ALTERNATIVE ON-SITE WATER USE WORKSHOP

Austin WATER

June 25, 2019

Welcome!

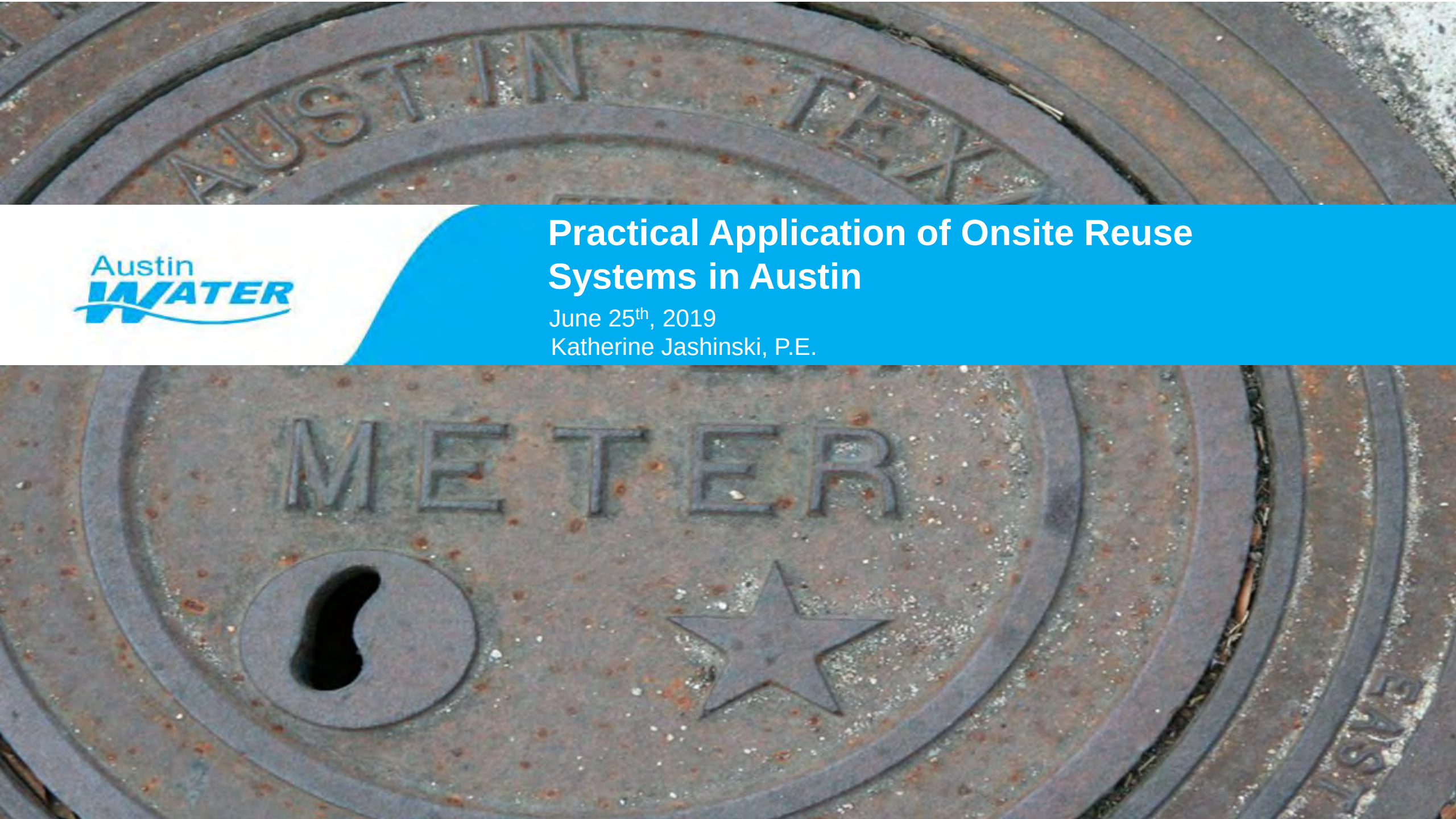
Onsite Reuse Workshop 2019

Opening remarks

Greg Meszaros Director

Jimmy Flannigan

Council Member



Austin WATER

Practical Application of Onsite Reuse Systems in Austin

June 25th, 2019

Katherine Jashinski, P.E.

OUTLINE

1 Onsite Reuse Systems

- Drivers
- Definitions
- Regulatory Landscape

2 Evolution of Onsite Reuse

- Previous Regulations
- Onsite Reuse Guides
- Looking Ahead

3 Projects and Outcomes

- City of Austin Systems
- WRF Dual Plumbing Study
- Other Onsite Reuse Initiatives

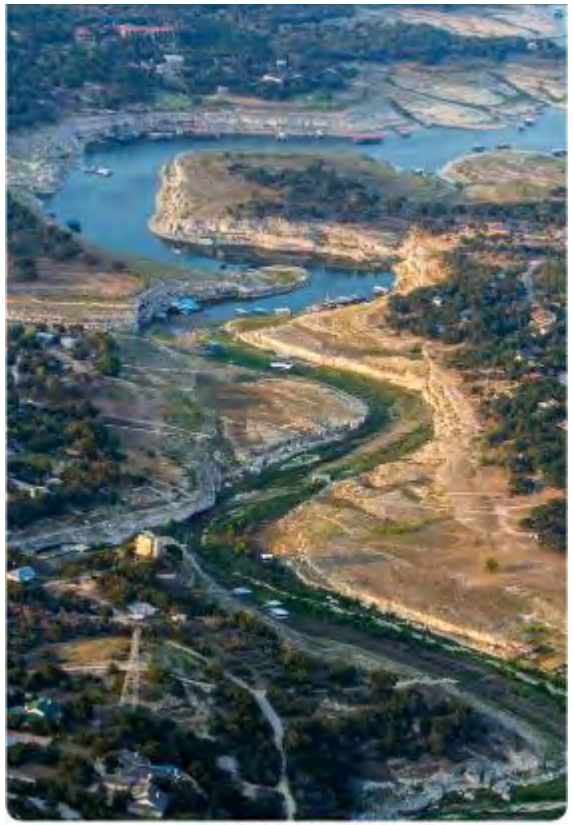
1

Onsite Reuse Systems

- **Drivers**
- **Definitions**
- **Regulatory Landscape**

DRIVERS

Water supply threats are demanding new water source solutions



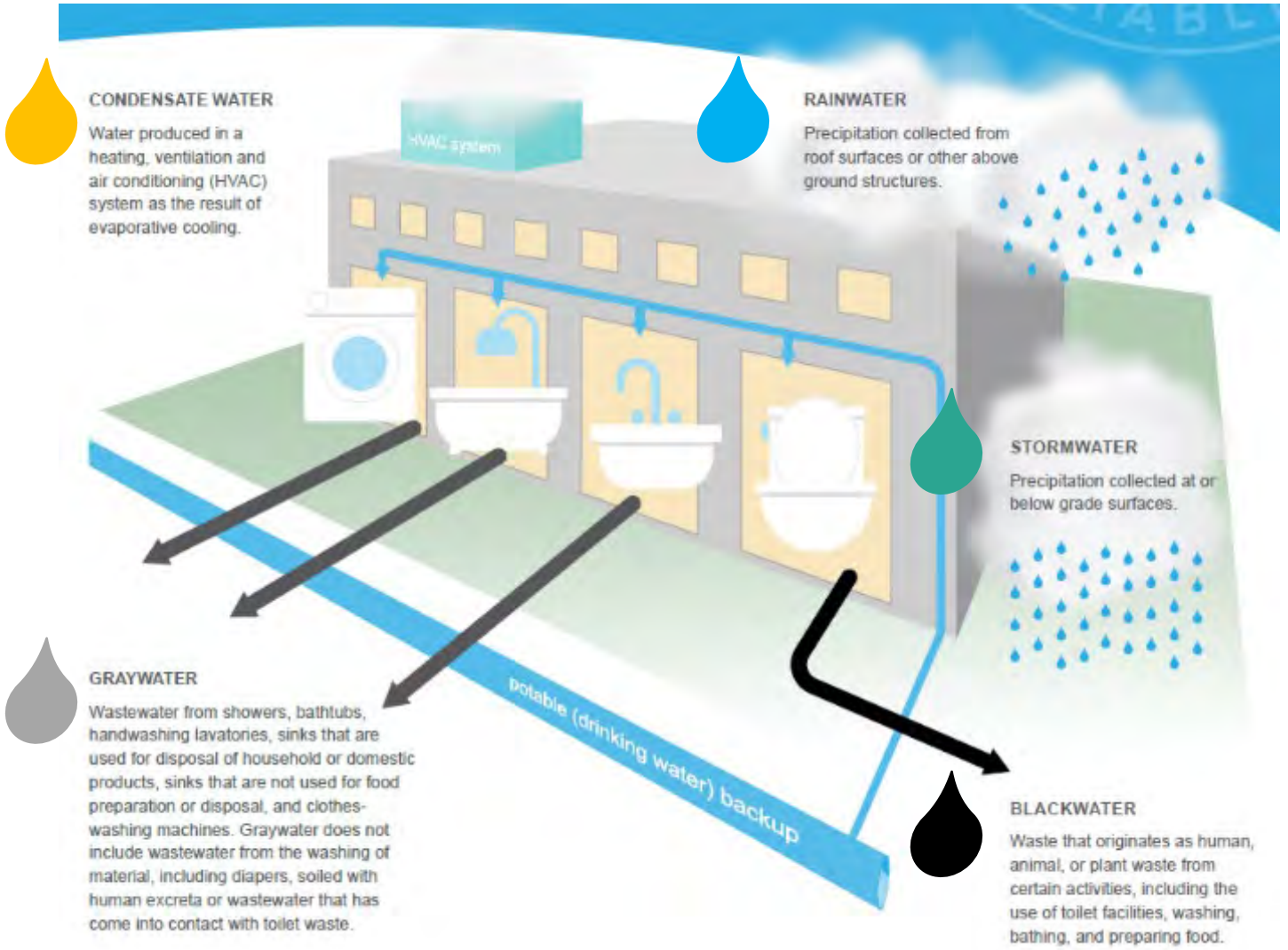
- Climate change impacts
- Water shortages/drought
- Catastrophic events
- Degradation of water quality
- Reliability and redundancy limitations
- Population growth with reduced consumption
- Demand for lower-cost solutions

Source: WRF Poject 4550
Integrated Water Management: Planning for Future Water Supplies

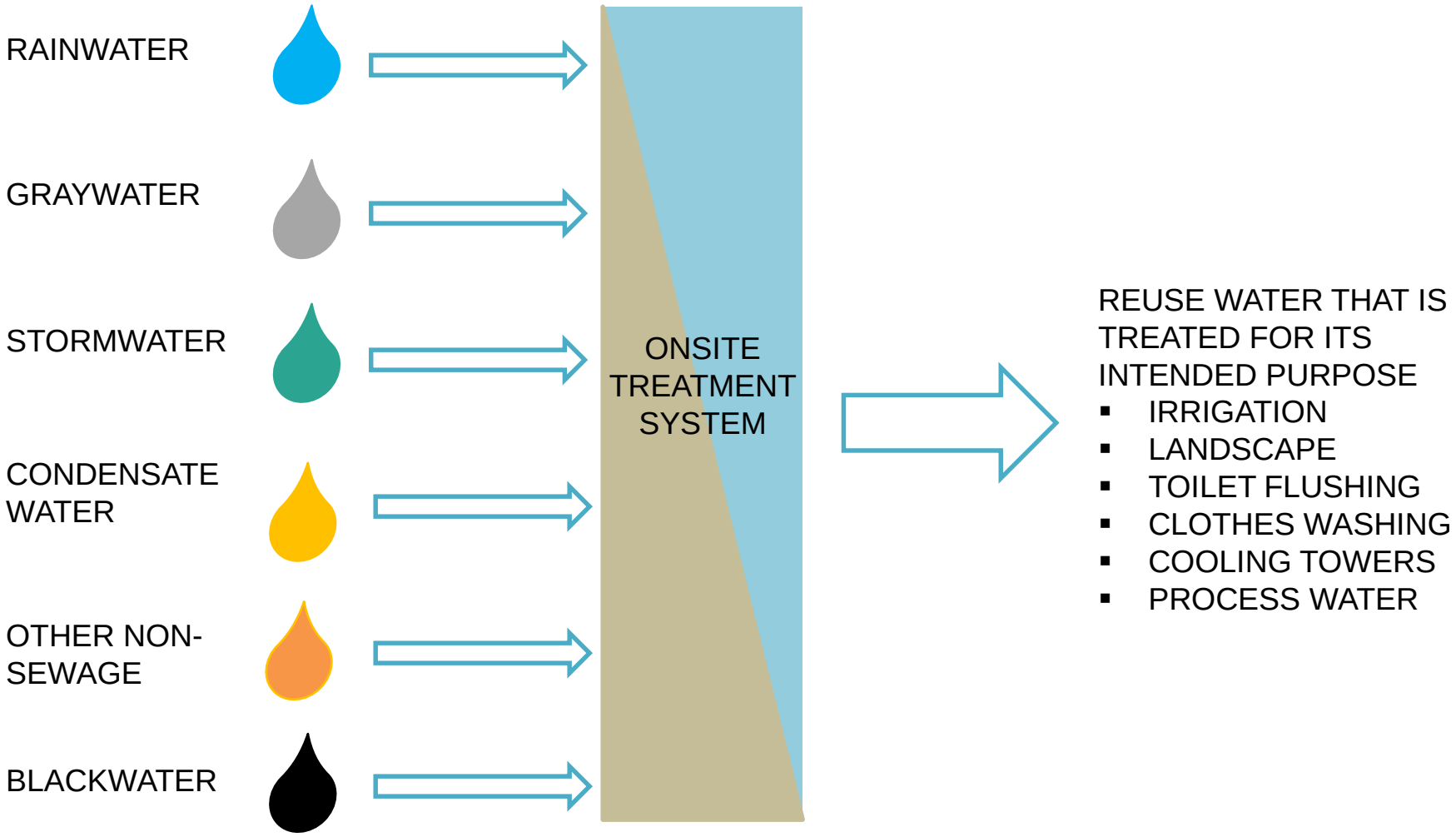
Water Forward
Austin's 100-year Integrated Water Resource Plan

- Goal to ensure a resilient water future through future population growth, drought, and climate change
- Plan embraces a fit for purpose approach to meet non-potable demands with non-potable sources
- Onsite water use is a key strategy in Water Forward to meet our future reuse goals

DEFINITIONS: ALTERNATIVE WATER SOURCES



DEFINITIONS: ONSITE WATER REUSE SYSTEMS



REUSE WATER THAT IS TREATED FOR ITS INTENDED PURPOSE

- IRRIGATION
- LANDSCAPE
- TOILET FLUSHING
- CLOTHES WASHING
- COOLING TOWERS
- PROCESS WATER

REGULATORY LANDSCAPE

WATER SOURCE	REUSE TYPE	STATE CODES	LOCAL CODES
RAINWATER STORMWATER CONDENSATE GRAYWATER	NON-POTABLE	-TH&SC CHAPTER 341 -30 TAC CHAPTER 210 SUBCHAPTERS E&F	CHAPTERS 15&16 OF THE UNIFORM PLUMBING CODE
BLACKWATER	NON-POTABLE	-TH&SC CHAPTER 341 -30 TAC CHAPTER 210 SUBCHAPTERS A-D	CHAPTER 15 OF THE UNIFORM PLUMBING CODE
RAINWATER	POTABLE	-TH&SC CHAPTER 341 -30 TAC CHAPTER 290	APPENDIX K OF THE UNIFORM PLUMBING CODE

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Evolution of Onsite Reuse

- Previous Regulations
- Onsite Reuse Guides
- Looking Ahead

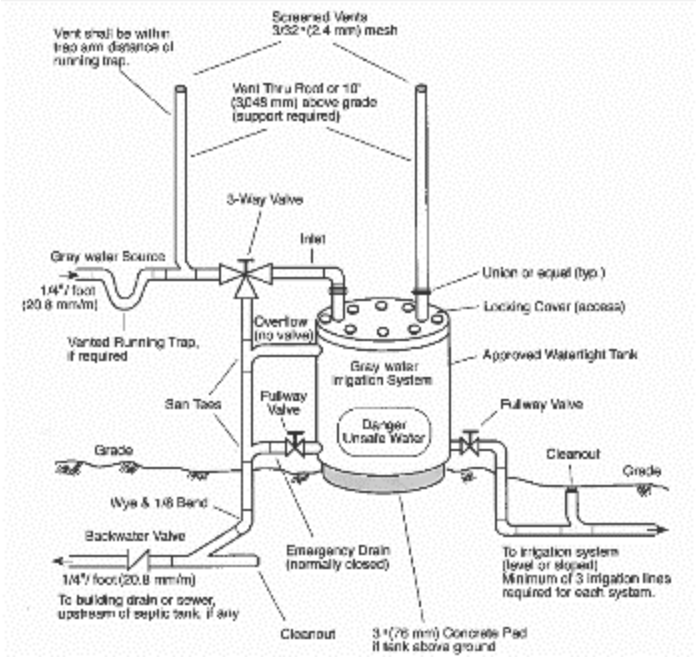
PREVIOUS REGULATIONS

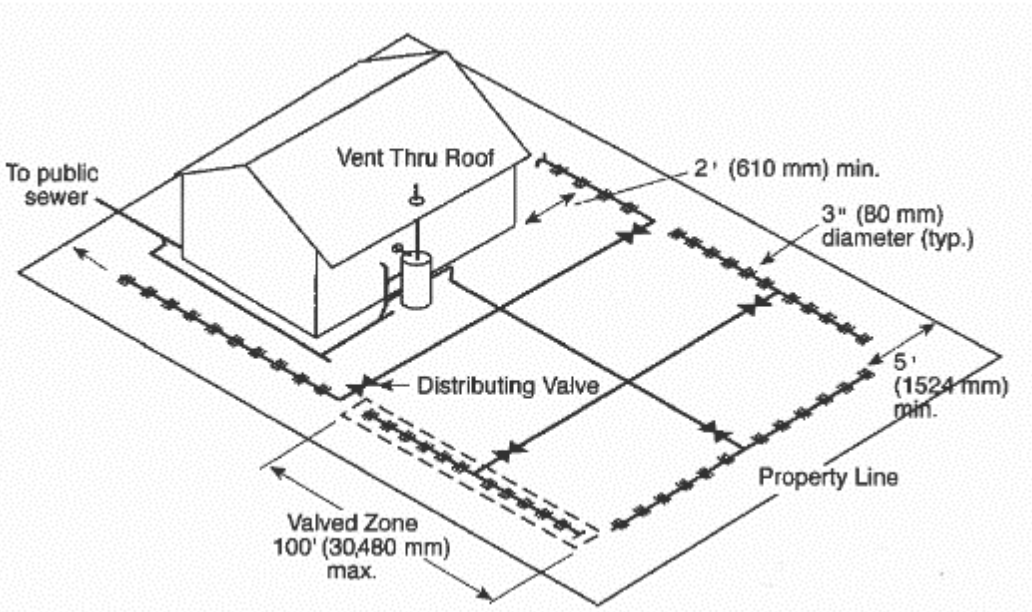
- 2005 adoption of 30 TAC 210 Subchapter F: Use of Graywater Systems

  Domestic graywater systems less than 400 gallons per day do not require a permit or inspection.

PREVIOUS REGULATIONS

- 2009 adoption of Chapter 16 of the Uniform Plumbing Code: Nonpotable Water Reuse Systems (Graywater and Reclaimed Water Systems)





PREVIOUS REGULATIONS

- 2012 adoption of Chapter 16 of the Uniform Plumbing Code: Nonpotable Water Reuse Systems (Addition of Condensate and Other Onsite Sources)

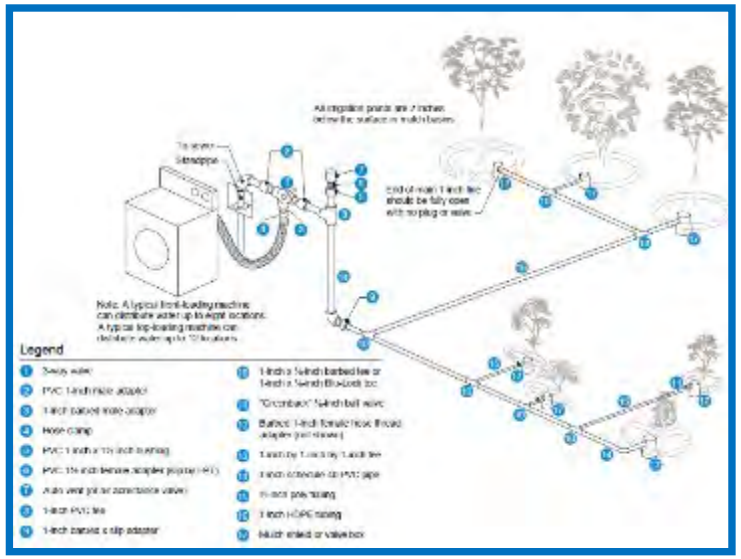
Council Initiated Graywater Working Group:

Identified 7 technical impediments to graywater use

- Recommended addressing through adoption of 2012 Uniform Plumbing Code and Local Amendments

Identified 6 process and information-related impediments

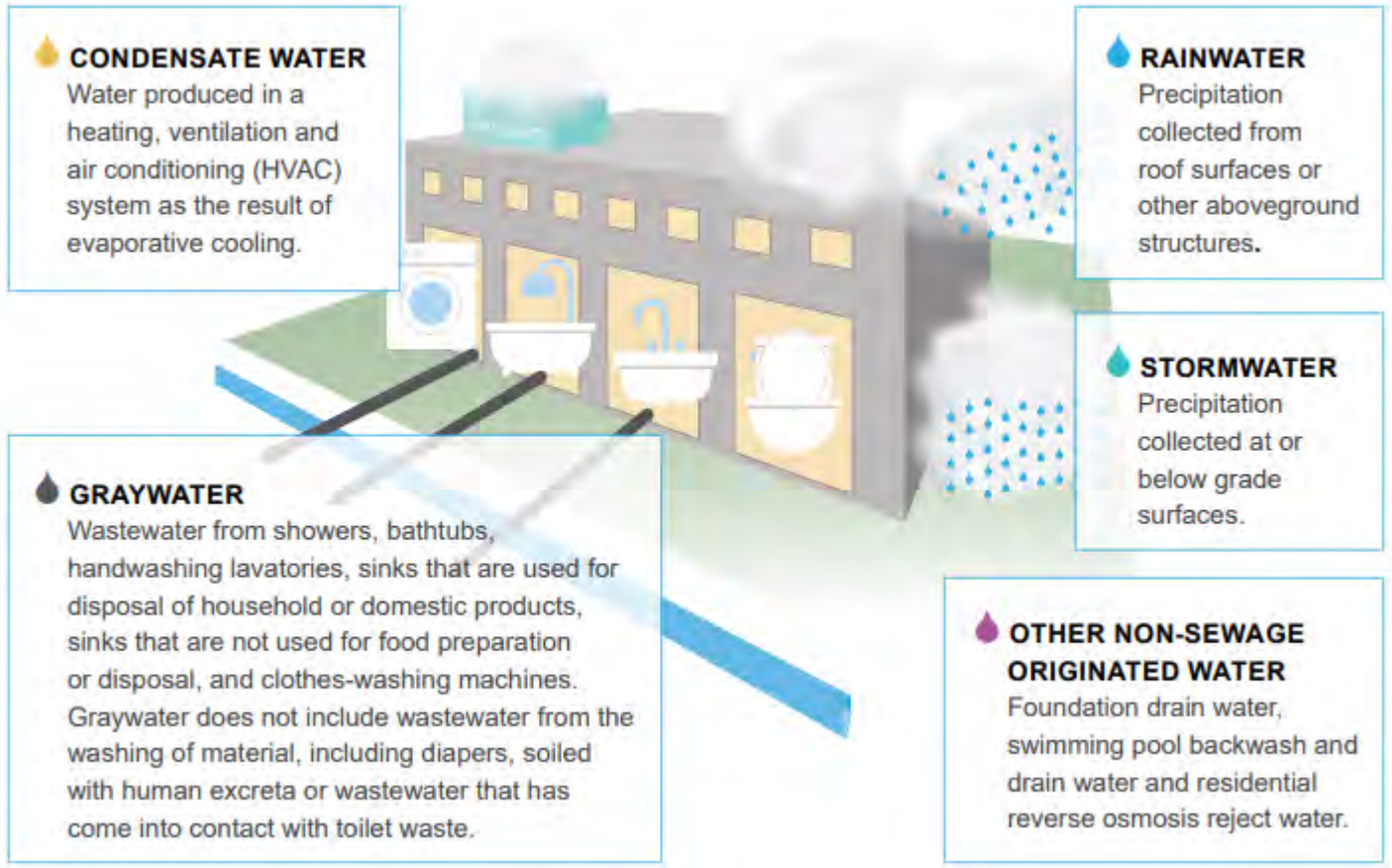
- Developing one-stop permit process for auxiliary water
- Coordinating information through Austin Water's Conservation Division
- Planning for additional outreach and education components



PREVIOUS REGULATIONS

- 2016 revision of 30 TAC 210 Subchapter F: Use of Graywater Systems

House Bill 1902 (2015) Addresses Alternative Onsite Water



PREVIOUS REGULATIONS

- 2017 amendments of the Uniform Mechanical Code

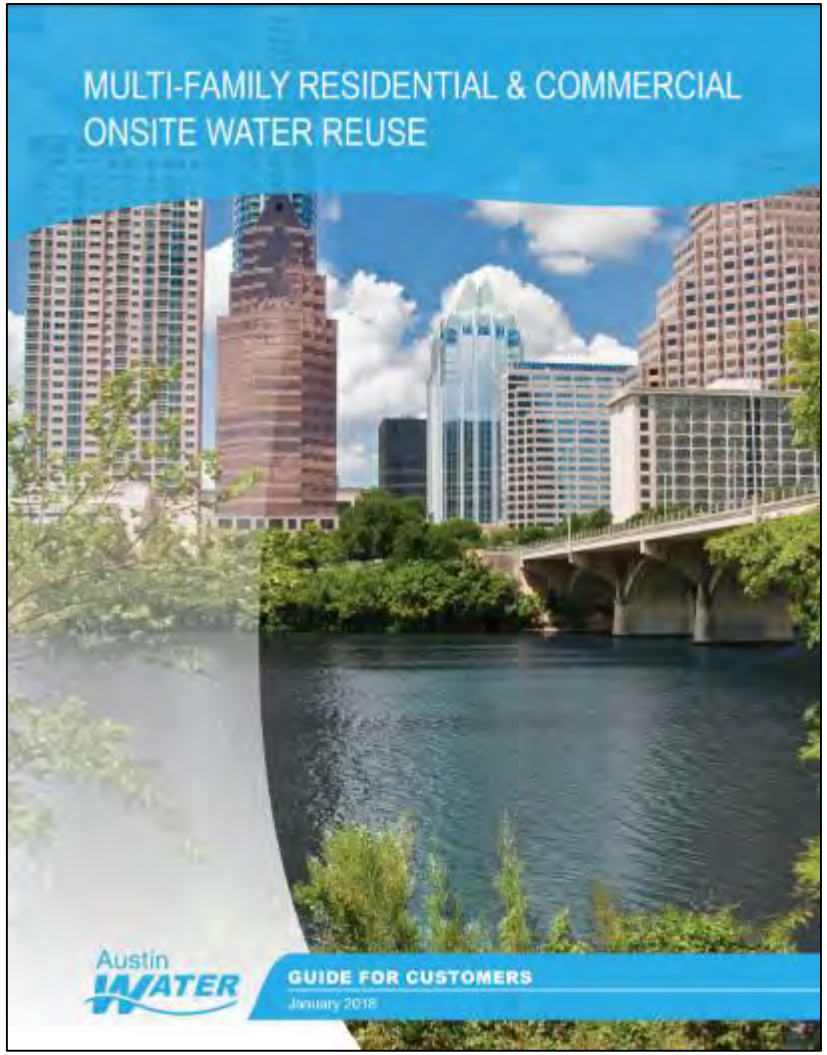
Mandatory Condensate Recovery Systems for New Development

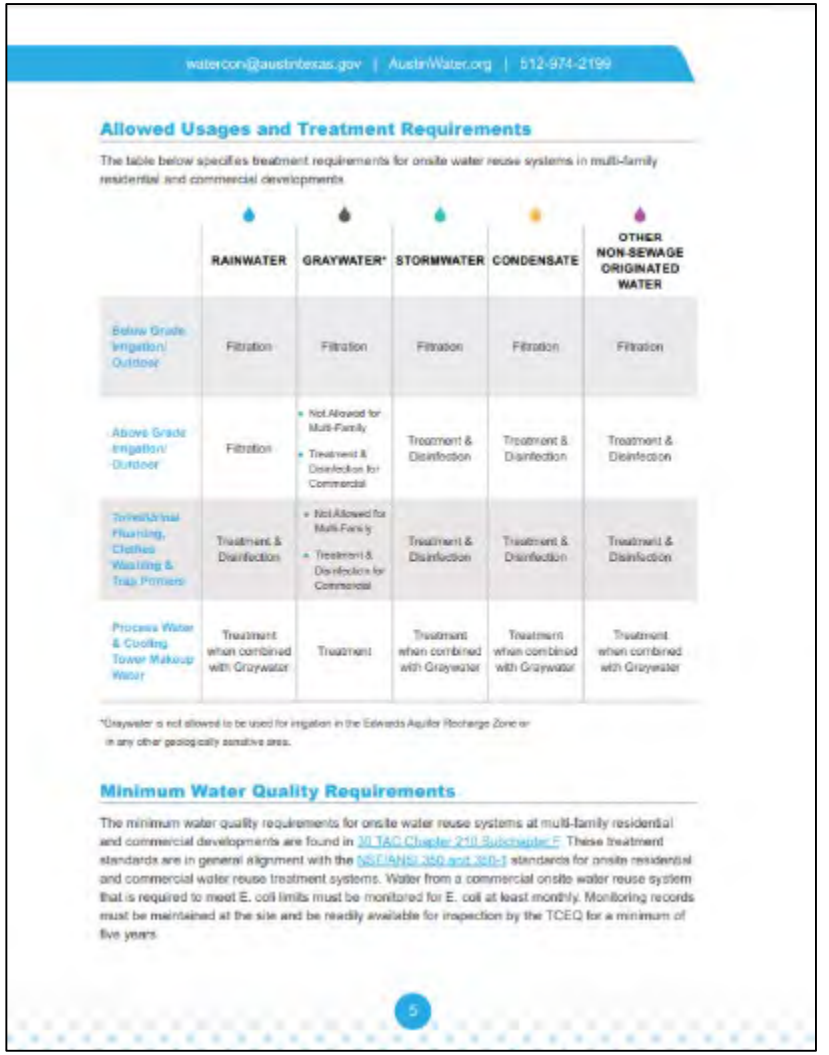
In June of 2017 the Austin City Council approved the adoption of the City's Mechanical Code which includes the following provisions related to condensate reuse systems:

- Section 310.10 requires new commercial and multi-family facilities with a cooling capacity of 200 tons or greater to install condensate recovery systems for beneficial reuse. Beneficial reuse includes the allowed usages outlined in this guide.
- Section 1126.0(6) requires new commercial and multi-family facilities with a cooling capacity of 100 tons or greater to either utilize blowdown water for beneficial reuse, or to offset a minimum of 10 percent of the cooling system's make-up water with reclaimed water or water from an onsite water reuse system.

- Information Bulletin No. 2018-0001, Standards for Air Conditioning Condensate Recovery Systems for New Development

ONSITE REUSE GUIDES





watercon@austintexas.gov | AustinWater.org | 512-974-2199

Allowed Usages and Treatment Requirements

The table below specifies treatment requirements for onsite water reuse systems in multi-family residential and commercial developments

	RAINWATER	GRAYWATER*	STORMWATER	CONDENSATE	OTHER NON-SEWAGE ORIGINATED WATER
Below Grade Irrigation/ Outdoor	Filtration	Filtration	Filtration	Filtration	Filtration
Above Grade Irrigation/ Outdoor	Filtration	• Not Allowed for Multi-Family • Treatment & Disinfection for Commercial	Treatment & Disinfection	Treatment & Disinfection	Treatment & Disinfection
Toilet/Urinal Flushing, Clothes Washing & Trap Primers	Treatment & Disinfection	• Not Allowed for Multi-Family • Treatment & Disinfection for Commercial	Treatment & Disinfection	Treatment & Disinfection	Treatment & Disinfection
Process Water & Cooling Tower Makeup Water	Treatment when combined with Graywater	Treatment	Treatment when combined with Graywater	Treatment when combined with Graywater	Treatment when combined with Graywater

*Graywater is not allowed to be used for irrigation in the Edwards Aquifer Recharge Zone or in any other geologically sensitive area.

Minimum Water Quality Requirements

The minimum water quality requirements for onsite water reuse systems at multi-family residential and commercial developments are found in 30 TAC Chapter 210 Subchapter F. These treatment standards are in general alignment with the NSF/ANSI 350 and 350-1 standards for onsite residential and commercial water reuse treatment systems. Water from a commercial onsite water reuse system that is required to meet E. coli limits must be monitored for E. coli at least monthly. Monitoring records must be maintained at the site and be readily available for inspection by the TCEQ for a minimum of five years.

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http://www.austintexas.gov/page/onsite-water-reuse-systems

ONSITE REUSE GUIDES

Permitting Steps

Design Approval & Permitting

1. **Preliminary Review**
   Contact the Austin Water Conservation Division for a complimentary preliminary review of your onsite water reuse system permit application. This step is optional but highly recommended to ensure the permitting process goes smoothly, and to ensure you are made aware of any qualifying incentives for onsite water reuse systems provided by the utility.
2. **Submit Applications**
   Submit a Development Services Department application for a plumbing permit and an Austin Water application for auxiliary water registration to the City's One Stop Shop. If you are applying for an Austin Water rebate that requires pre-approval, submit your application to the Austin Water Conservation Division.
3. **Obtain Approval**
   When your system design is approved, you will be issued a permit to construct the on-site water reuse system.

Construction and Approval for Use

4. **Construct the System**
   A system must pass all Development Services Department inspections. If your system requires a backflow prevention assembly, this will have to be tested and approved by a third party prior to your final construction inspection.
5. **Operate and Maintain System**
   After you pass the final Development Services Department inspection, you are approved to use your system to save water. No operating permit will be issued, but you are responsible for maintaining your system according to the operation and maintenance manual. You are also responsible for ensuring reoccurring cross connection testing is performed if your system requires it.
6. **Rebate Payment**
   If you have applied for an Austin Water rebate, there will be an additional post-installation inspection prior to receiving funds.

Qualifying Rebate Programs

At the time of publication the following rebate programs are available to multi-family residential and commercial customers for onsite water reuse system installations through Austin Water.

