

Reclaiming Water in Pender County, North Carolina



Presented by Bob Salvatelli
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Sustainable Growth

- Sustainable growth leads to economic prosperity, but this growth must be “resilient, reliable, economical, and environmentally sound.”

National Growth Trends

- College Enrollment : 24% growth (2002-2012)
- Food and Beverage: 17% growth in net profits (2012-2014)
- Automotive: Forecasted 13% growth (2013-2018)
- Microelectronics: **265%** growth (1987-2011)



Intel, Oregon



UMass Amherst



ConAgra Foods, California

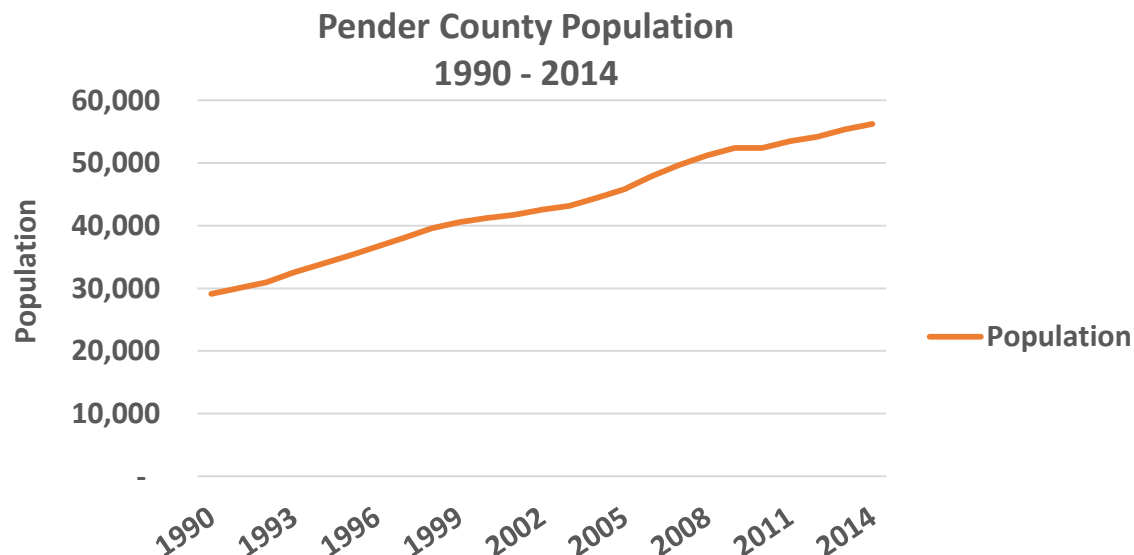


BMW, South Carolina

District Scale Utilities Provide Resiliency and Reliability

Pender County, North Carolina

- Doubled in Population since 1990
- Growing Industrial Sector
- Strategic Priorities:
 - Economic development
 - Public infrastructure expansion
 - Growth management
 - Quality of Life
 - Education



Growing Population and Economic Ambitions

Planning & Community Development



- Recognized for its environmental efforts
 - 2012 Pelican Award: Protecting & preserving the coast
- 2012: New 2 million GPD surface water treatment plant.
- Actively facilitating economic development
 - Partners with the Wilmington Business Development, Inc.
 - Part of Cape Fear Sustainable Communities Consortium
- Supported by \$1.13M grant
 - HUD, Dept. of Transportation and EPA



Standards to Promote Environmentally Conscious Development

Pender Commerce Park

“Our collaboration with Pender County has resulted in a world-class industrial park that is attracting world-class companies.”

- Scott Stanfield, CEO of Wilmington Business Development

- **431 Developable Acre Industrial Park**

Transportation Access

Rail	1 Mile
Port	10 Miles
I-40	3 Miles



Strong Partnership Driving Strategic Economic Objectives



“When you look at all the different subcontractors that are working over there, you are seeing economic development at its finest. There are a lot of people benefiting from the construction of that facility.”

– Scott Satterfield, CEO of Wilmington Business Development

Economic Development

“The combination of the area’s pro-business climate, motivating incentive offerings, and high quality of life made it the most viable option for our organization’s rapid growth.”

- Richard Nordt, RC Creations, Vice President of Manufacturing

- **Acme Smoked Fish Corp.**
 - 100,000 sq. ft. seafood processing plant
 - \$25 million investment
 - 120 new employees



Attracting Heavy Industrial Tenants with High Non-Potable Demands

Economic Development

“Empire is a great fit for Pender Commerce Park, which was developed with just these sort of state-of-the-art manufacturing and distribution operations in mind.”

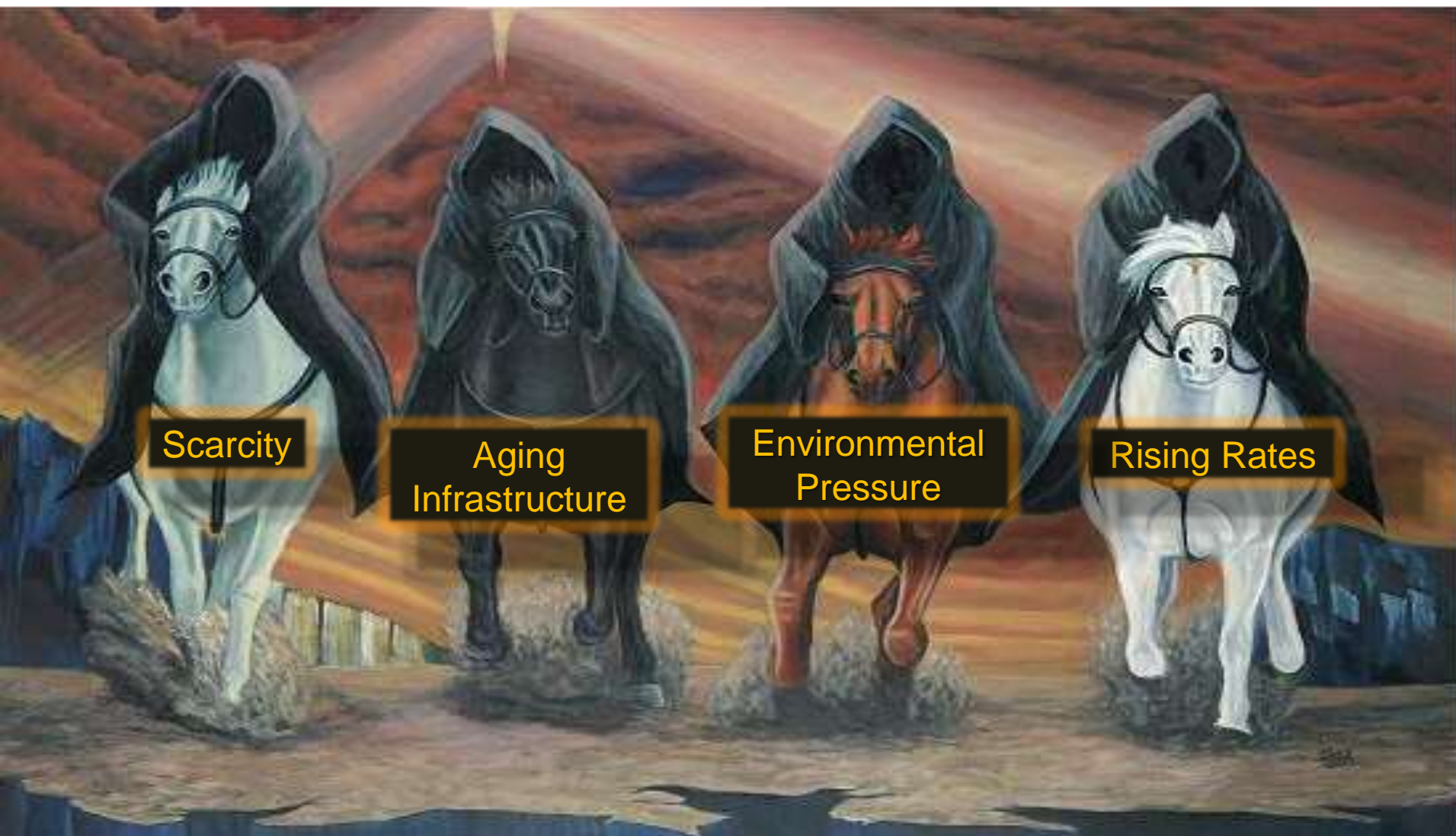
- Scott Satterfield, CEO of Wilmington Business Development

