



# Design for Water: Resilience and Discovery

April 15, 2021

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Erin English, PE  
Practice Leader & Senior Engineer



Credit: Jonathan Hillyer





**Erin English, PE**  
Practice Leader  
Senior Water Resources Engineer  
*Southwest Basin & Range Bioregion*  
*Santa Fe, NM*



Biohabitats is a national consulting firm focused on ecological restoration, conservation planning and regenerative design.

Our mission is to *Restore the Earth & Inspire Ecological Stewardship*





# AIA COTE Top Ten & Living Building Challenge



**Sidwell Friends School, DC** Kieran Timberlake Associates for Sidwell Friends School;  
*Design & engineering of stormwater & wastewater treatment/reuse infrastructure*



**Chatham University Eden Hall Campus, PA**  
Mithun for Chatham University; *Design & engineering of wastewater treatment/reuse infrastructure*



**Alice Ferguson Foundation Hard Bargain Farm, MD**  
Re:Vision Architecture for the Alice Ferguson Foundation; *Lead design & engineering for greywater treatment/dispersal infrastructure*



# AIA COTE Top Ten & Living Building Challenge



**Omega Center for Sustainable Living, NY**  
BNIM Architects for the Omega Institute; *Lead design & engineering for wastewater treatment/reuse infrastructure*



**Dixon Water Foundation Josey Pavilion, TX** Lake Flato Architects for the Dixon Water Foundation; *Design & engineering of stormwater & wastewater treatment/reuse infrastructure*



**Brock Environmental Center, VA**  
SmithGroupJJR for the Chesapeake Bay Foundation; *Peer review & permitting for rain to potable water infrastructure*



**The Bullitt Center, WA**  
The Miller Hull Partnership for the Bullitt Foundation; *Peer review & operational optimization of water infrastructure*

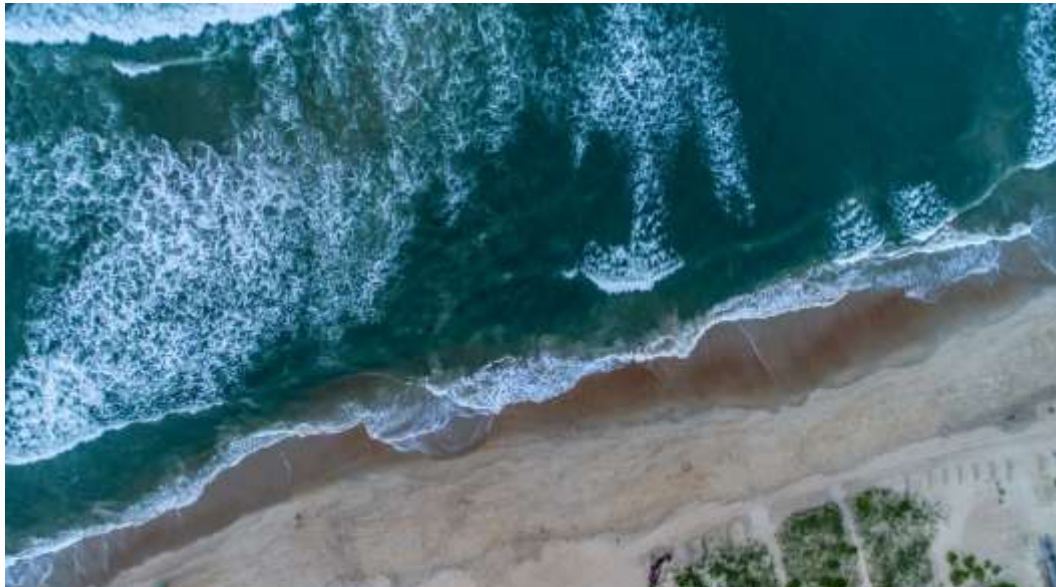


# Design for Water



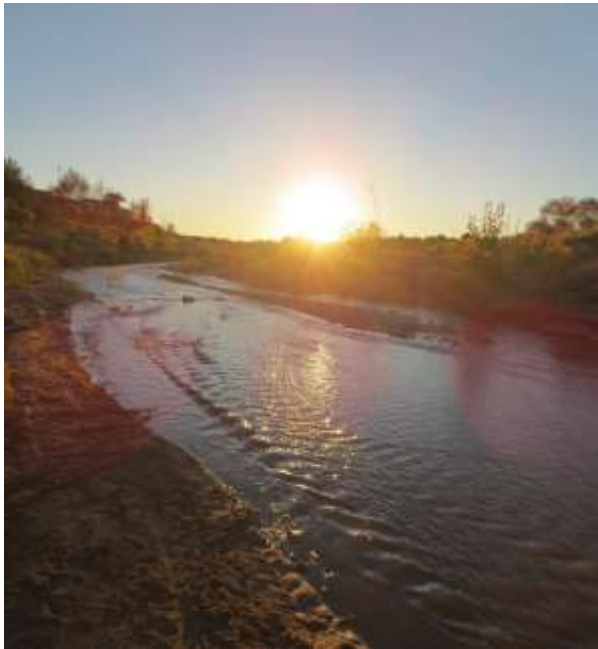
## ALA Framework for Design Excellence

- indoor water efficiency
- outdoor water use reduction
- process water reuse
- capture/reuse of greywater and/or blackwater
- rainwater/stormwater use and management
- Net Zero Water Building (nzw)





# Discovery





Resilience

TARGETING  
FULL LIVING  
BUILDING  
CHALLENGE™  
CERTIFICATION

# Kendeda Building for Innovative Sustainable Design

Georgia Tech, Atlanta, GA

Credit: Jonathan Hillyer



# Water Petal

Creating developments that operate within the water balance of a given place and climate