- Rainwater Harvesting
- Bucks for Business

These rebates are subject to change, and pre-approval is typically required before purchasing or installing any of the materials that are covered by the rebates. For the most up-to-date program information, customers are encouraged to check Austin Water's Water Conservation webpage prior to submitting a rebate application: http://www.austintexas.gov/department/water-conservation-rebates.

http://www.austintexas.gov/page/onsite-water-reuse-systems

LOOKING AHEAD

Alternate Water Sources for non-potable applications (Chapters 16&17 of the Uniform Plumbing Code)

- Lake or river water
- Well water
- Harvested rainwater
- Reclaimed water
- Gray water
- Condensate water
- Non-sewage originated waters

Auxiliary Water Sources relating to hazards requiring backflow prevention/cross connection control (TAC Chapter 290, Subchapter D)

- Lake or river water
- Well water
- Harvested rainwater
- Reclaimed water
- Gray water
- Water from a neighboring public water supply
- Other (aircraft plants to tall buildings)

Standards for Harvested Rainwater (THSC Section 341.042)

- Harvested rainwater

Alternative Onsite Waters relating to beneficial reuse of water (TAC Chapter 210, Subchapters E&F)

- Harvested rainwater
- Condensate water
- Gray water
- Foundation drain water
- Stormwater
- Swimming pool backwash
- RO reject water

Use of Reclaimed Water (TAC Chapter 210)

- Blackwater
- Industrial process water
- Cooling tower water

Mandatory Condensate Recovery Systems (Chapters 3&11 of the Uniform Mechanical Code)

- Condensate water

LOOKING AHEAD

National Blue Ribbon Commission for Onsite Non-potable Water Systems

The National Blue Ribbon Commission advances best management practices to support the use of onsite non-potable water systems within individual buildings or at the local scale. We are committed to protecting public health and the environment, and sustainably managing water—now and for future generations.

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

March 2017: This panel report provides a risk-based framework to develop public health guidance for decentralized non-potable water systems. More >

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Projects and Outcomes

City of Austin Systems

WRF Dual Plumbing Study

Other Onsite Reuse Initiatives

Port of Portland Building in Portland, OR

CITY OF AUSTIN SYSTEMS

City of Austin Planning & Development Review Center Blackwater & Rainwater Systems

- A 5,000 gallon per day blackwater treatment system for toilet flushing use and 40,000 gallon rainwater cistern for irrigation use will provide over 1 million gallons of potable water offset each year
- Budgeted at $1.5 million, the goal of the project is to demonstrate building-scale blackwater reuse to the development community

CITY OF AUSTIN SYSTEMS

City of Austin Central Library Rainwater & AC Condensate System

- Use of a blend of alternative onsite sources for toilet flushing and irrigation with a back-up connection to the City's reclaimed water
- Integrated water quality control with beneficial reuse captured in a 700,000 gallon below-grade cistern
- Annual average potable water offset of 1.88 million gallons each year

WRF DUAL PLUMBING STUDY

- Austin Water applied for and was awarded funding to research costs associated with dual-plumbing actual developments in Austin, TX
- The study is estimated to be completed by the end of 2019

OTHER ONSITE REUSE INITIATIVES

Water Balance Calculator to Assist Developers in Onsite Reuse Projects

Summary of the water balance:

Potable water demands

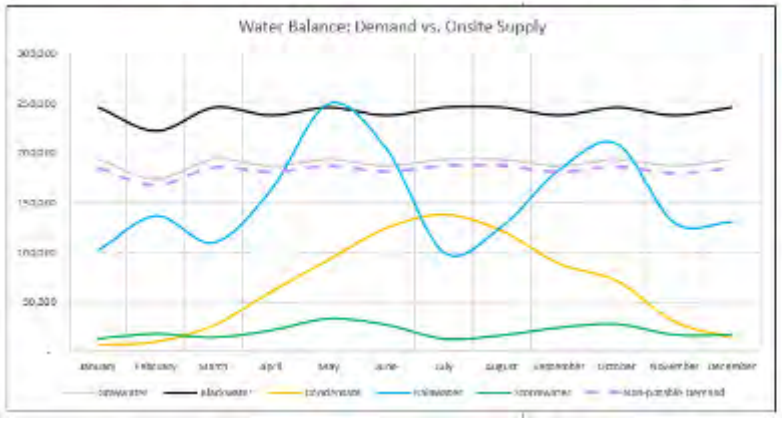
Month	January	February	March	April	May	June	July	August	September	October	November	December	Annual	
Indoor fixtures (gallons)	505,405	456,405	505,405	489,102	505,405	489,102	505,405	505,405	489,102	505,405	489,102	505,405	5,950,749	Retrieved from Sheets 2 and 5
Pools/spas (gallons)	1,399	1,670	2,645	3,205	3,880	4,338	4,380	4,398	3,386	2,670	1,682	1,363	938,035	
Total potable demand (gallons)	506,804	458,165	508,051	492,307	509,285	493,439	509,785	509,803	492,488	508,075	490,784	506,768	6,888,774	

Non-potable water demands

	January	February	March	April	May	June	July	August	September	October	November	December	Annual	
Indoor fixtures (gallons)	184,848	166,950	184,848	178,885	184,848	178,885	184,848	184,848	178,885	184,848	178,885	184,848	2,176,454	Retrieved from Sheets 2 and 3
HVAC makeup water (gallons)	-	-	-	-	-	-	-	-	-	-	-	-	-	
Outdoor irrigation (gallons)	130	311	744	1,807	2,197	2,652	2,476	2,486	1,910	1,592	470	328	16,905	
Water features (gallons)														
Total non-potable demand (gallons)	184,978	167,270	185,592	180,692	187,039	181,537	187,324	187,334	180,795	186,350	179,355	184,974	2,193,039	
(gallons per day)	5,967	5,996	5,987	6,024	6,034	6,050	6,043	6,045	6,026	6,011	5,786	5,967		

Onsite alternative water supplies

	January	February	March	April	May	June	July	August	September	October	November	December	Annual	
Graywater (gallons)	192,888	174,221	192,888	186,665	192,888	186,665	192,888	192,888	186,665	192,888	186,665	192,888	2,271,095	Retrieved from Sheets 4 and 5
Blackwater (gallons)	245,063	221,356	245,063	237,177	245,063	237,177	245,063	245,063	237,177	245,063	237,177	245,063	2,885,629	
Condensate water (gallons)	8,407	9,847	26,199	60,271	92,308	128,927	133,550	121,401	88,180	70,941	50,228	19,694	780,884	
Rainwater (gallons)	101,756	136,304	105,273	162,750	240,027	208,598	99,406	125,376	182,313	208,760	125,401	120,877	1,858,085	
Stormwater (gallons)	13,395	18,203	14,593	21,730	33,257	27,189	13,287	16,744	24,348	27,881	17,281	17,358	245,472	



OTHER ONSITE REUSE INITIATIVES

Streamlined Alternative Water Program Tied into Development Review

Zoning Review	Land Use Review			Commercial Plan Review
Ex: PUDS	Development Assessment (optional)	Subdivision/ Plat	Site Plan	Building Permit
Designates "uses" (e.g. residential, commercial, or industrial), the size of buildings, and how buildings relate to their surroundings, including other buildings, open spaces, and the street.	A voluntary (and free) review step that developers may elect to undergo in order to obtain guidance on subsequent permitting processes.	A map of land that has been subdivided into lots showing the location and boundaries of individual parcels with the streets, alleys, easements, and rights of use over the land of another.	Review of detailed architectural and engineering designs of proposed improvements to a tract of land. **Alternative Water Review**	Review of detailed architectural and engineering designs of buildings and accessory structures. **Alternative Water Review**

Questions?

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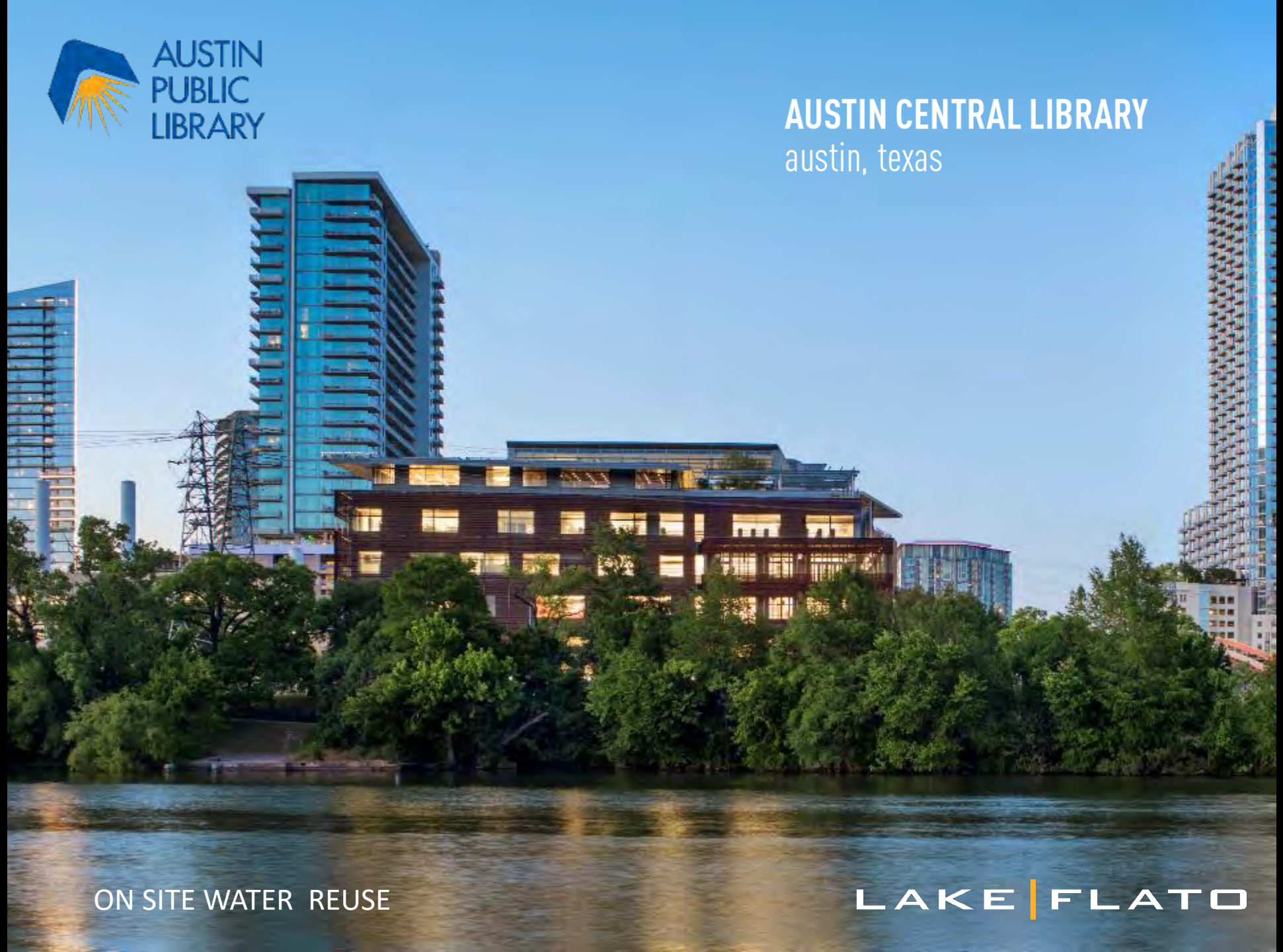
Jonathan Smith,
AIA, LEED AP BD+C
Lake Flato Architects

Lee Butler,
Building Services Manager, Austin Central Library

AUSTIN PUBLIC LIBRARY

AUSTIN CENTRAL LIBRARY

austin, texas



ON SITE WATER REUSE

LAKE | FLATO

BIRDS EYE VIEW OF THE CITY OF

AUSTIN

TRAVIS COUNTY TEXAS.

Project team

Client: City of Austin, Austin Public Library, Austin Public Works
Joint Venture Architect: Lake Flato + Shepley Bulfinch
Construction Manager: Hensel Phelps
Engineer -Structural: Datum Engineers, PE Structural Consultants
Engineer - Mechanical: Jose I. Guerra Inc.
Engineer - Electrical: Jose I. Guerra Inc.
Engineer - Plumbing: Encotech Engineering
Engineer - Civil: Urban Design Group
Landscape Architect: Coleman and Associates
Cost Estimator: Eudacorp
Acoustic Consultant: Dickensheets Design Associates
ADA Consultant: Accessology
LEED Consultant: Holos Collaborative
Security Consultant: BLW Security Group
Environmental: Baer Engineering & Environmental
Interior Design: Shepley Bulfinch
Furniture Procurement: West East Deign Group
Food Service Consultant: Cosper & Associates Inc.
Permitting: Austin Permitting
Fire Protection: Jensen Hughes
Building Enclosure: Simpson Gumpertz & Heger
Wayfinding: FD2S
Artificial Lighting: Clanton and Associates
Daylighting: Integrated Design Lab
Sustainability: Center for Maximum Potential Building Systems
Photovoltaic: Integral Group
Energy: Supersymmetry USA
Water: Biohabitats
Electrical Service: Harutunian Engineering Incorporated
Parking: Parking Planners
Public Art: Celia Munoz
Traffic: HVJ Associates

lake | flato

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hensel
phelps

TIMELINE

Dinosaurs roamed the earth

1980’S
Jonathan Smith spends time as a kid at the Austin Public Library

NOVEMBER 2006
Voters approve a new central library

DECEMBER 2008
Joint Venture awarded the project

SEPTEMBER 2009
Rancherette kick-off

AUGUST 2013
Construction Documents complete

OCTOBER 28, 2017
Library opens

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March, 2006
Twitter created

June 29, 2007
Iphone released

January, 2009
Makerbot founded

August 23, 2010
Ebooks outsell hardcover books for first time on Amazon

September 14, 2013
Nation’s first bookless library opens in San Antonio

TIMELINE

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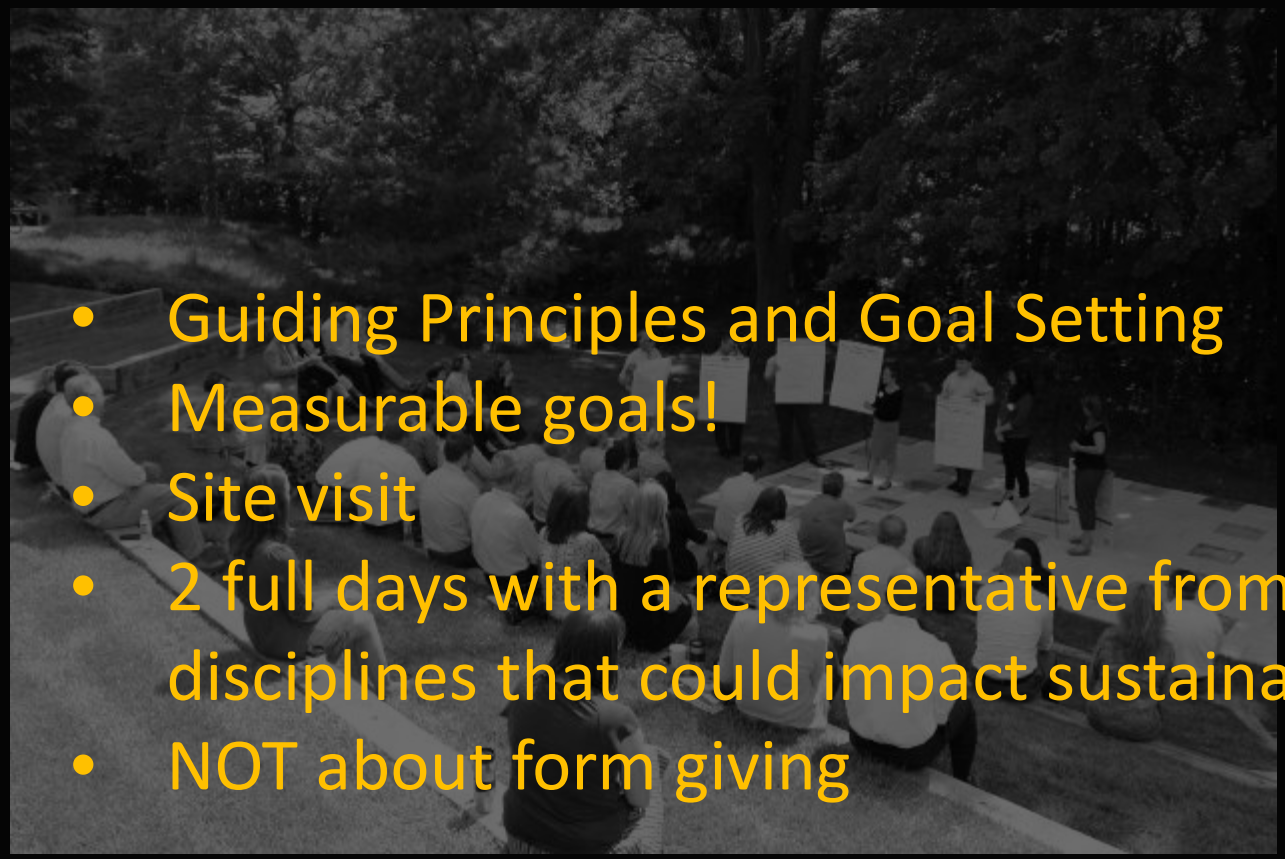
Nation’s first bookless library opens in San Antonio

2006 - Population
Austin-Round Rock MSA – 1,519,220

2016 - Population
Austin-Round Rock MSA – 2,020,157

INTEGRATED DESIGN WORKSHOP

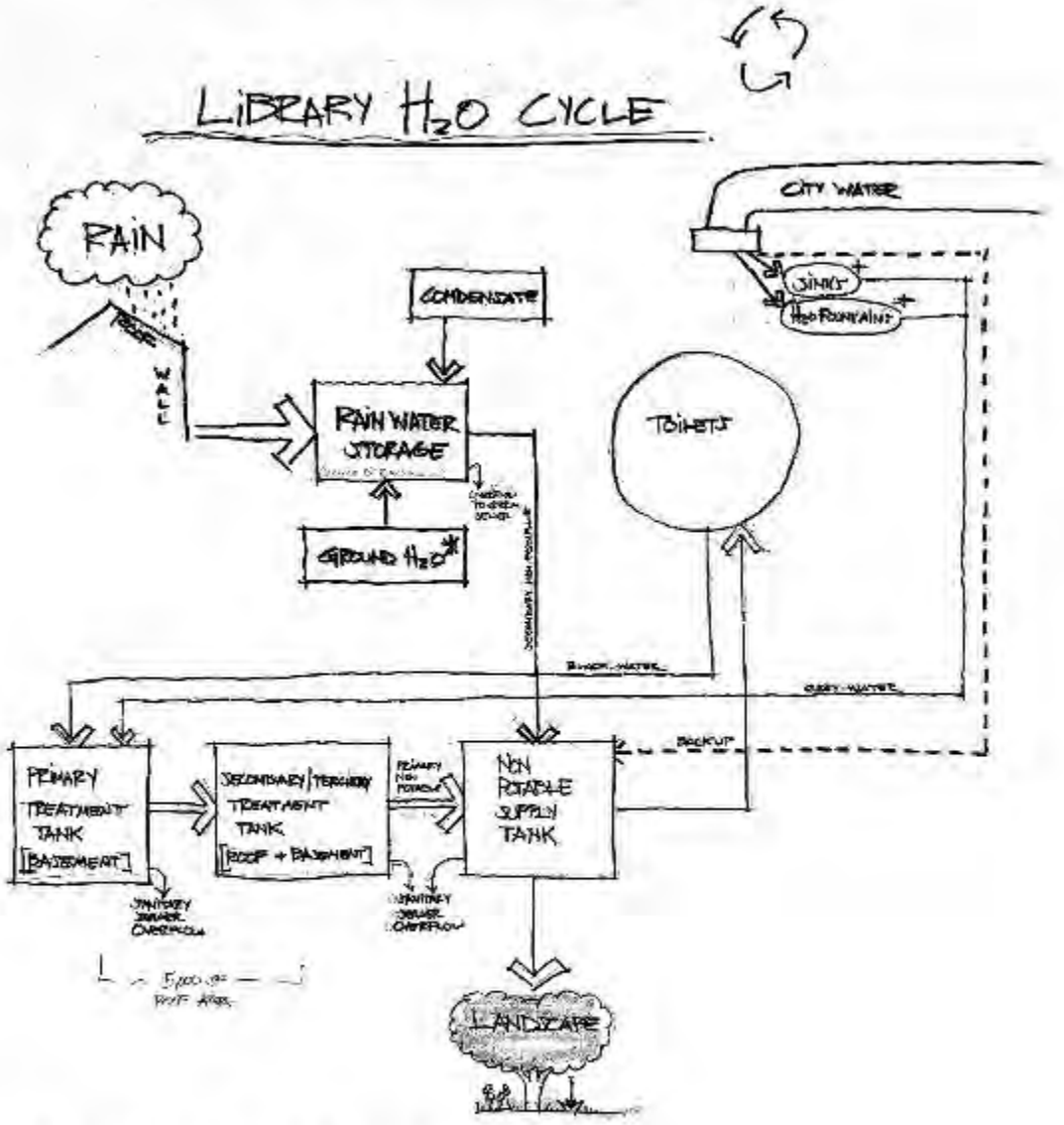


- Guiding Principles and Goal Setting
- Measurable goals!
- Site visit
- 2 full days with a representative from all disciplines that could impact sustainability
- NOT about form giving

ASPIRATIONS

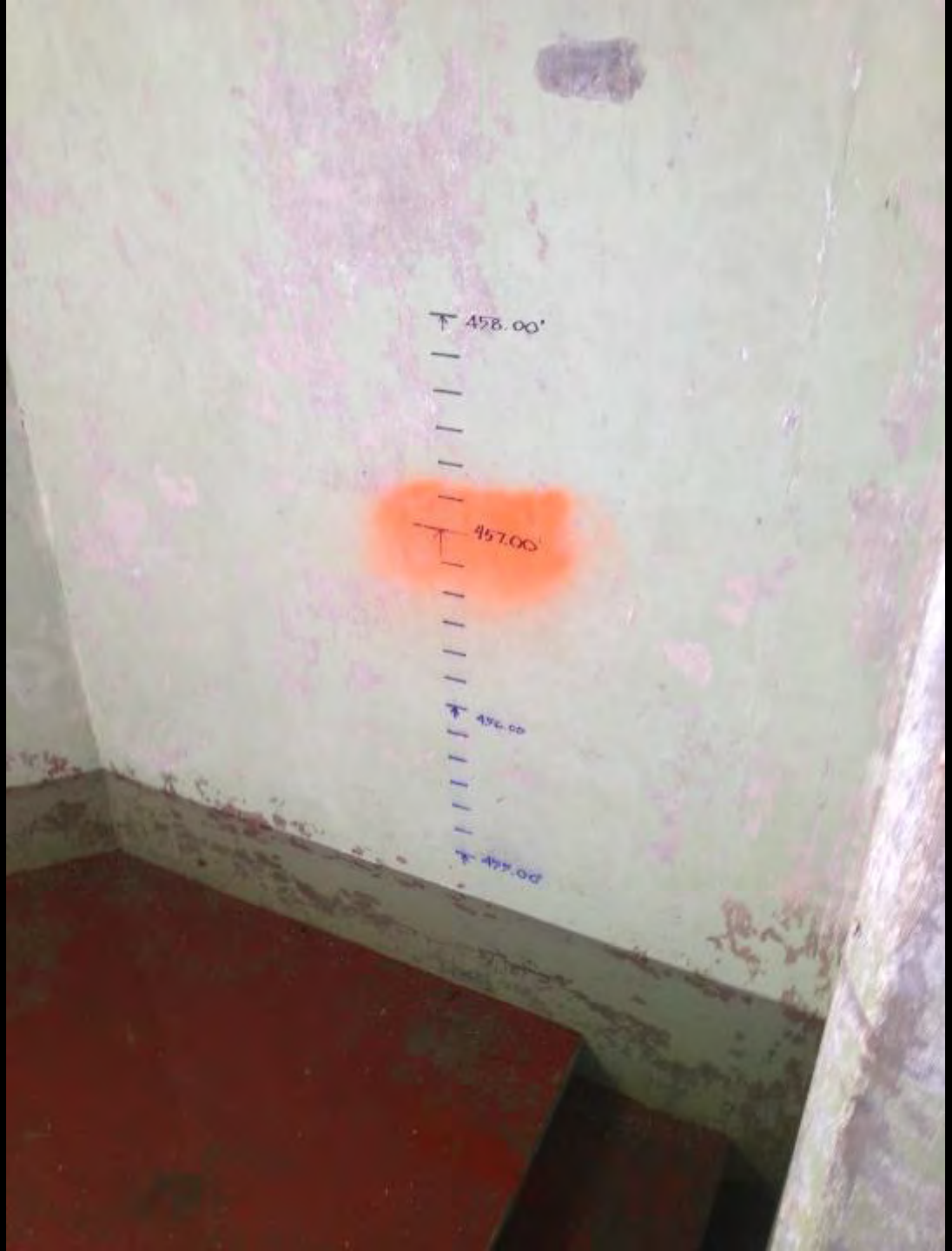
- The best daylit library in America
- A hub for knowledge and learning
- Adapt gracefully to change
- Potable water used only for drinking
- 64% reduction in energy
- Engage the natural world

LIBRARY H_2O CYCLE



* PENDING TESTING (BROWNFIELD SITE)

+ PENDING RAIN USE FOR POTABLE SUPPLY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ASPIRATIONS

POTABLE WATER TO BE USED ONLY FOR DRINKING &

THIS IS WHAT 373,390 GALLONS OF WATER LOOKS LIKE.

