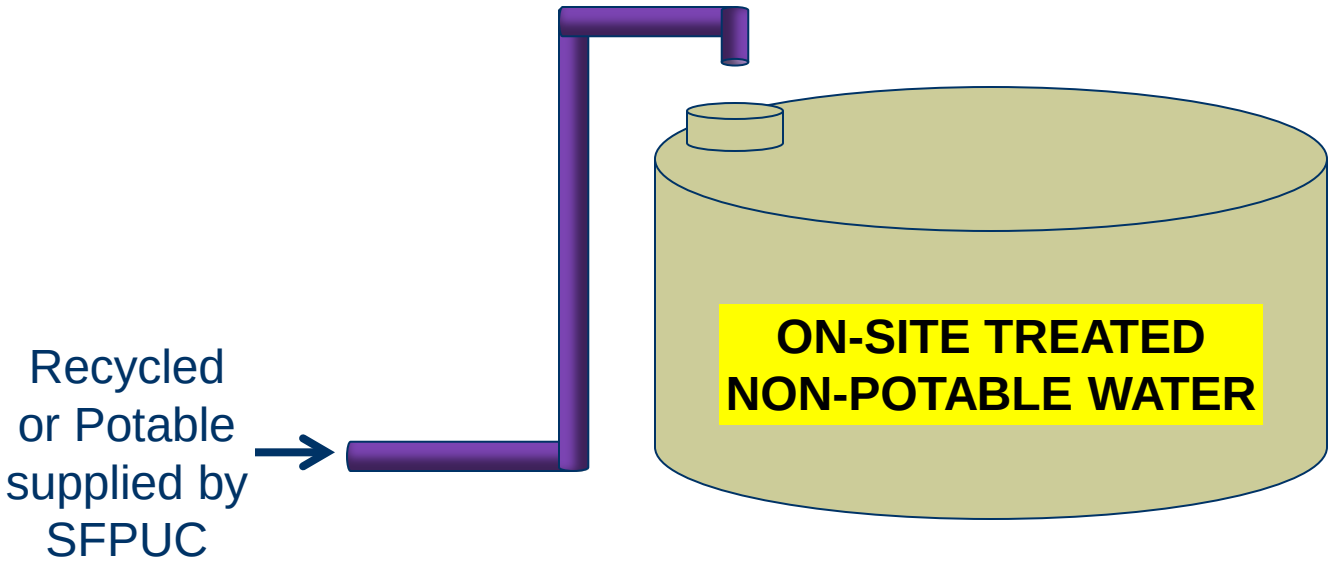
System Construction - Identification

- Purple pipe for all non-potable water
- Pipe labeling and signage will identify type
  - “On-site Treated Non-potable,” “Rainwater,” “Recycled,” etc.
  - Consistent with 2013 California Plumbing Code



System Construction – Make-Up Water

- Municipal recycled water as make-up/backup supply to on-site non-potable water systems:
  - If RW not available, potable water will be supplied
  - Same backflow protection requirements as potable



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 Foundation Drainage	No state codes - SFDPH establish