- **Empire Distributors, Inc.**
 - 160,000 sq. ft. warehouse and distribution center
 - \$11 million investment
 - 20+ new jobs



Strategic Transportation Hub Attracting Major Distributor

☺ The Water Apocalypse ☺



Together These Factors Will Completely Change Water Management

Local Water-Related Stresses

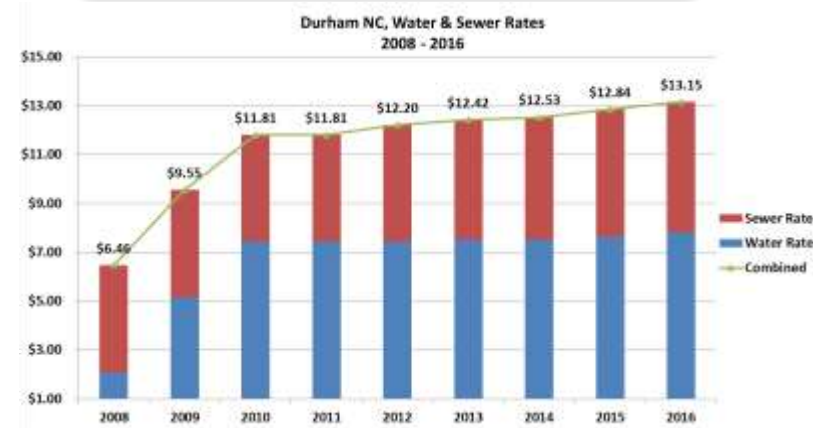
Aging Infrastructure



Scarcity



Rate Pressure



Environmental Constraints



Water Stresses Inhibits Growth and Development



SUSTAINABLE WATER

Critical Infrastructure for Sustainable Growth

“The development of water and wastewater infrastructure is absolutely critical for economic development. Water and wastewater projects will not only facilitate industrial development within the Commerce Park, but will also open up other development opportunities along the US 421 corridor in Pender County.”

- Pender County Economic Development

Facility will feature innovative green technology **County wastewater plant on schedule**

By Andy Pettigrew
Post & Voice Publisher

Pender County's wastewater treatment plant continues to take shape at the Pender Progress Industrial Park. Utilities Director Michael Mack says construction is on schedule for completion of the project, which will feature innovative green technology used to process wastewater.

"The collection system is in

at Commerce Park. The waterlines are in. The phase one, which is the holding tank for R.C. Creations will be in place by Oct. 1," Mack said.

R.C. Creations, the seafood processing facility currently under construction at Pender Commerce Park, will begin production before the wastewater plant comes online. Wastewater from the plant will be pumped into a holding tank and then trucked by tanker

to Wallace to its wastewater plant for processing. This will continue until the wastewater plant at the industrial park is completed. Mack says the county is working through the permits needed to move the wastewater to Wallace, where the county already has wastewater capacity.

"We did get formal notification of our fourth and final

Continued on page 9A

Wastewater *Continued from page 1A*

grant on the project recently. That was from the U.S. Department of Commerce, Economic Development Administration. It was \$2.275 million. We have received \$3.925 million in

grant awards for the wastewater treatment plant. Not a bad day's work," Mack said. "The anticipated total cost of the project is about \$13 million."

Mack says the green technology provider is on board with the new plant.

"When we finish this plant it will be the first of its kind in the United States. This is

cutting-edge technology. We think it will be an asset and attraction to the Commerce Park. When the technology begins to get national press coverage, people are going to want to know about it and be involved," Mack said. "In the long run, it's a good strategic plan to have something unique that no one else has."

ASCE 2013 Report Card for
NORTH CAROLINA SECTION
North Carolina's Infrastructure

Wastewater
C

ASCE 2013 Report Card for
NORTH CAROLINA SECTION
North Carolina's Infrastructure

Drinking Water
C+

Overview

North Carolina has over 530 public water systems which serve approximately 7.3 million North Carolinians or about 75 percent of the state's population. The majority of these systems are owned and operated by incorporated municipalities. The 2007 Environmental Protection Agency (EPA) Drinking Water



Infrastructure Needs Survey and Assessment documented a 20-year infrastructure need of \$10.06 billion for North Carolina. This need represents a decrease of \$920 million from the \$10.98 billion need identified in the 2003 EPA Survey. These funds are needed to replace aging facilities, comply with mandated Safe Drinking Water Act (SDWA) regulations and boost economic development. Although the outbreaks of waterborne caused sickness is at or near zero, the number of drinking water systems with regulatory violations is on the rise due to factors such as water supply challenges water quality degradation as well as tightened regulations. If funding needs are not met, the state risks losing the improved public health and economic gains that have been made over the past years. As a result,