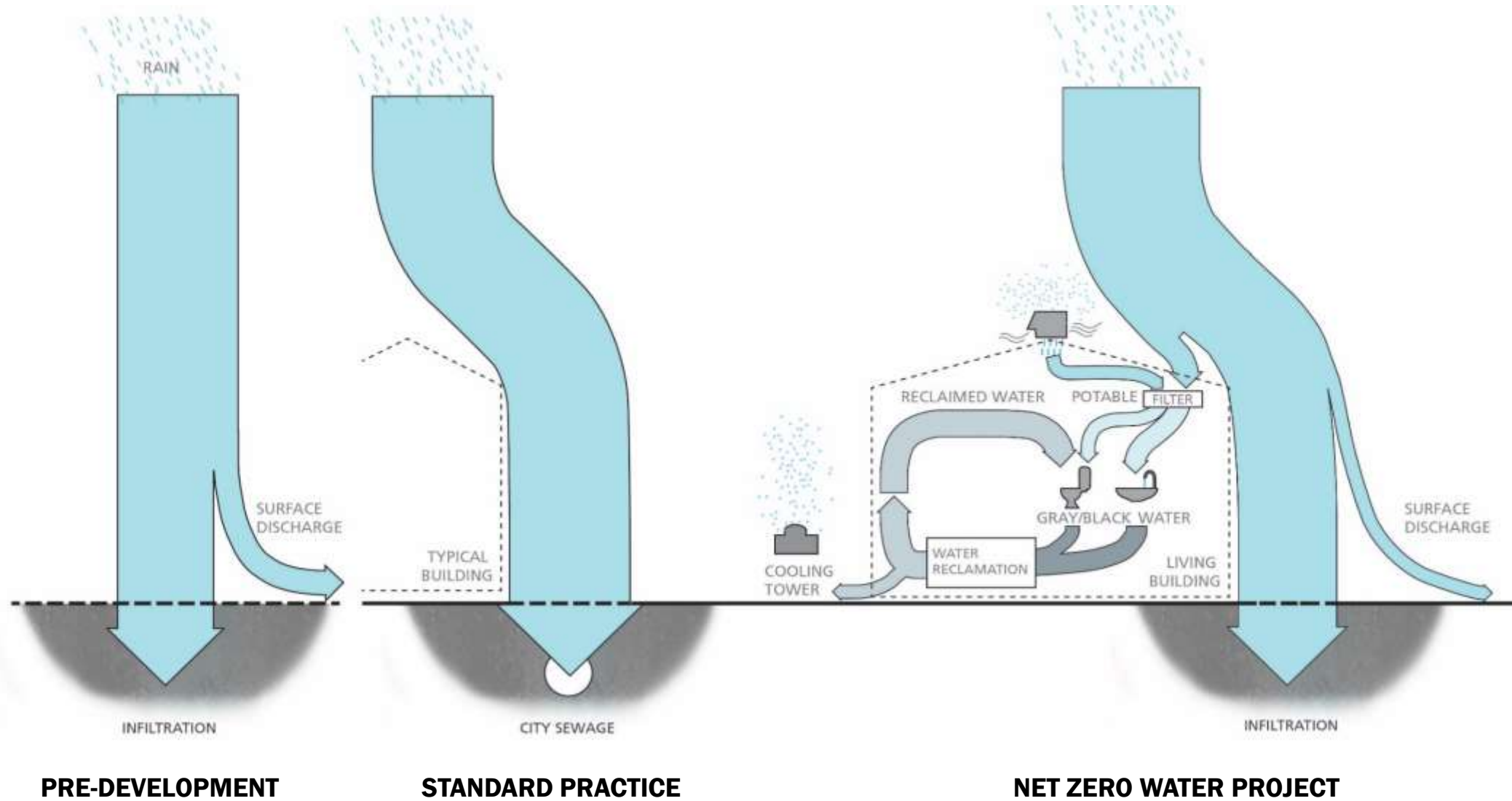
*“The intent of the Water Petal is to realign how people use water and to redefine ‘waste’ in the built environment so that water is respected as a precious resource.”*

*- International Living Future Institute*



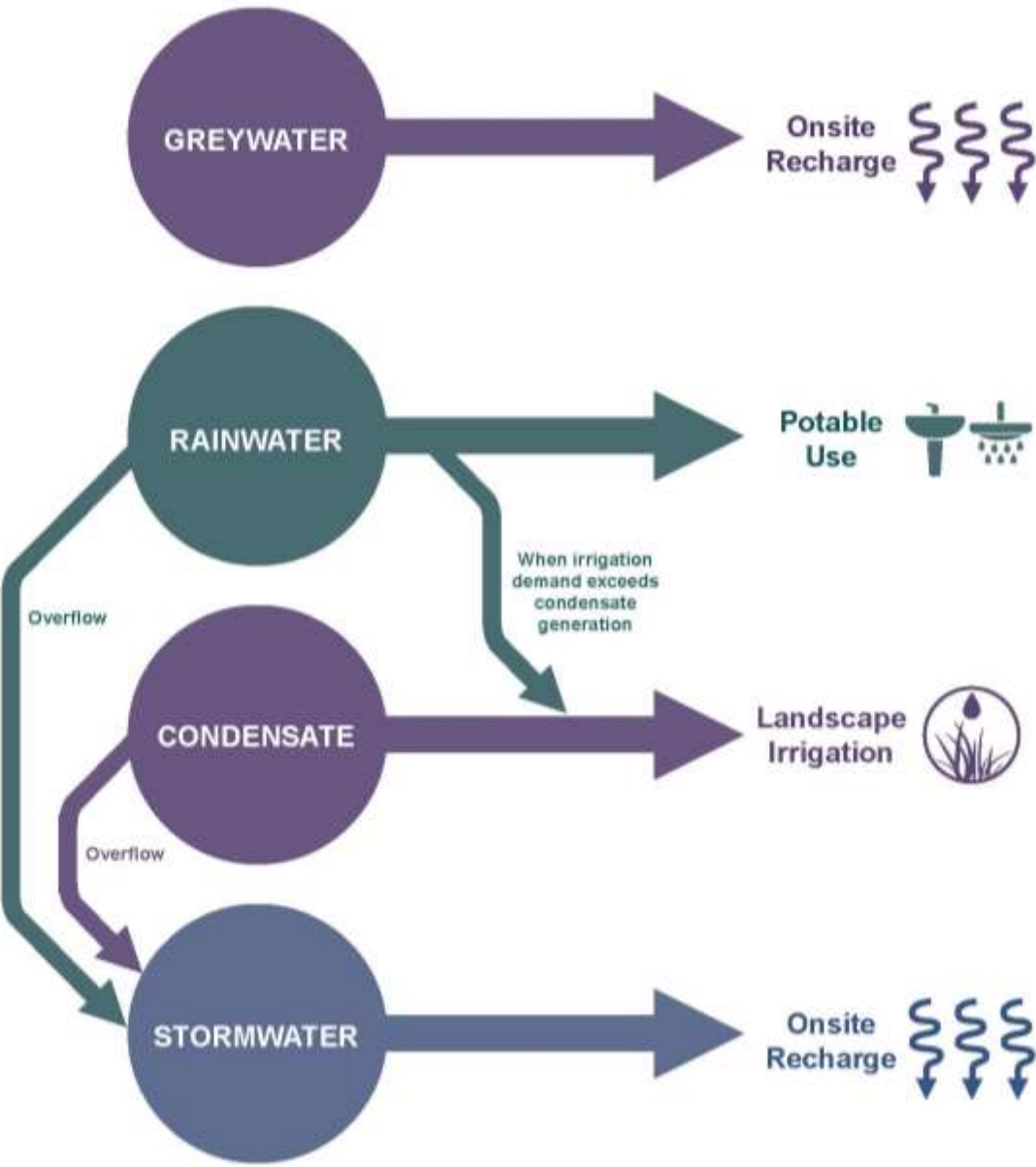


# Changing the Water Flow Paradigm





# Aligning Fit-for-Purpose Strategies



**NET POSITIVE WATER CYCLE –  
LIVING BUILDING CHALLENGE STRATEGY**  
Kendeda Building for Innovative Sustainable Design  
Georgia Institute of Technology, Atlanta, GA



