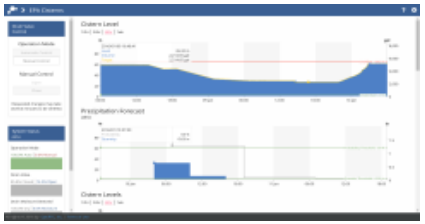
Preventing Flooding and Improving Water Quality with Automated Stormwater Management

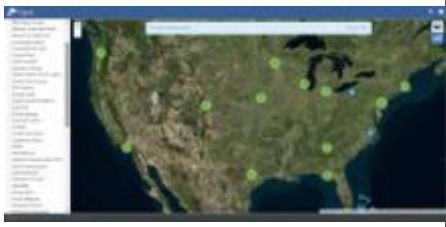
January 10, 2019

"The infrastructure we have today is capable of much more than we realize," states Shively. "By understanding and improving the system that already exists, we can adapt best management practices and begin to utilize existing assets to the maximum extent possible, UEA to the MEP."

— City of Kansas City, MO







Viktor Hlas, PE

Opti

John Andersen

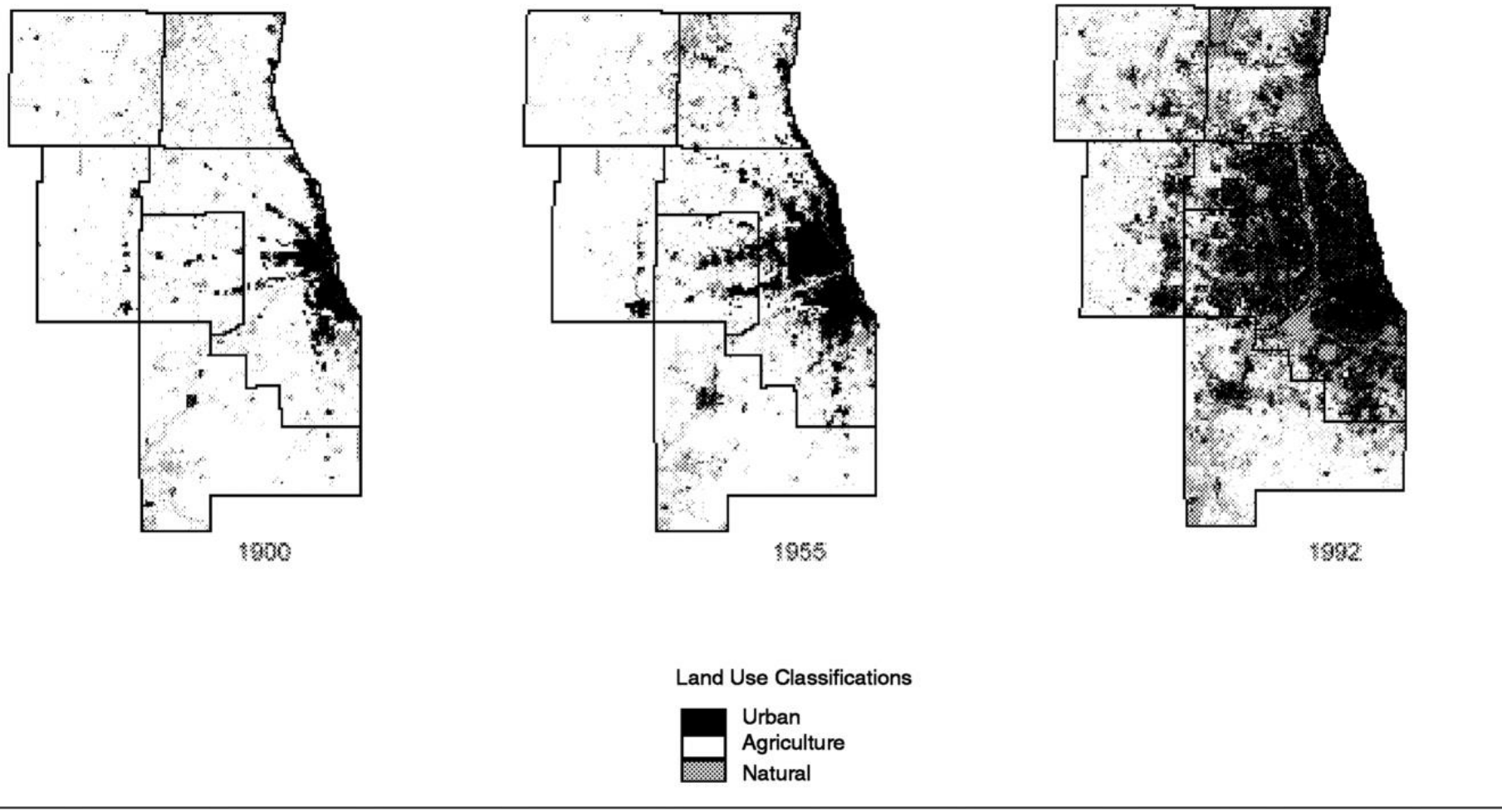
Katie DeMuro

GLA GREENLEAF ADVISORS, LLC

DuPage County residents grapple with flooding after weekend storms

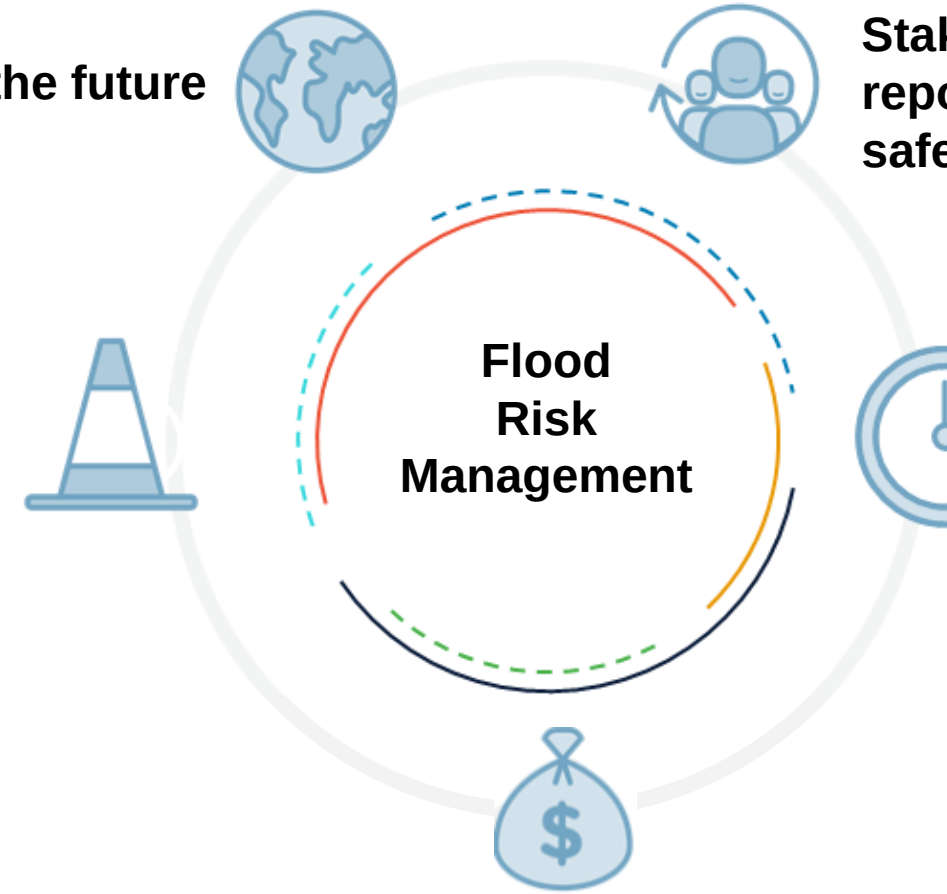
POSTED: MAY 01 2017 08:23PM CDT
VIDEO POSTED: MAY 01 2017 09:17PM CDT
UPDATED: MAY 01 2017 09:20PM CDT

Watersheds and rainfall patterns are constantly changing



National Research Council. 2001. *Growing Populations, Changing Landscapes: Studies from India, China, and the United States*. Washington, DC: The National Academies Press. https://doi.org/10.17226/10144.