Water and Waster Infrastructure Driving Economic Development and Growth

Commerce Park - A Competitive Advantage

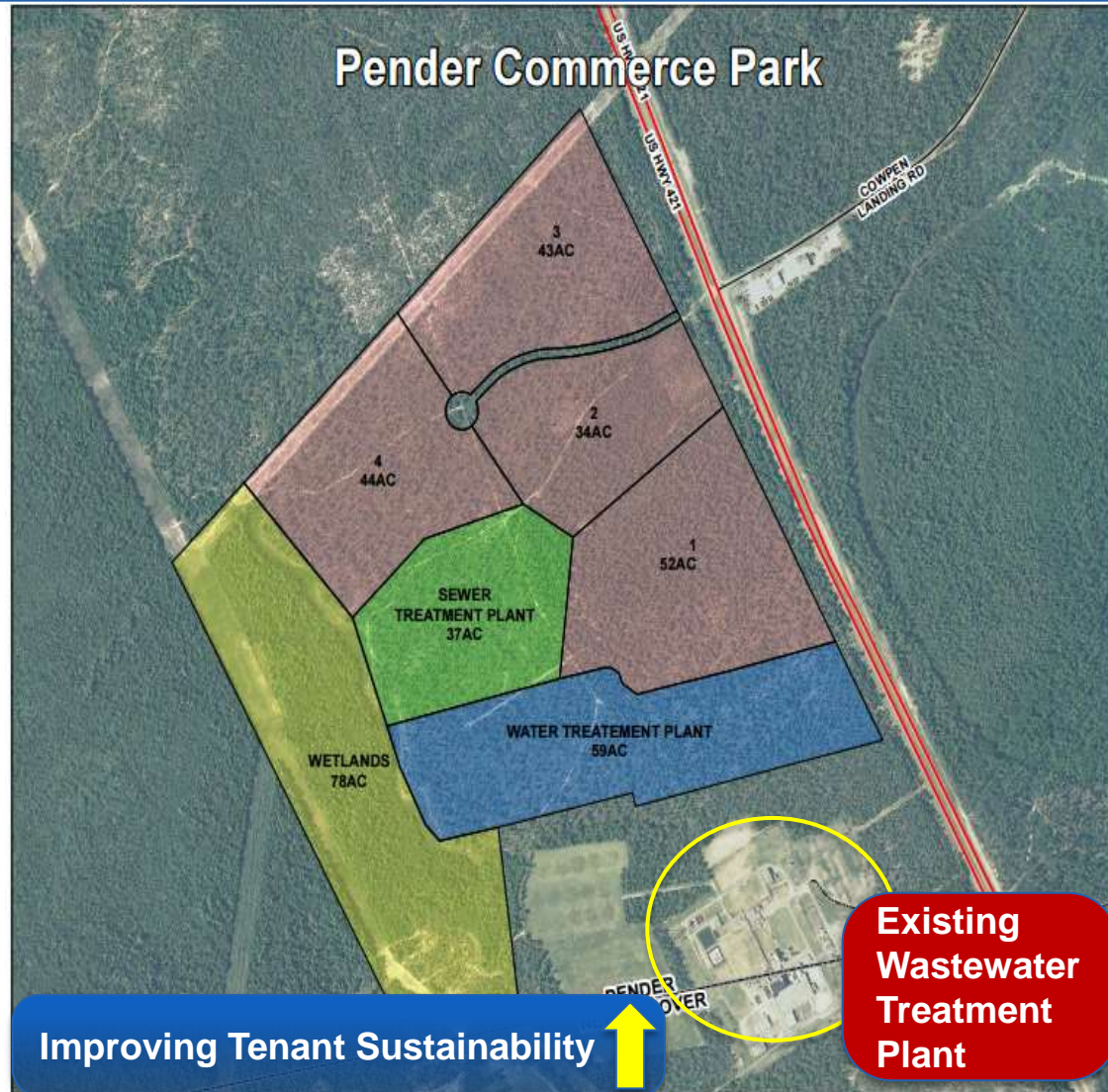
Increasing Tenant
Resiliency/Reliability



Lowering Utility Costs



Improving Tenant Sustainability



Insufficient Wastewater Capacity for Commerce Park Demanded Action

Decentralized Wastewater Infrastructure

“Decentralized wastewater systems help communities reach the triple bottom line of sustainability: good for the environment, good for the economy, and good for the people.”

- United States Environmental Protection Agency, *Decentralized Wastewater Treatment: A Sensible Solution*.



U.S. DEPARTMENT OF
ENERGY

“The Department of Energy will develop models and next-generation grid operating systems, broaden integration of distributed resources and pursue techniques for decentralized and coordinated control of energy resources.”

- United States Department of Energy, *Strategic Plan 2014 - 2018*

A Paradigm Shift in Management of Critical Infrastructure

A Sustainable Water Cycle...

Decentralized Reclamation and Reuse

Before



After



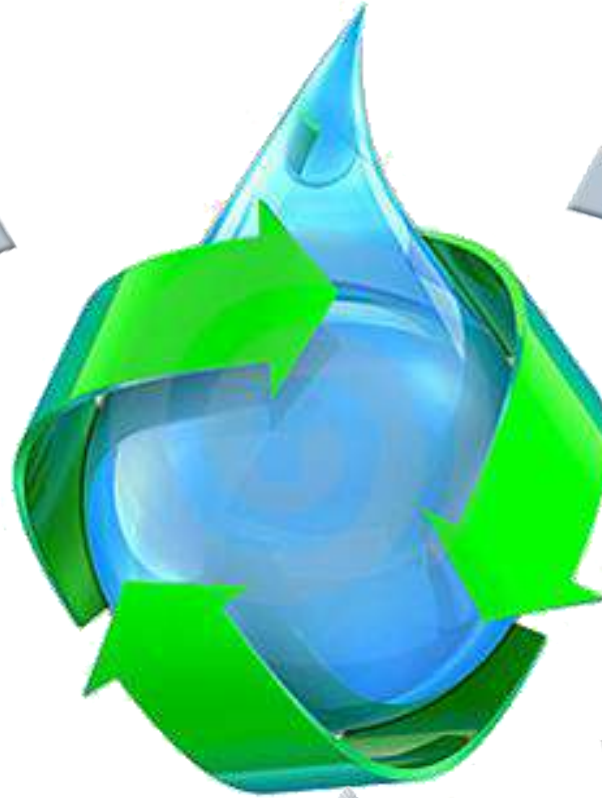
~Risk Management ~Cost Savings ~Environmental Responsibility

Water Reclamation & Reuse

**Reduces
freshwater
withdrawal**

**Can restore
Rivers / Lakes /
Groundwater
Levels**

**Zero Discharge: reduced
contribution to CSOs and
wastewater discharge to
environment**



**Enhances recreational
areas**

**Expands Muni.
Infrastructure Capacity**

**Reliable & local
water supply**

**Lower Life
Cycle Costs**

**Net energy reductions
& lower carbon
footprints**

Multiple Benefits Allow Competitive Advantage for Commerce Park

Provides Pender County Tenants with:

- Redundant Water Supply
 - Drought
 - Municipal infrastructure failures
- Additional On-Site Storage
- Flexibility & Resilience
- Independence/Water Security
- Availability in the event of failure
- Minimum recovery time
- Insulation from rising water costs



Guarantees Consistent Water Supply, Quality, and Low Rates for Park Tenants

Local Support for Water Reuse

“Substitution of reclaimed, non-potable water for uses which do not require potable water can reduce demand on current potable water supplies, extending the life of the current source and treatment capacity.”

- North Carolina Division of Water Resources, *Strategic Management Implications of Water Reclamation and Reuse on Water Resources*.



“The heart of the system is hydroponic reactors designed with a “Greenhouse” enclosure that supports a diverse and vibrant community of plants. This “Green” technology takes advantage of a natural process and provides a cost effective and energy efficient treatment solution.”