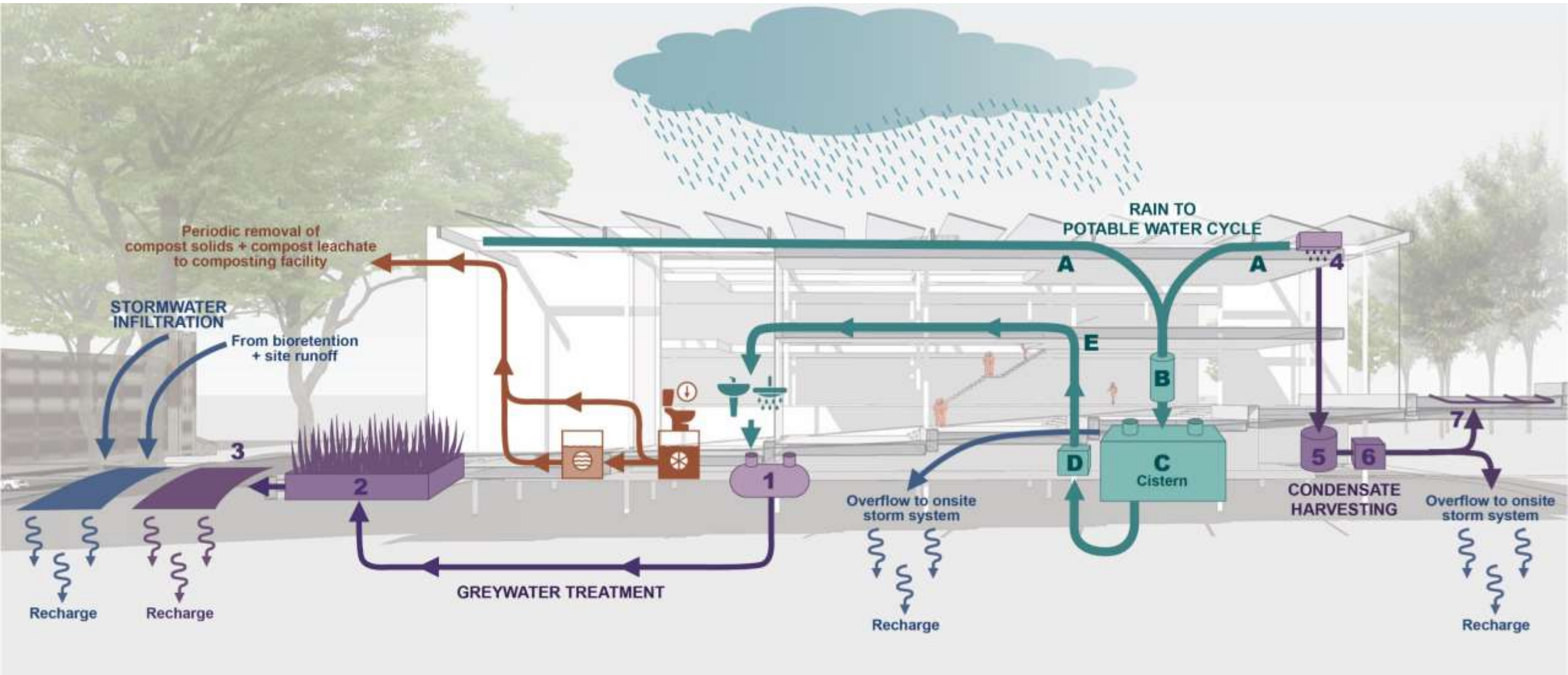
**Biohabitats**

**PROJECT TEAM**

Miller Hull	Newscomb & Boyd
Lord Aeck & Sargent	Long Engineering
Andropogon Associates	Biohabitats
PAE	Skanska USA