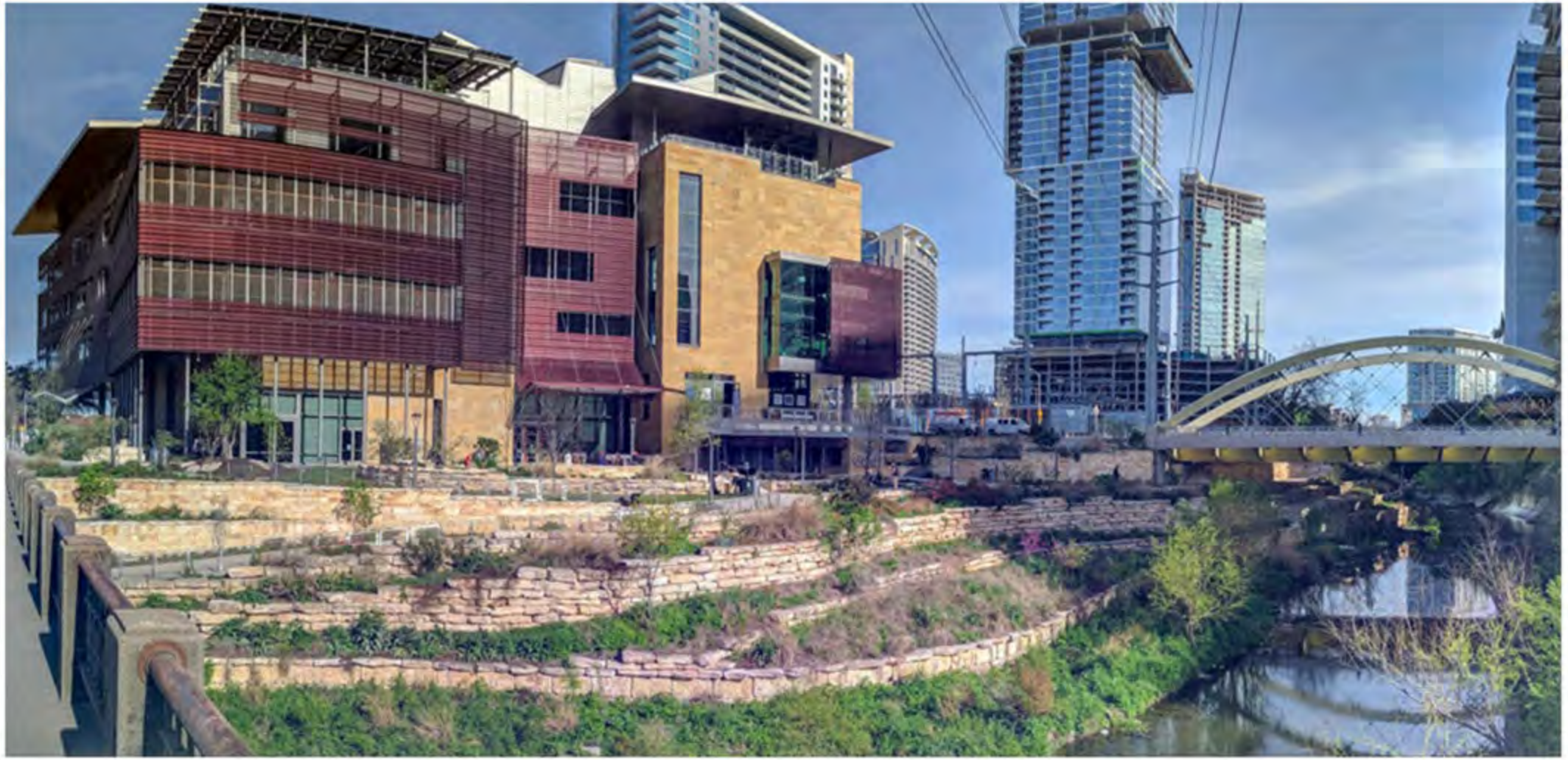

FOAMULAR
FOAMULAR
FOAMULAR

CURRENT METRICS

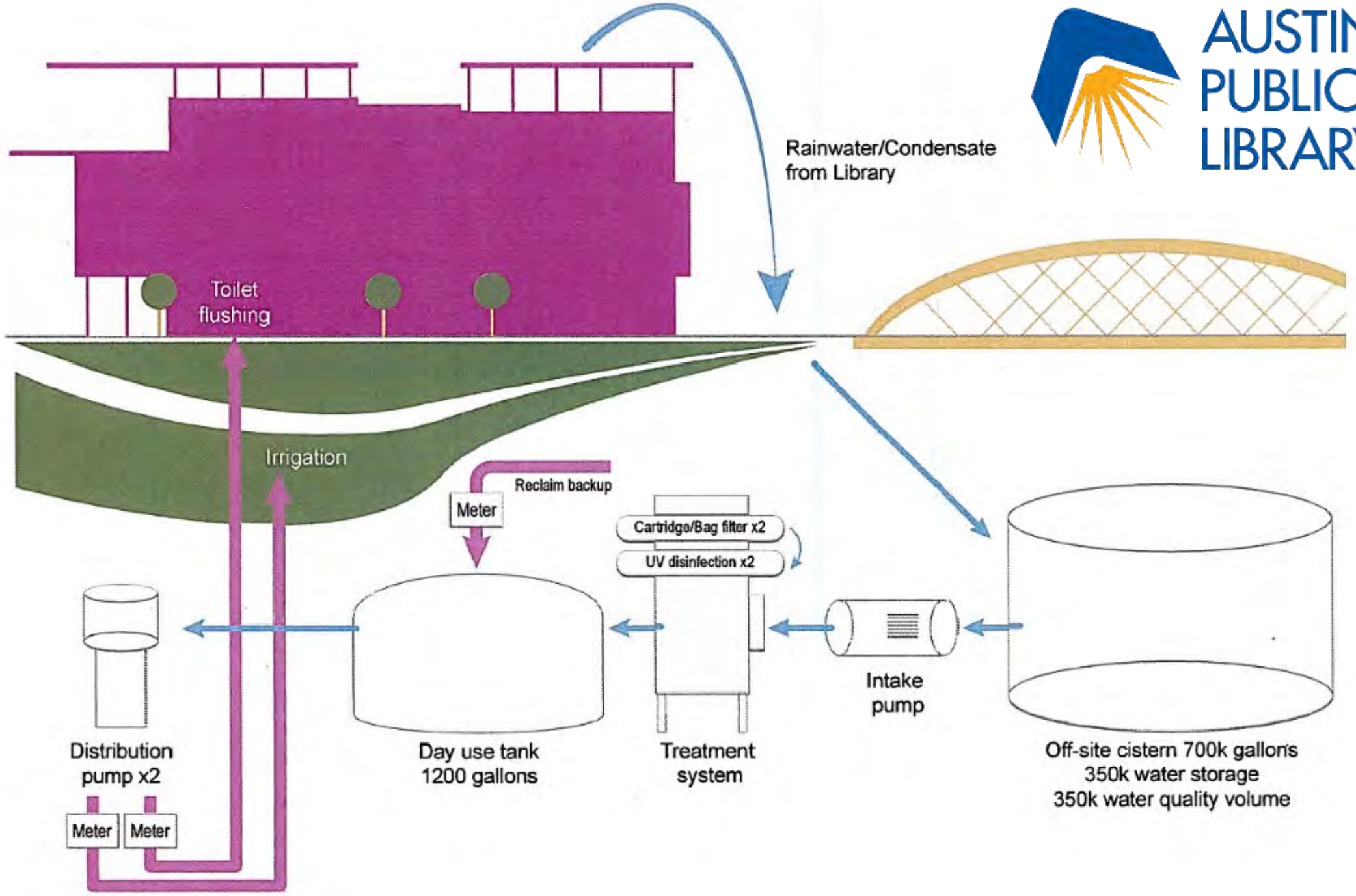
CERTIFIED LEED PLATINUM

New Austin Central Library
On-site Water Reuse System

AUSTIN PUBLIC LIBRARY

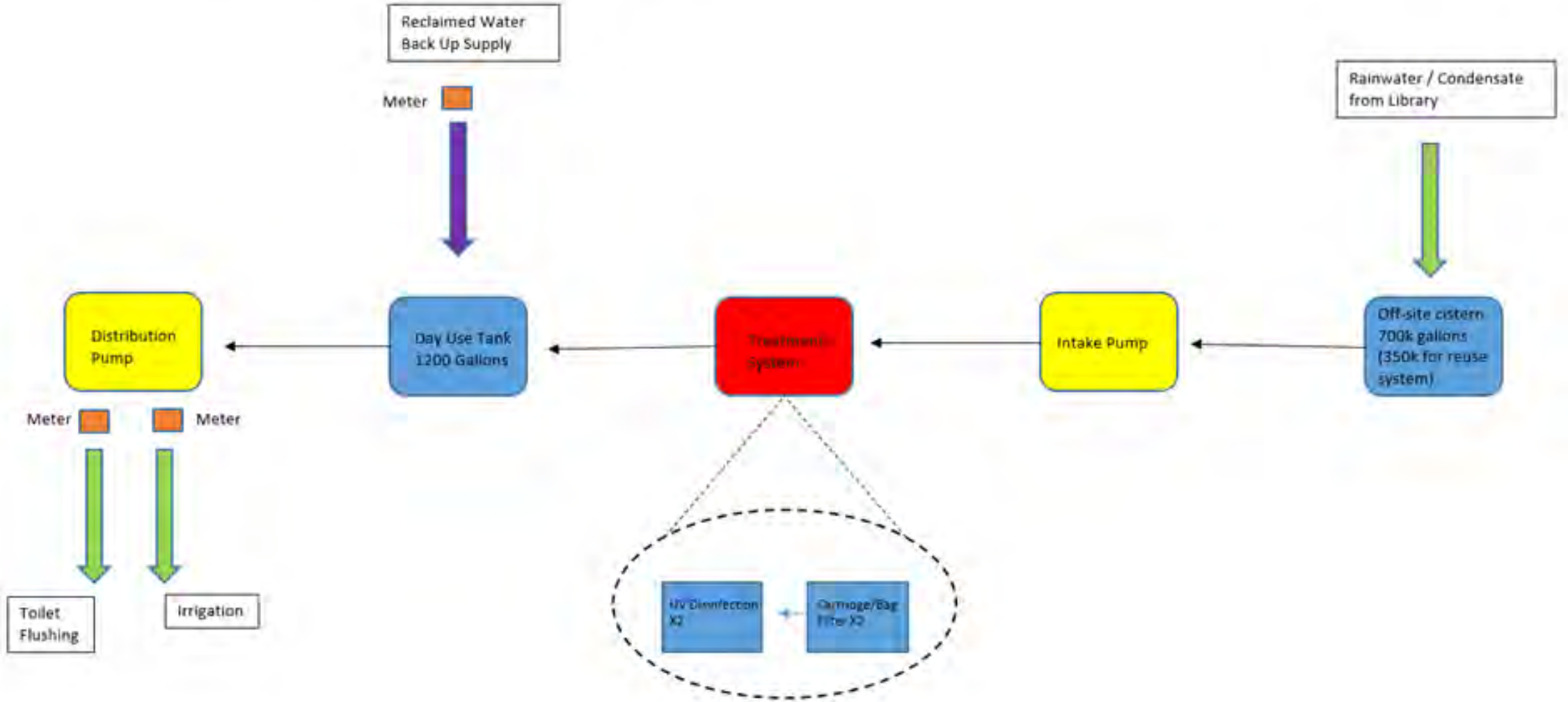


AUSTIN PUBLIC LIBRARY



System Design

AUSTIN PUBLIC LIBRARY



Reuse System

AUSTIN PUBLIC LIBRARY

Source Intake

AUSTIN PUBLIC LIBRARY

Treatment Run

AUSTIN PUBLIC LIBRARY

AUSTIN PUBLIC LIBRARY

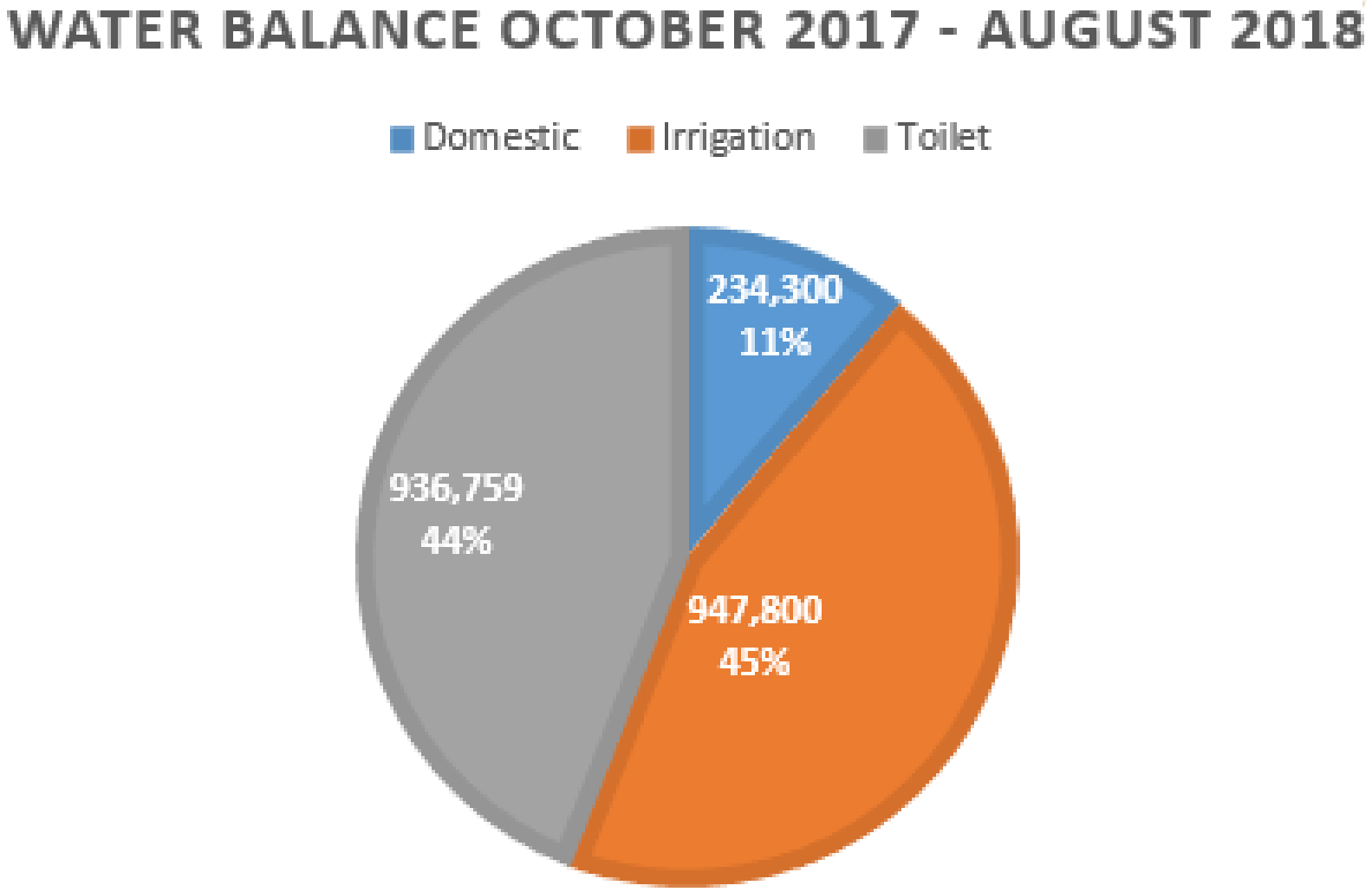
Day Use Tank

Distribution

AUSTIN PUBLIC LIBRARY

Usage

AUSTIN PUBLIC LIBRARY



Lessons Learned

AUSTIN PUBLIC LIBRARY

- Anticipate Start Up Issues
- Be thoughtful of diagnostic/metering points
- Long term Operation and Maintenance concerns
- Be invested in system function and performance

Break

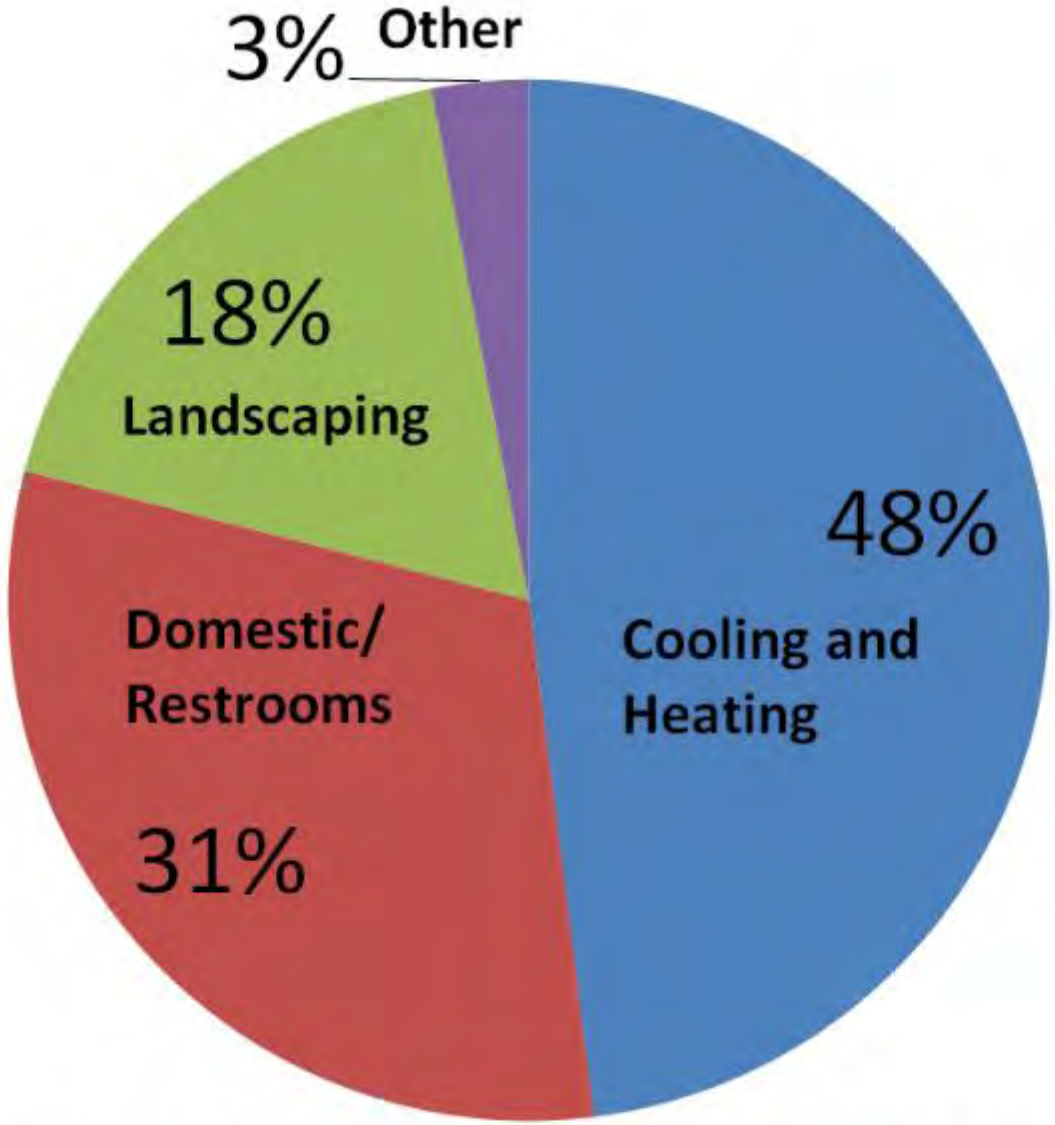
Chris Maxwell-Gaines, P.E.

Large Scale On-site Water Reuse System Installation

Innovative Water Solutions®

Chris Maxwell-Gaines, P.E.

Water Use in Commercial Buildings



California Urban Water Conservation Council (2001), BMP 9 Handbook, June 2001

Alternative Onsite Water Sources

- Lake/River Water
- Well Water
- Reclaimed Water
- AC Condensate
- Rainwater Harvesting
- Stormwater / Shallow Groundwater
- Graywater

Issues with Commercial Systems

- Not budgeting correctly or understanding true costs
- No design or “Over” design
- Stormwater Management AND/OR Water Conservation
- System appropriateness and aesthetics
- Building/Project integration issues
- Component specifications
- Not understanding backflow requirements

Austonian Tower:
RW to AC Condensate Collection

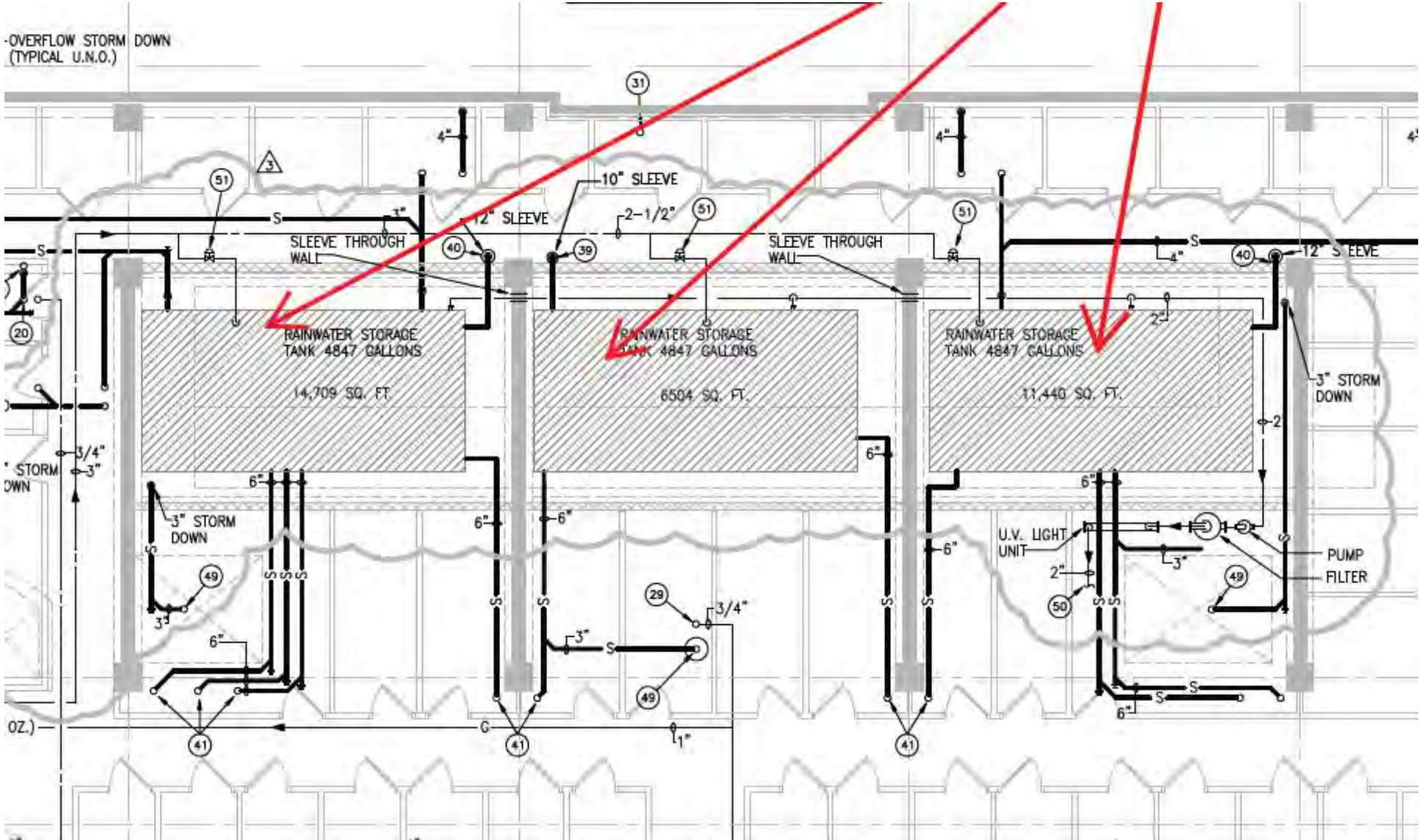
Completed January 2010

Collect approximately 1.2 million gallons of condensate per year

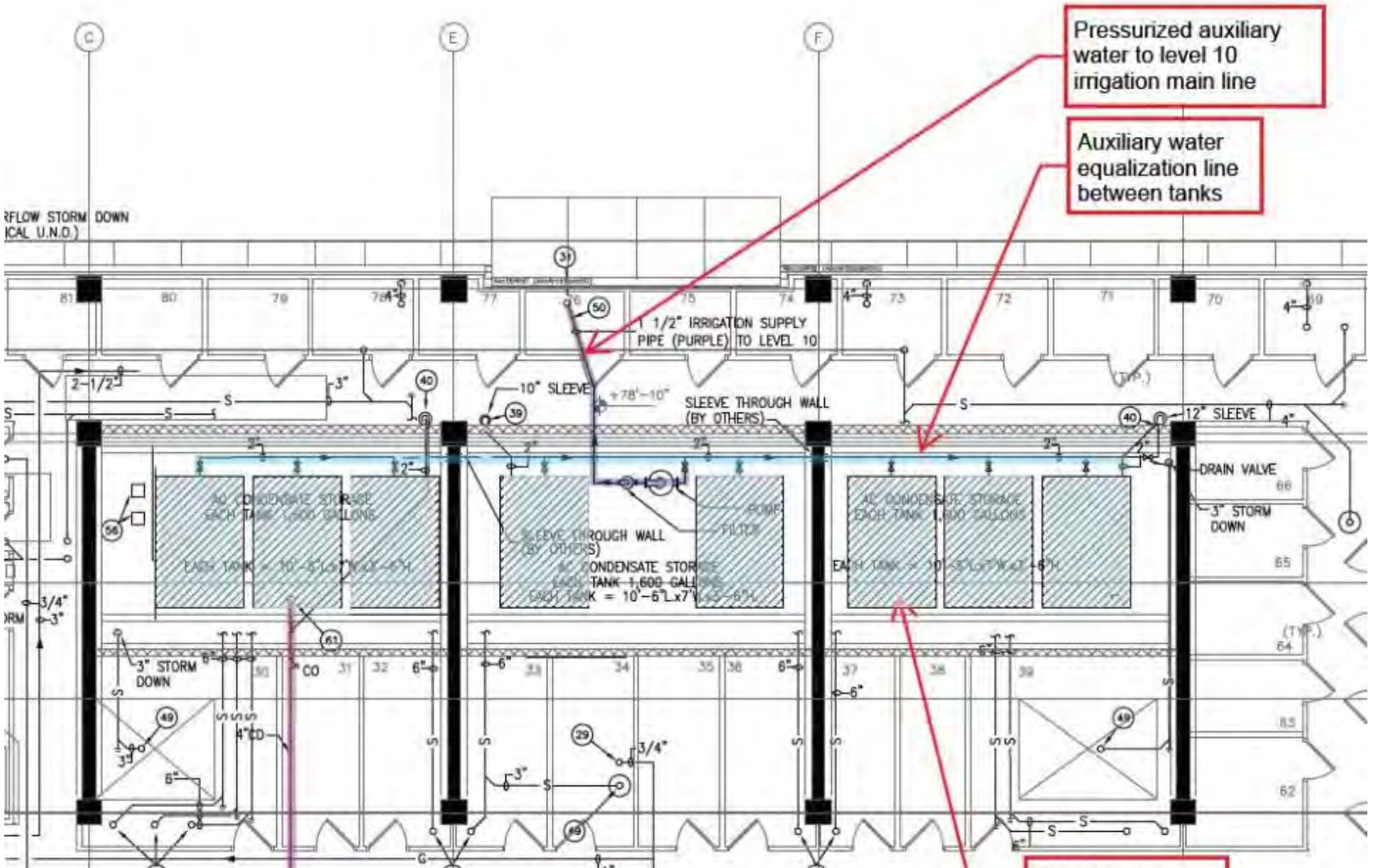
(8) 1,600 gallon cisterns installed on 9th floor under swimming pool

Complete irrigation of 10th floor Amenity Deck

Austonian Design: Before



Austonian Design: After



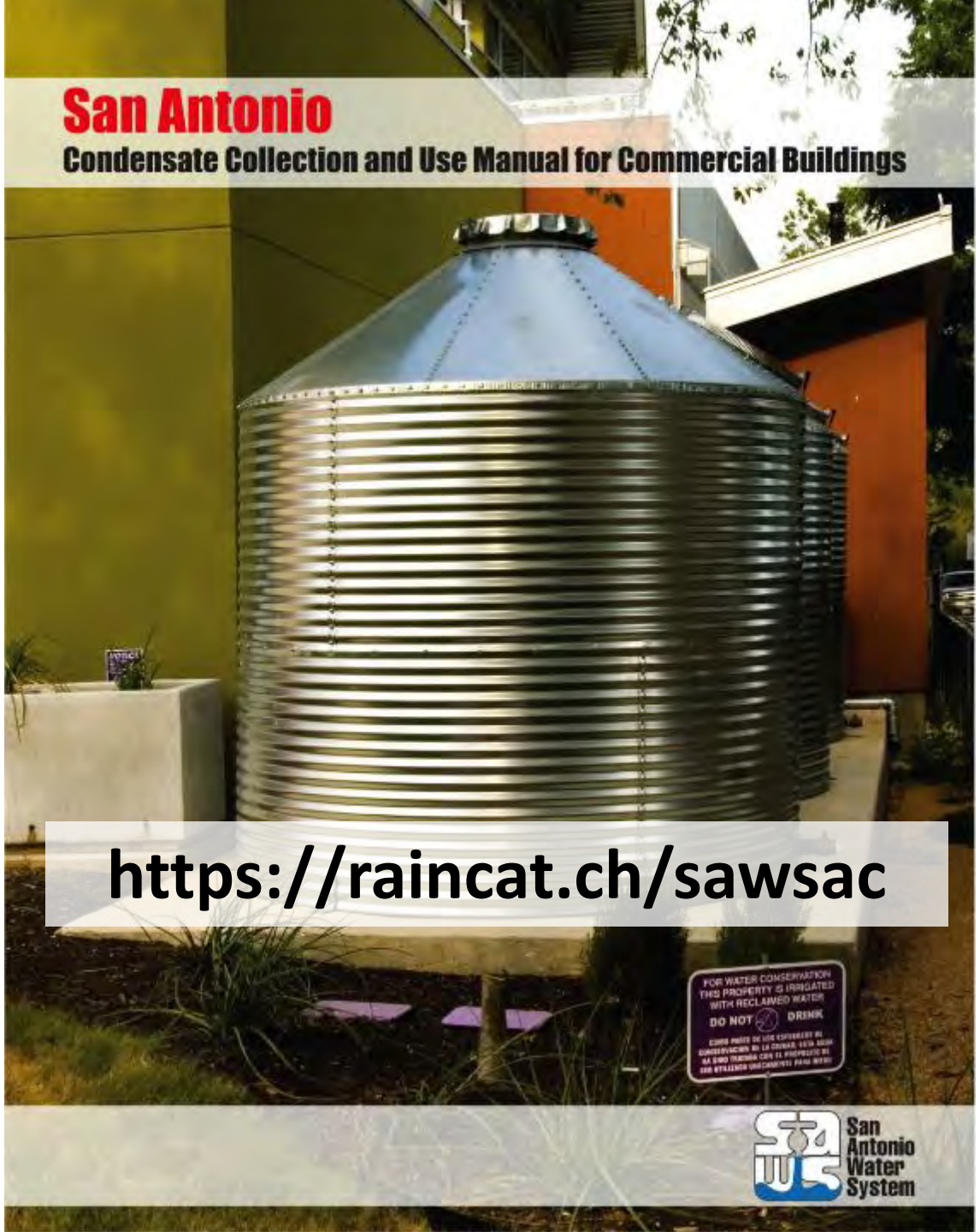
Eagle Veterinary Clinic
Olmos Park, Texas
LEED rated Platinum

Collection from 8,000 square feet

Collects rainwater and AC condensate

(3) 3,200 gallon rainwater cisterns provide water for irrigation and indoor non-potable uses


CHALLENGER

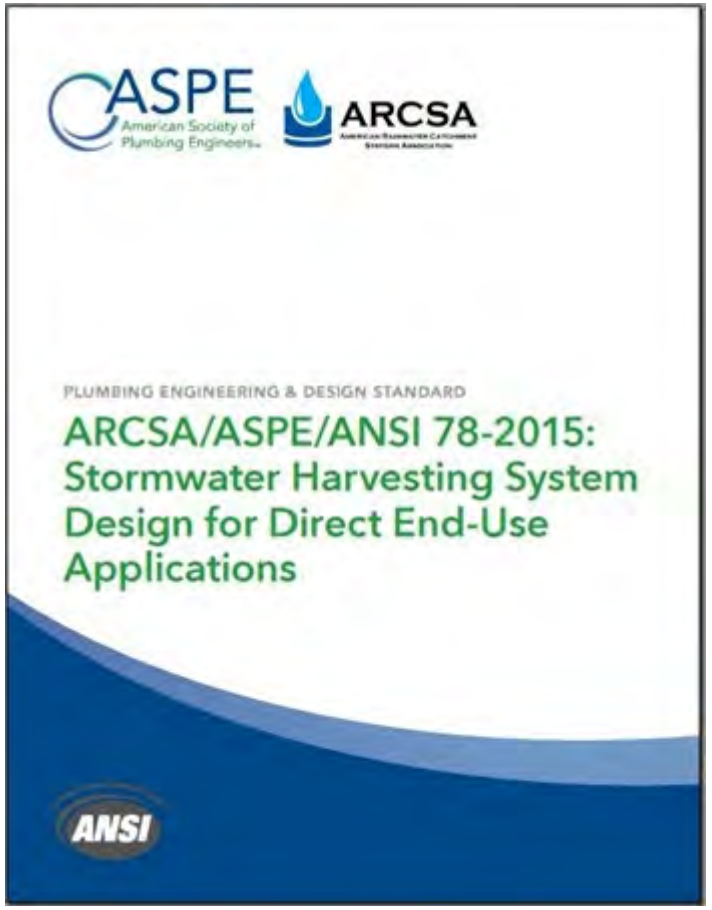


- Published in 2013
- Growing interest among design professionals
- Outlines potential issues, uses, system designs, and treatment options

ARCSA/ASPE/ANSI 63-2013: *Rainwater Catchment Systems*

- Approved on November 14, 2013
- Jointly developed by ASPE and ARCSA
- Co-sponsored by IAPMO and NSF International
- Assist engineers, designers, plumbers, builders/developers, local government officials, and end users in safely implementing a rainwater catchment system using precipitation from rooftops

ARCSA/ASPE/ANSI 78-2015:
Stormwater Harvesting System Design



- Approved on August 3, 2015
- Jointly developed by ASPE and ARCSA
- Co-sponsored by IAPMO and NSF International
- Provides guidance on how to install and maintain a safe alternative to utility-provided water and to optimize stormwater utilization to reduce dependence on municipal potable water systems

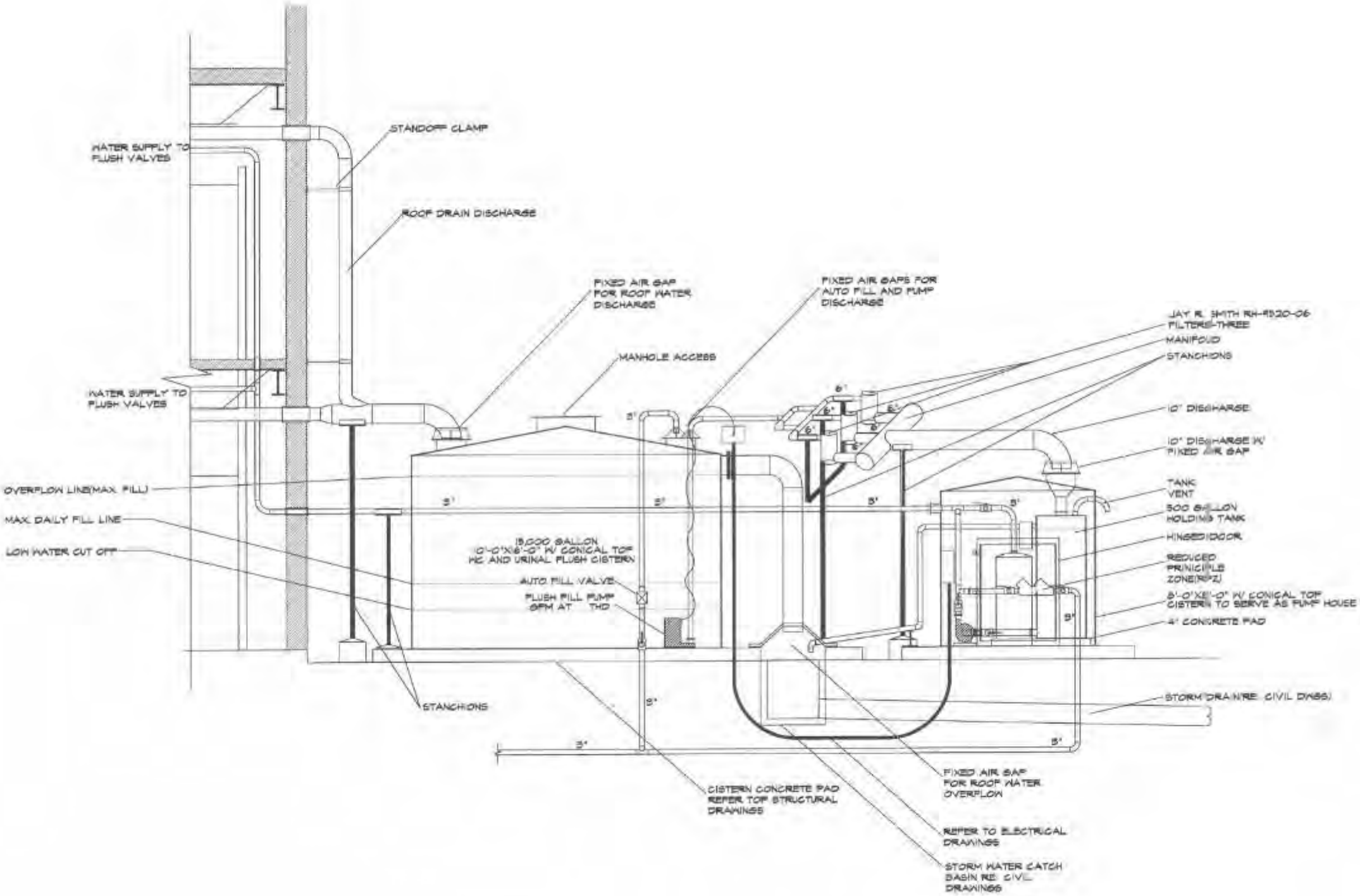
Dripping Springs
Sycamore Springs School

Completed July 2017

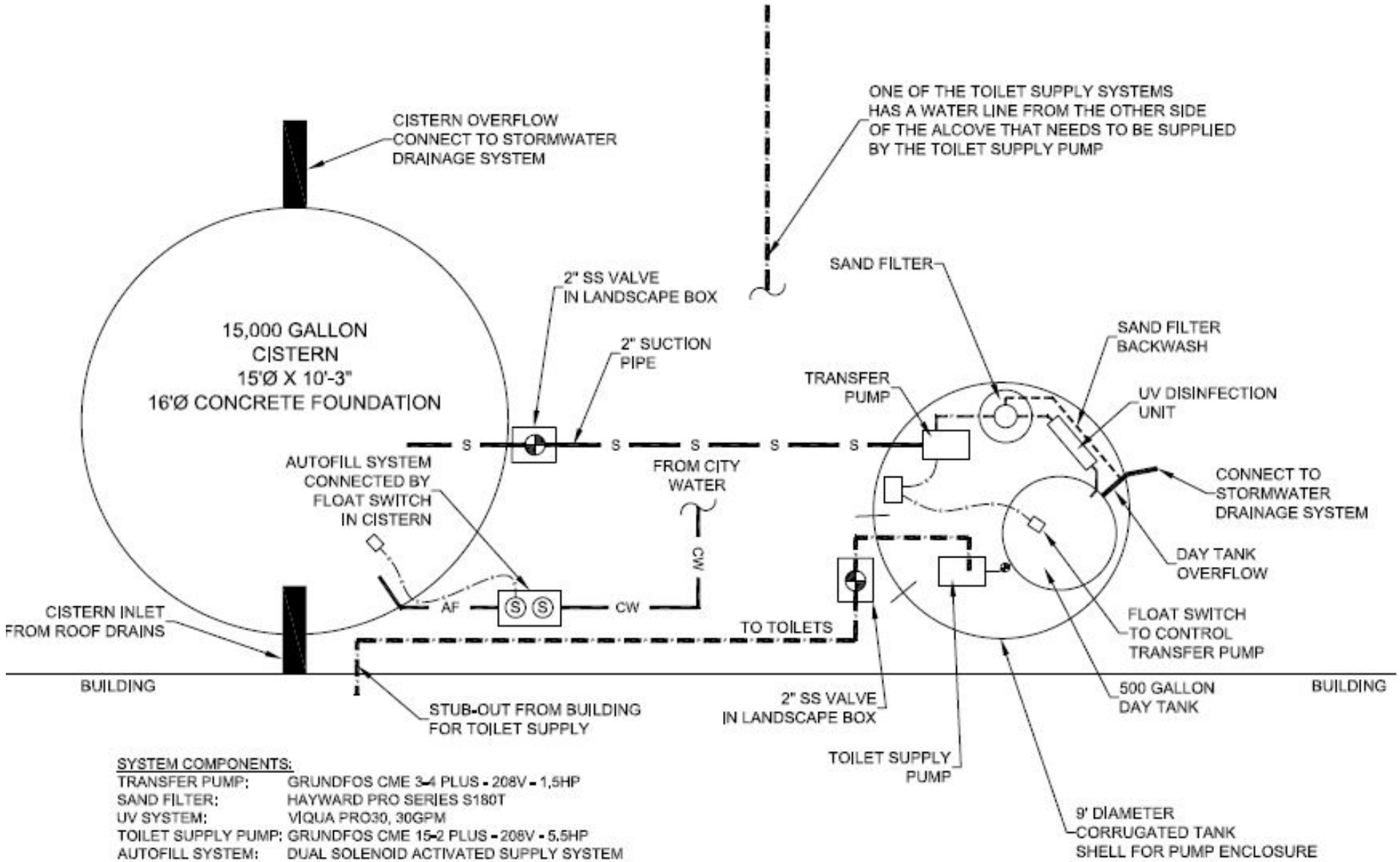
Two systems for toilet flushing which harvests rainwater into 15,000 gallon tanks

One system for irrigation use which harvests rainwater into 10,000 gallon tank

System redesign


WATER SUPPLY TO FLUSH VALVES
STANDOFF CLAMP
ROOF DRAIN DISCHARGE
FIXED AIR GAP FOR ROOF WATER DISCHARGE
FIXED AIR GAPS FOR AUTO FILL AND PUMP DISCHARGE
MANHOLE ACCESS
JAY R. SMITH RH-9520-06 FILTERS-THREE
MANIFOLD
STANCHIONS
10" DISCHARGE
10" DISCHARGE W/ FIXED AIR GAP
TANK VENT
500 GALLON HOLDING TANK
HINGED DOOR
REDUCED PRINCIPLE ZONE(RPZ)
8'-0"X8'-0" W/ CONICAL TOP CISTERN TO SERVE AS PUMP HOUSE
4" CONCRETE PAD
WATER SUPPLY TO FLUSH VALVES
OVERFLOW LINE(MAX. FILL)
MAX. DAILY FILL LINE
LOW WATER CUT OFF
15,000 GALLON (2)-0"X8'-0" W/ CONICAL TOP WC AND URINAL FLUSH CISTERN
AUTO FILL VALVE
FLUSH FILL PUMP 6PM AT THD
STANCHIONS
STORM DRAIN(RE: CIVIL DWGS)
CISTERN CONCRETE PAD REFER TOP STRUCTURAL DRAWINGS
FIXED AIR GAP FOR ROOF WATER OVERFLOW
REFER TO ELECTRICAL DRAWINGS
STORM WATER CATCH BASIN RE: CIVIL DRAWINGS

Rainwater System Schematic



SYSTEM COMPONENTS:

TRANSFER PUMP:	GRUNDFOS CME 3-4 PLUS - 208V - 1.5HP
SAND FILTER:	HAYWARD PRO SERIES S180T
UV SYSTEM:	VIQUA PRO30, 30GPM
TOILET SUPPLY PUMP:	GRUNDFOS CME 15-2 PLUS - 208V - 5.5HP
AUTOFILL SYSTEM:	DUAL SOLENOID ACTIVATED SUPPLY SYSTEM
FLOAT SWITCH:	SJE RHOMBUS SIGNAL MASTER
PUMP START RELAY:	HUNTER PSR-30