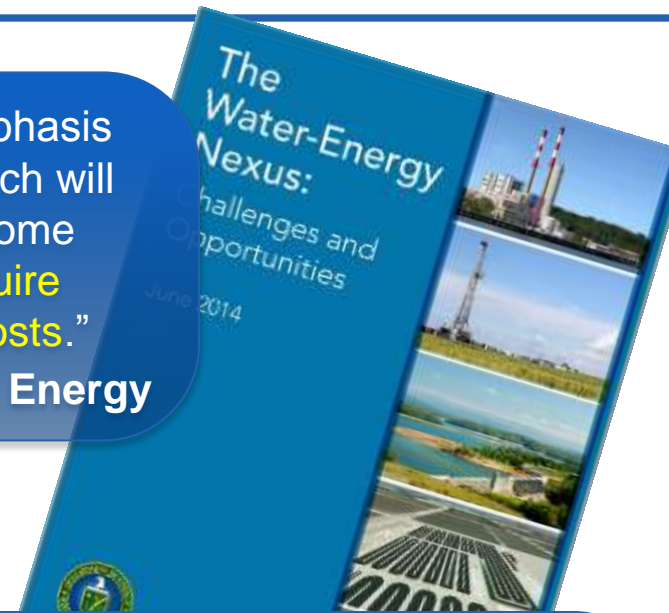
- Pender County Utilities, *Adaptive Ecosystem Reclamation Facility*

Municipalities and Utilities Embracing the Impact of Reclaimed Water

Federal Support for Water Reuse

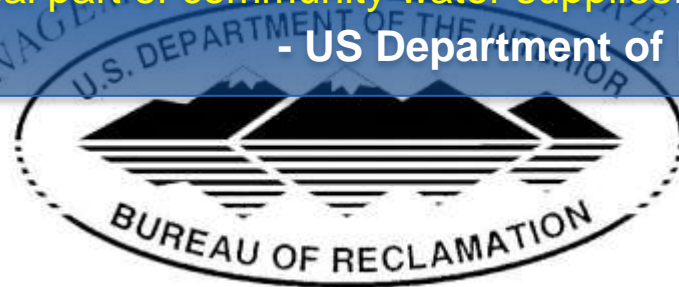
“U.S. water and wastewater utilities are putting more of an emphasis on water reuse and improving energy and water efficiency, which will benefit both water and energy conservation. In recent years, some states have started to promote decentralized systems that require much less energy for delivery and much lower infrastructure costs.”

- US Department of Energy



“Water reuse is the reclamation of water from wastewater plants for beneficial non-potable and potable uses. As freshwater supplies are approaching or have reached full allocation, water reuse is becoming a critical part of community water supplies.”

- US Department of Interior, Bureau of Reclamation



Decentralized Water Treatment and Reuse is Becoming Nationally Accepted

A Shift to Decentralization

Why the shift to Decentralized Infrastructure?

- Cost-effective & economical
- Promote growth & job opportunities
- Efficient use of energy
- Allow growth while preserving green space



Maximum Treatment Capacity with a Minimum Required Footprint

Ecological Water Treatment Technologies

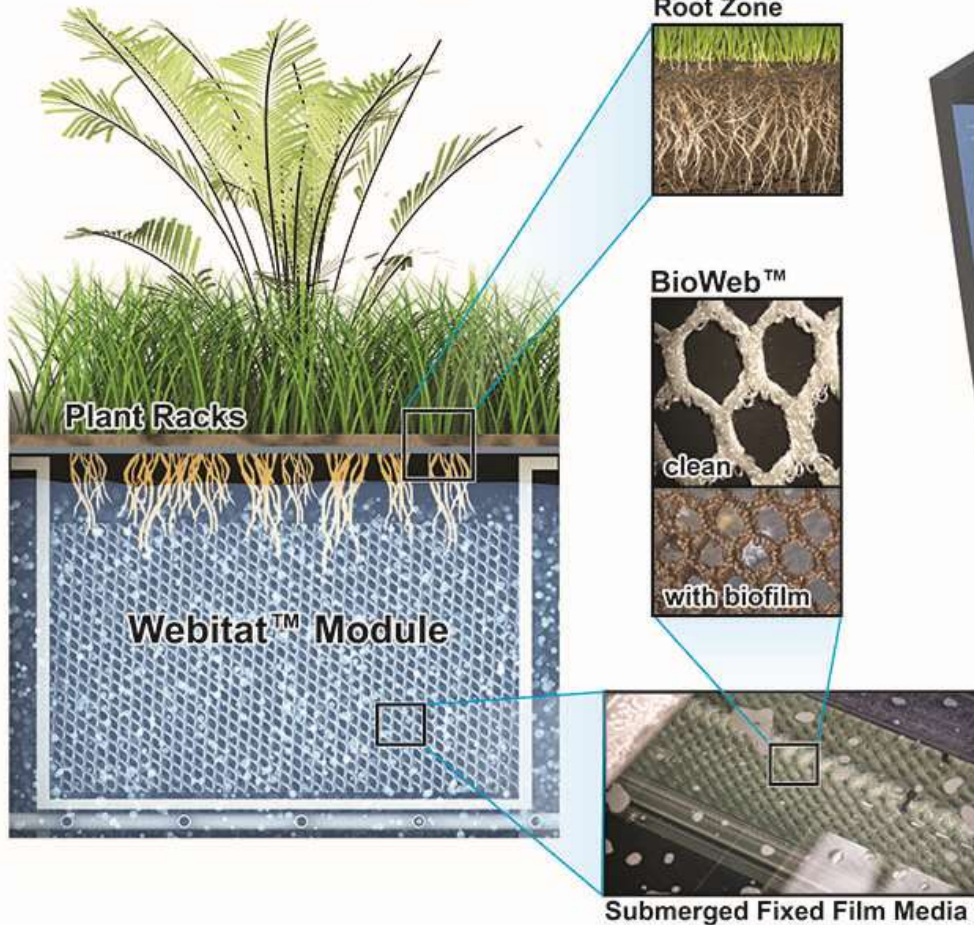


	ReCip® Tidal Wetlands	Hydroponic and Fixed Media	Moving Bed Bioreactor (MBBR)	Membrane Bioreactor (MBR)	Conventional Activated Sludge
Capital Expense	●	●	●	●	●
Operating Expense	●	●	●	●	●
Energy Efficiency	●	●	●	●	●
Effluent Quality	●	●	●	●	●
Footprint	●	●	●	●	●
Aesthetics	●	●	●	●	●