# Building and site as watershed – Net Positive Water Approach





# Stormwater *is* an equity issue





# An edible, working landscape sustained by harvested water

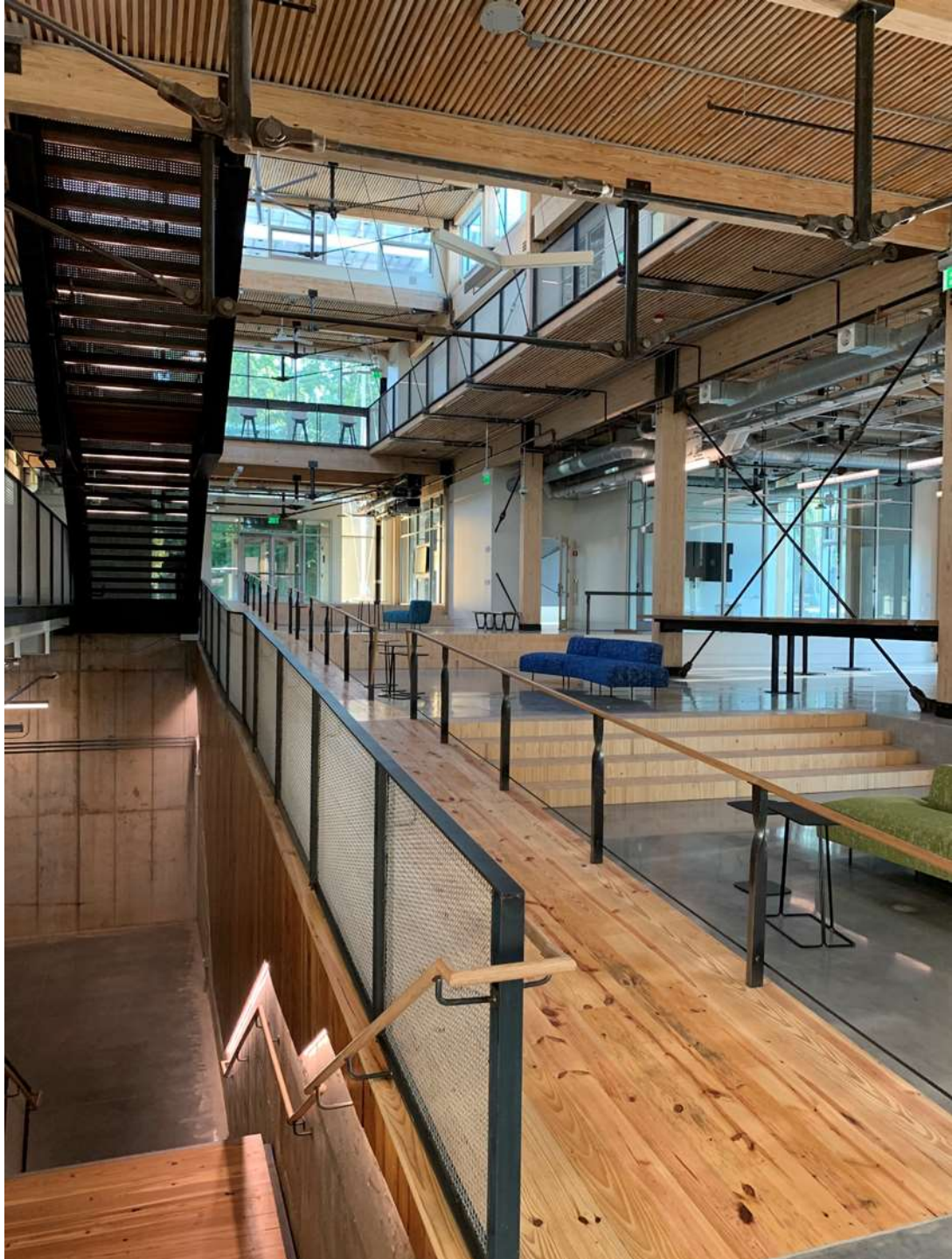




## Tours & Engagement (& even remotely during Covid-19 pandemic)









# Story of Water Mural





# Georgia Tech Project Website: content & media-rich online presence over full arc of project



GT Home > Admin & Finance >

The Kendeda Building for Innovative Sustainable Design is a multi-disciplinary, non-departmental education building that is pursuing the Living Building Challenge – the world’s most ambitious building performance standard. Rather than being less bad than conventional buildings, The Kendeda Building is regenerative. It gives back more than it takes from the environment. To learn more, take the 3D Tour, browse the Interactive Image Maps, and review this website.

## Video Tour ▶



## 3D Tour ▶



## Blogs Roll

### The Living Building Launch

Source: Campus Sustainability Blog  
Date: November 20, 2017

### A Living Building Project Journey, Part-12

Source: Lord Aeck Sargent Blog  
Date: October 23, 2017

### A Living Building Project Journey, Part-11

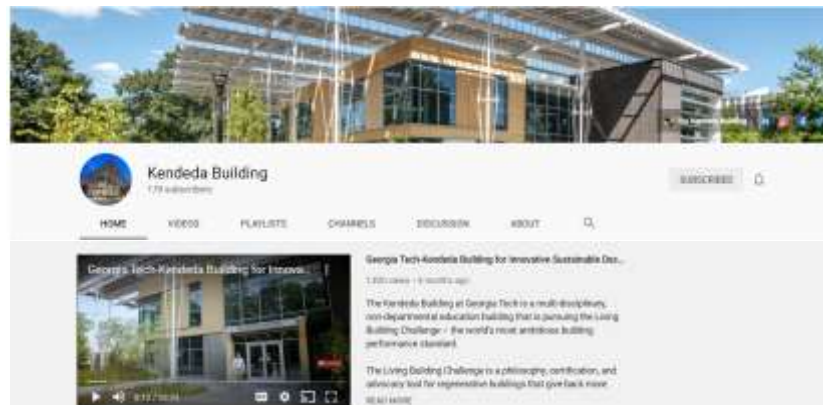
Source: Lord Aeck Sargent Blog  
Date: September 13, 2017

### Learning Through Doing, Recognizing Student Work

Source: Lord Aeck Sargent Blog  
Date: August 4, 2017

### A Living Building Project Journey, Part-10

Source: Lord Aeck Sargent Blog  
Date: July 14, 2017



## Academic Pilot Programs



### Documenting the Effects of the Living Building on Biological Diversity and Succession

Professors Marc Weissburg and Emily Weigel from the School of Biological Sciences, along with Georgia Tech students, are studying the impact buildings and construction have on biodiversity in the ecosystem.



### Imagining Living Building Monitoring Systems

The Living Building is like any living organism; it must use its resources wisely. Led by Dr. Michael Chang of the Brook Byers Institute for Sustainable Systems and Dr. Dana Hartley of the School of Earth and Atmospheric Sciences, this pilot... More »



### Crowdsourcing through Virtual and Augmented Reality: A Pilot Project of the Kendeda Building for Innovative Sustainable Design

The Kendeda Building for Innovative Sustainable Design has the intention of becoming a resource for and model of sustainable design for the Southeast. This necessitated feedback from the community even in the design phase. One way to collect... More »