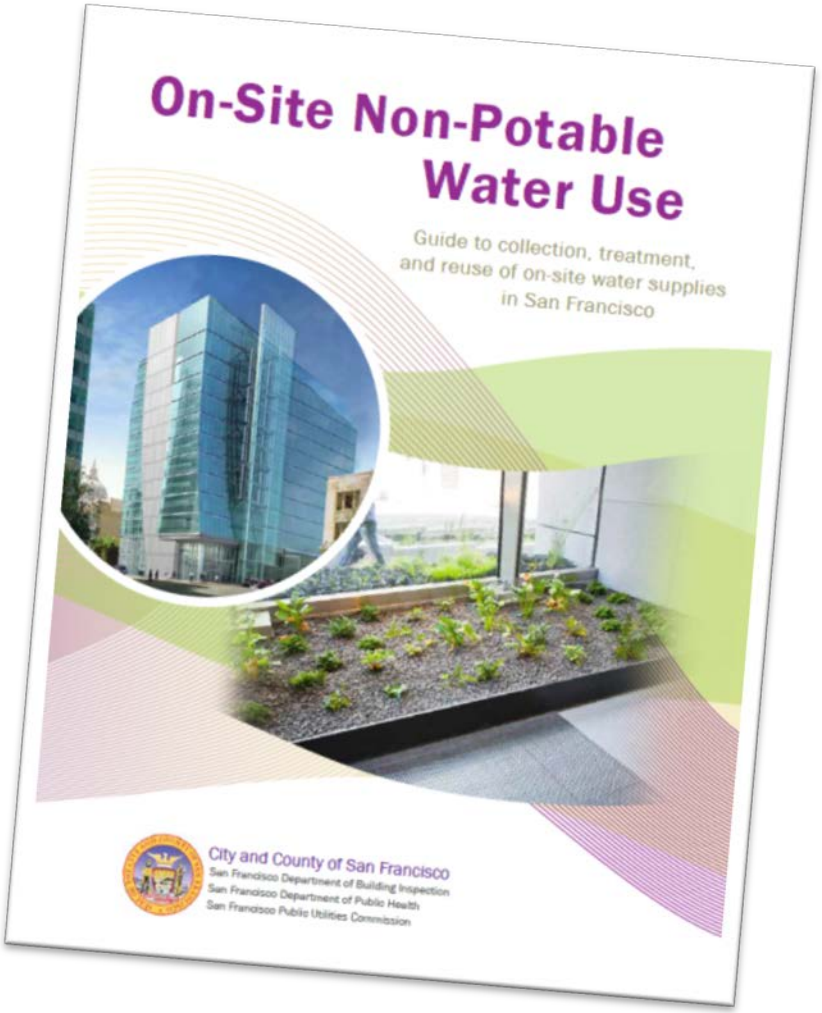
SFDPH will permit onsite systems and require monitoring and reporting

SFDPH Monitoring and Reporting Frequency

	Rainwater	Stormwater	Foundation Drainage	Graywater	Blackwater
Start-Up Mode *(90 days)*					
Temporary Use Mode *(9 months)*					
Final Use Mode					

SFPUC Provides Technical Assistance and Financial Incentives

- On-site Non-potable Guidebook
- Water Use Calculator
- Grant program
- Project review meetings



Water Use Calculator

NON-POTABLE WATER CALCULATOR

Step 2 of 7:

NON-POTABLE WATER CALCULATOR

Step 4 of 7: Calculate Outdoor Water Demand (Landscape Irrigation, Outdoor Water Features)

NON-POTABLE WATER CALCULATOR

Step 6 of 7: Summary of Building Potential

Project Name:
ABC Building

LEGEND:

User Input	
Linked from User Input	
Default Value	
Autogenerated Value	

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

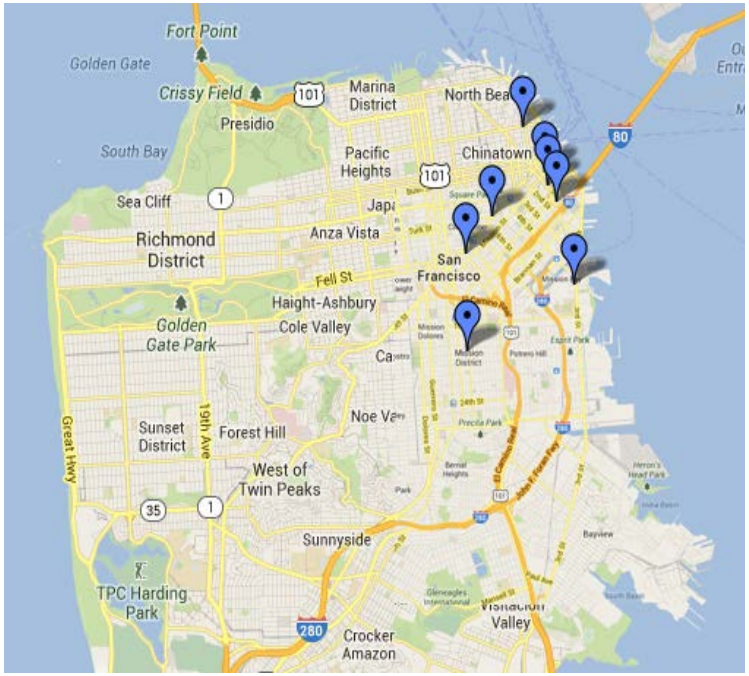
A. TOTAL DEMAND (No user input needed - auto-calculated)