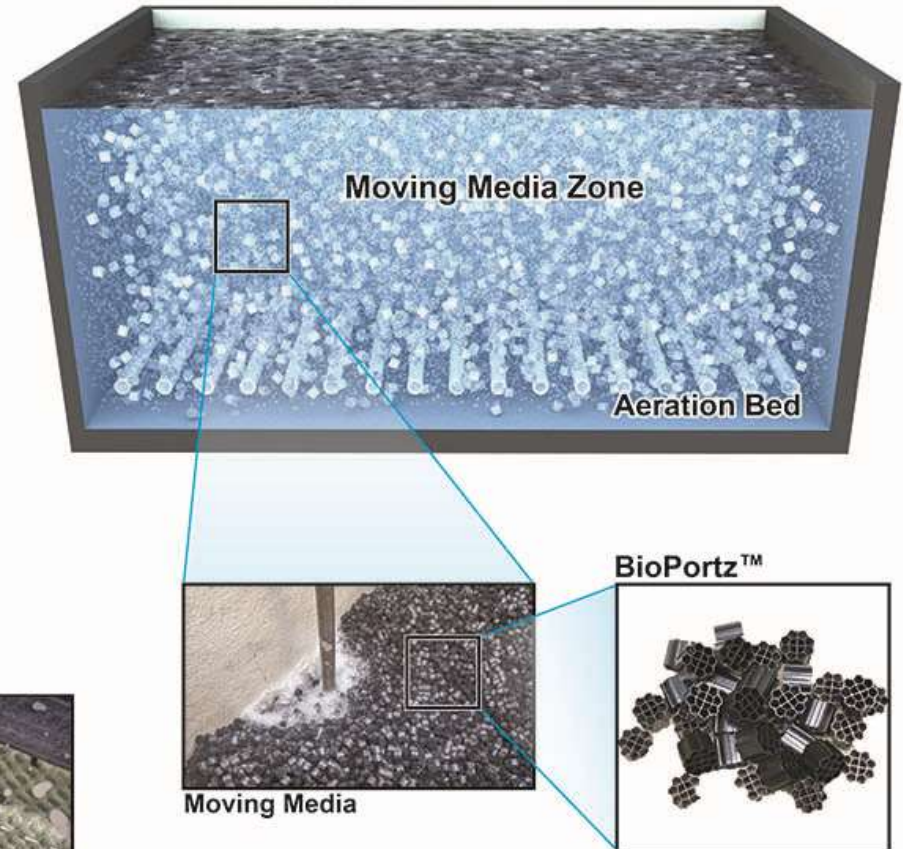
Innovative Technology Increases Biodiversity & Reduces Energy Requirements