Improved community resilience



Prepare for the future

Stakeholder engagement, reporting and public safety

Reduce maintenance costs

Achieve faster results

Save money and increase value of existing assets

The evolution in stormwater management

Traditional Grey Infrastructure

Conventional Green Infrastructure

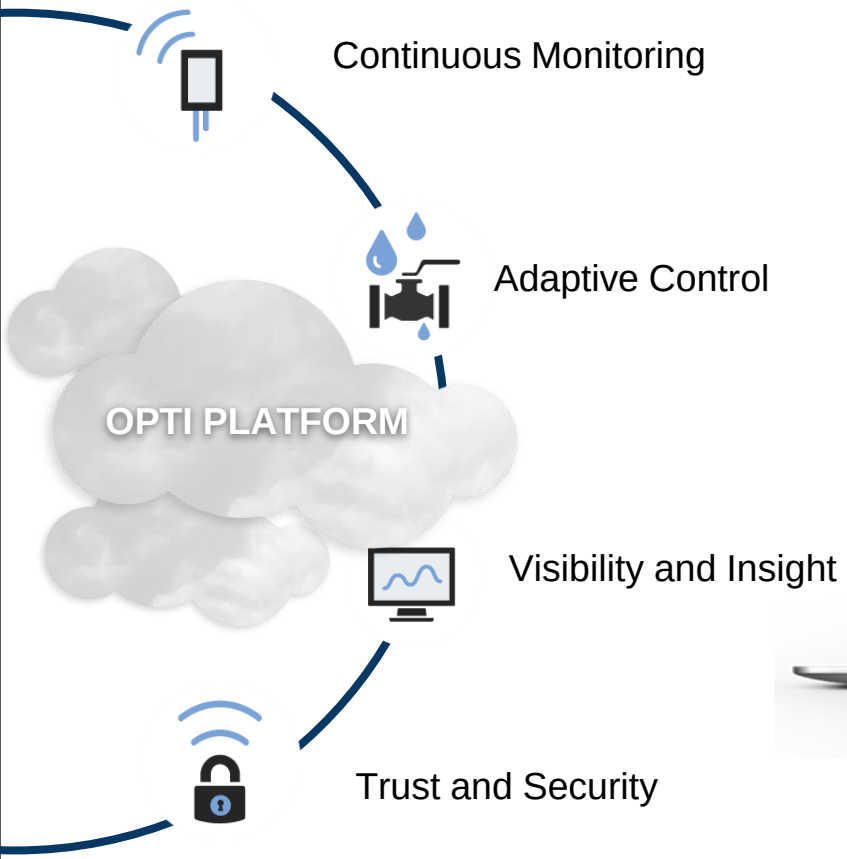
Smart Green Infrastructure

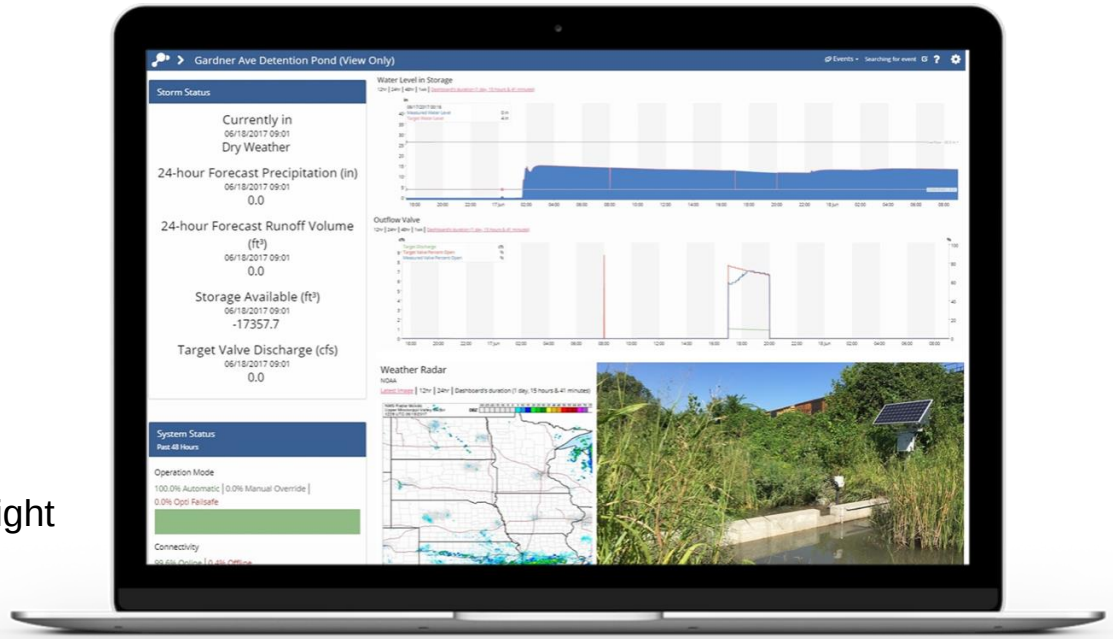
What is “Smart” Stormwater Infrastructure?