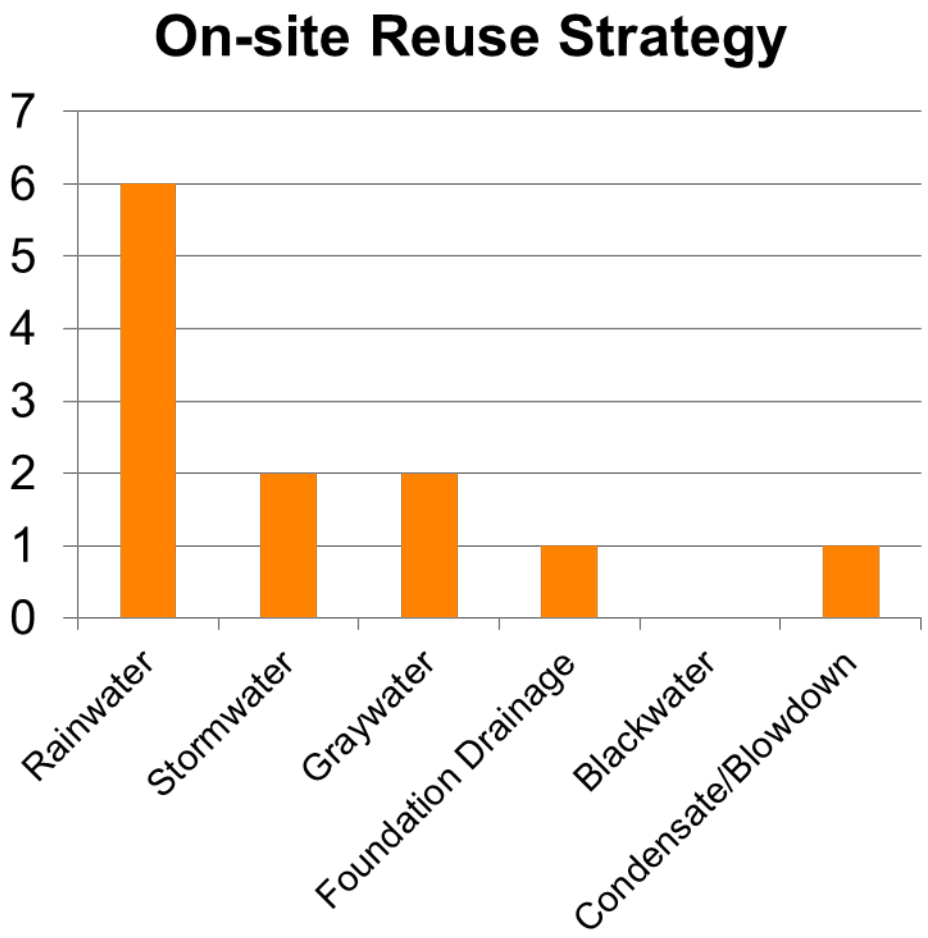
Demand Types	Ave Daily Water Demand (gpd)	Annual Water Demand (gpy)	Average Monthly Demand (gal/mth)											
			January	February	March	April	May	June	July	August	September	October	November	December
DOMESTIC FIXTURES - Commercial														
Showerhead	13	4,745	395	395	395	395	395	395	395	395	395	395	395	395
Lavatory Faucet	120	43,800	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650
Urinals	174	63,510	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)	891	325,171	27,098	27,098	27,098	27,098	27,098	27,098	27,098	27,098	27,098	27,098	27,098	27,098
Kitchen Faucet	180	65,700	5,475	5,475	5,475	5,475	5,475	5,475	5,475	5,475	5,475	5,475	5,475	5,475
Low Flow Sprayer - Restaurants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	1,378	503,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000
DOMESTIC FIXTURES - Multi-Family Residential														
Showerhead	2,143	782,071	65,173	65,173	65,173	65,173	65,173	65,173	65,173	65,173	65,173	65,173	65,173	65,173
Bathroom Faucet	392	143,062	11,922	11,922	11,922	11,922	11,922	11,922	11,922	11,922	11,922	11,922	11,922	11,922
Bath	503	183,413	15,284	15,284	15,284	15,284	15,284	15,284	15,284	15,284	15,284	15,284	15,284	15,284
Washing Machine	2,299	839,222	69,935	69,935	69,935	69,935	69,935	69,935	69,935	69,935	69,935	69,935	69,935	69,935
Toilet (Water Closet)	1,222	446,059	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172
Kitchen Faucet	2,829	1,032,686	86,057	86,057	86,057	86,057	86,057	86,057	86,057	86,057	86,057	86,057	86,057	86,057
Dishwasher	90	32,721	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727
SUBTOTAL	9,477	3,459,300	288,300	288,300	288,300	288,300	288,300	288,300	288,300	288,300	288,300	288,300	288,300	288,300
HVAC/COOLING														
Conventional Cooling	1,957	714,775	43,821	46,461	55,045	55,979	61,290	64,418	67,319	69,580	72,727	72,729	58,922	46,486
SUBTOTAL	1,957	714,800	43,900	46,500	55,100	56,000	61,300	64,500	67,400	69,600	72,800	72,800	59,000	46,500
OTHER INDOOR DEMANDS THAT CAN BE MET WITH NON-POTABLE SUPPLIES														
Indoor Decorative Water Feature	100	25,000	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083
Commercial Laundry	34	1,768	147	147	147	147	147	147	147	147	147	147	147	147
<Please specify here>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	134	26,800	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300
OUTDOOR DEMANDS														
Landscape Irrigation	N/A	106,727	0	0	0	0	13,999	25,093	27,823	24,817	14,995	0	0	0
Decorative Water Feature	100	25,000	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083
<Please specify here>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	100	131,800	2,100	2,100	2,100	2,100	16,100	27,200	30,000	27,000	17,100	2,100	2,100	2,100
GRAND TOTAL	13,047	4,835,700	378,600	381,200	389,800	390,700	410,000	424,300	430,000	429,200	422,500	407,500	393,700	381,200