Moving & Fixed Media Solutions

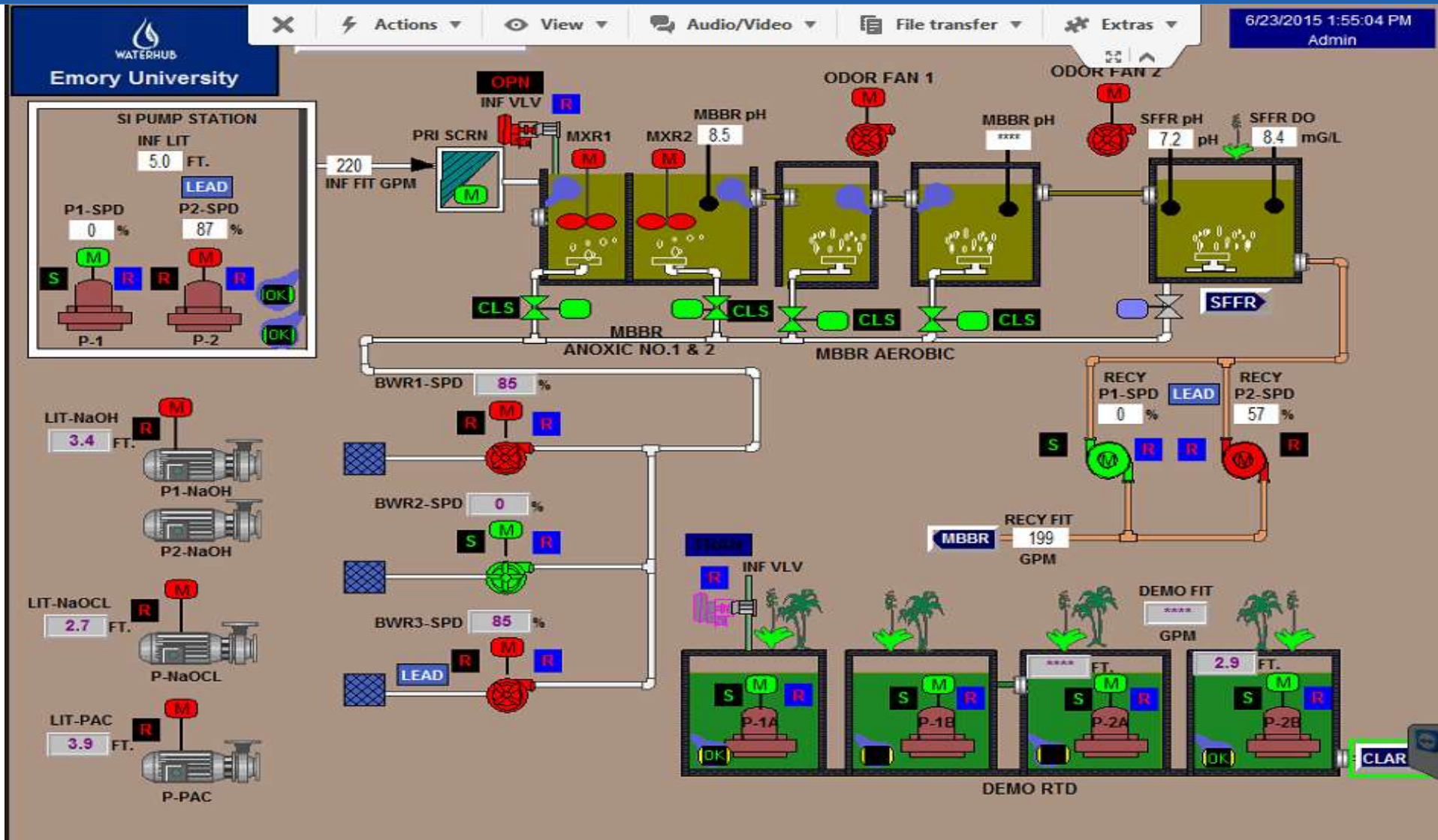
Hydroponic Reactor



Moving Bed Bio-Reactor

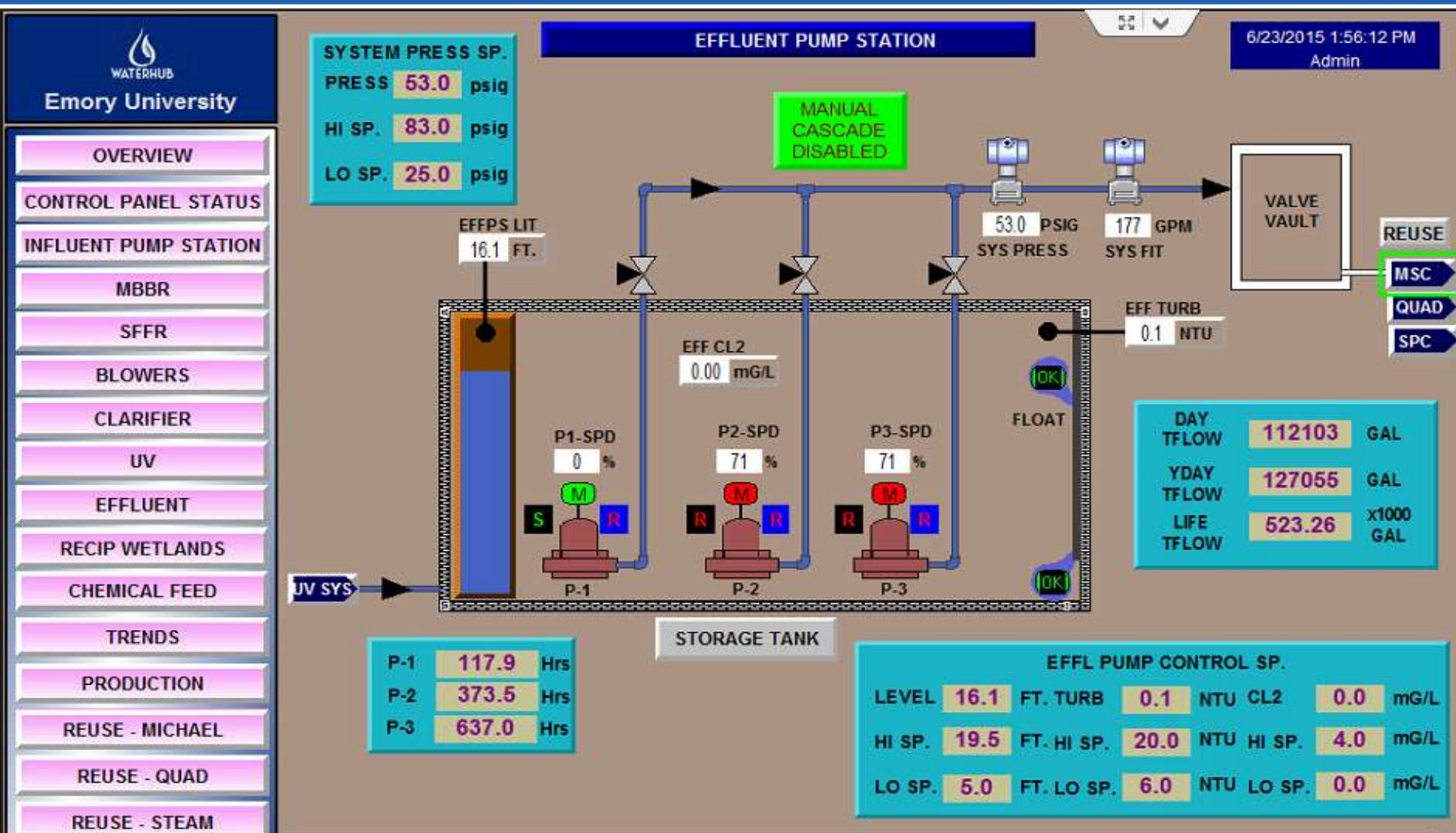


State of the Art Controls



Real Time Remote Access Allows for Proper Oversight

State of the Art Controls



Real Time Remote Access Allows for Proper Oversight

Pender County Commerce Park

System Overview:

- 0.5 -1 MGD Hydroponic/MBRR System
- Part of County Economic Development Initiative
 - Providing reclaimed water for multi-tenant industrial park to attract industry to area
- Future expansion potential to serve as Highway 421 WWTP
- **Phase 1:** 0.5 MGD
- **Phase 2:** 1.0 MGD
- **Phase 3:** up to 11 MGD as wastewater collection service area expands (no timetable for expansion)

Pender Commerce Park





The WaterHub at Emory Atlanta, Georgia



Center for Disease
Control and Prevention

The WaterHub at Emory University

400K GPD and up to 140M GPY Displaced
35% of Total Campus Demand
90% of Utility Water Demand
3 Chiller Plants/1 Power Plant