United Rentals


8/ 2/2017 14:44

Hays ISD
Buda Elementary School

Collection from 40,000 square feet and AC condensate

(2) 50,000 gallon rainwater cisterns provide water for irrigation


LOKBox

TAMU Ag Headquarters, College Station, TX

Completed Fall 2011

Canopy and buildings collect into (4) 7,500-gallon cisterns

Overflow into 40,000-gallon underground cistern

Irrigation use

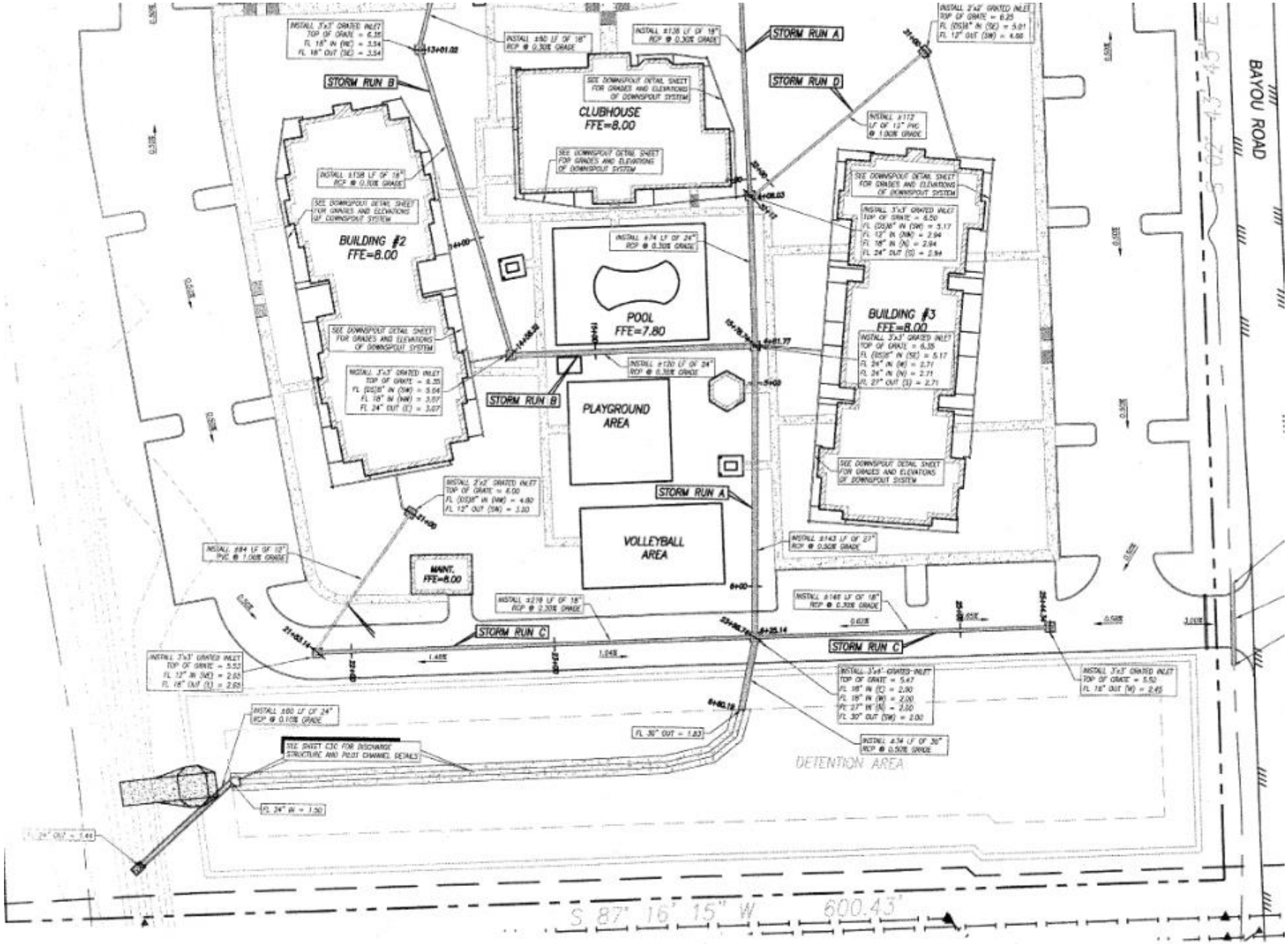

TEREX
TEREX

Horizon Meadows Apartments, LaMarque, TX

Collection from 21,750 square feet

(2) 31,000 gallon rainwater cisterns provide water for irrigation

Adaption of existing stormwater piping system


BAYOU ROAD
CLUBHOUSE
FFE=8.00
BUILDING #2
FFE=8.00
BUILDING #3
FFE=8.00
POOL
FFE=7.80
PLAYGROUND
AREA
VOLLEYBALL
AREA
MAINT.
FFE=8.00
STORM RUN A
STORM RUN B
STORM RUN C
STORM RUN D
DETENTION AREA
S 87° 16' 15" W 600.43'


FIRE LANE

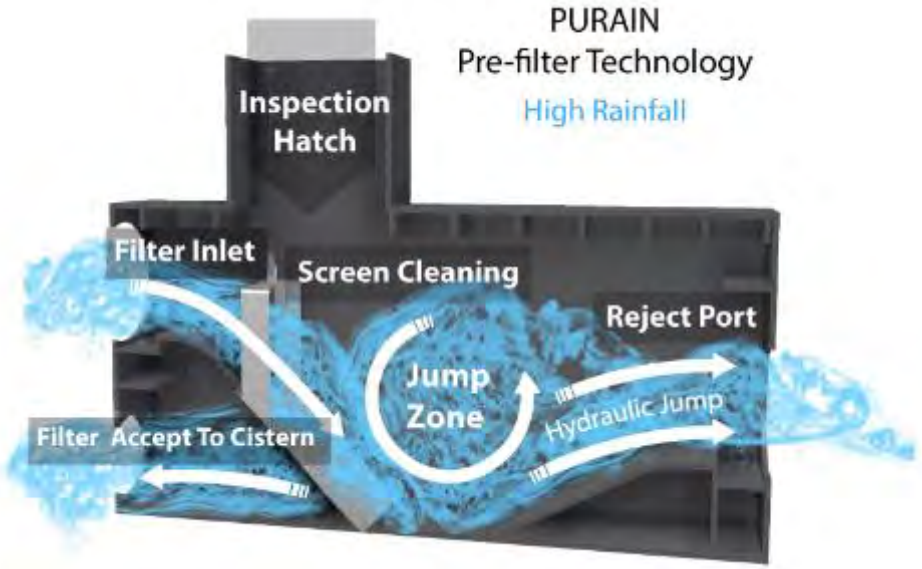
Retrofit a Commercial Site with Stormwater Harvesting


SUPERIOR TANK
COMPANY INC.

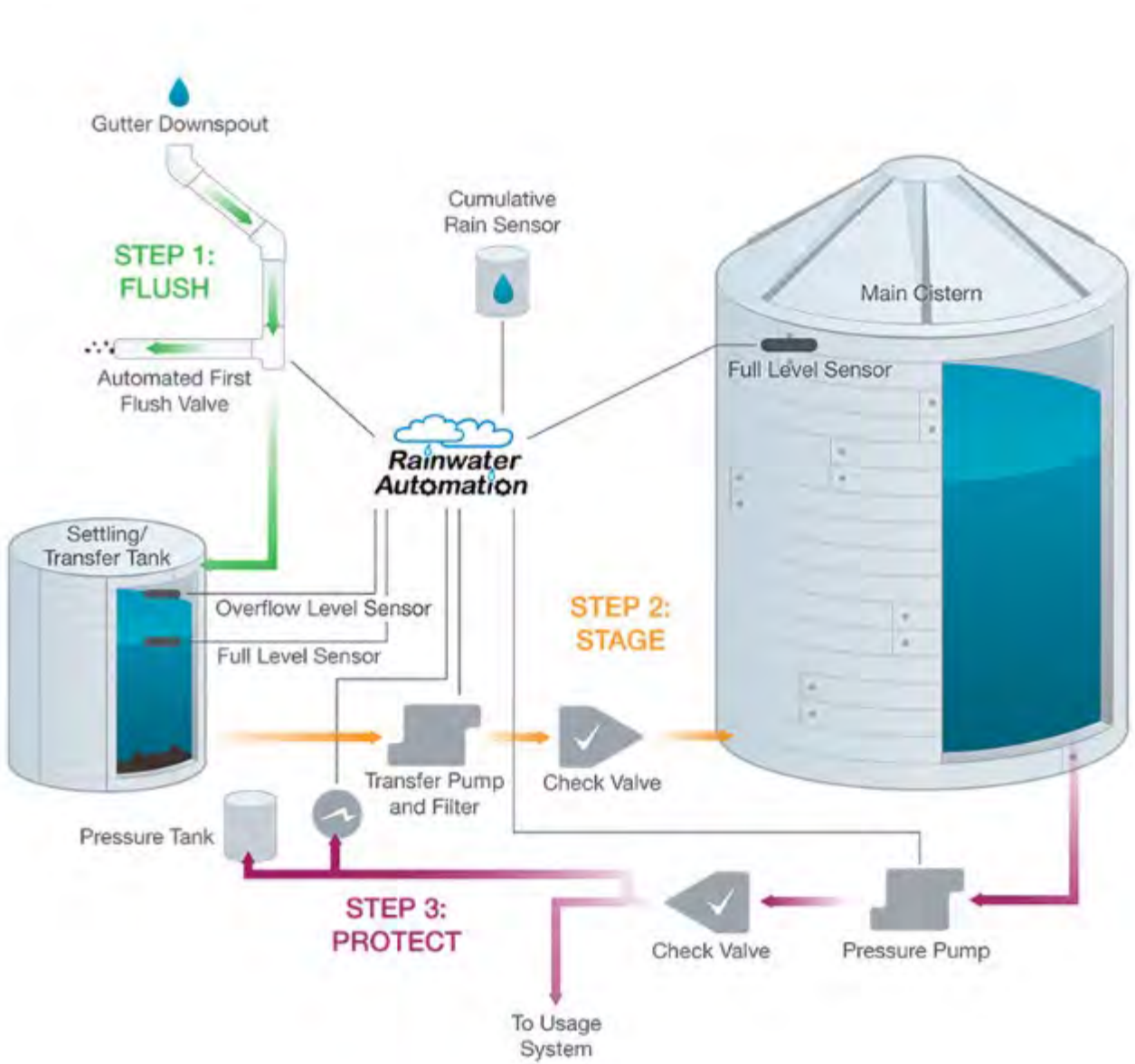
Large System Components

- Inlet filtration
- First-flush diversion
- Pump / filtration systems
- Water storage tanks
- Backflow prevention
- Graywater systems

Inlet Filtration



First-Flush Diversion



Pump / Filtration Systems

Constructed Pump / Filter System

Pump / Filtration Systems

Skid Mounted Pump / Filter System


5/ 5/2017 11:21


WILLOWS


2017. 4.11 9:45


Link-Belt
CASE

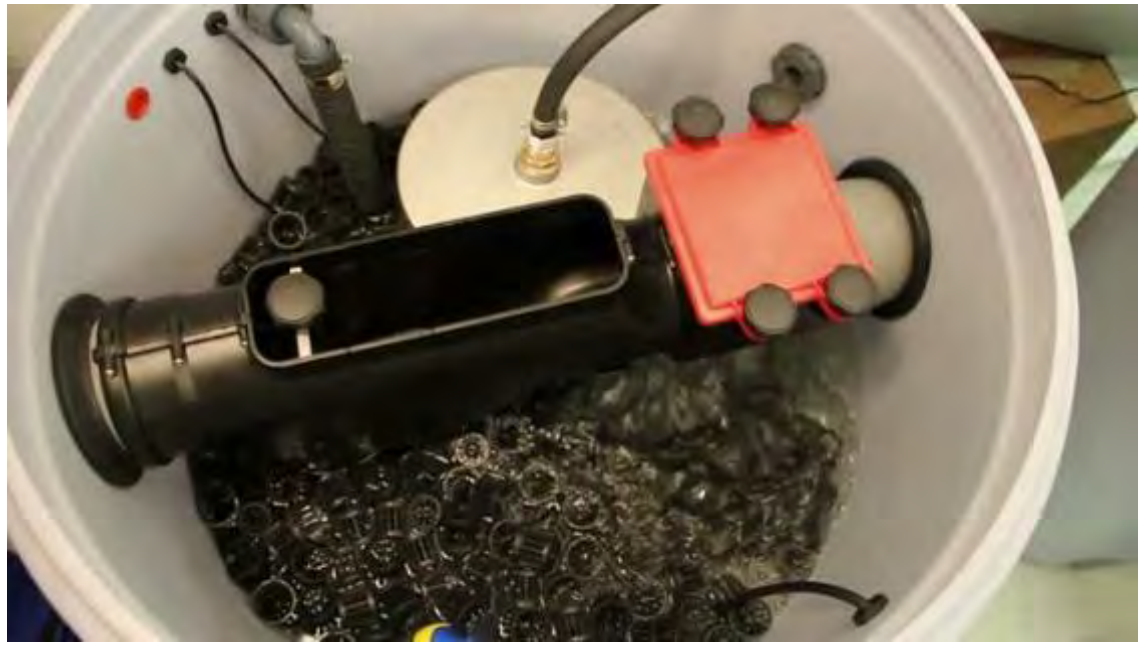
Graywater Systems: Aqualoop

NSF 350 Certified

The AQUALOOP system consists of a few modular components:

- Pre-filter
- Growth bodies
- Membrane station with system control
- Membranes
- Blower

Intewa Aqualoop



Dual Plumb to Future Proof

Questions?

Thank you for your attention today!

Email: chris@watercache.com

Website: www.watercache.com

Innovative Water Solutions®

Matt Rickert, LEED AP

Senior Project Manager

RYAN Companies

City of Austin Planning and Development Center

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About Ryan

FOUNDED
1938

PROJECTS DELIVERED IN
NEARLY EVERY STATE

REVENUE
$2.0 BILLION

1,200+
EMPLOYEES

DAYS AWAY FROM WORK DUE TO INJURY:
94% BELOW
INDUSTRY AVERAGE

HEALTHCARE
INDUSTRIAL
RETAIL
SENIOR LIVING
NATIONAL BUILD-TO-SUIT

ATLANTA	MILWAUKEE
AUSTIN	MINNEAPOLIS
CEDAR RAPIDS	PHOENIX
CHICAGO	ROCHESTER
DALLAS/FORT WORTH	SAN DIEGO
DAVENPORT	SEATTLE
DES MOINES	TAMPA
KANSAS CITY	TUCSON

COA PDC Project

COA PDC

Office + Parking Garage

251,000 SF Office

969 Stall Parking Garage

Ryan's Responsibility

- Development
- Design + Construction

Completion Date: May 2020

Current Job Status

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COA PDC – Water Reclamation System

COA PDC

Water Reclamation System - RFP

5,000 GPD System

Recycle toilet waste water for re-flushing toilets.

Goal: Reduce potable water consumption by 60-70%

COA PDC – Water Reclamation System

COA PDC

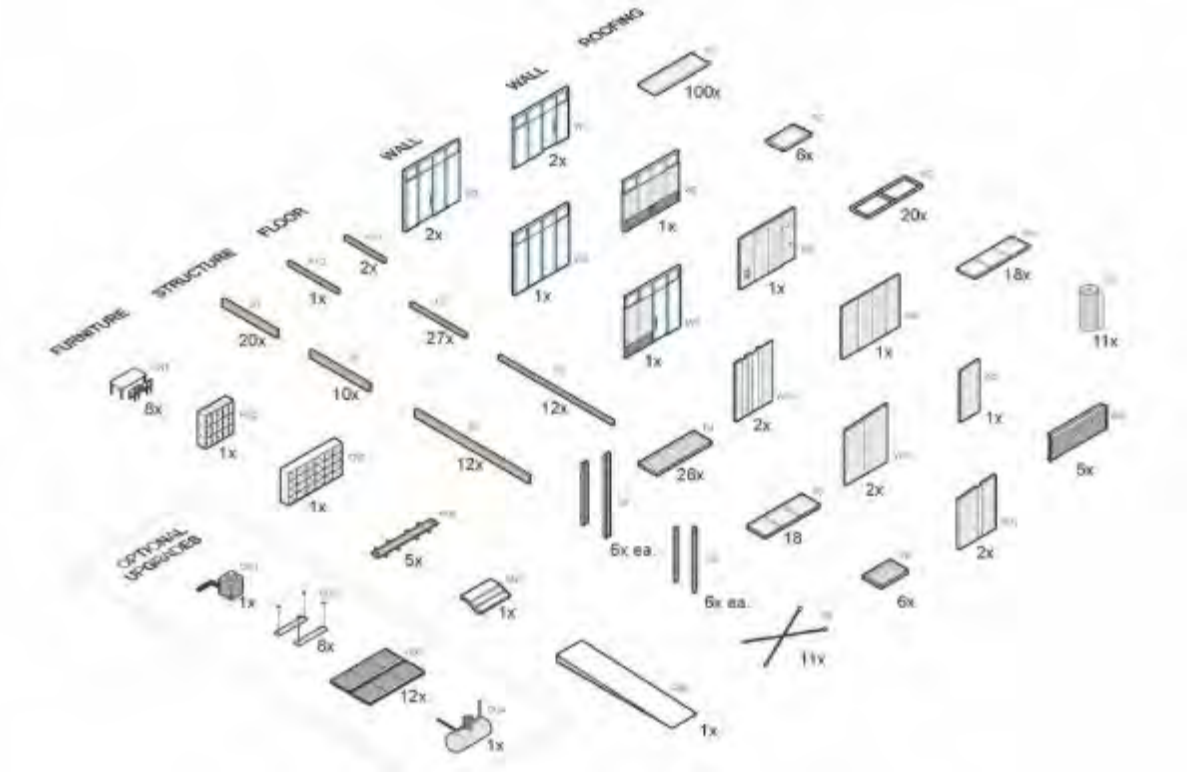
Vendor Selection

Kit of Parts vs Turn Key

- Design
- Procurement
- Assembly
- Start Up / Commissioning / Support

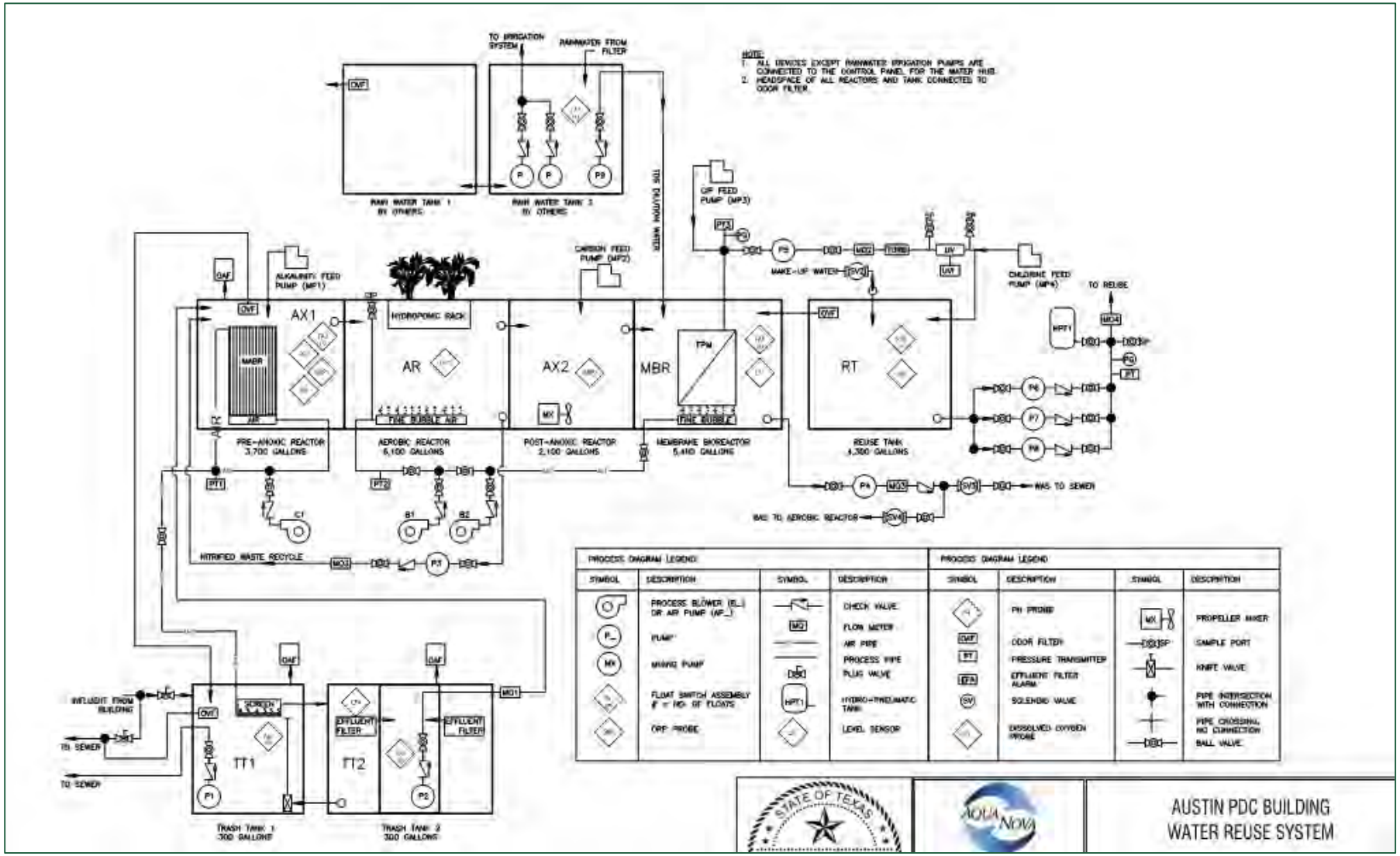
Design Build Subcontractor:

Sustainable Water, Glen Allen, VA



Process Flow

Primary Screening -> Pre-Anoxic Reactor -> Hydroponic Reactor (Plants) -> Post Anoxic Reactor -> Membrane Filtration -> Disinfection



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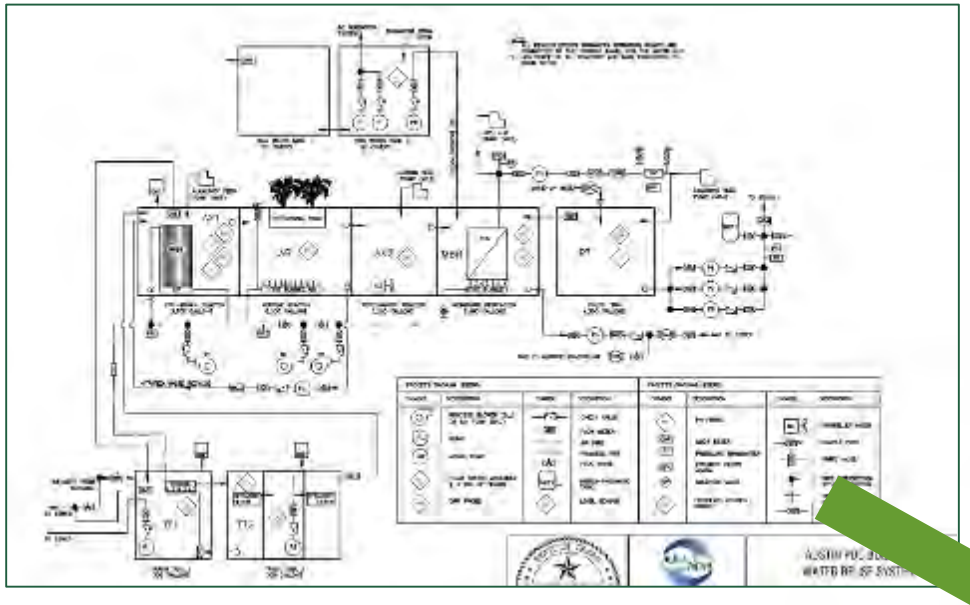
Where Does This Thing Go On Site?



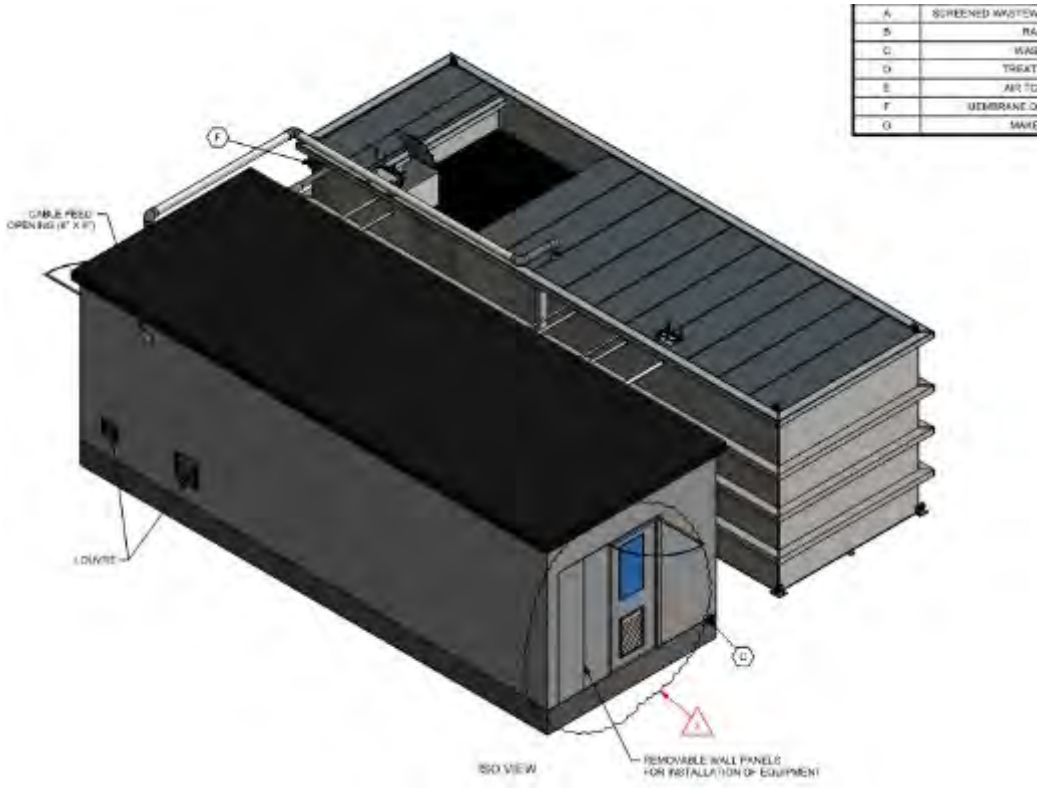
Considerations/Opportunities

- Size of the System: 40’ x 40’
- How to conceal system yet provide visibility?
- Future Maintenance and Operation of System
- Above vs Below Grade
- Schedule

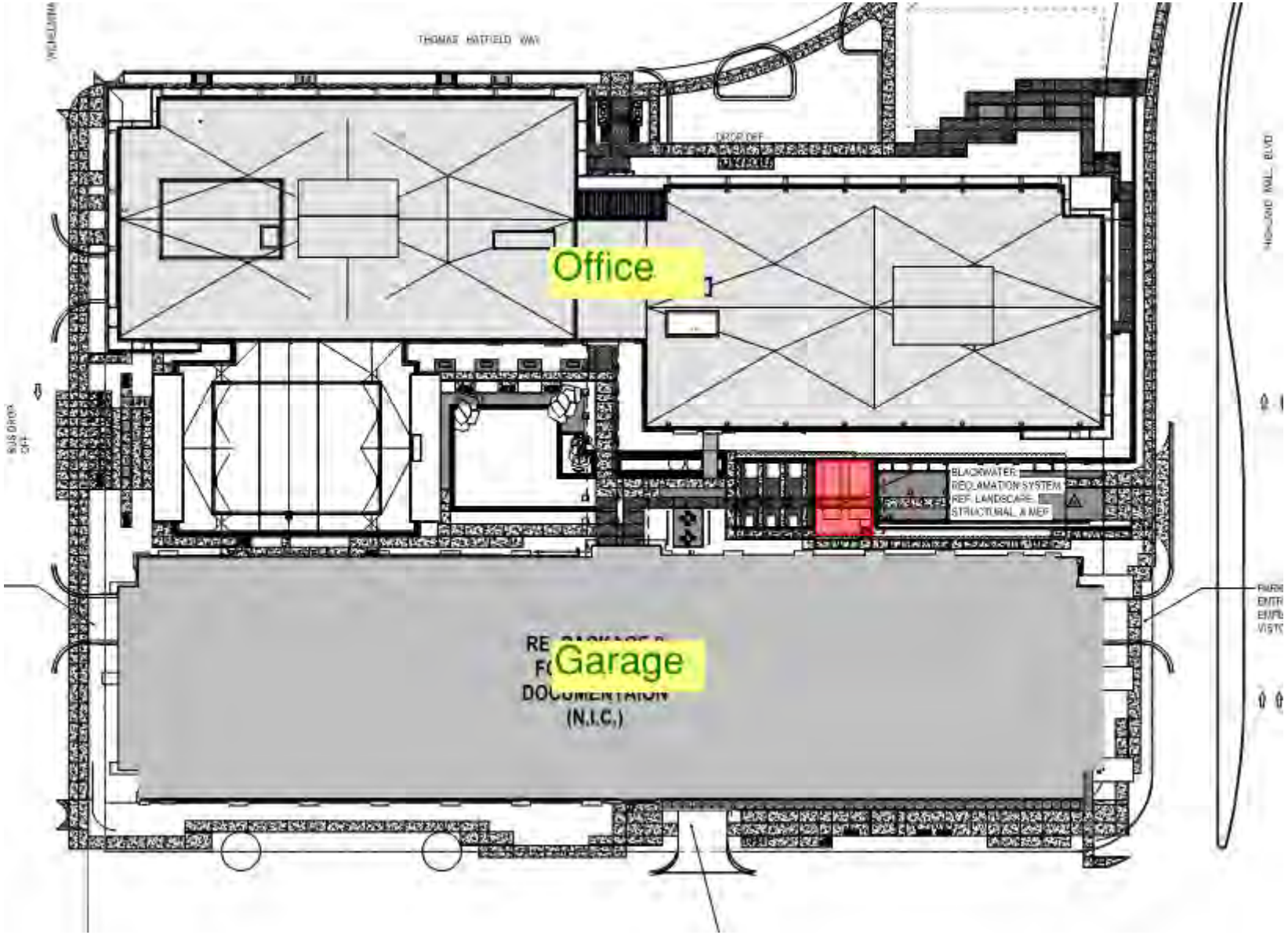
Design

Outcomes

- Give System It’s Own Space
- Locate System Above Grade, Outside of Buildings
- Prefabricate System Off Site
- Prefabricated Tank and Mechanical Buildings
- Deliver to Site -> Plug and Play



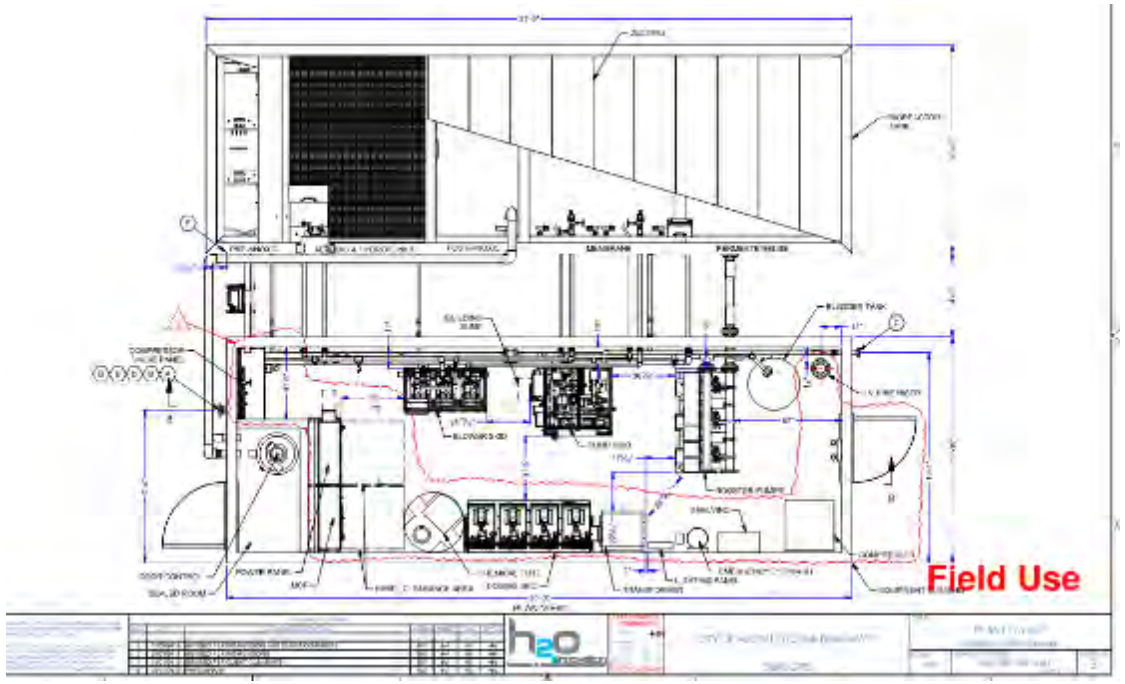
Where Does This Thing Go On Site?



Design – Lessons Learned Thus Far

Lessons Learned

- Meet with TCEQ Early for Permitting Discussion
- Set Up Utilities To Isolate System if Needed
- Lift Station May Be Required
- Prefabricate As Much As Possible, Plug and Play
- One Year+ From Vendor Selection to Delivery
- Need Occupants for Final Commissioning



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What's Next?

- **Acquire TCEQ Permit:**
  - July 2019
- **Prefabrication Plant Visit:**
  - September 2019
- **System Delivery:**
  - October 2019
- **Hook Up System / Pre Test:**
  - Nov 2019 Thru April 2020
- **Bio Ramp Up:**
  - May 2019
- **Full Waste Water Flow:**
  - August 2019

Questions?

Amelia Luna, PE, LEED AP, ENV SP

Sherwood Design Engineers

On-site Non-potable Water Systems:
Drivers for Owners from a National Perspective

Alternative On-site Water Use Workshop

AUSTIN WATER - June 25, 2019

Amelia Luna, M.S., P.E., LEED AP,
ENV SP
Project Manager (Water/Wastewater)
aluna@sherwoodengineers.com

SHERWOOD
DESIGN ENGINEERS

Food for Thought…

1. **On-site non-potable water systems can be a transformative opportunity**

   …but there is a risk that the benefits may not be realized, so…

2. **Consider all driving forces**

   …because a one-size-fts-all approach does not work!