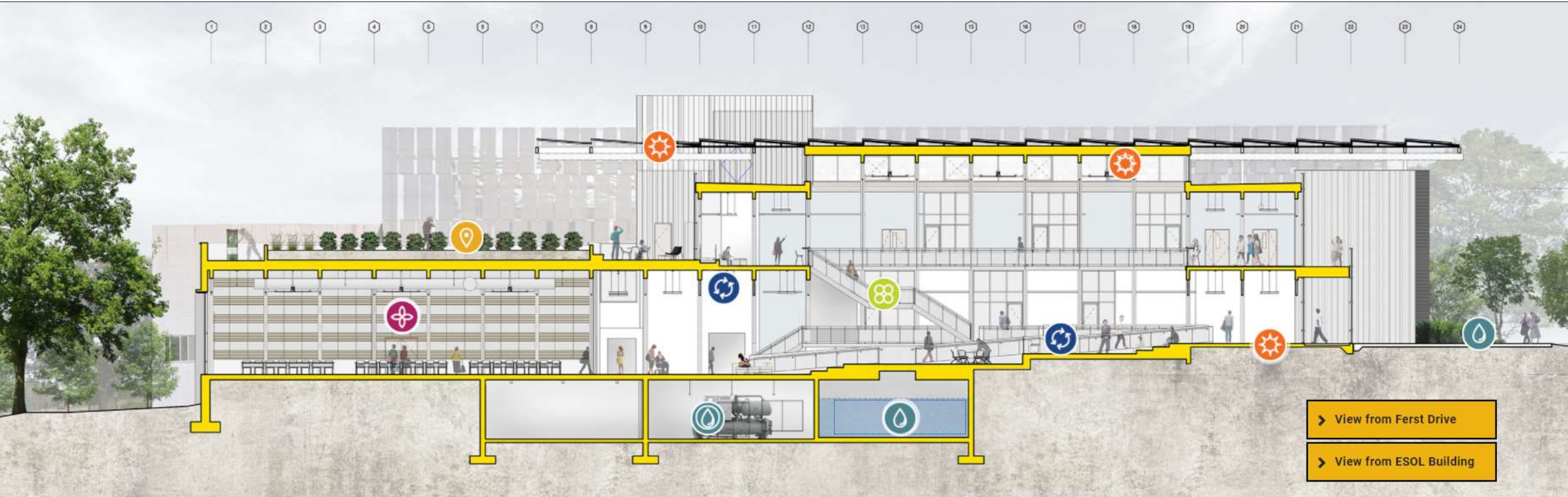


### Equipping The Kendeda Building Equity Champions

One of the seven petals of the Living Building Challenge, the fulfillment of the Equity Petal requires a demonstration that the building supports a just and equitable world. The Equity Petal defines this as "a society... More »