Permitted for Use in Utility Operations, Irrigation, and Toilet Flushing

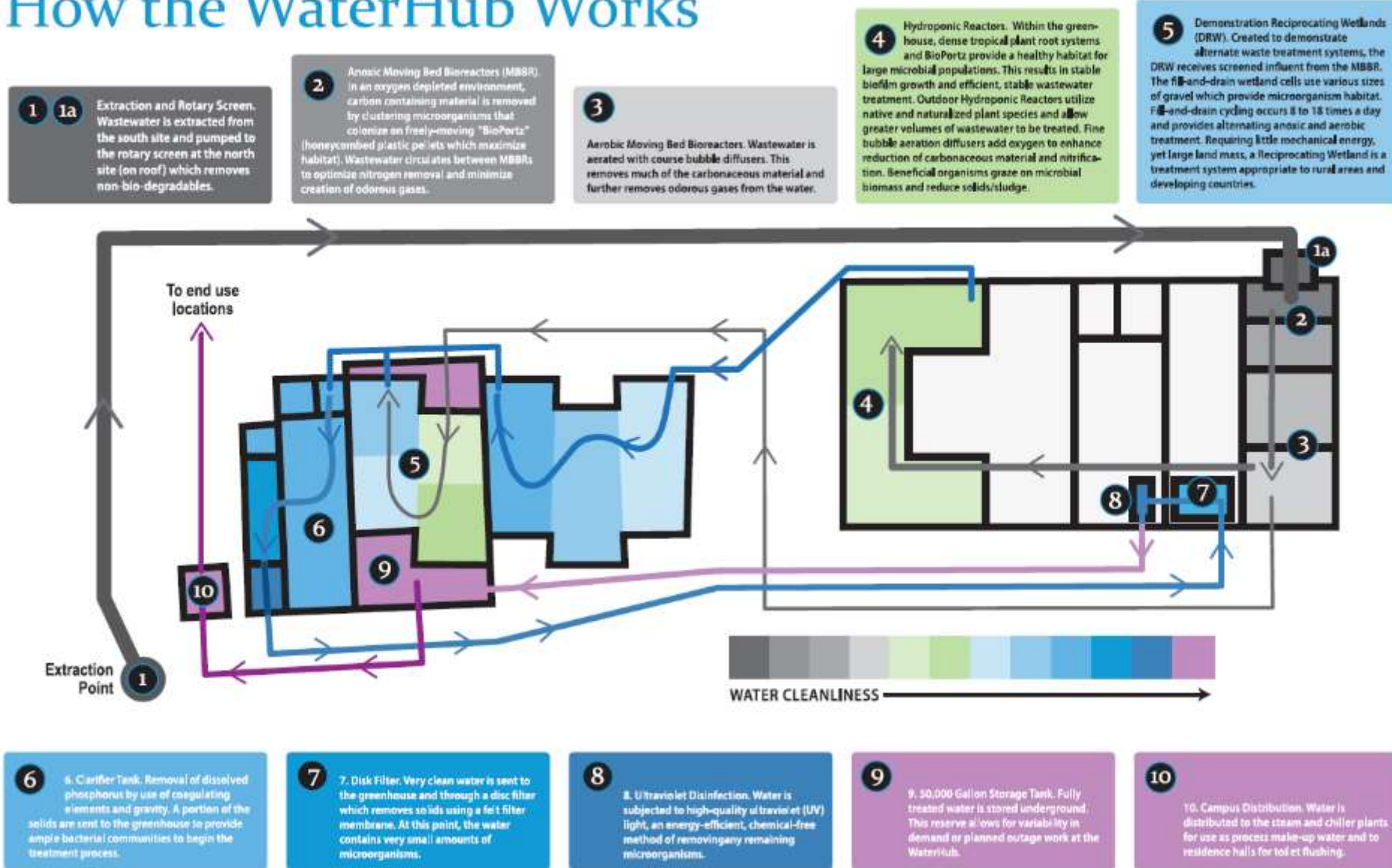
The WaterHub at Emory



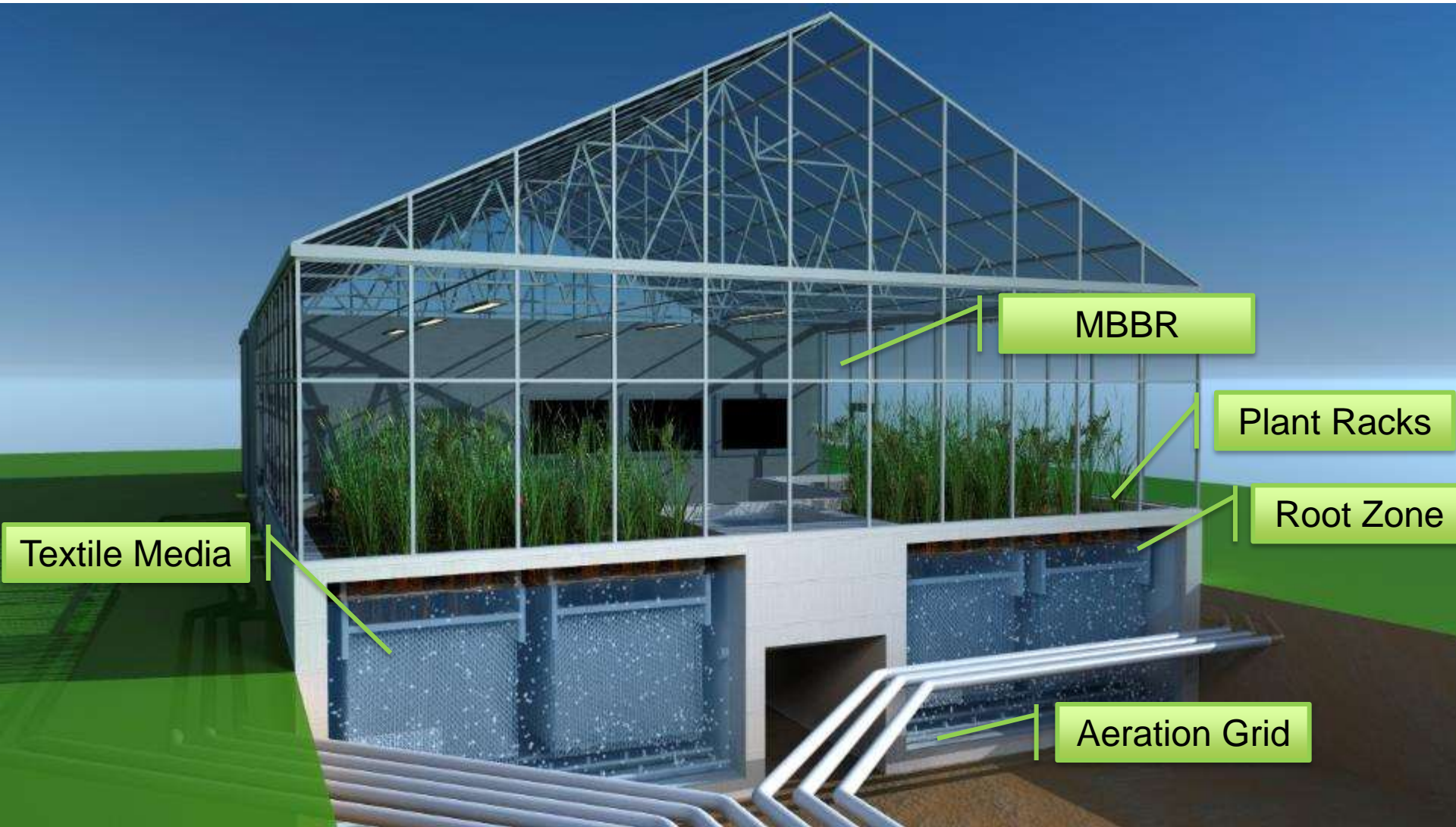
Multi-Functional Facility to Showcase Sustainability Initiatives