3. **Changes to market demands are driving developers away from "business-as-usual" thinking.**

*"For utilities and developers, ONWS can be a **means of complying with new regulations while maximizing the social, environmental, and economic benefits** of each project."*

– US Water Alliance, Making the Utility Case for Onsite Non-Potable Water Systems

Mutually Beneficial Outcomes

Developers

1. Insulation from market volatility
2. Potential to reduce connection fees
3. Return on investment
4. Increase allowable density (FAR)
5. Demystify water entitlements process for predictable outcomes and to meet permitting schedules

Utilities

1. Bolster regional infrastructure
   - Flexibility + Resilience
   - ONWS as “second line of defense”
2. Contribute to a diverse future water supply (reuse as conservation)
3. Helpmeet wastewater treatment needs
4. Potential to defer capital-intensive projects

Agenda

*It is abundantly clear that our society must **reevaluate the way in which we use and dispose of water** if we are to avoid serious environmental, social, and **economic hardships**.*

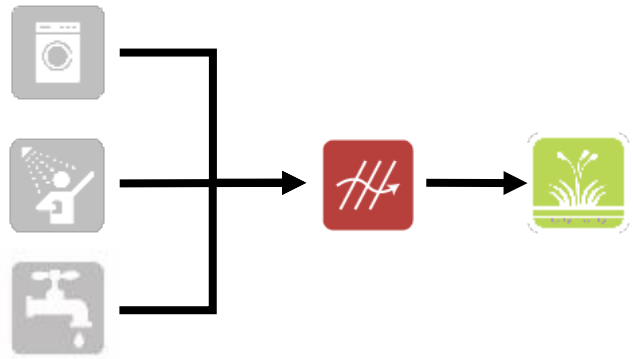
- Amazon Reviewer,
Water 4.0 by David Sedlak

1. **Project Delivery Considerations**
2. **Water Balance**
3. **Water Characterization**
4. **Business Case Studies**
5. **Design Solutions**
6. **What's Next for the Industry?**

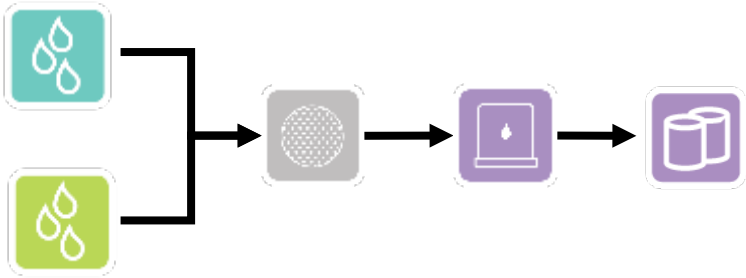
PROJECT DELIVERY CONSIDERATIONS

What is the opportunity?

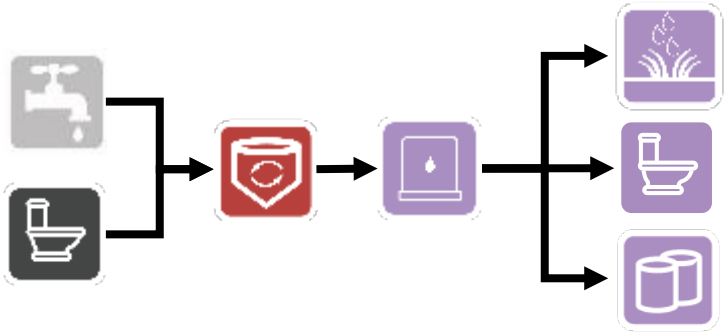
RESIDENTIAL BUILDING: graywater can be separately drained, filtered and reused for subsurface irrigation.



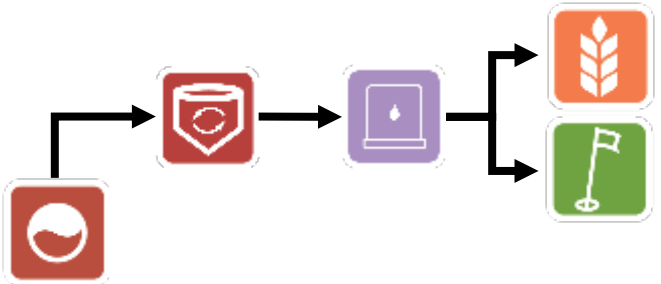
COMMERCIAL BUILDING: Precipitation can be harvested, treated, stored and reused as makeup for evaporative cooling applications.



SITE: Wastewater from buildings can be treated and reused to irrigate landscapes, flush toilets and provide cooling makeup.



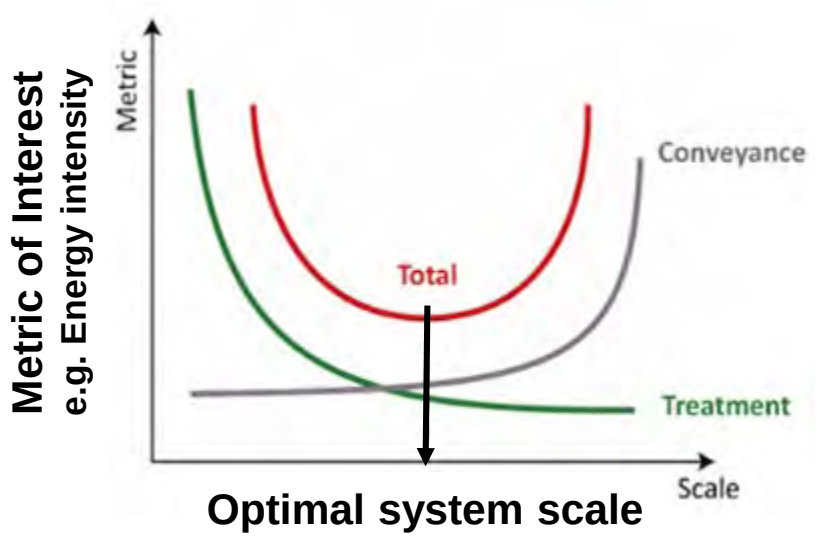
DISTRICT: Wastewater can be mined from a nearby sanitary sewer, treated and reused to irrigate crops and golf courses.

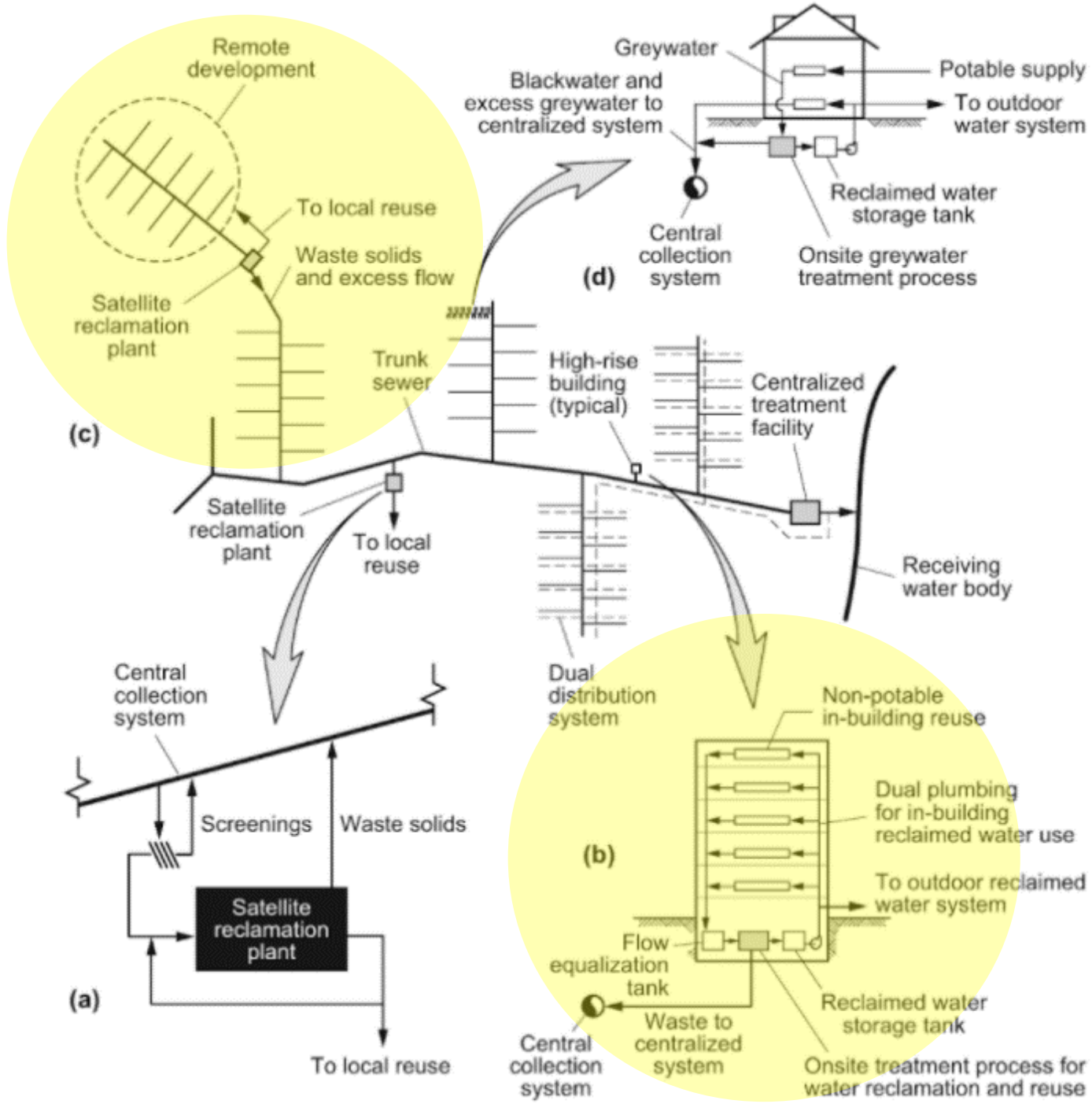


Location + Scale

- **Urban (satellite)**
- **Remote (decentralized)**
- **Water infrastructure is <u>spatially sensitive</u>**

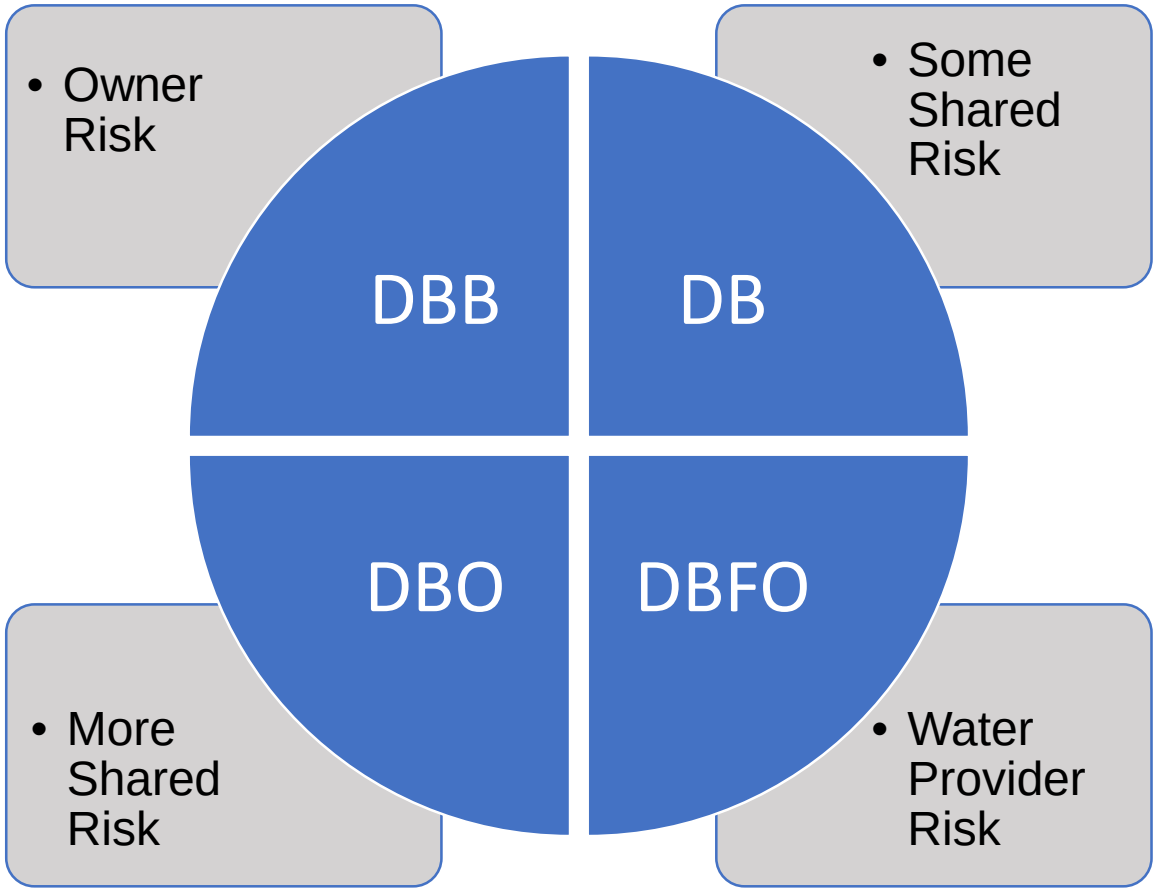
Scale/Location	Treatment Energy	Distribution Energy
Centralized	40%	60%
On-site	85%	15%





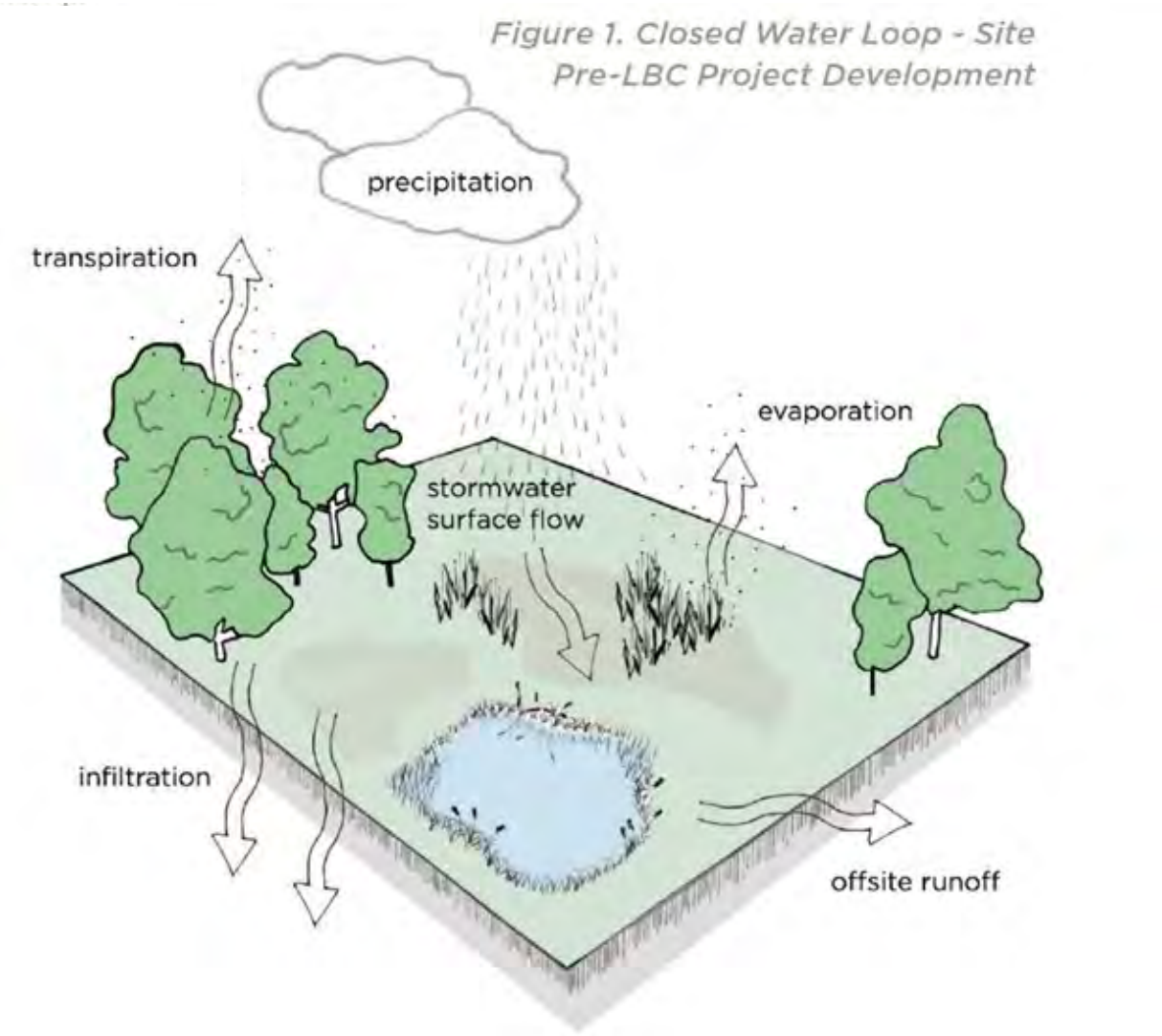
Ownership Typologies

- **Terminology**
  - Project Delivery:
    Design (D), Bid/Build (B), Finance (F)
  - On-going:
    Operate (O), Maintain (M),
    Monitoring + Reporting (M+R)
- **Development**
  - Owner-Builder → Owner-Occupied (campuses)
  - Developer-Builder → Ownership Transfer (everything else)
  - Public-private partnerships (P3)

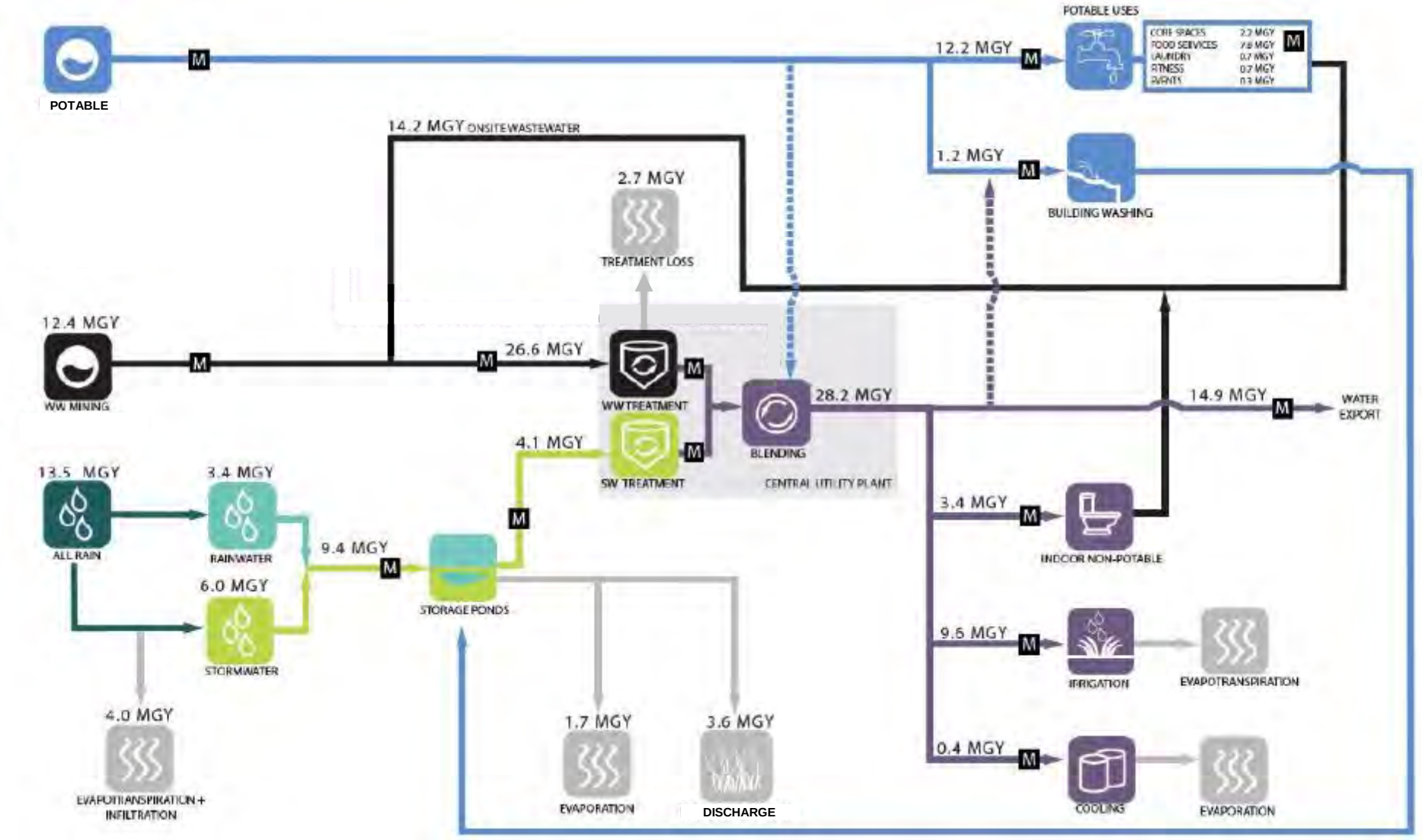


STEP 1: WATER BALANCE

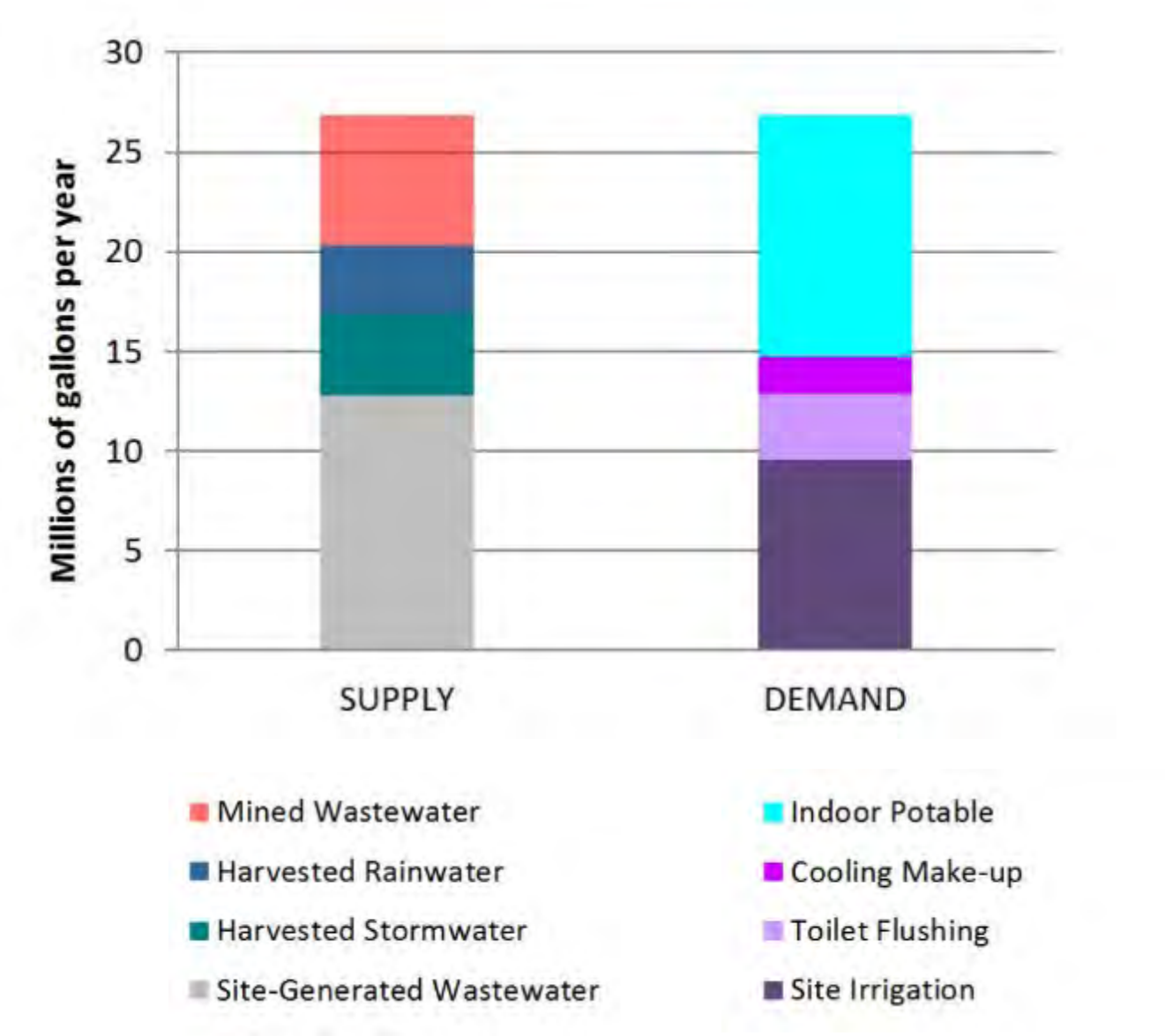
Green Building Standards



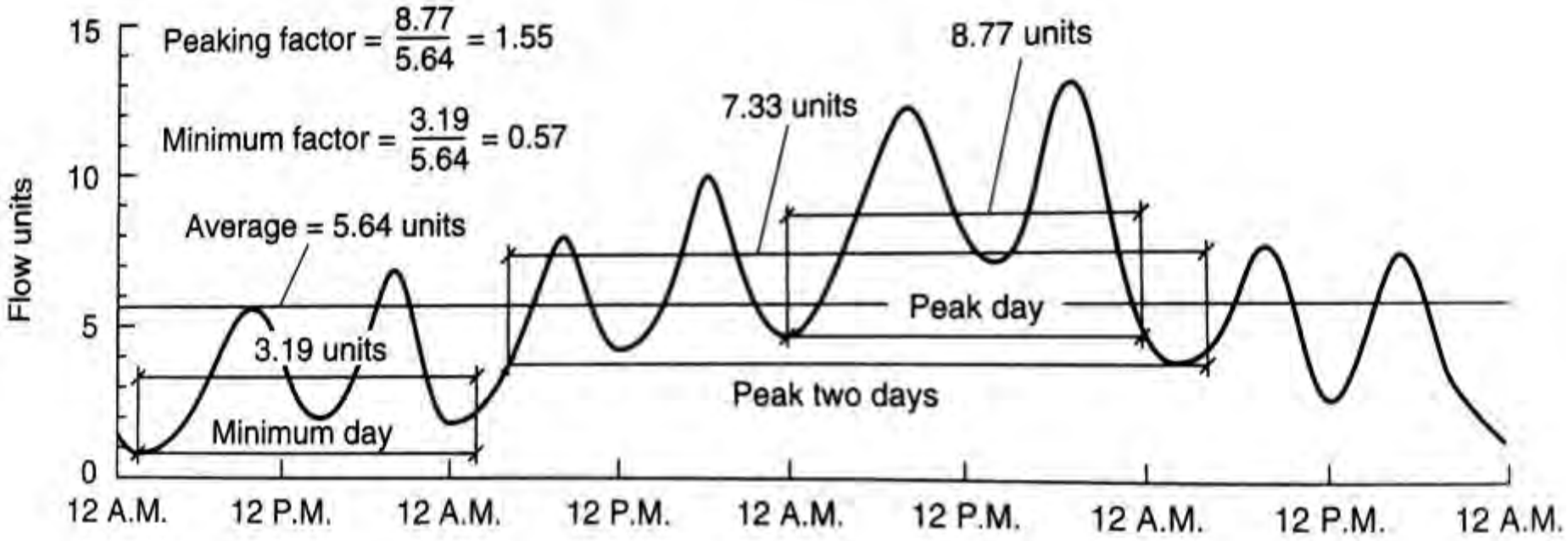
Water Balance Concept



Annual Water Balance



Peaking Factors



STEP 2: WATER CHARACTERIZATION

Rainwater, stormwater, graywater, wastewater

Considering collecting the rain?

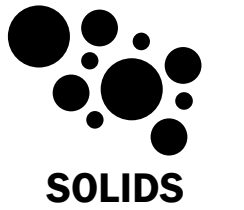
- Rainwater vs. Stormwater
- Watershed land cover type
- Proximity to sources of airborne pollutants
- Vehicle traffic type and frequency
- Source control of potential pollutants
- Event-driven (requires on-demand treatment)

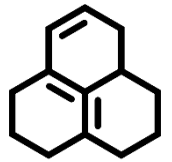
Naturalized Watershed

Urbanized Watershed

Taking the waste out of water!

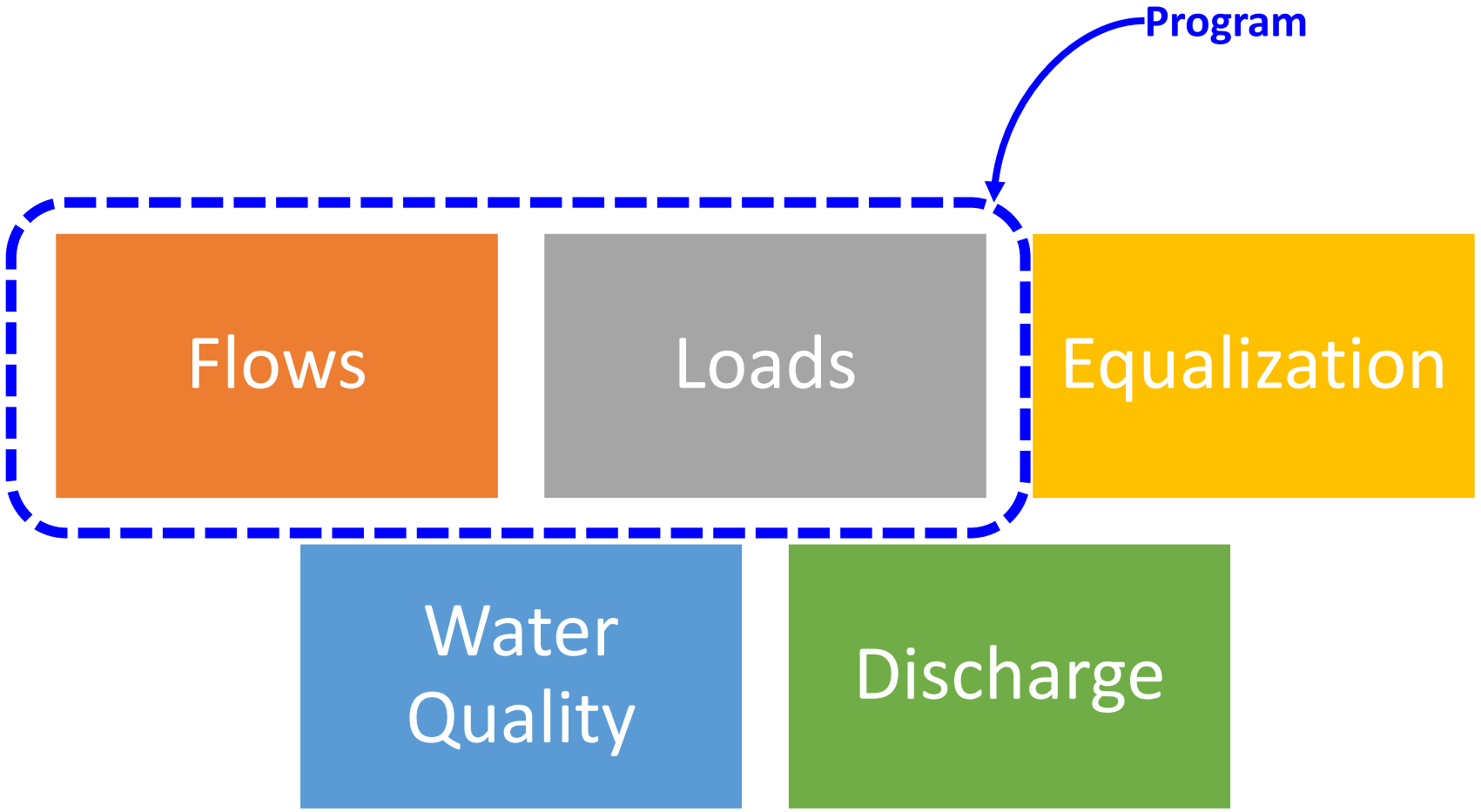
- Program: what's activities?
- Occupancy: how many people?
- Dilution volume: which fixtures?
- Timing: when will the highest flows occur? Lowest flows?
- Special considerations (e.g., hospitals)?