# Interactive Image tour



PLACE



WATER



ENERGY



HEALTH + HAPPINESS



MATERIALS



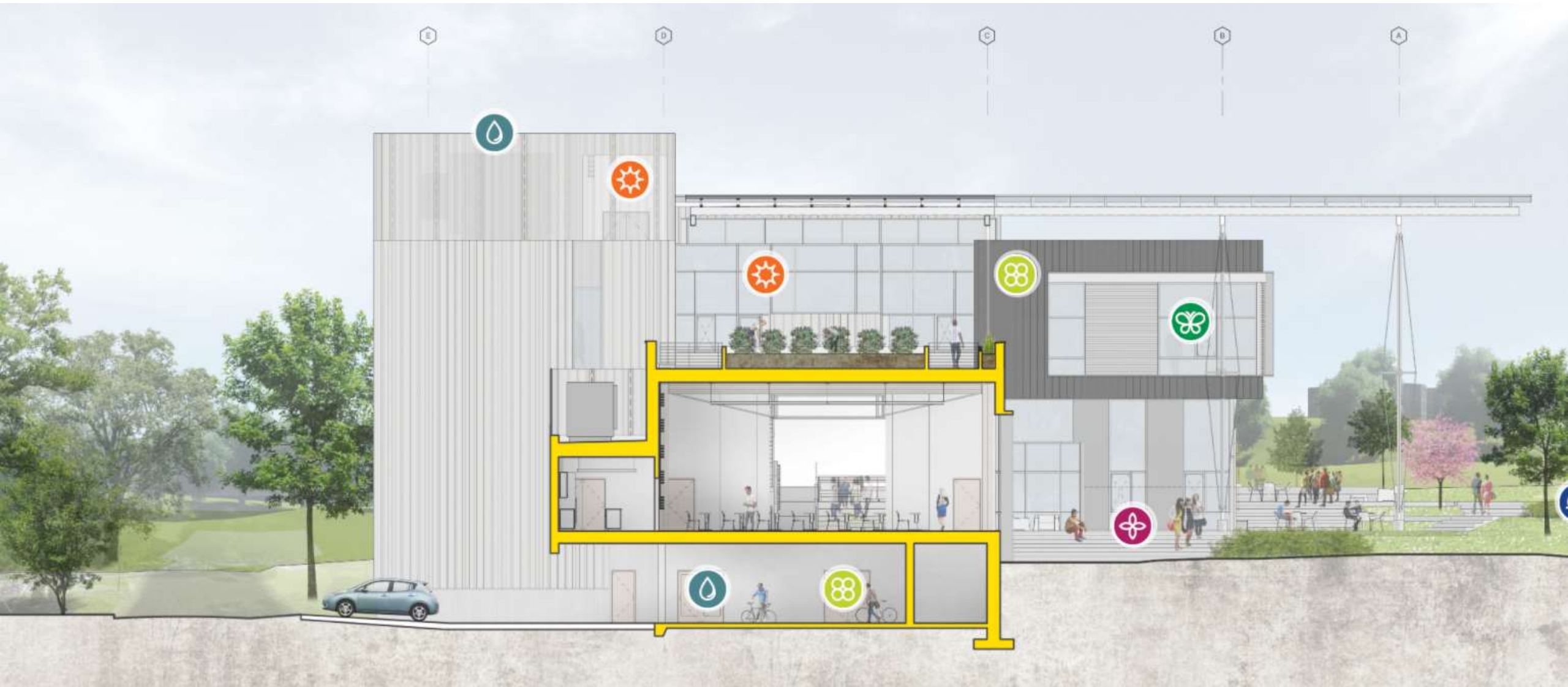
EQUITY



BEAUTY

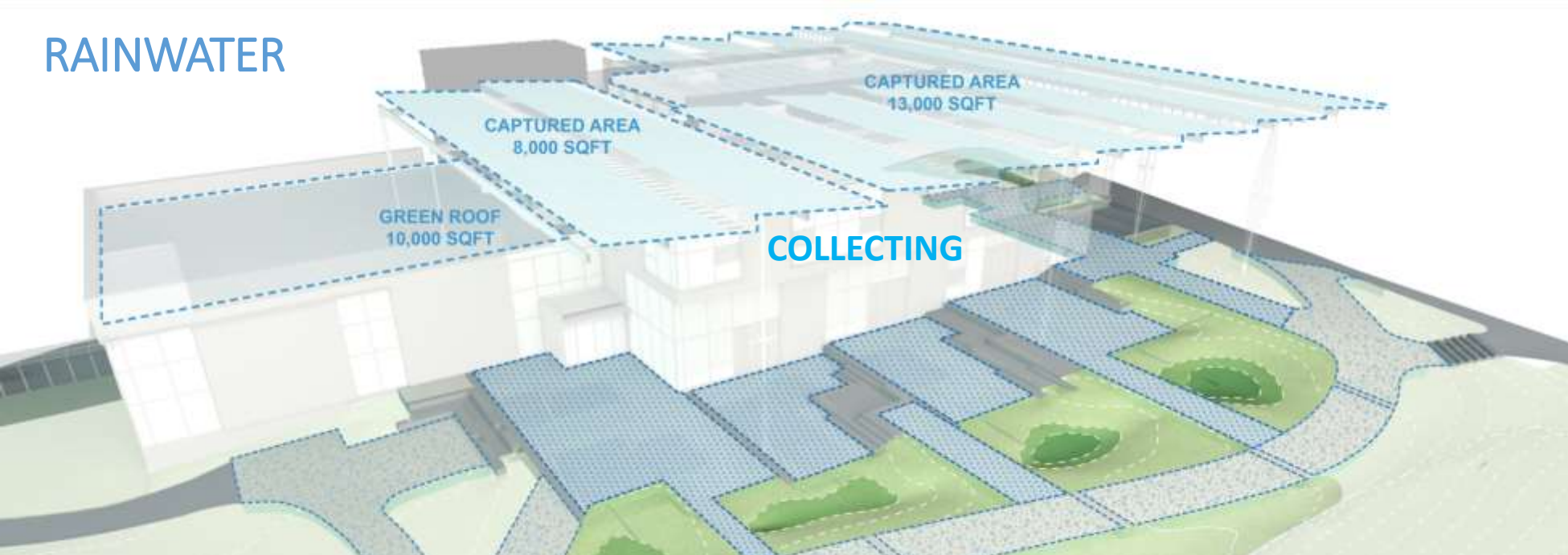


# Interactive Image tour





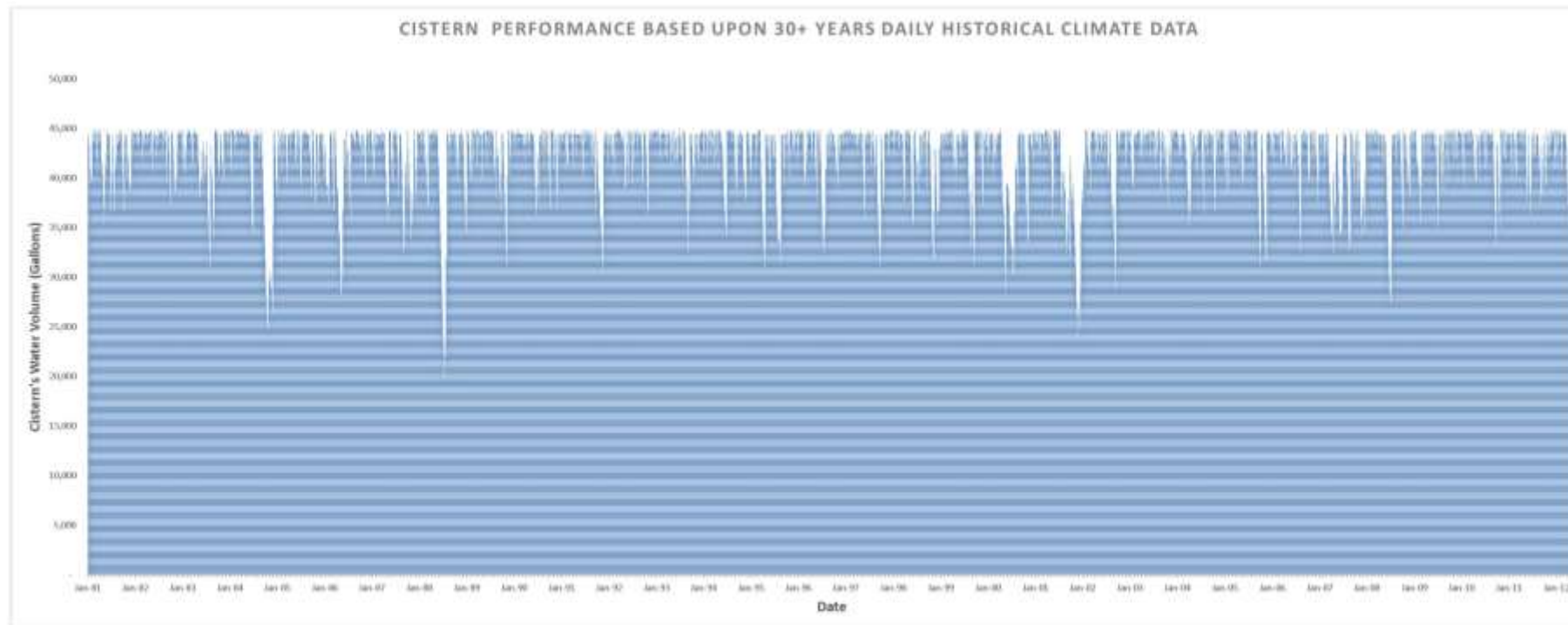
# RAINWATER



**Rainwater + harvested condensate supplies 100% of water demand.**

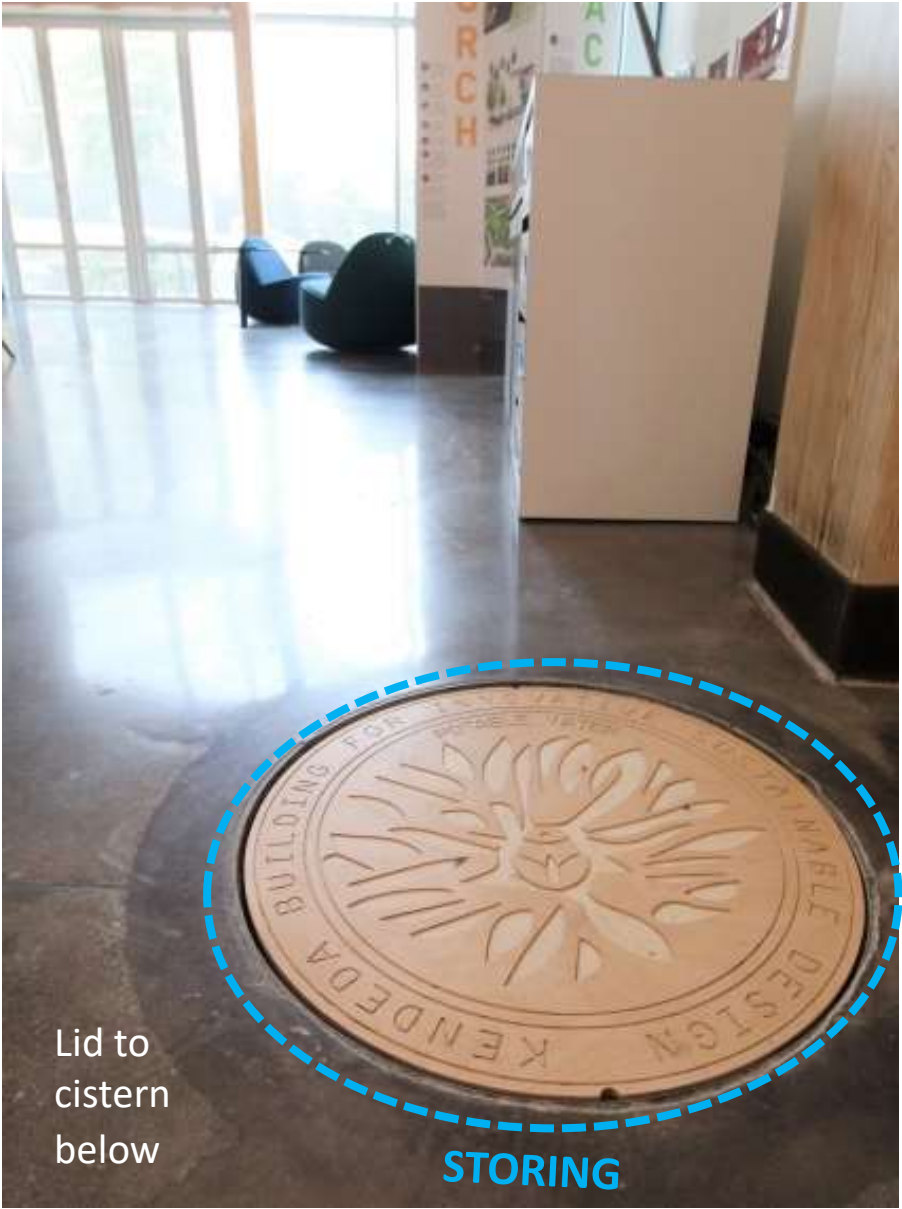
Cistern is sized to bridge extreme drought and provide resilient source of fresh water.