SFPUC Grant Program for Large Alternate Water Source Projects

- The SFPUC offers up to **$250,000** for new projects that replace potable water use with on-site alternate water sources
  - Must be **100,000 sf or more**
  - Must replace potable water for one of the following:
    - **All toilet flushing demands** or
    - **Offset 40% of potable water use**

8 New Projects Proposing to Offset 6 Million Gallons Per Year

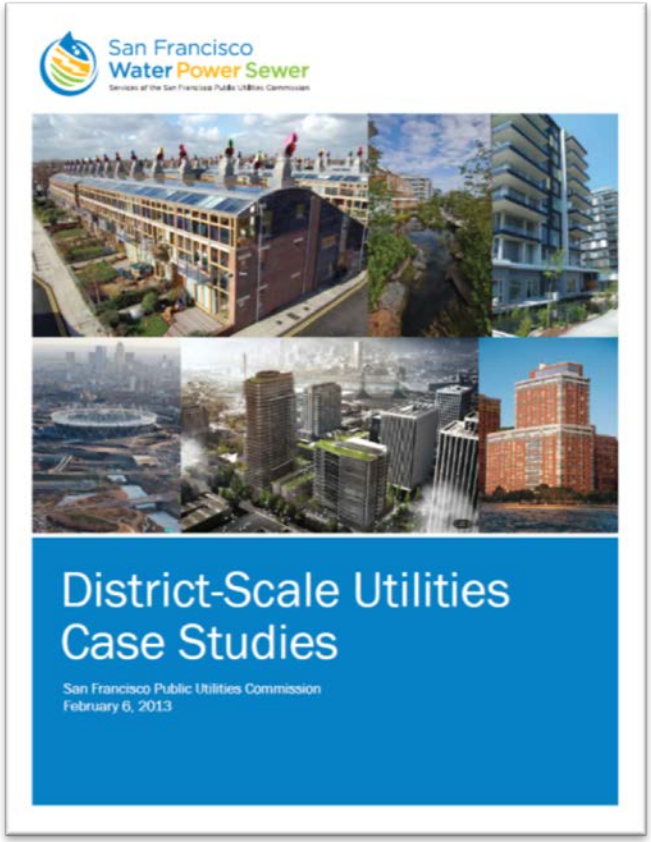




Expanding Program to Address District-Scale Water Systems

- Non-potable Ordinance Amendments proposed to include district-scale
  - Incorporates encroachment permit process
  - Incorporates legal agreements & easements between property owners

- Expansion of grant program approved by SFPUC to encourage district-scale
  - Offering up to **$500,000** for multi-parcel projects that will utilize **3 MGY** or more on-site



San Francisco to Establish Alliance with Cities

San Francisco Water Power Sewer

Thank You