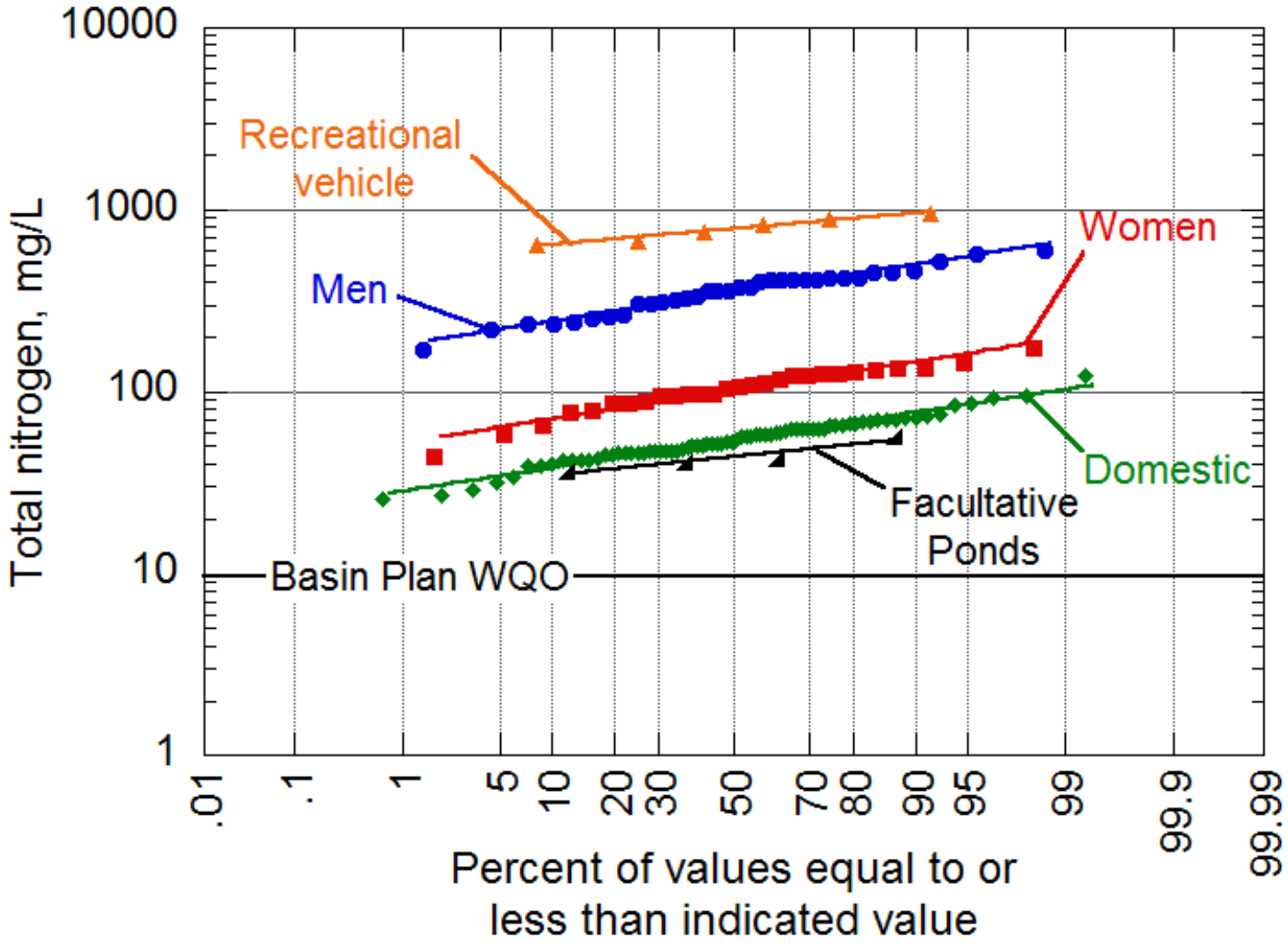


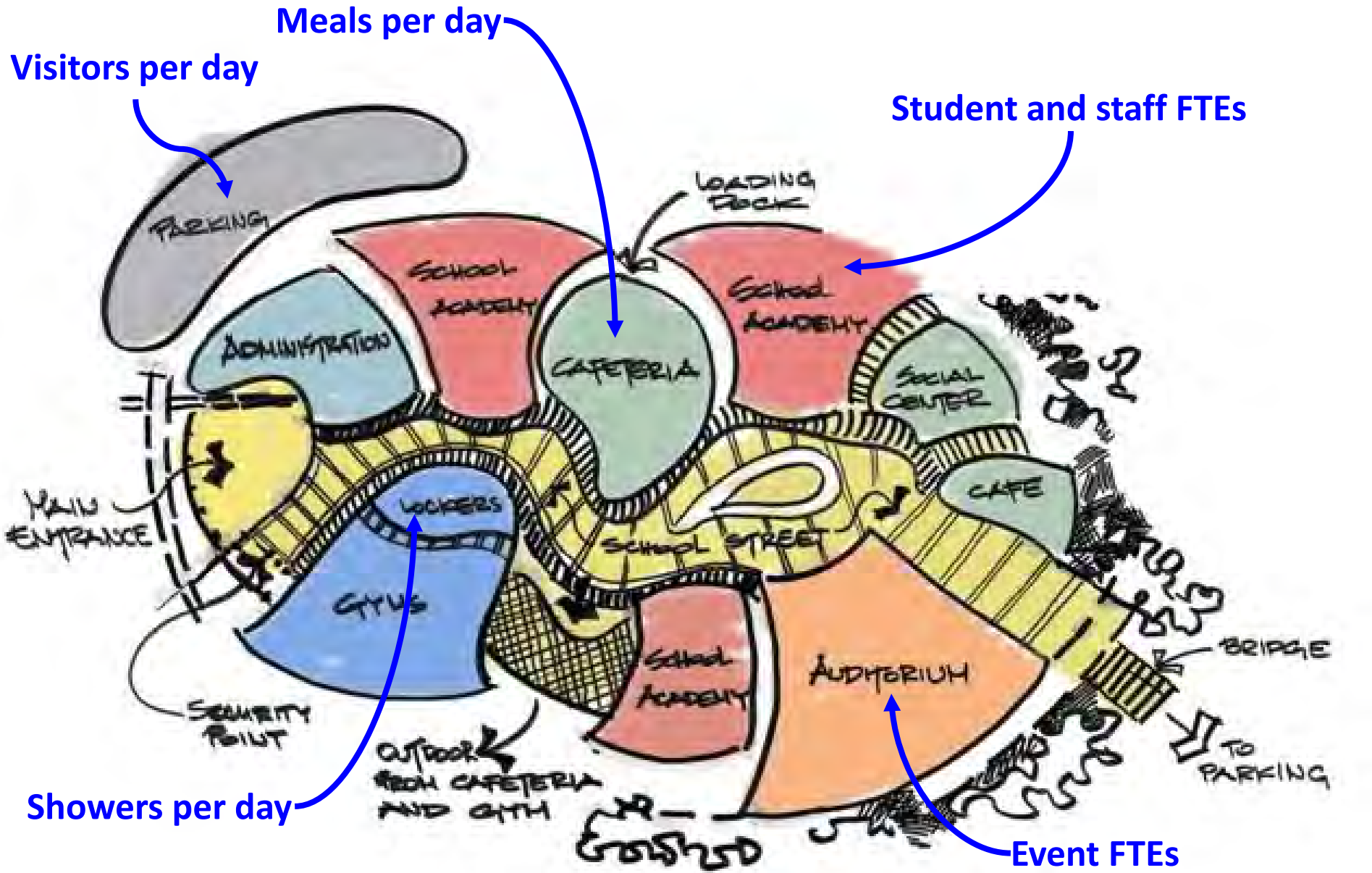
graphics credit: SFPUC

Sizing Considerations



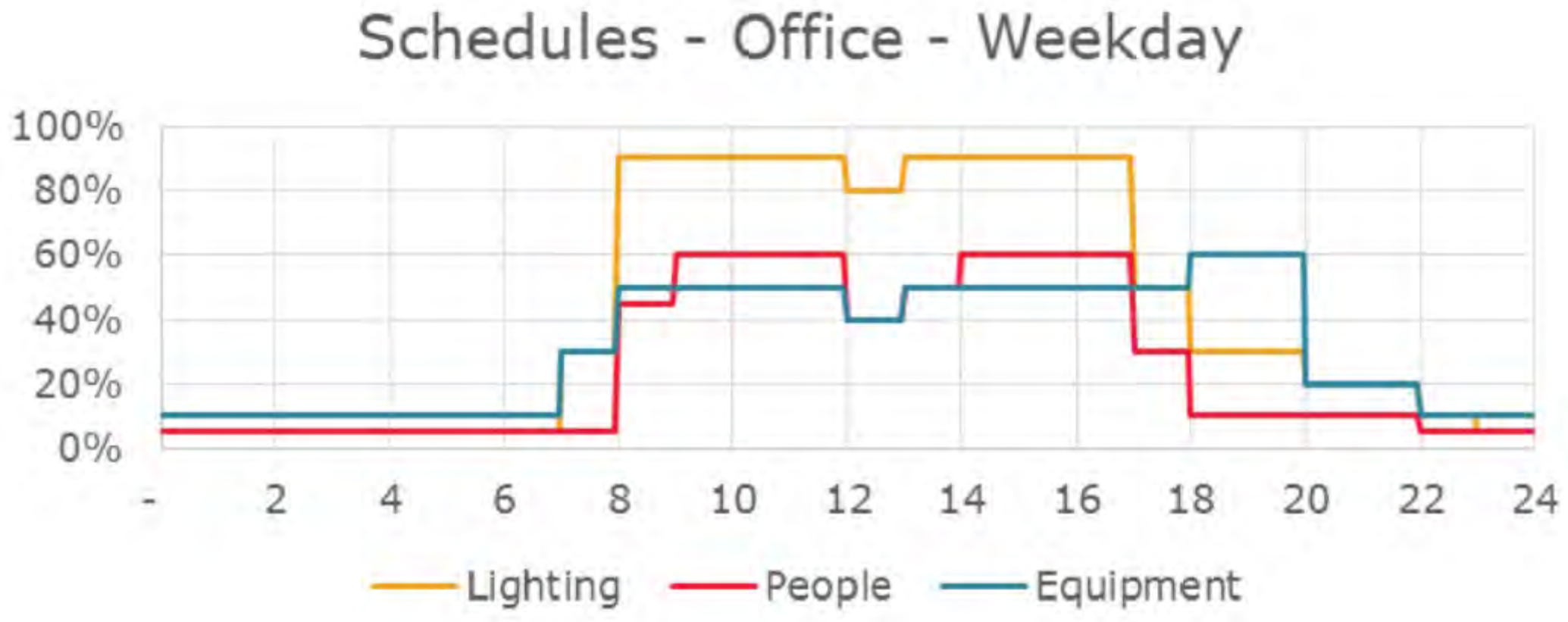
Water Quality Goals



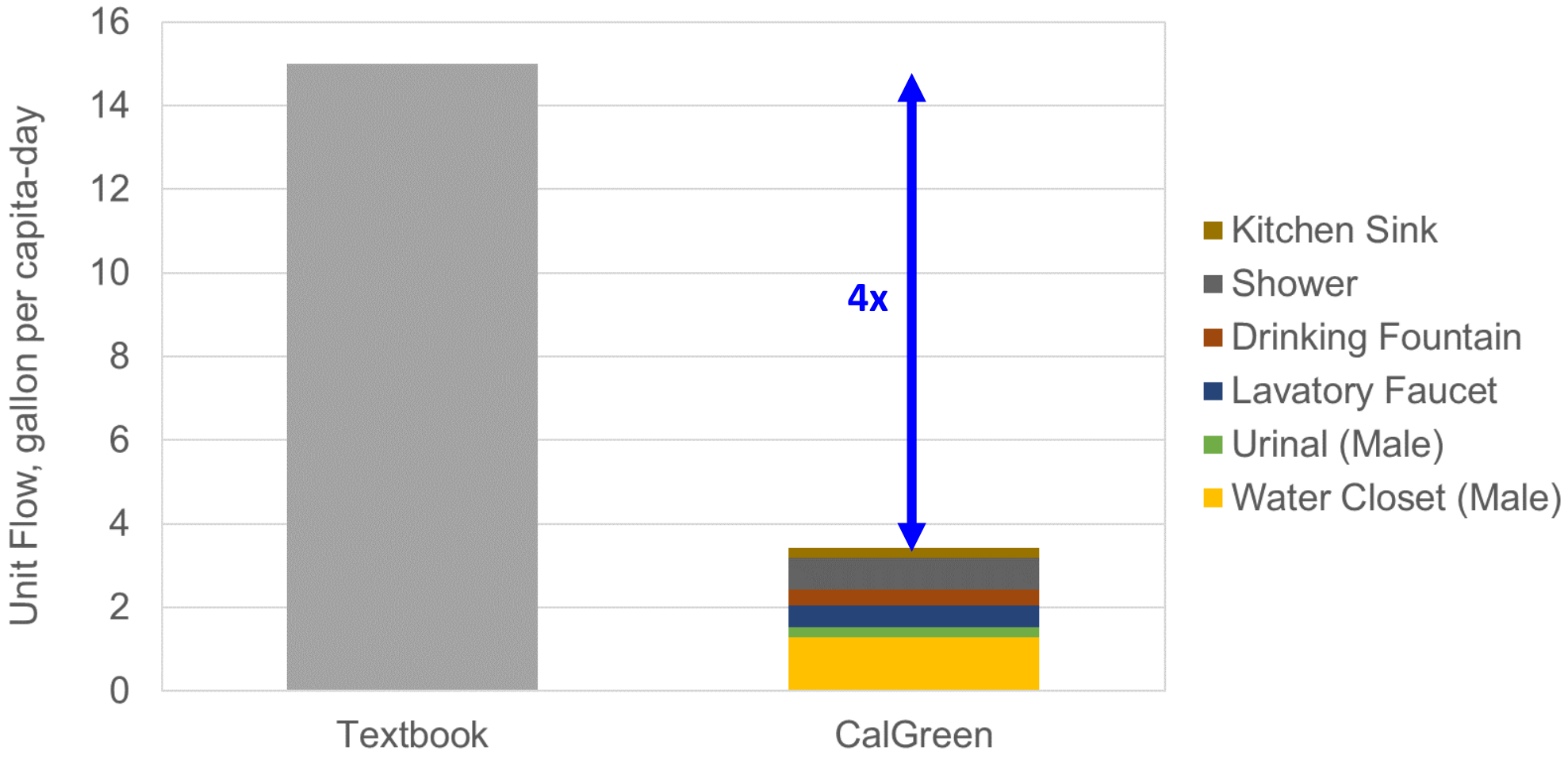


"Unfortunately, bedrooms do not generate wastewater, people do."

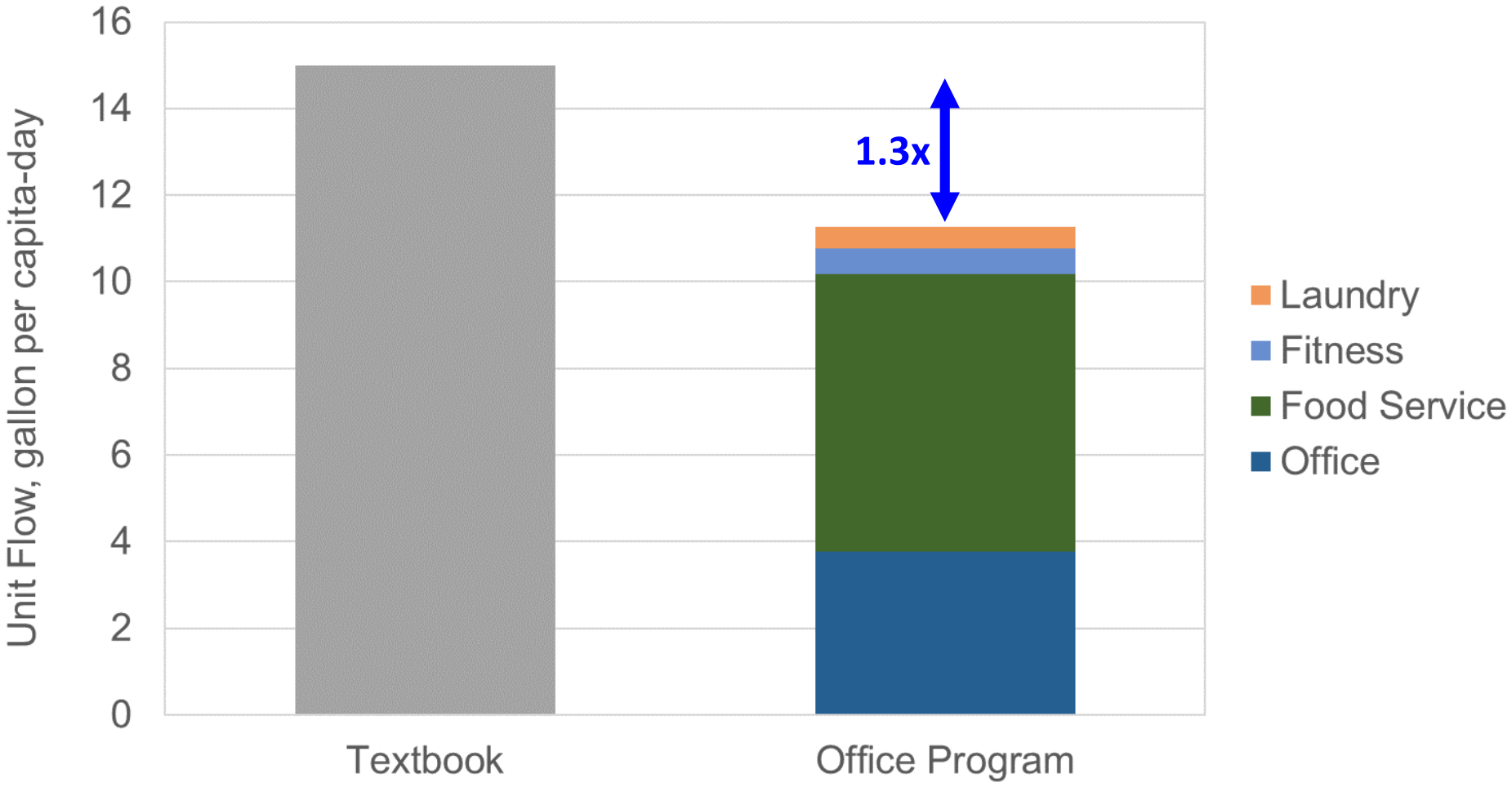
Occupancy Profile



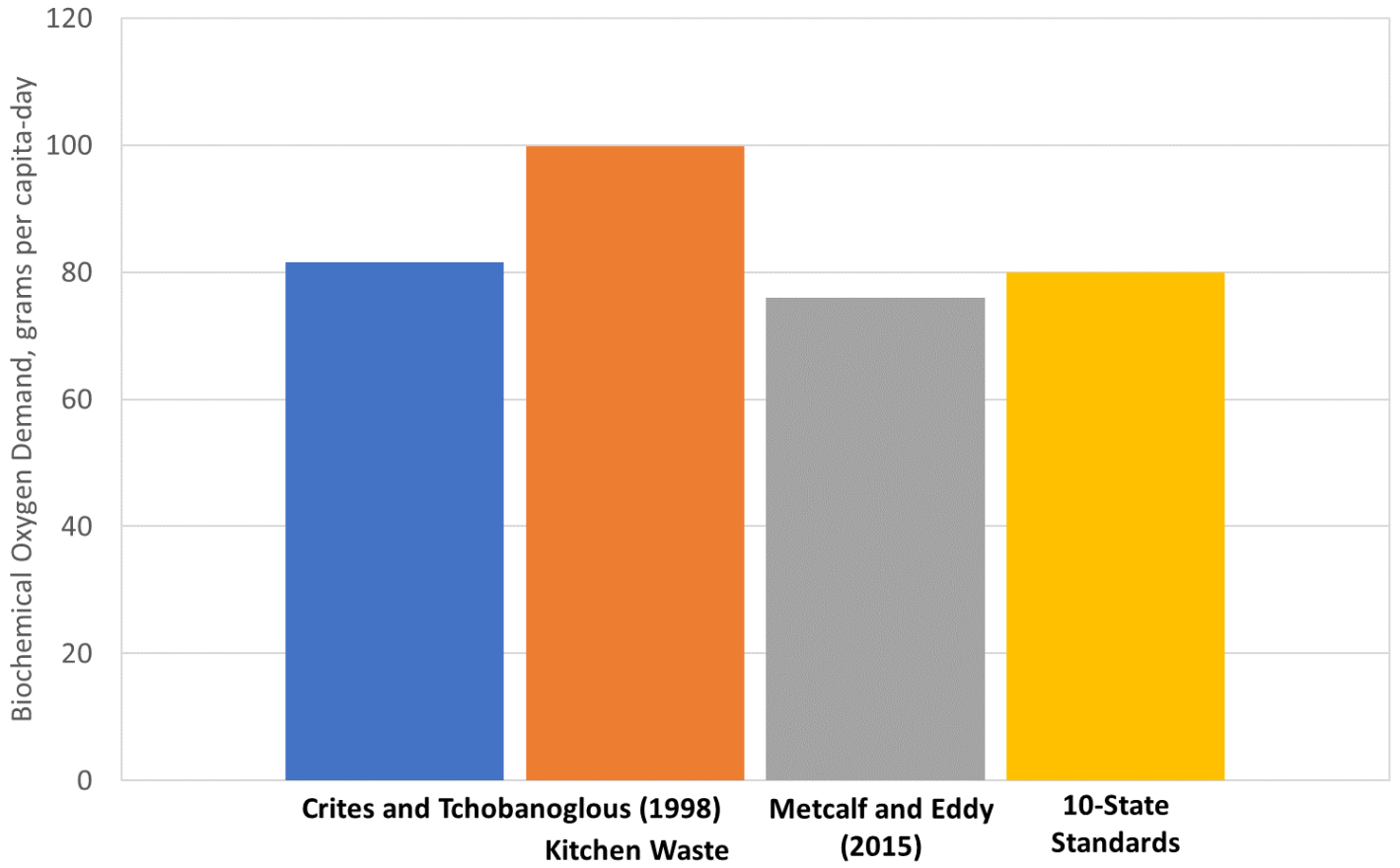
Unit Flows


16
14
12
10
8
6
4
2
0
Unit Flow, gallon per capita-day
4x
Textbook
CalGreen
Kitchen Sink
Shower
Drinking Fountain
Lavatory Faucet
Urinal (Male)
Water Closet (Male)

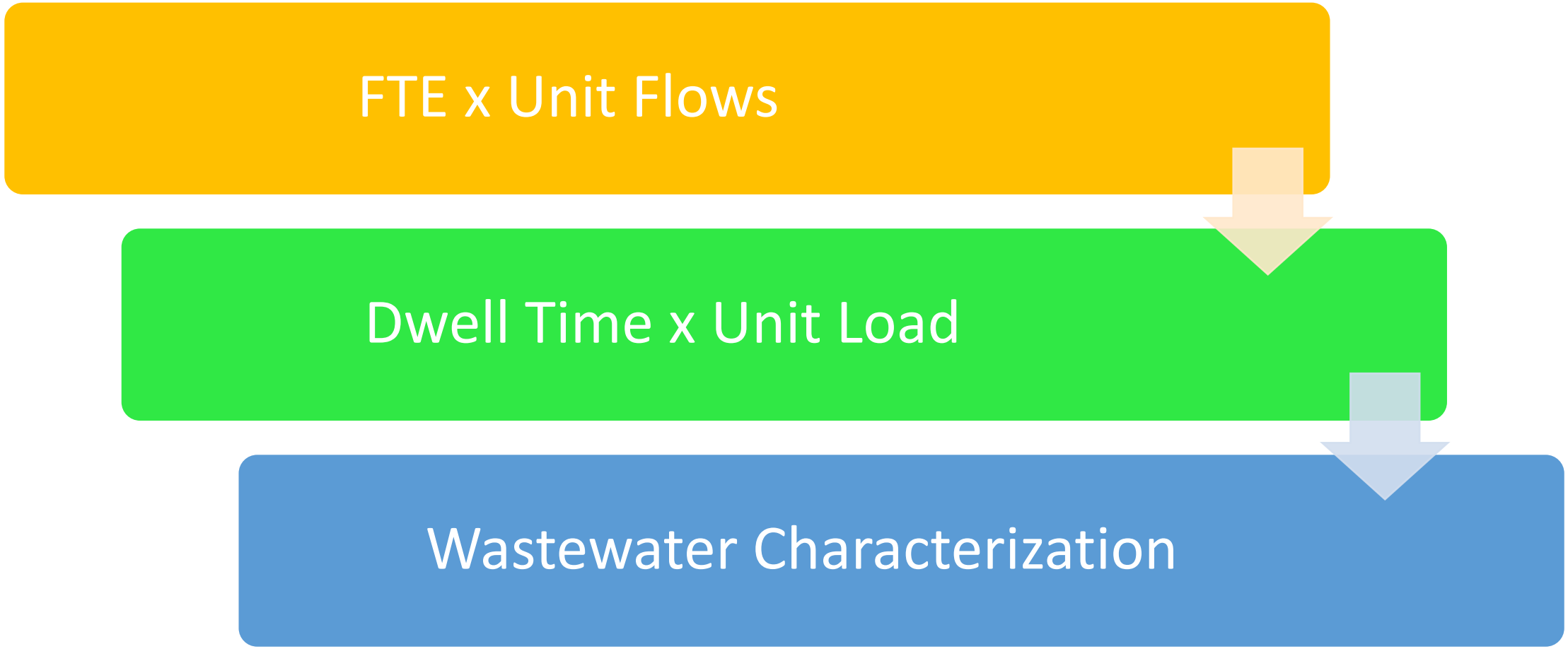
Unit Flows


16
14
12
10
8
6
4
2
0
Unit Flow, gallon per capita-day
1.3x
Textbook
Office Program
Laundry
Fitness
Food Service
Office

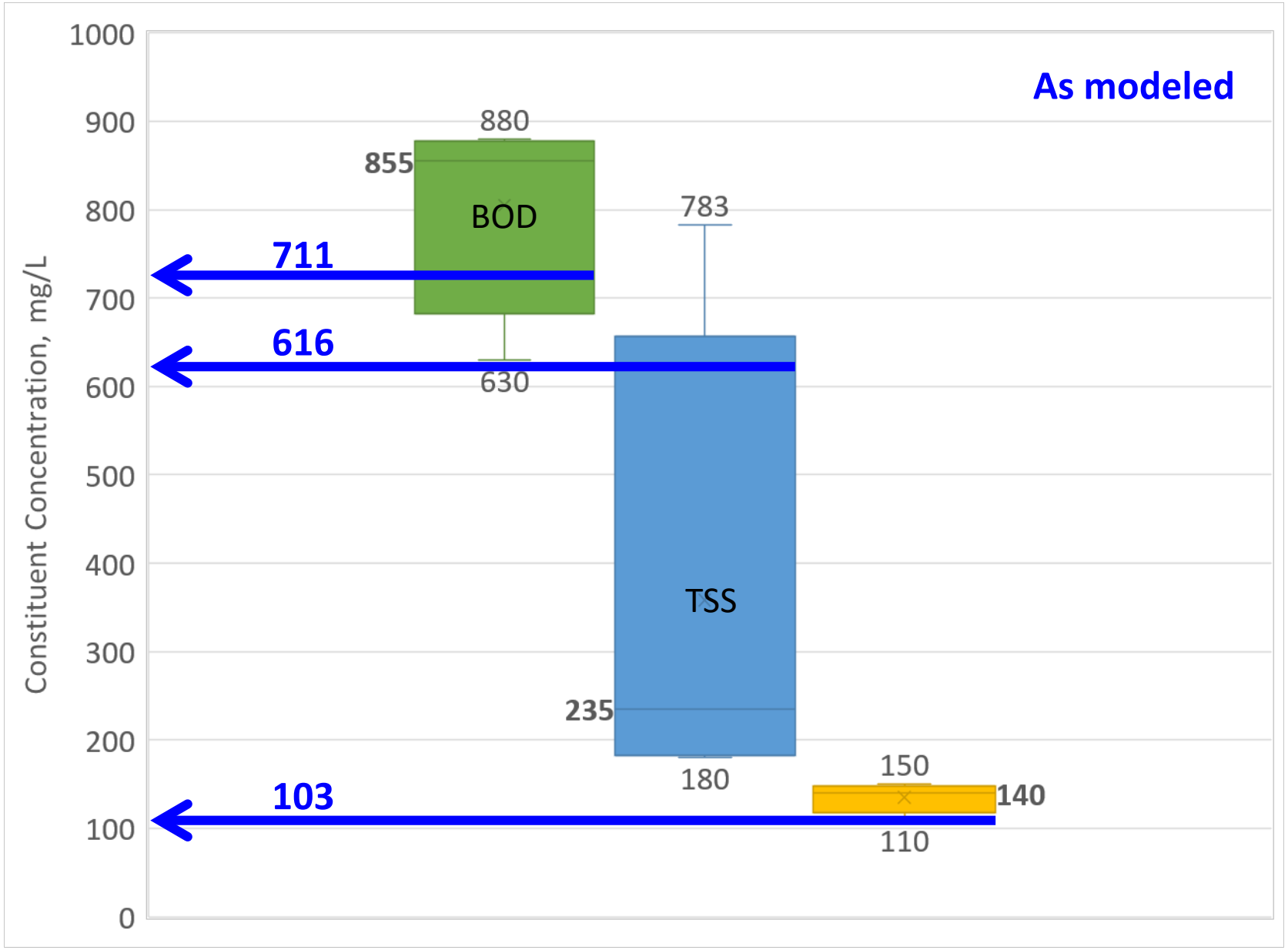
Unit Loading



Model build-up: wastewater



Office: Characterization (n = 4)



STEP 3: BUSINESS CASE STUDIES

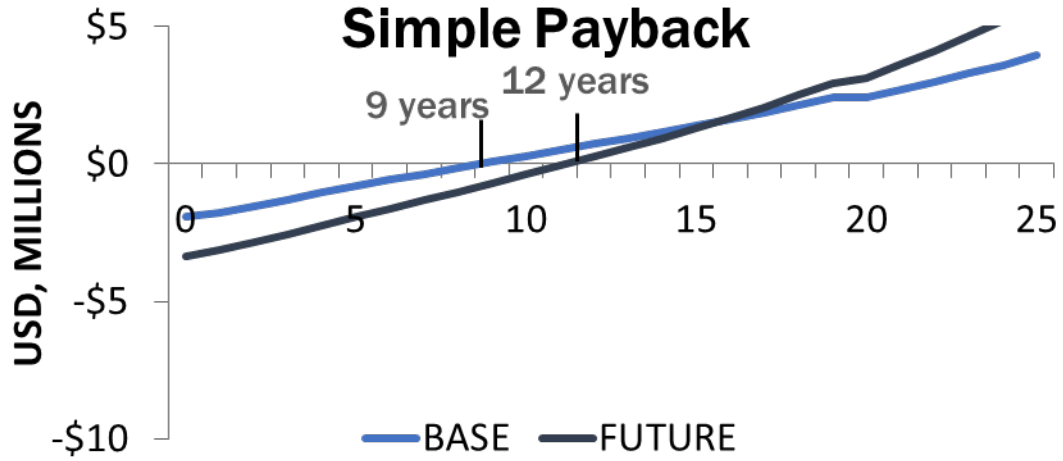
Water infrastructure is not optional…

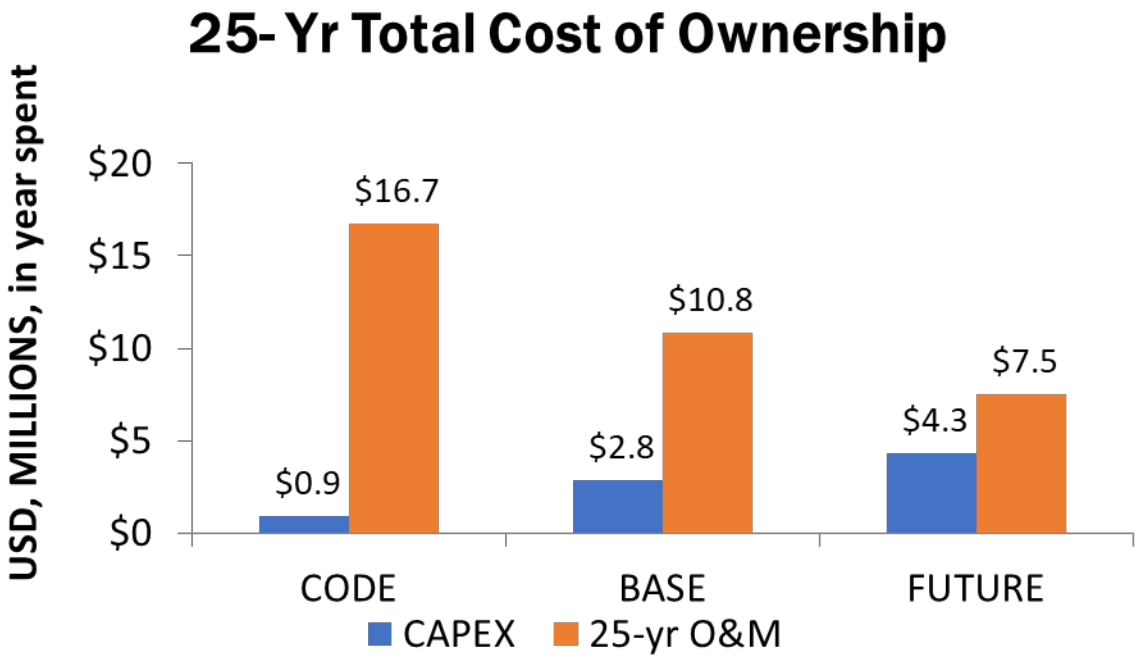
…now what?

1. Are investments required to support my development?
2. If so, what type of investment is needed?
3. How can I gain confidence in commitments I make to specific investments?

How will I pay for this investment?