Condensate is harvested to offset irrigation demand.





Exposed systems are clues to function





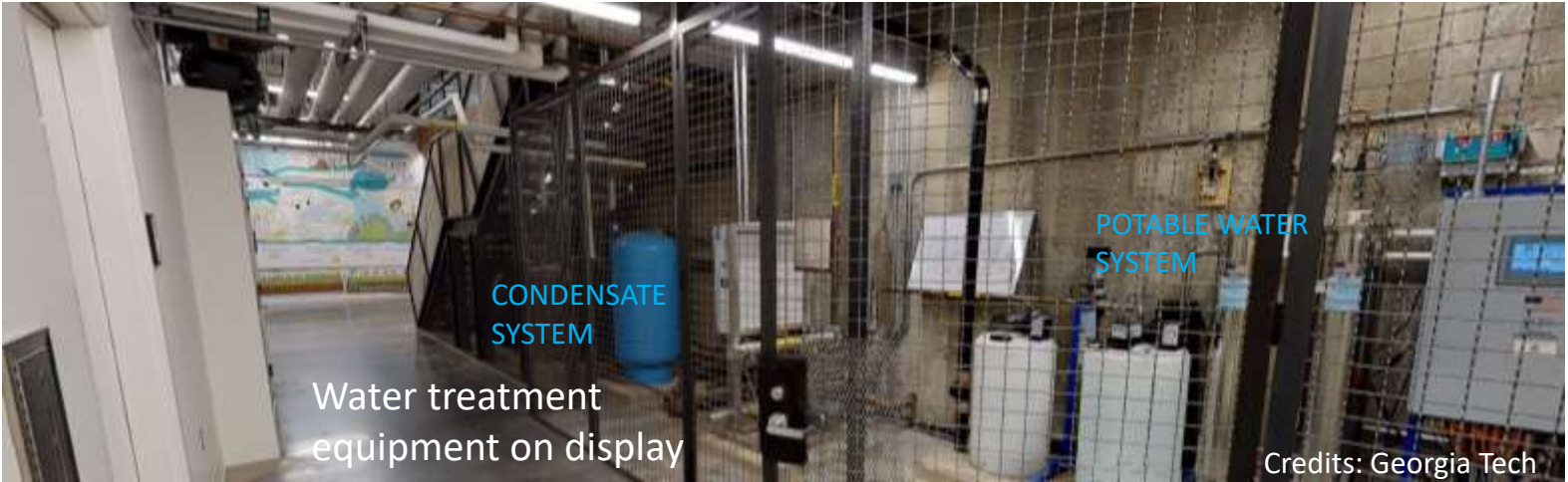
Potable Water Treatment



Operational tours & trainings



Solar harvesting strategy



Water treatment equipment on display



# GREYWATER

Subsurface  
Constructed  
Wetland Garden for  
Greywater Filtration  
at building entrance.

Effluent is passively  
recharged to  
groundwater







YOU ARE HERE!

THE KENNEDY BUILDING  
FOR INNOVATION AND COLLABORATION

**BIOFILTRATION**





## CONDENSATE

Atlanta's humid climate creates ideal conditions to recover condensate from Outside Air Handling Units to feed landscaping