WaterHub Process Design

How the WaterHub Works

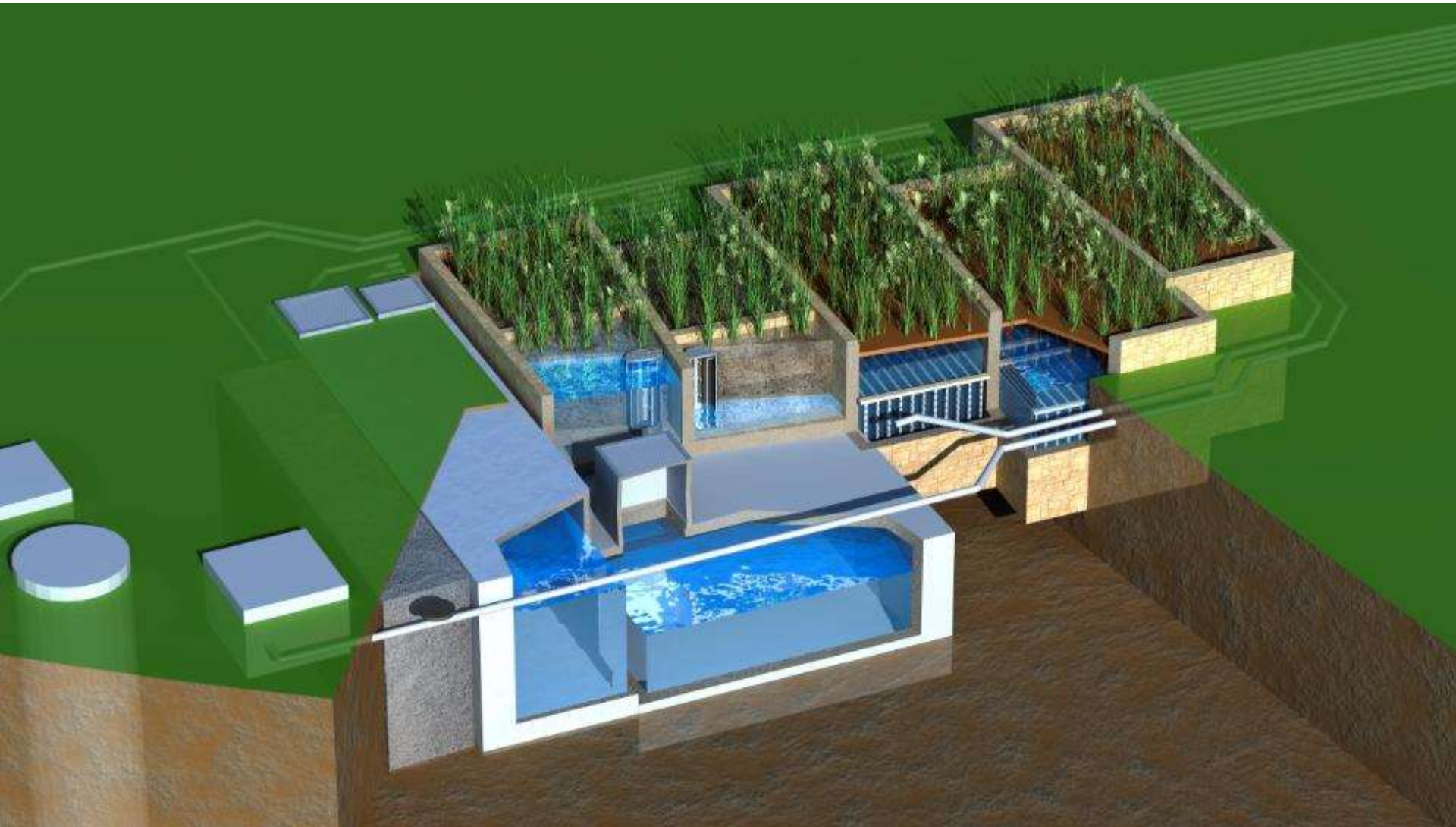


GlassHouse (Upper Site)



GlassHouse Footprint Compact and Efficient

Outdoor System (Lower Site)



Convergence of Multiple Ecological Treatment Technologies

EPA Administrator Gina McCarthy Tours Emory University's WaterHub



Gina McCarthy @GinaEPA · Feb 5

.@EmoryUniversity cut water use by ~35% w/new WaterHub, saving the school big on utility costs. A model for us all!



Gina McCarthy @GinaEPA · Feb 5

.@EmoryUniversity WaterHub isn't a typical treatment facility. It filters wastewater thru plant roots & microbes clean out organic material.



Federal Validation for an Ecological Solution to Wastewater Management

EPA Administrator Tours WaterHub



The Administrator
Washington, D.C. 20460

FEB 27 2015

Ms. Ciannat Howett
Director of Sustainability Initiatives
Emory University
201 Dowman Drive
Atlanta, Georgia 30322

Dear Ms. Howett:

The tour of the WaterHub was a highlight of my recent visit to Emory University, and I want to thank you and your colleagues again for all the hard work you devoted to making it so interesting and informative.

I enjoyed learning more about Emory's commitment to best practices in water stewardship and in conservation. You offered a great overview of the operations there, and everyone I met was so eager to share their knowledge and to answer my questions.

Given the U.S. Environmental Protection Agency's ongoing focus on protecting and improving the quality of America's waters, I was impressed to learn the new facility will make it possible for Emory to save tens of millions of gallons of potable water every year. That is a real achievement.

I applaud Emory's leadership in sustainability and wish you continued success in your exciting initiatives.

Sincerely,



Gina McCarthy

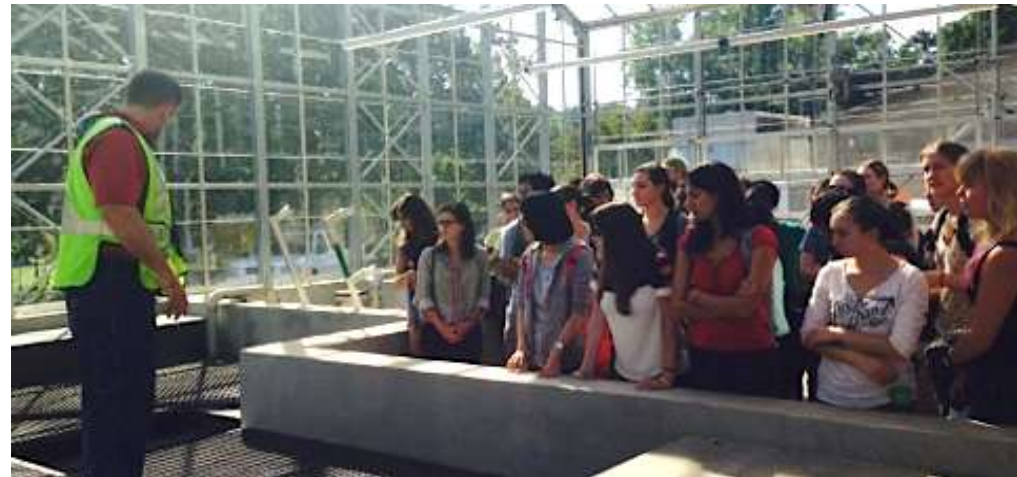
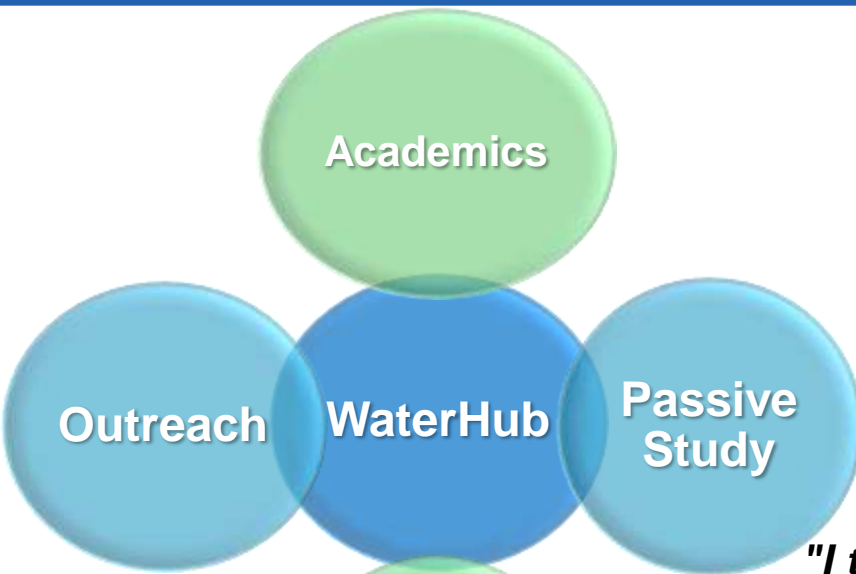
"The WaterHub will make it possible for Emory to save tens of millions of gallons of potable water every year. That is a real achievement." – Gina McCarthy



Federal Validation on Treatment Approach and Decentralized Model

Community Approach to Sustainability

"The WaterHub is a Living Learning Laboratory"



"I think it also shows an important role the university can play in advancing sustainability and engaging in this idea of the campus as a living laboratory, a place of experimentation and engagement and learning. This (facility) offers an interesting case study for how an institution can move a community toward a bold step in water conservation. It's also exactly the kind of reduction we need to see in order to support a more sustainable future."

- Ciannat Howett, Director of the Office of Sustainability Initiatives at Emory



Multi-Functional Facility Serves as Educational Asset to the Community



EXTENDING THE LIFECYCLE OF WATER.

Nature's Idea. Our Science.

QUESTIONS?

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(973) 632-8560

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