1. Review <u>true delta</u> between "business as usual" and ONWS
2. Assess whether lifecycle costs are important for your development
   - If not, what costs can be recovered via water purchase agreement?
3. Determine first cost offsets
   - Identify incentives, connection fee discounts
4. Articulate less tangible benefits
   - Community benefits
5. Review water, sewer, stormwater rates
   - Create business case



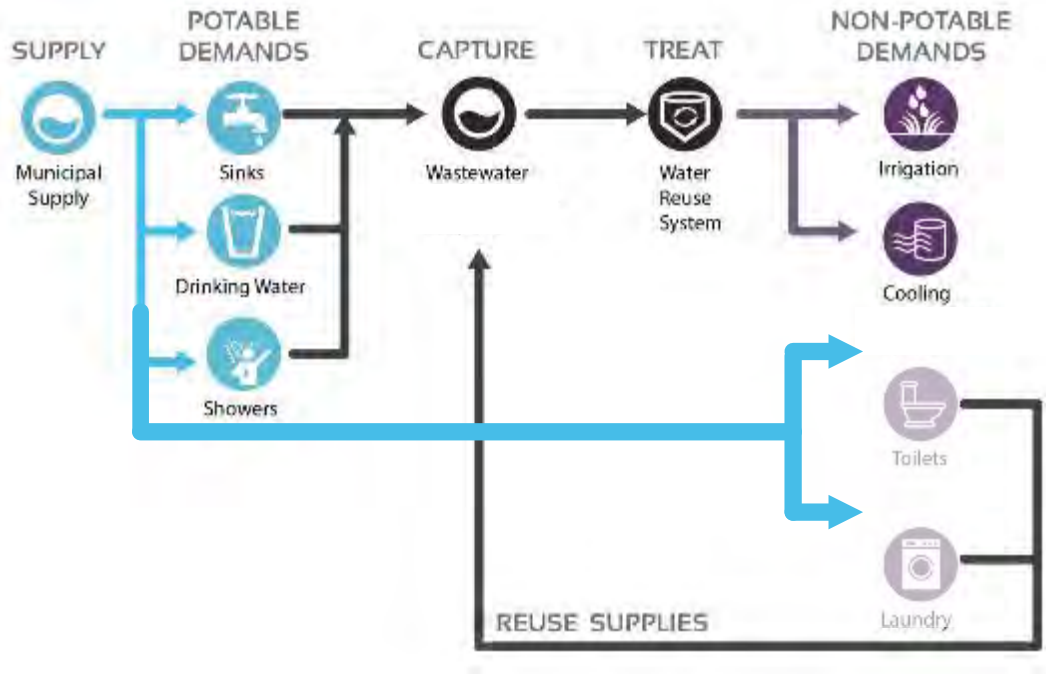


Water Reuse in Atlanta

District-Scale Reuse Concepts

Alt 1

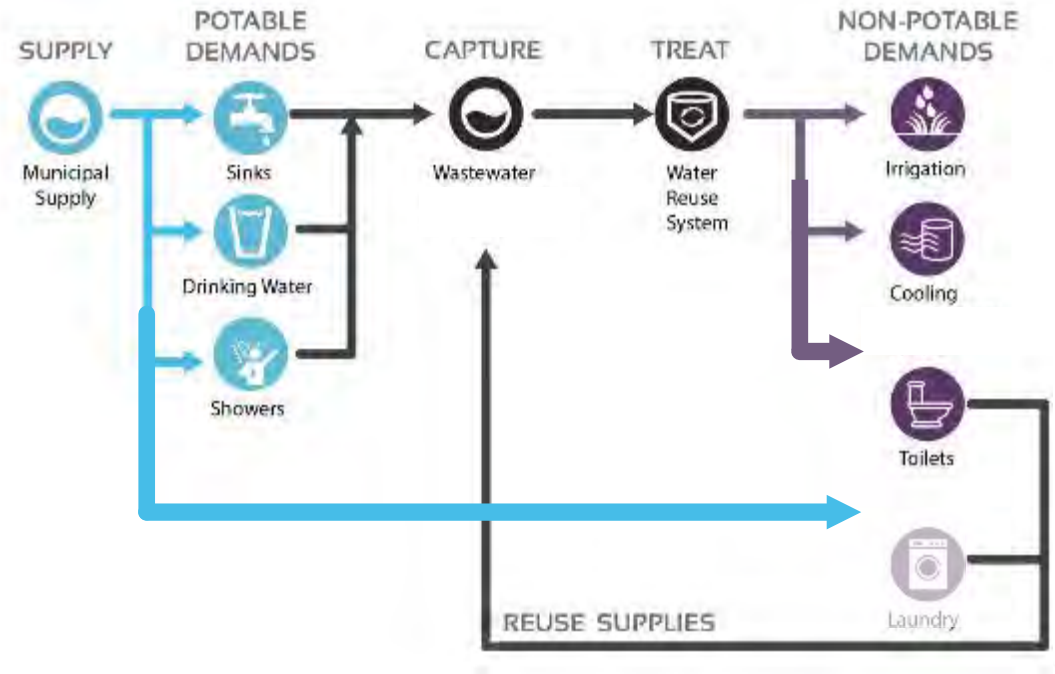
- Harvest wastewater from sanitary system
- Treat in central treatment plant
- Supply from: O+C & Multi-Family Buildings
- Reuse for: Site & Park Irrigation
  Office and Residential Cooling



Alt 2

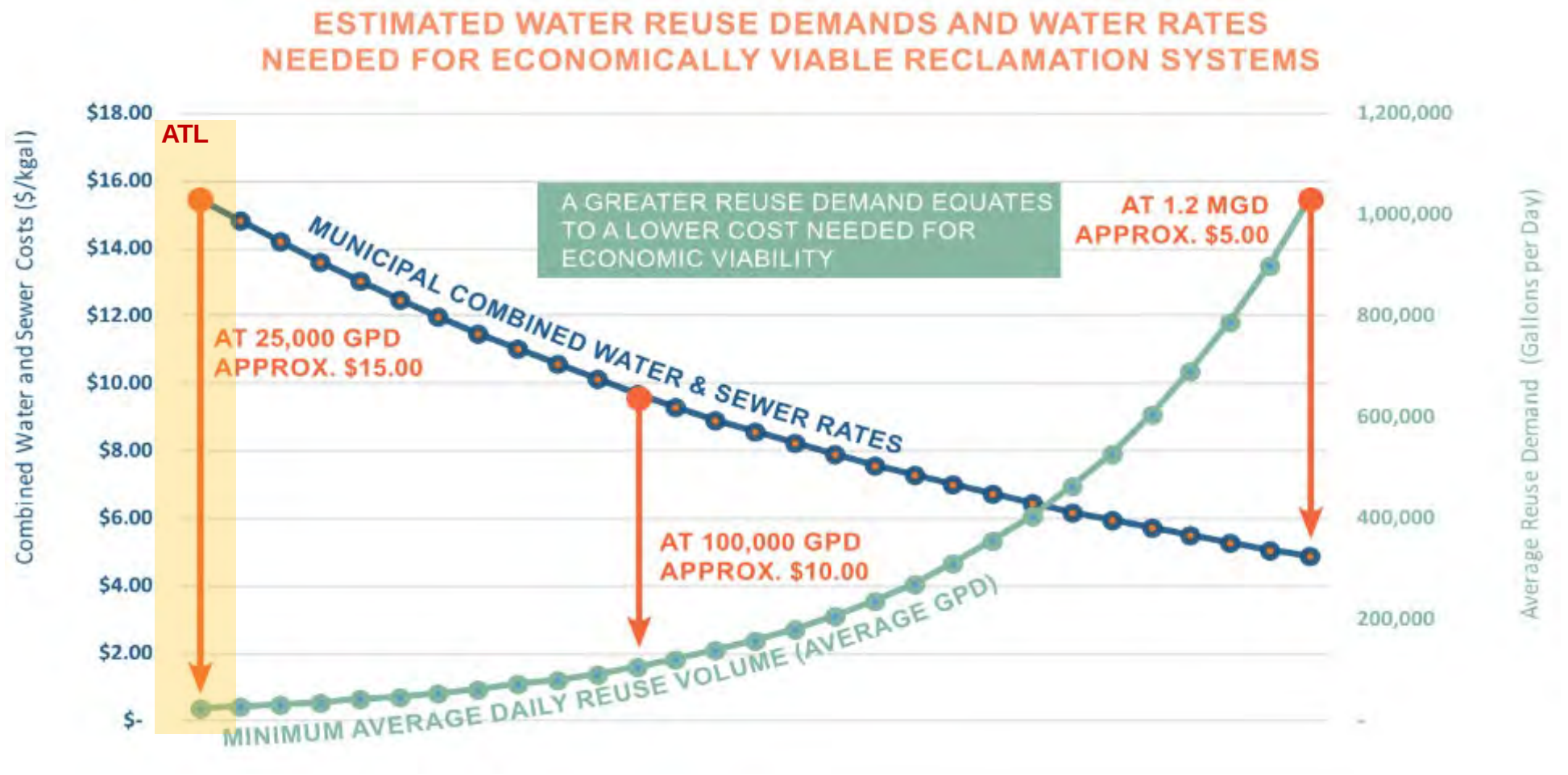
Alt 2 includes water reuse for toilet flushing

- Harvest wastewater from sanitary system
- Treat in central treatment plant
- Supply from: O+C & Multi-Family Buildings
- Reuse for: Site & Park Irrigation
  Office Cooling
  All Toilets



Financial Comparison

Total cash flow includes CapEx, OpEx, savings from water and sewer bills compared to no reuse

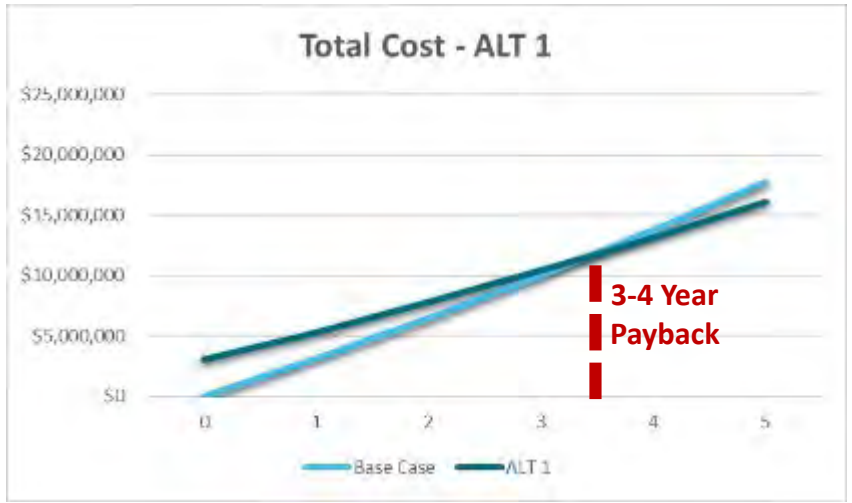


Financial Comparison

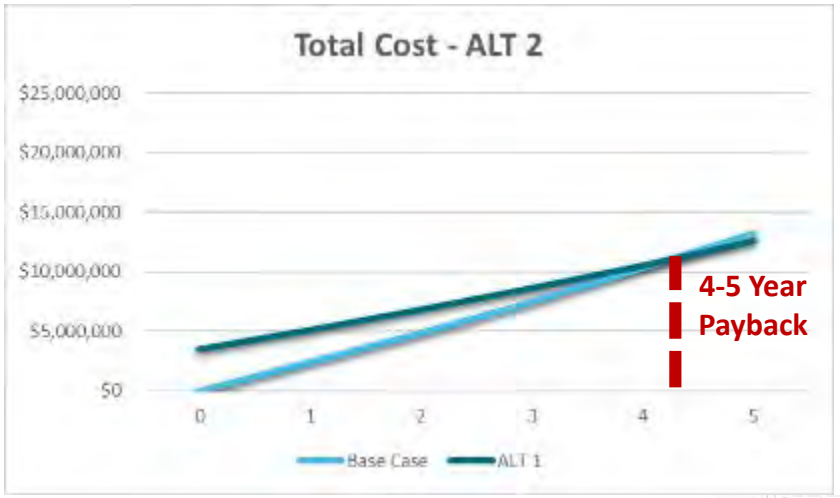
5.95% Historic Water Escalation Rate

$28,800,000 Saved

$25,300,000 Saved



3-4 Year Payback

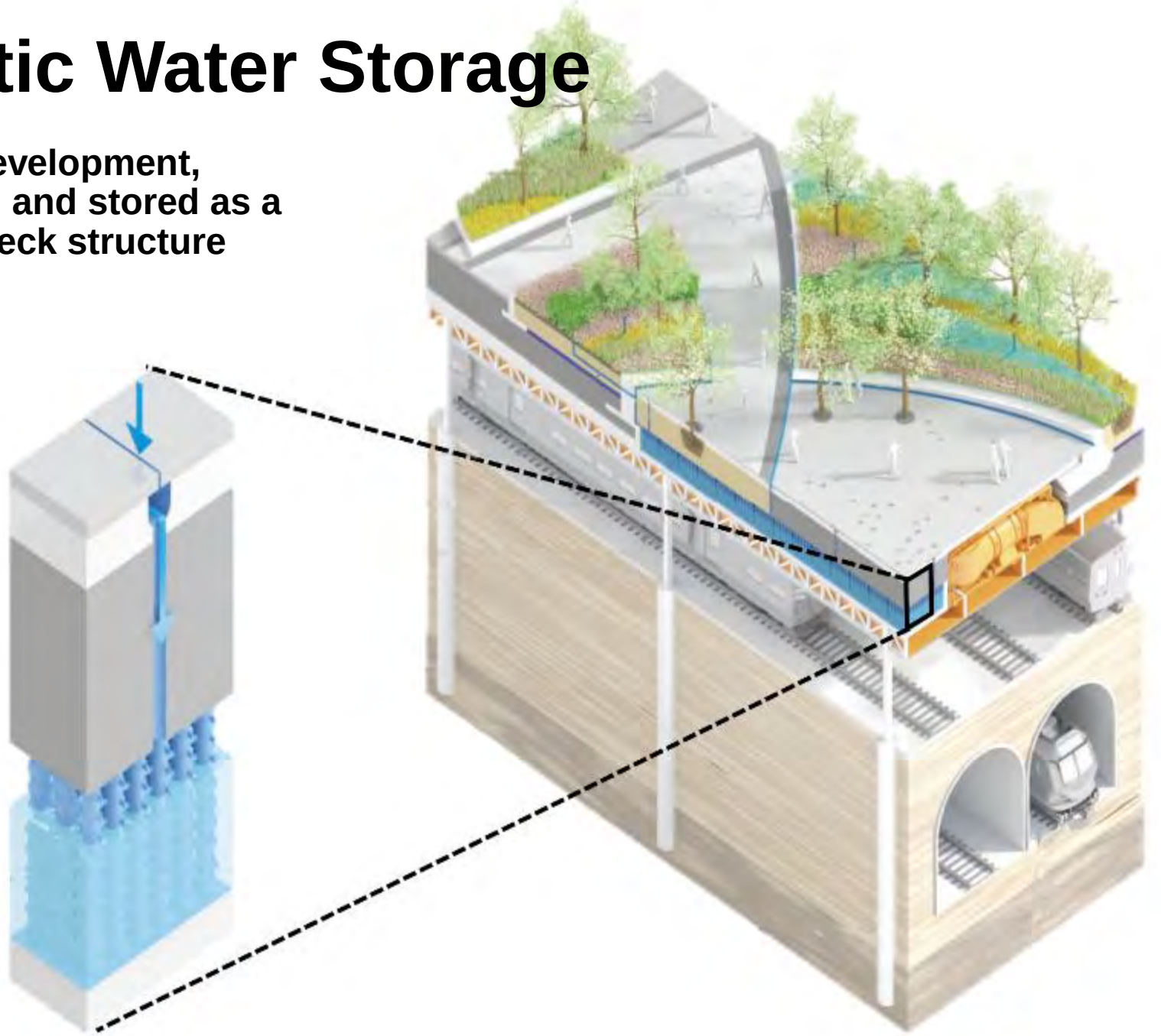


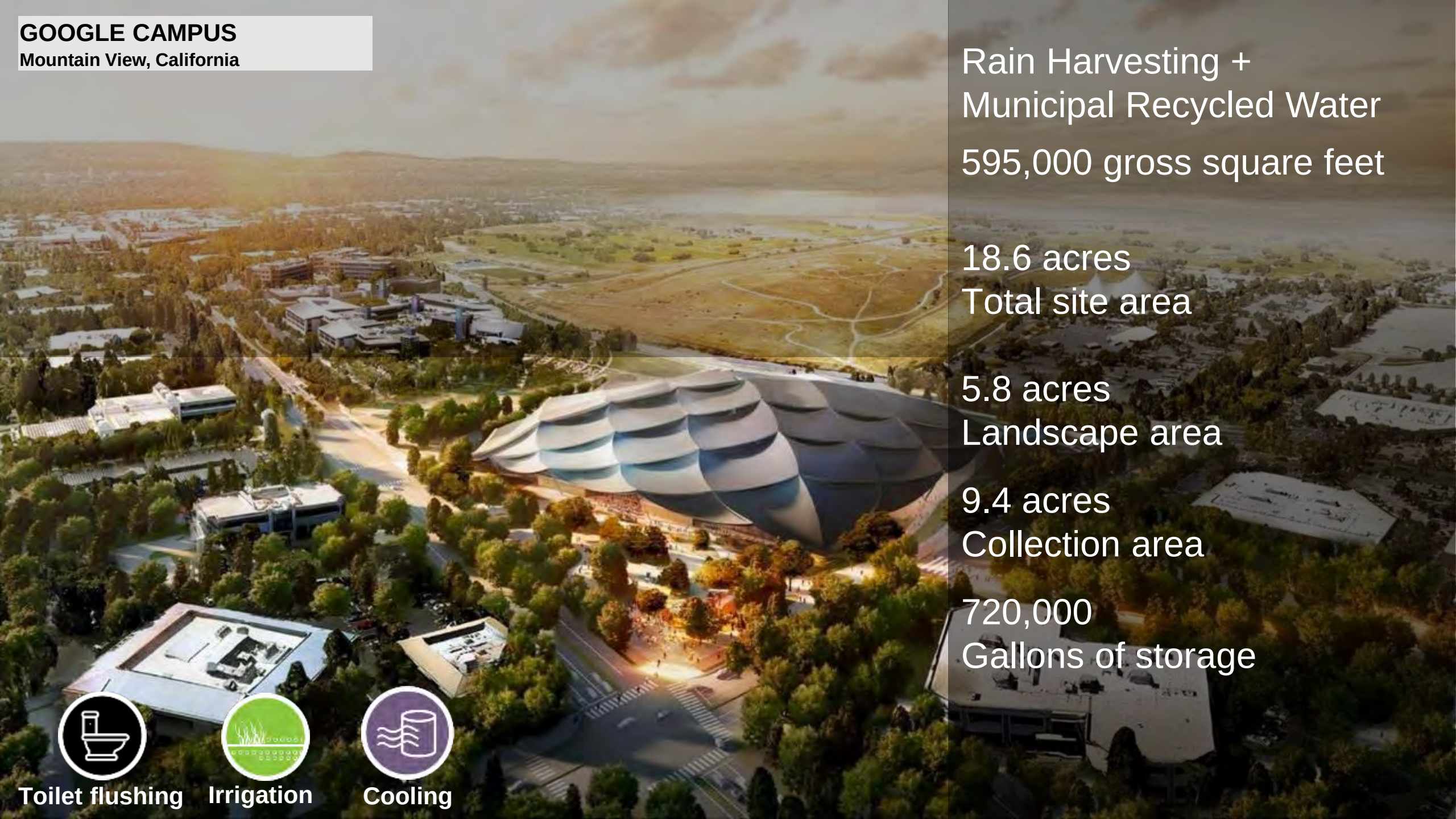
4-5 Year Payback

DESIGN SOLUTIONS

Opportunistic Water Storage

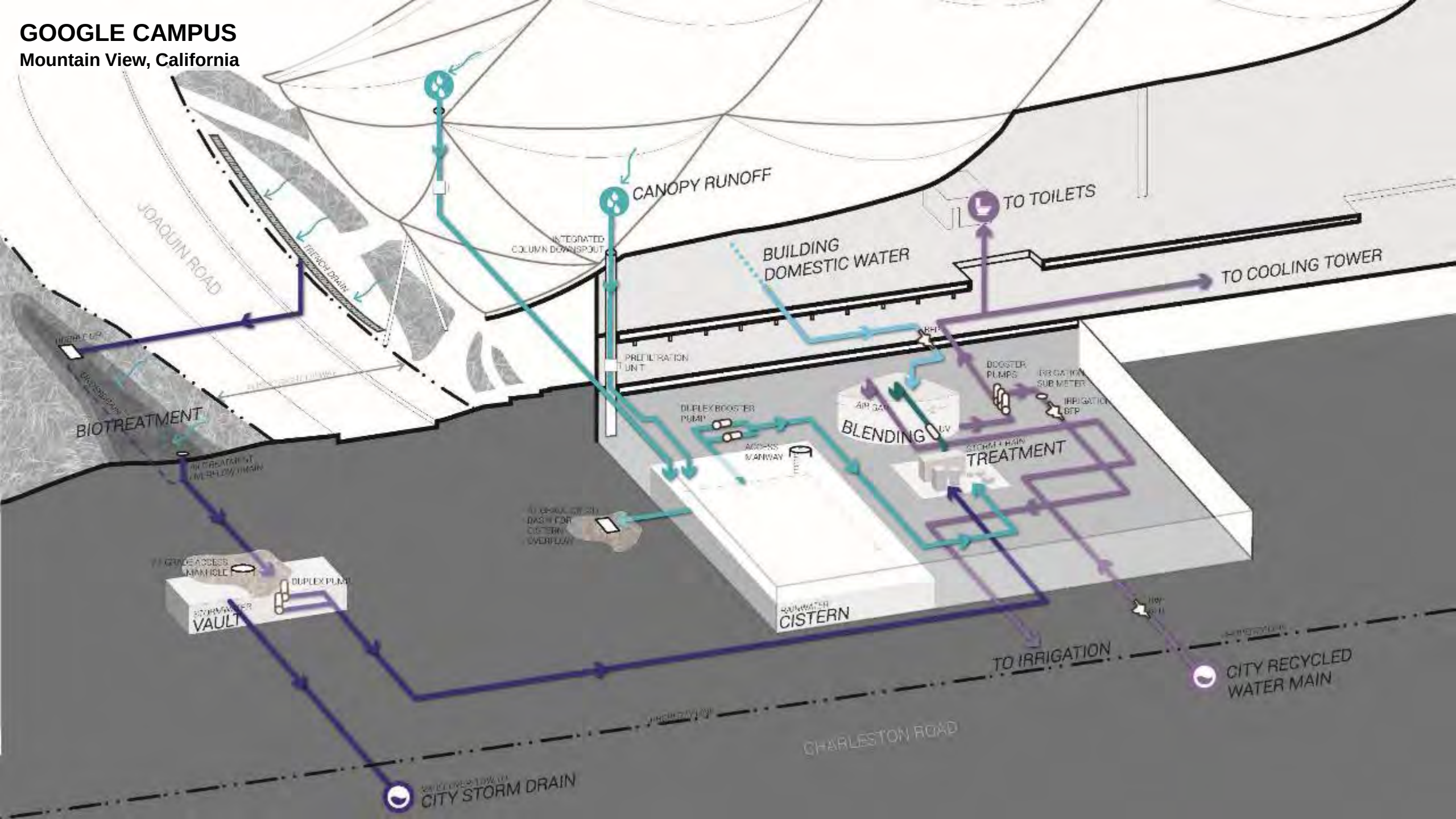
At the Hudson Yards development, stormwater is collected and stored as a part of the landscape deck structure built over the rail yard.




GOOGLE CAMPUS
Mountain View, California
Rain Harvesting +
Municipal Recycled Water
595,000 gross square feet
18.6 acres
Total site area
5.8 acres
Landscape area
9.4 acres
Collection area
720,000
Gallons of storage
Toilet flushing
Irrigation
Cooling

GOOGLE CAMPUS

Mountain View, California



GOOGLE CAMPUS

Mountain View, California

Flexible integration into the built environment

centralized wastewater treatment plants are becoming increasingly space constrained

EMORY WATER HUB

MICROSOFT CAMPUS
Mountain View, California

IMAGE WRNS STUDIO

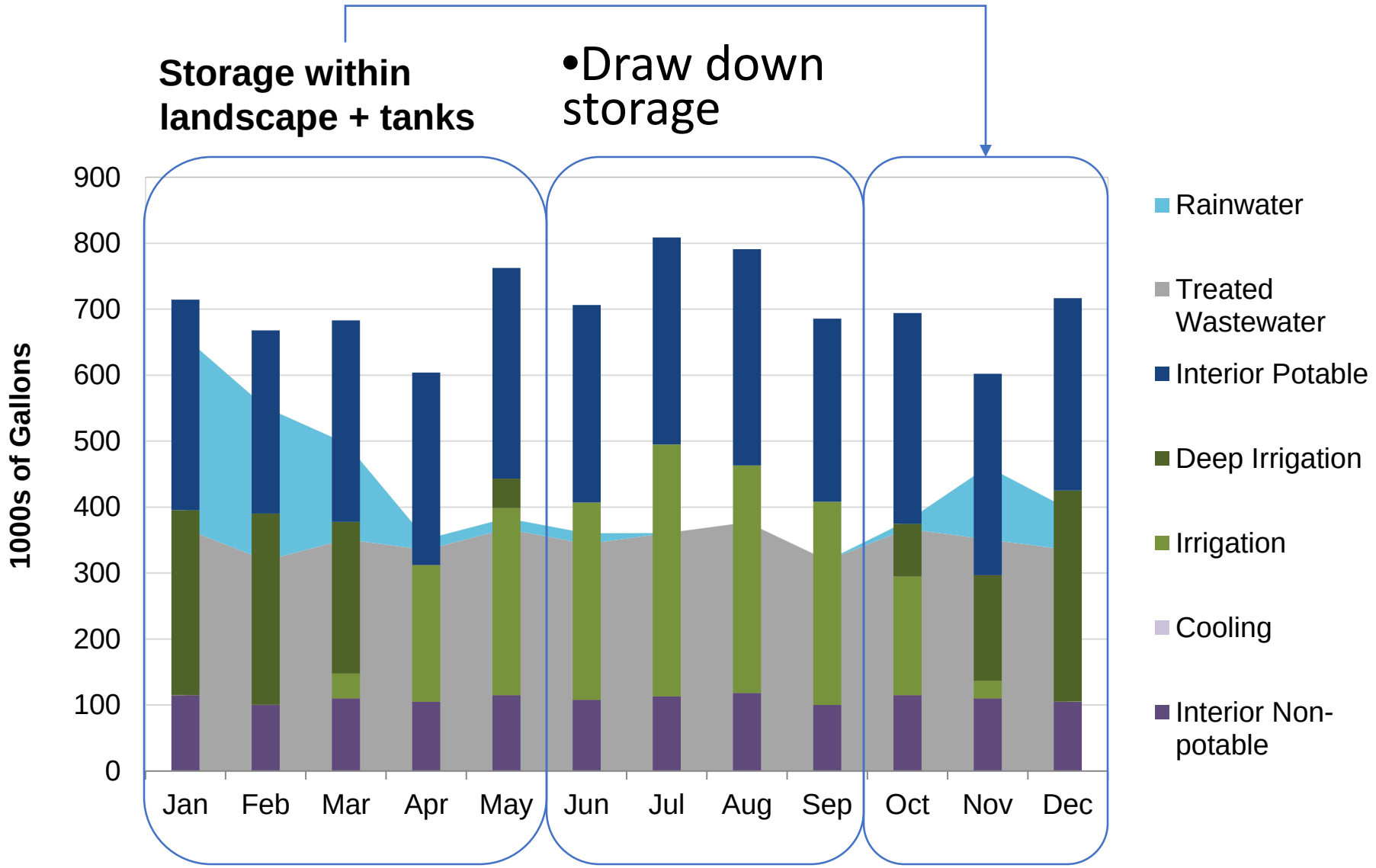
Campus Scale

- 15-acre site (4 acres living roof)
- 643,000 gross square feet
- 2,000 employees
- Wastewater treatment and reuse
- Rainwater treatment and reuse

Net Zero Non-Potable Water

- 55% water use reduction despite added headcount
- 4 MGY potable use savings
- 100% of wastewater reused onsite

Seasonal balancing act



MICROSOFT CAMPUS

Mountain View, California

MICROSOFT CAMPUS

Mountain View, California

IMAGE NSU

CAMP HESS CRAMER
Malibu, California

TREATMENT WETLANDS

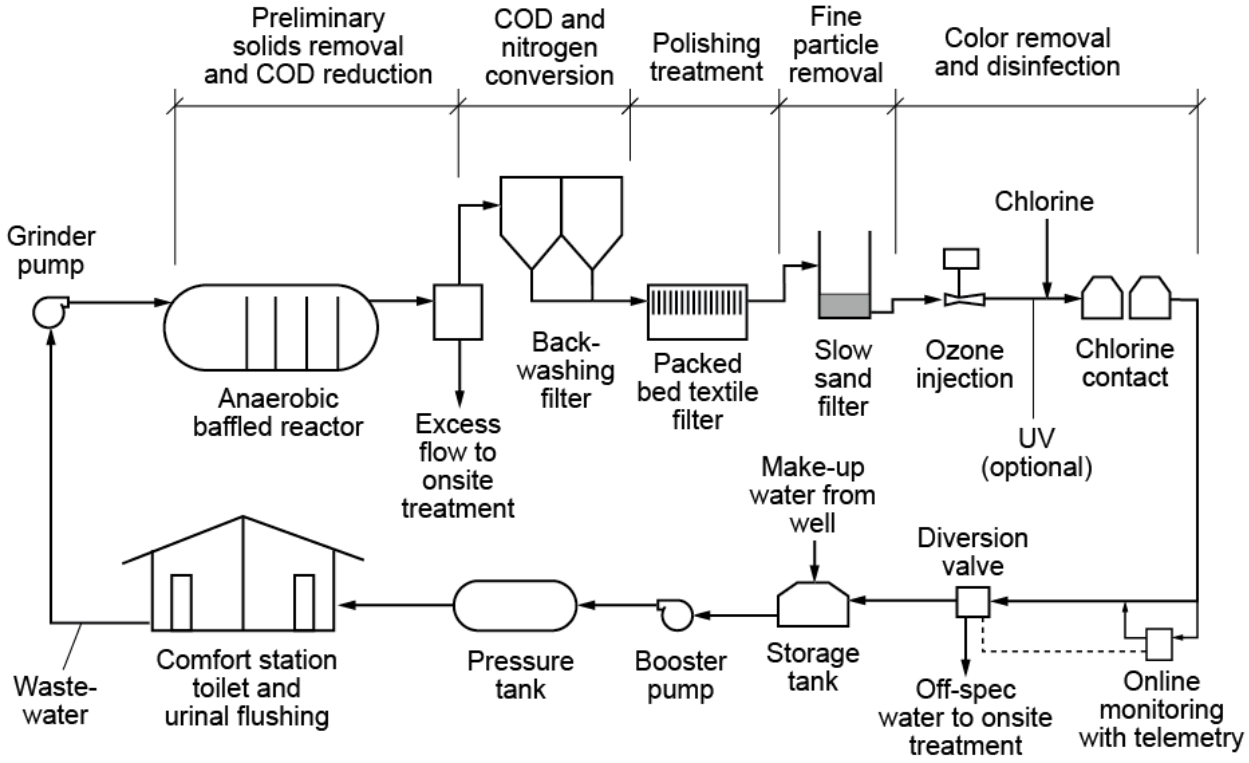
Precedents

Case Study: Caltrans Pilot Study

CLOSED LOOP REUSE FOR TOILET FLUSHING

Remote Location | Building Scale

- **Low maintenance**
  - Reliable remote monitoring
  - Minimal dedicated staff time
- **Water Quality**
  - Very high strength wastewater
  - Comply with CCR Title 22, Disinfected Tertiary
  - Acceptable color and odor
- **Replicable**
  - Project to serve as a model for other rest areas
  - Affordable to ensure budget feasibility



WHAT’S NEXT FOR THE INDUSTRY?

Themes		Actions
1. On-site non-potable water systems can be a transformative opportunity	→	Engage in an engineering assessment early to inform decision-making
2. Consider all driving forces	→	Water supply characterization is paramount
3. Changes to market demands are driving developers away from “business-as-usual” thinking	→	Create a project-appropriate business case framework that considers water risk factors

THANK YOU!

Alternative On-site Water Use Workshop

AUSTIN WATER - June 25, 2019

Amelia Luna, M.S., P.E., LEED AP,
ENV SP
Project Manager (Water/Wastewater)
aluna@sherwoodengineers.com

SHERWOOD
DESIGN ENGINEERS

Lunch

Kevin Critendon

Assistant Director, Water Resource Management

Paula Kehoe

Director of Water Resources

San Francisco Public Utilities Commission

ADVANCING ONSITE WATER REUSE IN SAN FRANCISCO AND ACROSS THE US

Paula Kehoe
Director of Water Resources
San Francisco Public Utilities Commission

Water Delivery 24 hours/7 Days a Week
Not an Easy Task

Source: National Geographic, 2010, 2011; Reuters, 2006.

20th Century Model: Water In, Water Out

Source: San Francisco Public Utilities Commission

21st Century Model: One Water

Source: San Francisco Public Utilities Commission

Diversify Water Supply Portfolio


San Francisco Chronicle

CONSERVATION

Green way to keep greens green

Harding Park golf course is using recycled wastewater — a 1st for S.F.

Source: San Francisco Public Utilities Commission; US EPA WaterSense, 2014

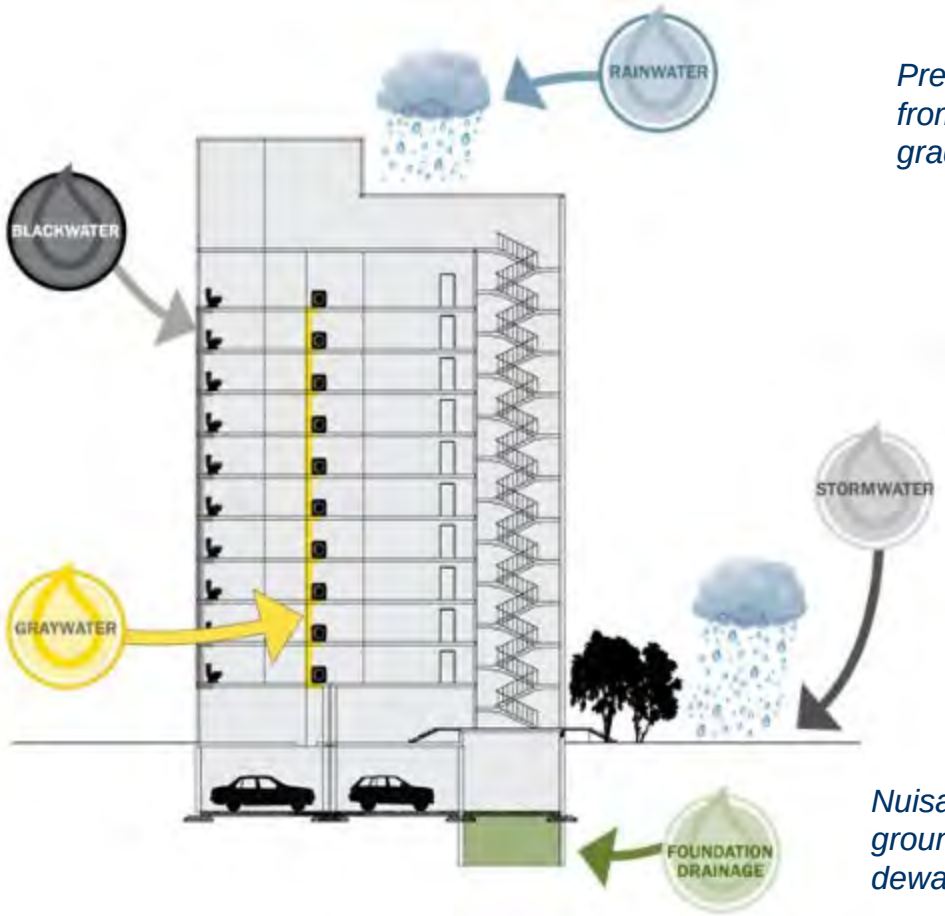
Opportunity to Re-think Building Design & Re-imagine How We Use Water

Source: San Francisco Public Utilities Commission

Buildings are Sources of Water

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

Wastewater from clothes washers, bathtubs, showers, and bathroom sinks



Precipitation collected from roofs and above-grade surfaces

Precipitation collected at or below grade

Nuisance groundwater from dewatering operations

Source: San Francisco Public Utilities Commission

Onsite Water Systems Throughout The World

Source: San Francisco Public Utilities Commission

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

Source: Natural Systems Utilities

Hassalo on Eighth – Portland, OR
45,000 GPD

Source: Laura Swimmer; Jim G. Maloney/Biohabitats, Inc

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

Source: Sustainable Water

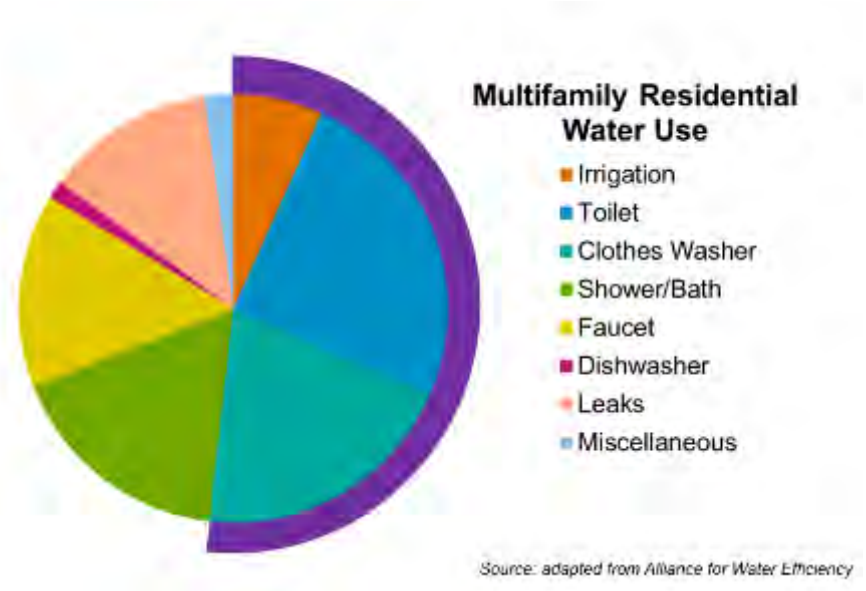
1 Bligh Street- Sydney, Australia
6M GPY Potable Water Offset