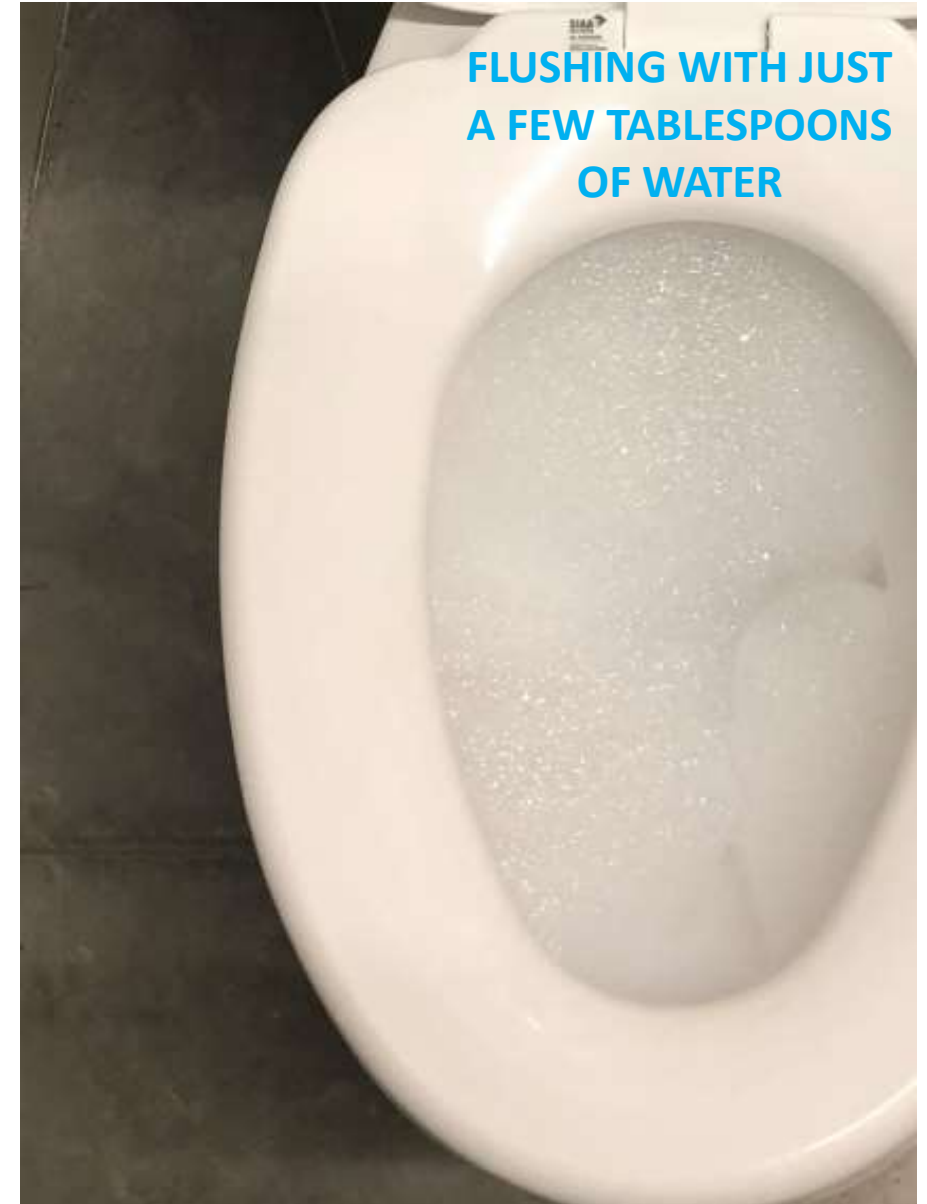
HARVESTING  
WATER FROM  
AIR



# COMPOSTING TOILETS



RECAPTURING  
NUTRIENTS



FLUSHING WITH JUST  
A FEW TABLESPOONS  
OF WATER

Composting Toilets with Foam-Flush fixtures and leachate collection





# Biophilic Water Infrastructure

Design for People as  
part of Nature



## Integration with functions of place and ecosystem



## Creating inspirational restorative healthy spaces



# RELEVANCE TO DESIGN

Create settings where connections to nature are accessible, recurrent and engaging

Sidwell Friends School  
Washington, DC

BIOHABITATS © Stephen Spartana



# Direct Experience + Make Connections

WASTEWATER

STORMWATER

BIOLOGY STUDY  
POND



Recognize primary objective is to create good  
habitat for people as a biological animal





# WATER IN EDUCATIONAL SPACES

Stephen Spartana



# TRANSFORMING WASTEWATER TREATMENT

Jim Maloney



# CREATING RESTORATIVE SPACES

BNIM



# DISTRICT SCALE WATER RECYCLING

John Cunningham



# LIVING WATER FEATURES

Biohabitats

Biohabitats



# COMBINING STORMWATER + HABITAT + REUSE

Biohabitats



# GROW STEWARDSHIP





Omega Center for  
Sustainable Living

Engage people  
where they  
are learning







## Omega Center for Sustainable Living

“We wanted to come up with a way that we could actually educate people to the level of connection that was necessary to water, so that we could really address some of the water issues that we are facing as nation, and as a planet. Water as the primary essence of life.”

**Omega Institute CEO Robert "Skip" Backus on their decision to use a natural systems approach**



# CHATHAM UNIVERSITY'S EDEN HALL CAMPUS

Western Pennsylvania

EDEN HALL CAMPUS

Building a more  
sustainable and  
healthy world.

AIA COTE  
TOP  
TEN

Chatham University

chatham  
UNIVERSITY  
EDEN HALL CAMPUS



Committee on  
Architecture for Education  
at AIA Knowledge Center  
The American  
Institute of Architects





Bring the infrastructure to the forefront



Wastewater Recycling  
Wetlands



# Showcase Water: Waste as Resource







THE WILLOW SCHOOL  
Gladstone, NJ



RAINWATER  
SUPPLY



Showcase Water:  
Interlinked Water Systems

WASTEWATER  
WETLANDS





Omega Center for  
Sustainable Living

**“Regenerating the human spirit, fostering health  
and inspiring stewardship are central to a culture  
of sustainability”**

Dr. Stephen Kellert





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THANK YOU!



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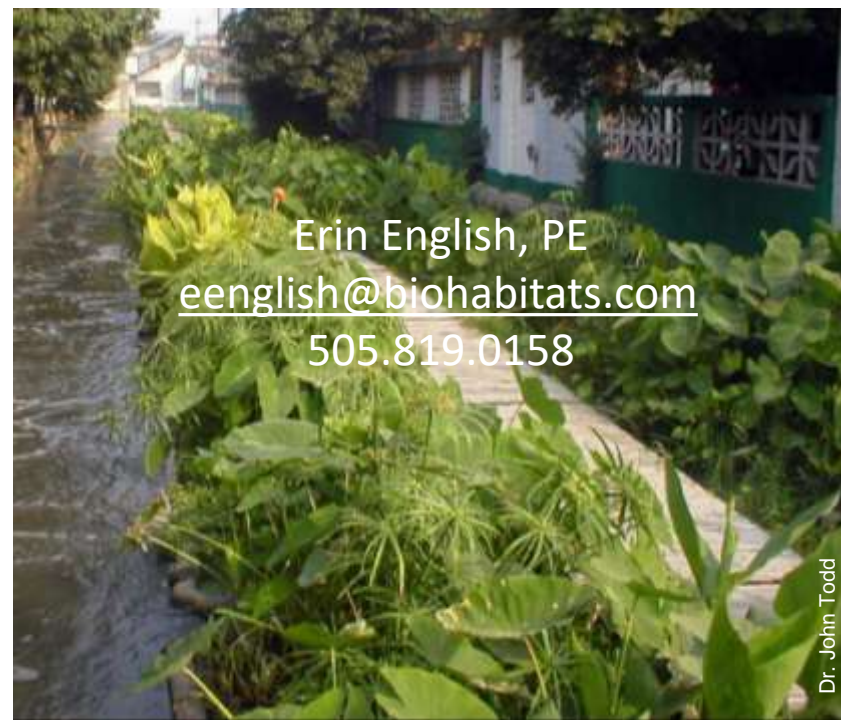
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