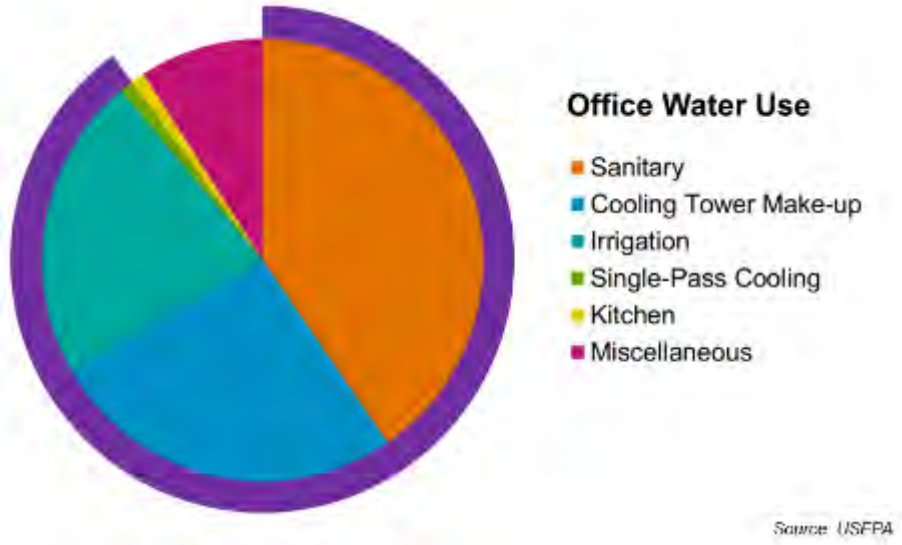
Source: Aquacell

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

Source: Dockside Green

Non-potable Water Demand in Multi-family and Commercial Buildings





Source: San Francisco Public Utilities Commission

Interest from Private Sector

Source: U.S. GREEN BUILDING COUNCIL

Technology Available in the Marketplace

Sources: Sustainable Water, Aquacell, Living Machine, and BioHabitats

Pioneer New Ways to Treat and Reuse Water in San Francisco

Source: San Francisco Public Utilities Commission

Barriers to Scaling Up Decentralized Water Systems: Water Quality and Oversight and Management

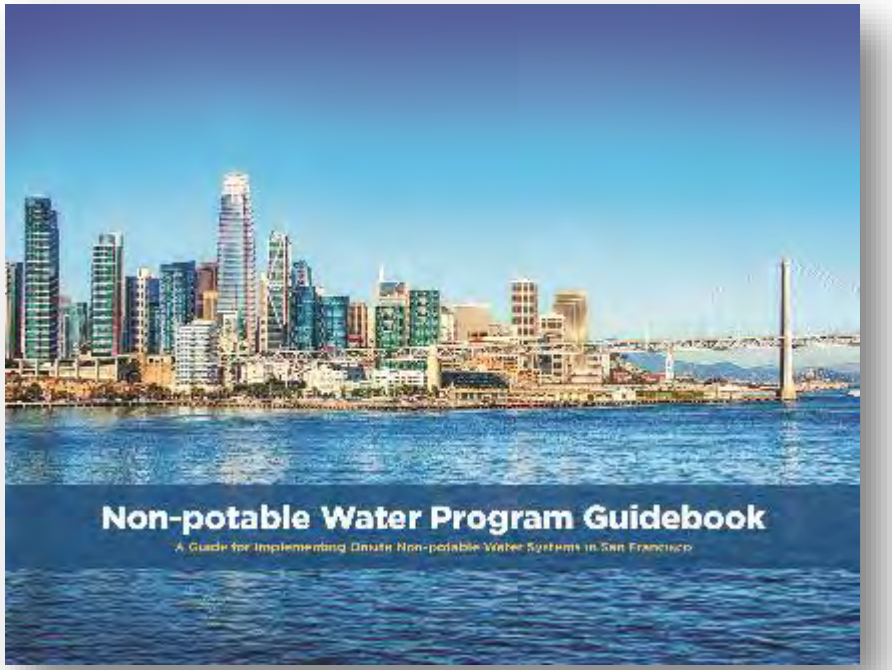
Source: Forbes.com

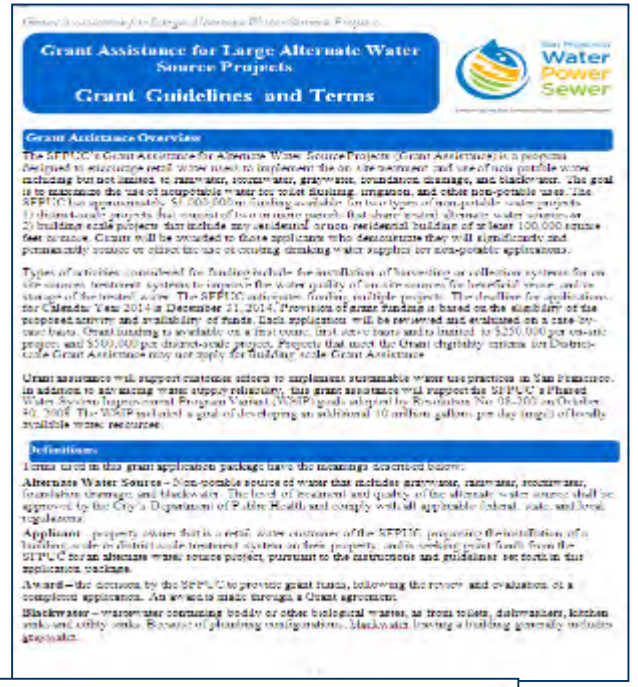
Local SF Ordinance Streamlines Permitting

SFPUC	SFDPH	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)

Source: San Francisco Public Utilities Commission

Technical and Financial Assistance

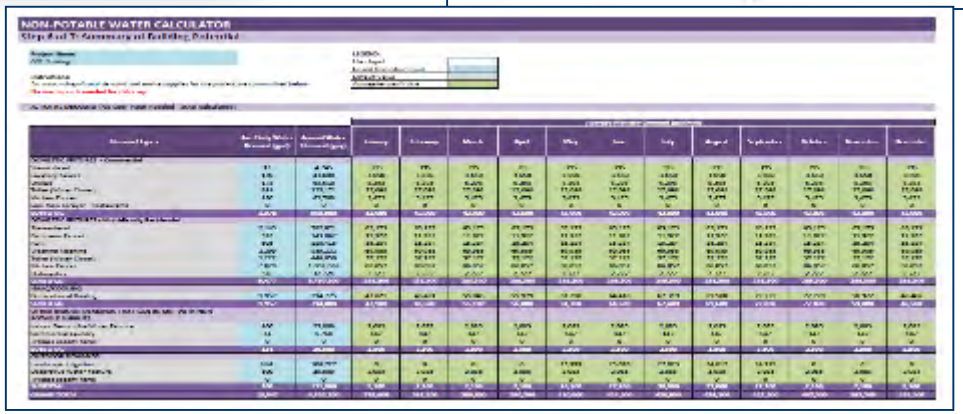



Grant Assistance for Large Alternate Water Source Projects

Grant Guidelines and Terms

Grant Assistance Overview

Definitions


NON-POTABLE WATER CALCULATOR

Source: San Francisco Public Utilities Commission

Evolving Non-potable Water Program

Source: San Francisco Public Utilities Commission

181 Fremont, San Francisco

Graywater and Rainwater for Flushing and Irrigation
1.3M GPY Potable Offset

Source: Aquacell and Jay Paul Company and Heller Manus Architects

Salesforce Tower, San Francisco

Blackwater for Flushing, Cooling, and Irrigation
7.8M GPY Potable Offset

Source: Aquacell

Moscone Convention Center, San Francisco

Foundation Drainage for Flushing, Irrigation, and Street Sweeping
15M GPY Potable Offset

Source: Skidmore, Ownings & Merrill LLP with Mark Cavagnero Associates

Chase Center, San Francisco

Rainwater, Stormwater, Graywater, and Condensate for Flushing
3.7M GPY Potable Offset

Source: Golden State Warriors

Industrial Reuse

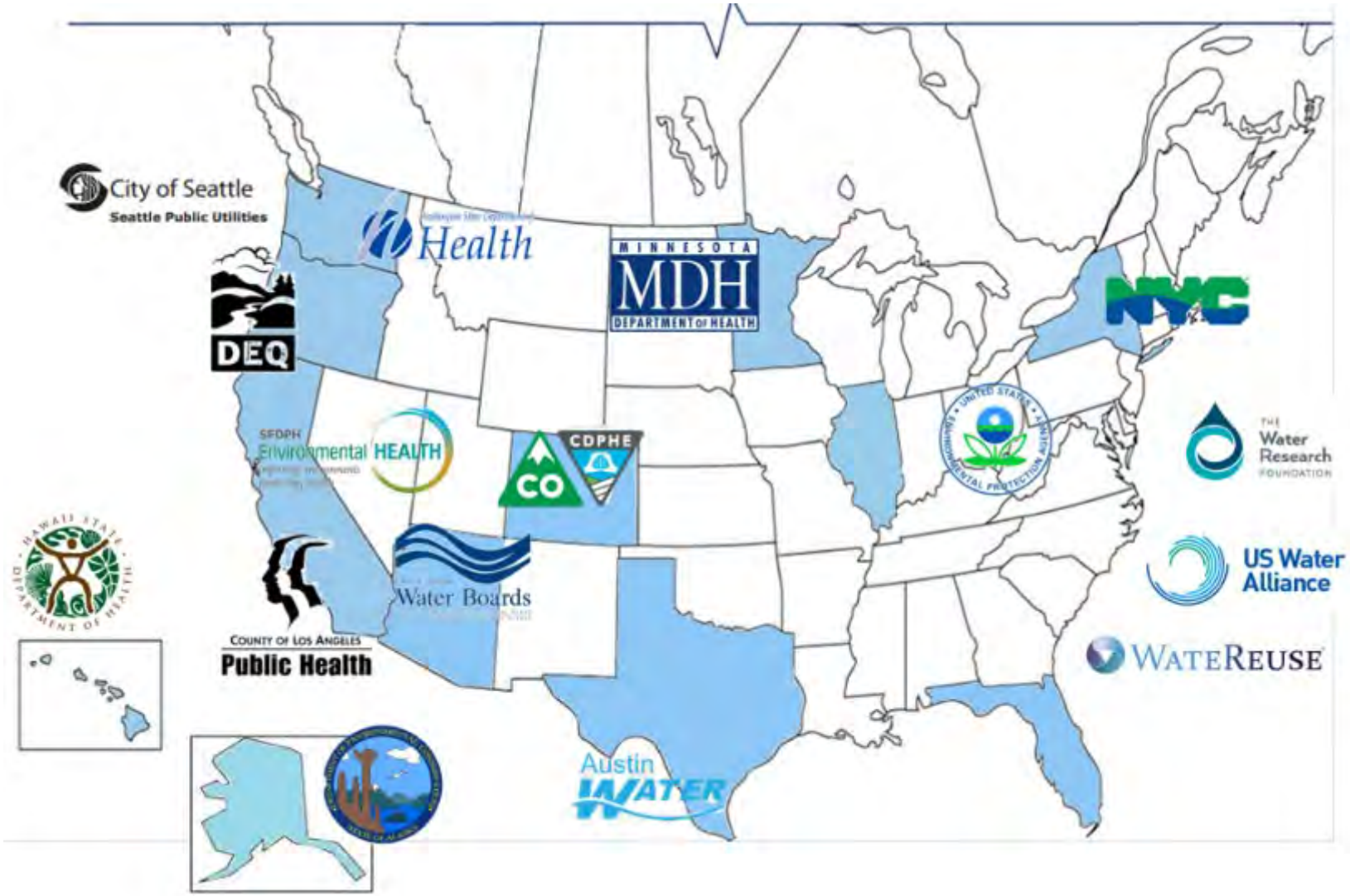
NRG Steam Loop
15M GPY Potable Offset

Source: NRG; San Francisco Public Utilities Commission

Lessons Learned

Source: Thesafetydept.com

Collaborating on a National Level



Addressing Barriers: *Governance*

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.

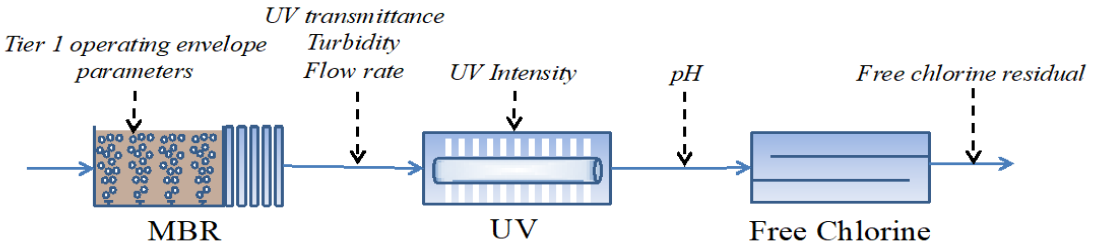
Source: San Francisco Public Utilities Commission

Addressing Barriers:
Varying Standards Across the US

Graywater Use to Flush Toilets						
	BOD_5 ($mg\ L^{-1}$)	TSS ($mg\ L^{-1}$)	Turbidity (NTU)	Total Coliform (cfu/ 100ml)	*E. Coli* (cfu/ 100ml)	Disinfection
California	10	10	2	2.2	2.2	0.5 – 2.5 mg/L residual chlorine
New Mexico	30	30	-	-	200	-
Oregon	10	10	-	-	2.2	-
Georgia	-	-	10	500	100	-
Texas	-	-	-	-	20	-
Massachusetts	10	5	2	-	14	-
Wisconsin	200	5	-	-	-	0.1 – 4 $mg\ L^{-1}$ residual chlorine
Colorado	10	10	2	-	2.2	0.5 – 2.5 mg/L residual chlorine
Typical Graywater	80 - 380	54 -280	28-1340	$10^{7.2} – 10^{8.8}$	$10^{5.4} – 10^{7.2}$	N/A

Source: Jay Garland, US EPA

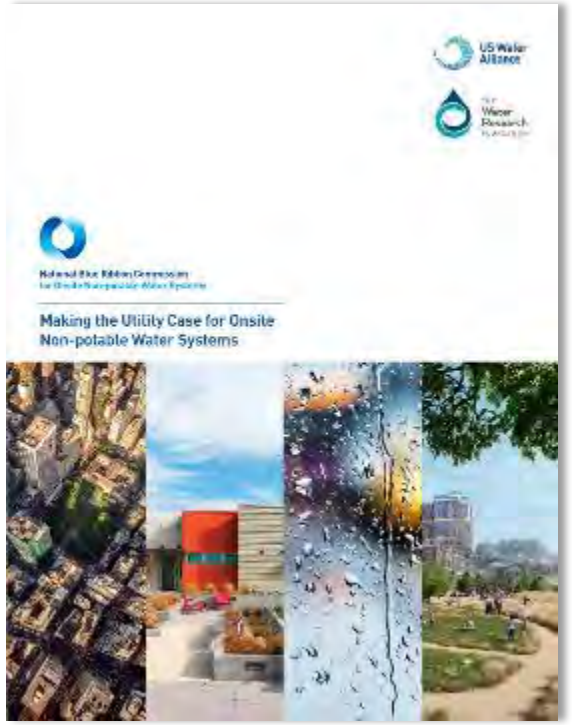
Risk-Based Public Health Guidance



Source: Jay Garland, US EPA; San Francisco Public Utilities Commission

Model Legislation for Consistency across US

Addressing Utility Considerations



Source: San Francisco Public Utilities Commission; Jim G. Maloney/Biohabitats, Inc; City of Santa Monica

Utilities Incorporating Onsite Water Systems

SAN FRANCISCO

Mandatory for new development over 250,000 sq ft

DENVER WATER

Blackwater system at new admin building

AUSTIN WATER

10 mgd from decentralized systems by 2040

SANTA MONICA

Downtown stormwater, groundwater, wastewater reuse by 2020

NEW YORK CITY

Battery Park operating decentralized system since 2003;
Grant program for onsite systems

ANAHEIM

Operating blackwater system for irrigation around City Hall and toilet flushing in Anaheim West Tower

Training Manual for Engineers, Operators, Utilities and Regulators

Source: Water Research Foundation

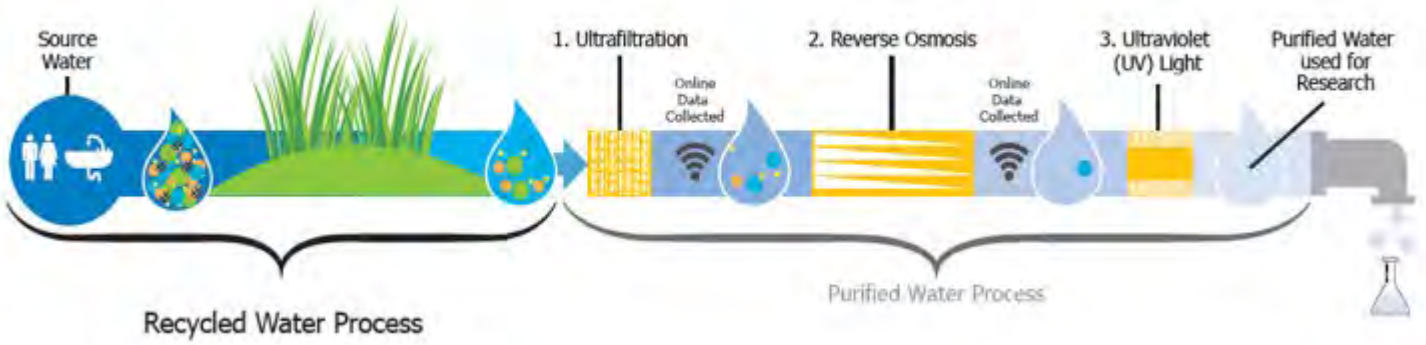
Beginning of Our Journey

Source: San Francisco Public Utilities Commission

SF Expanding to Breweries Treating and Reusing Process Water

Source: Water & Wastes Digest, 2018

SF Piloting Decentralized Purified Water

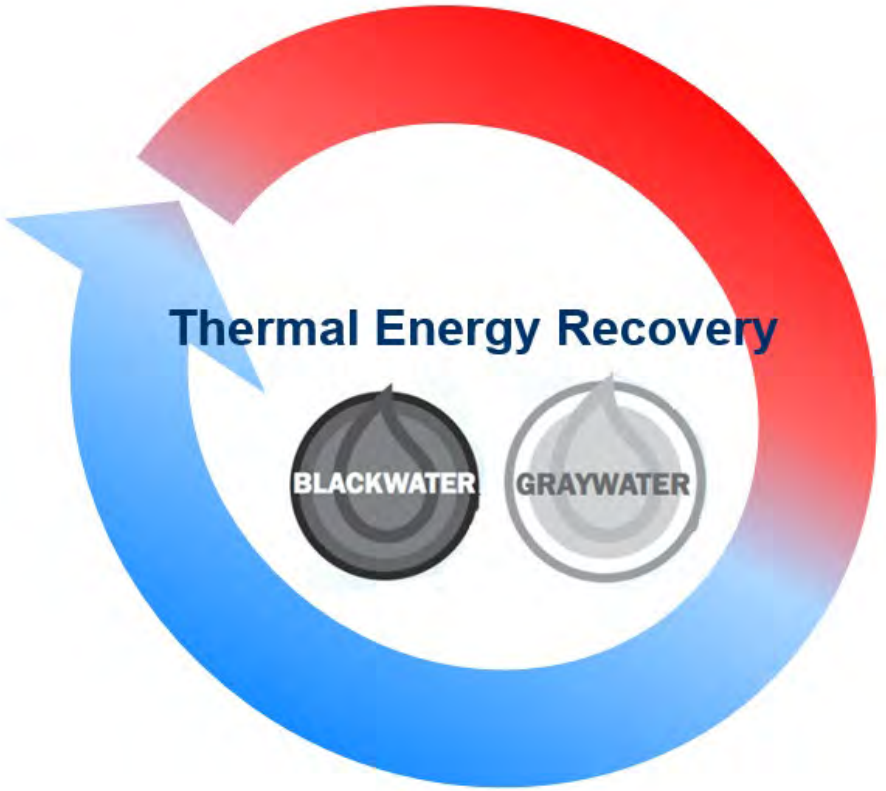


Source: San Francisco Public Utilities Commission

Atmospheric Water Generation Technologies

Source: Zero Mass Water and FogQuest

Heat Exchangers in Onsite Reuse



Opportunities to Adapt and Reimagine Our Water Systems

Source: Golden State Warriors; San Francisco Public Utilities Commission

THANK YOU

Paula Kehoe
pkehoe@sfwater.org

www.sfwater.org/np

Marisa Flores-Gonzalez

Austin Water
Water Forward
Program Manager

Austin WATER | WATER FORWARD
INTEGRATED WATER RESOURCE PLAN

Water Forward Ordinances Workshop

June 25, 2019

Workshop Format

- Brief overview presentation
- Breakout discussions
  - We will cycle through three tables
    - Water Balance Submittal
    - Regulatory Framework and Water Quality Requirements
    - Permitting Process
  - Twenty minutes per table, five minute transitions
  - We are asking for your help in identifying issues to address in the development of these ordinances
- Staff facilitators will report out on discussions and workshop will end with an open house

Water Forward

Austin's Integrated Water Resource Plan

- Austin Water-led interdepartmental effort to develop a 100 year water plan that:
  - Reflects our community's values
  - Ensures a diversified, sustainable, and resilient water future
  - Places strong emphasis on conservation
- Council-appointed Task Force met monthly
- Plan approved by Council in November 2018, with planned updates on a five year cycle

Water Forward Plan Strategies

Demand Management

- Implement Advanced Metering Infrastructure (AMI)
- Enhance distribution system water loss control
- Provide customer water use benchmarking information and implement water budgets
- Transform to regionally appropriate landscapes
- Expand irrigation efficiency incentives

Water Supply

- Store water for drought via Aquifer Storage and Recovery and a new Off Channel Reservoir
- Bring on additional supplies via Brackish Groundwater Desalination
- Expand the Centralized Reclaimed Water System
- Use Indirect Potable Reuse as a deep drought strategy
- Capture local inflows to Lady Bird Lake

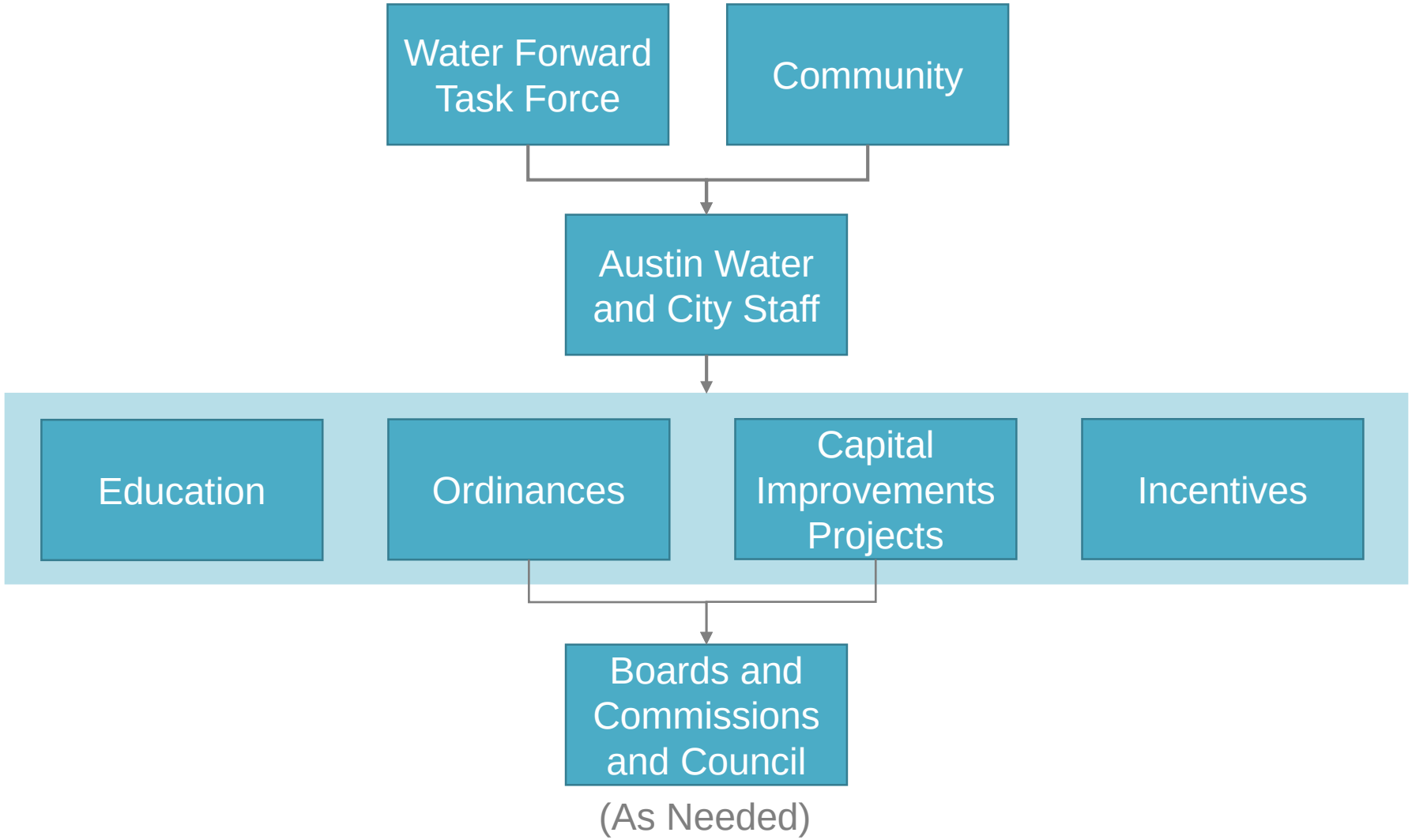
Decentralized

Use on-site and neighborhood scale alternative water sources for non-potable end uses

Rainwater, Stormwater, Wastewater, Graywater, and AC Condensate

Planning and Development Center Pilot

Water Forward Implementation Approach



City Code Refresh

Title 25 - Land Development Code

The set of rules and processes that guides how land is used and developed in the city of Austin. Austin's Land Development Code regulates new development, redevelopment, zoning, subdivisions, transportation and parking, outdoor signs, site plans, drainage, watershed protection, open space, and more.

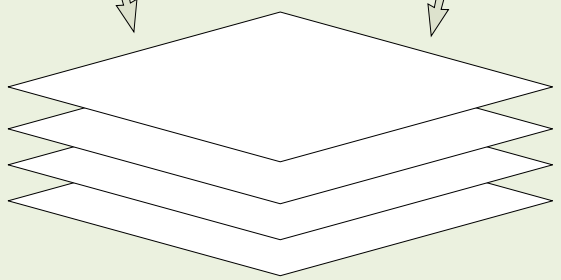
Key Sections Included In Scope of LDC Revision

Other sections not listed include – 25-1 General Requirements, 25-3 Traditional Neighborhood District, 25-4 Subdivision, 25-5 Site Plans, 25-6 Transportation, 25-10 Sign Regulations, 25-11 Building Demolition and Relocation Permits, and 25-13 Airport Hazards

25-8 Environment
Beneficial Use of Stormwater

25-7 Drainage
Flood Mitigation

25-9 Water and Wastewater
- Service Extension Requests
- Creation of Districts
- Capital Recovery Fees



25-2 Zoning
Development regulations for different land uses
Commercial landscape

Outside the Primary Scope of LDC Revision

25-12 Technical Codes

- Building Code
- Electrical Code
- Plumbing Code
- Mechanical Code
- Fire Code
- Solar Energy Code
- Prop. Maint. Code
- Residential Code
- Energy Code

Outside the Primary Scope of LDC Revision

Other Code Titles

- Title 6 – Environmental Control and Conservation
- Title 15 – Utility Regulations

Technical Criteria Manuals

Design Requirements

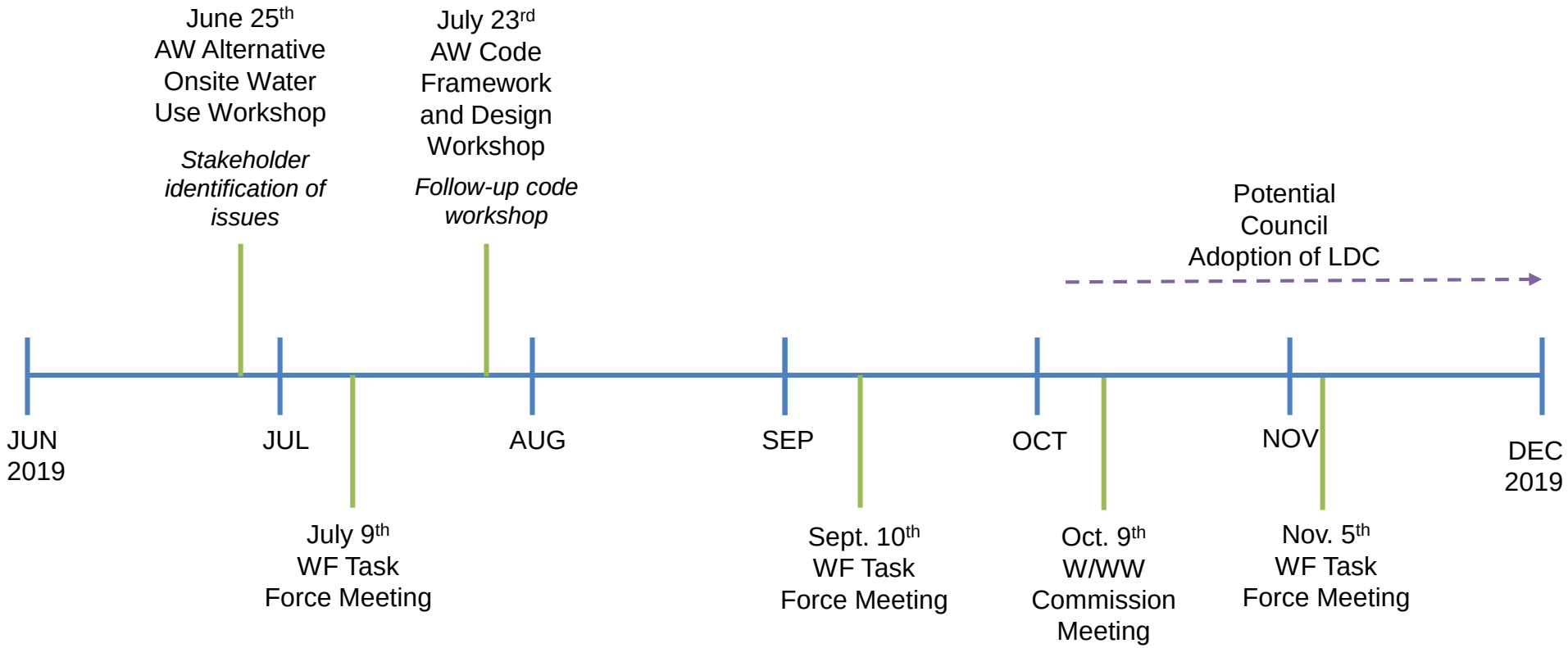
- Building
- Drainage
- Environmental
- Fire Protection
- Transportation
- Utilities

Direction from Council 5/2/19

"To ensure that the Land Development Codes and permitting process are streamlined to the greatest extent possible upon adoption of any revision to the Land Development Code, the regulatory requirements adopted as part of Water Forward, Austin's 100-year integrated water resource plan, that are related to the Land Development Code and are able to be accelerated and implemented this year should be codified and implemented as part of this comprehensive land development code revision process.

The staff should report back at least on the following areas if they were not able to accelerate and implement this year (especially as concerns commercial buildings larger than 250,000 square feet): water benchmarking, dual plumbing, landscape transformation, and alternative water."

Timeline – Subject to Change



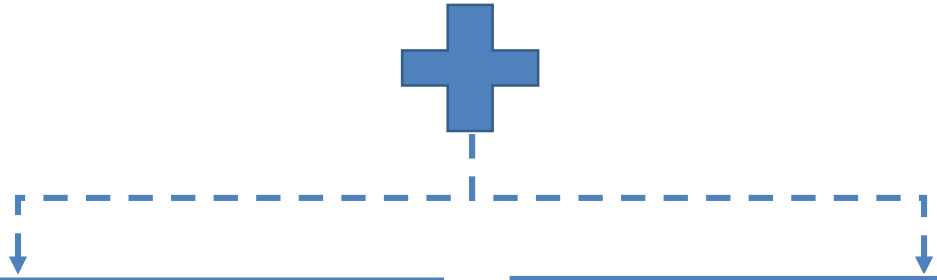
Code Concepts	Code Outline	Code Language	RCA Backup	Presentations to Boards, Commissions, and Council

Continued Analysis, Technical Criteria, and Regulatory Program Development

Proposed Code Concept Breakdown

Code Adopted Fall 2019

New development submitting a site plan must also submit a water balance



Concept 1

New non-single family residential development over 250,000 square feet must meet with staff to **discuss** optimization of alternative and onsite water. Current requirements related to reclaimed water and air conditioning condensate would still apply (effective with Land Development Code changes).

Concept 2

New non-single family residential and non-multifamily residential development over 250,000 square feet **must use** alternative and/or onsite water (excluding blackwater) to meet non-potable demands (toilet, urinal flushing, irrigation, cooling) with a potable back-up required (one year lag in effective date).

Acceptable onsite water sources include rainwater, stormwater, AC condensate, foundation drainage, graywater.

Proposed Code Concept Breakdown

Code Adopted Fall 2019

New development submitting a site plan must also submit a water balance

Concept 1

New non-single family residential development over 250,000 square feet must meet with staff to **discuss** optimization of alternative and onsite water. Current requirements related to reclaimed water and air conditioning condensate would still apply (effective with Land Development Code changes).

Concept 2

New non-single family residential and non-multifamily residential development over 250,000 square feet **must use** alternative and/or onsite water (excluding blackwater) to meet non-potable demands (toilet, urinal flushing, irrigation, cooling) with a potable back-up required (one year lag in effective date).

Code Adopted Later

18-24 months later

New development over 250,000 square feet must use alternative and/or onsite water sources to meet non-potable indoor and outdoor demands with a potable back-up required.

24-36 months later

Revisions to code to expand applicability (ex: potentially including multifamily), required non-potable demands to be met (ex: laundry), and onsite sources of water that can be used to meet non-potable demands (ex: blackwater).

What is needed beyond code language to be able to effectively implement requirements?

- Development of technical criteria
  - Code tells you what to do, criteria tells you how to do it
- Integration the development review process
  - Definition of roles and responsibilities
  - Dedicated staff for review, inspection, and monitoring
- Development of guidance and educational materials for the development community

COA Development Review Process for Multifamily and Commercial Properties

Zoning Review	Land Use Review			Commercial Plan Review
Ex: PUDS	Development Assessment (optional)	Subdivision/Plat	Site Plan	Building Permit
Designates "uses" (e.g. residential, commercial, or industrial), the size of buildings, and how buildings relate to their surroundings, including other buildings, open spaces, and the street.	A voluntary (and free) review step that developers may elect to undergo in order to obtain guidance on subsequent permitting processes.	A map of land that has been subdivided into lots showing the location and boundaries of individual parcels with the streets, alleys, easements, and rights of use over the land of another.	Review of detailed architectural and engineering designs of proposed improvements to a tract of land. Alternative Water Review	Review of detailed architectural and engineering designs of buildings and accessory structures. Alternative Water Review

Save the Date

Austin Water

Code Framework and Design Workshop

Tuesday, July 23rd

Waller Creek Center

625 East 10th Street

Breakout Discussions

- We will cycle through three tables
  - Benchmarking/Water Balance Submittal
  - Regulatory Framework and Water Quality Standards
  - Permitting Process
- Thirty minutes per table, five minute transitions
- We are asking for your help in identifying issues and questions to address in the development of these ordinances

Report Out

Open House


AUSTIN WATER
100
YEARS
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