A system that:

- Improves environmental outcomes at the site and watershed level
- Is safer and lowers risk
- Is configurable and adaptive
- Provides direct verification of performance

Platform for smart stormwater management



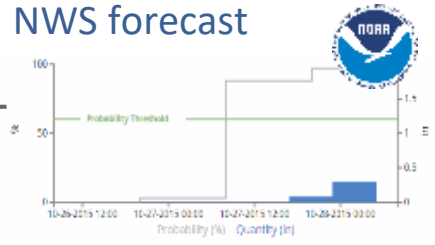


Continuous Monitoring & Adaptive Control (CMAC)

web-based dashboard

cloud software

NWS forecast



control panel

runoff

adaptive use of storage

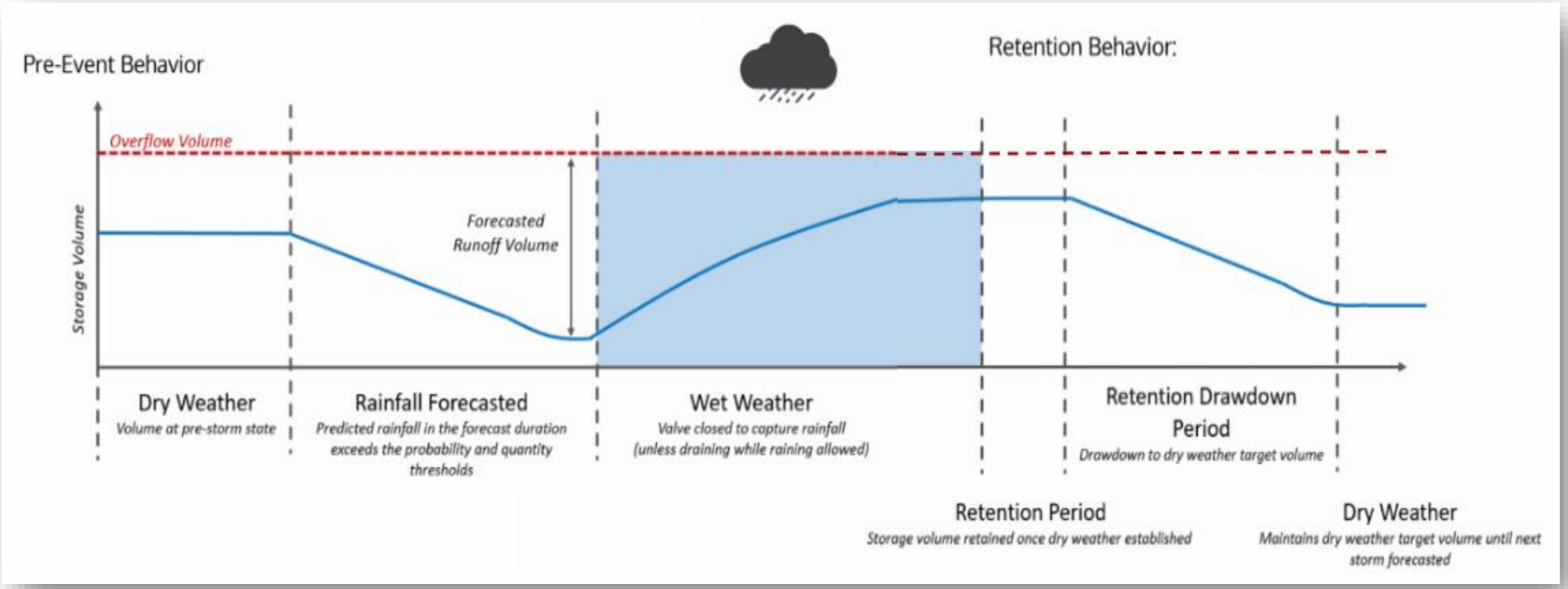
water level sensor

stormwater infrastructure

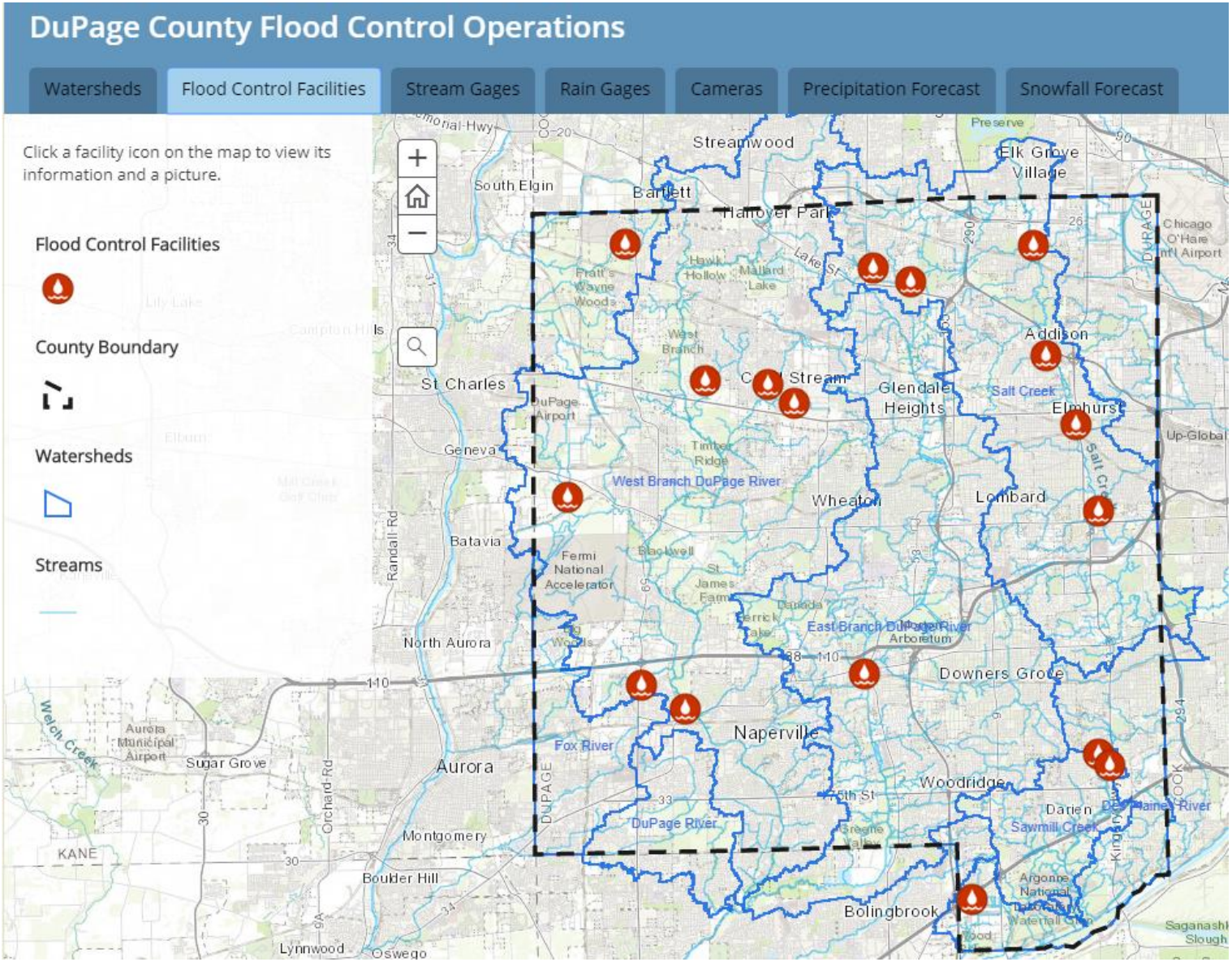
actuated valve outlet

infiltration

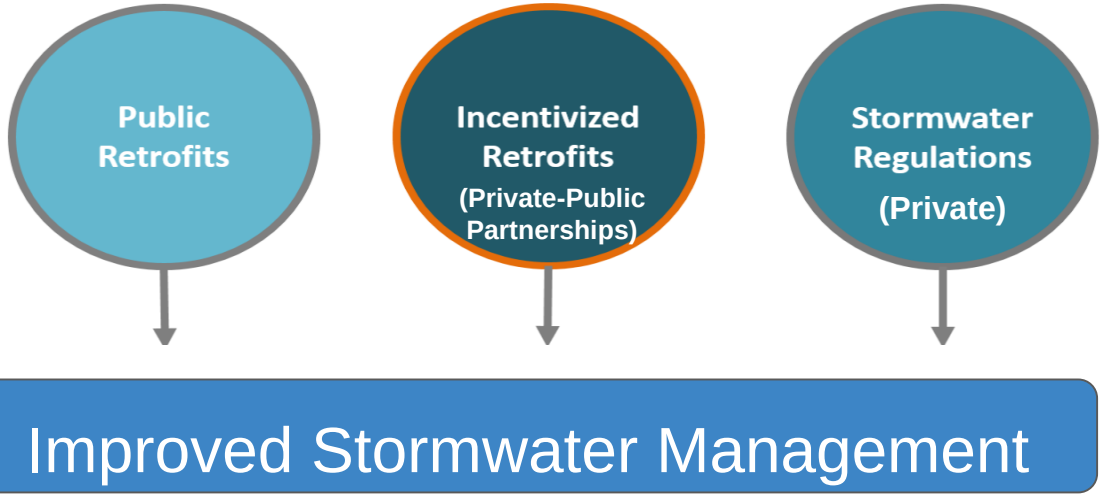
CMAC Behavior Modes



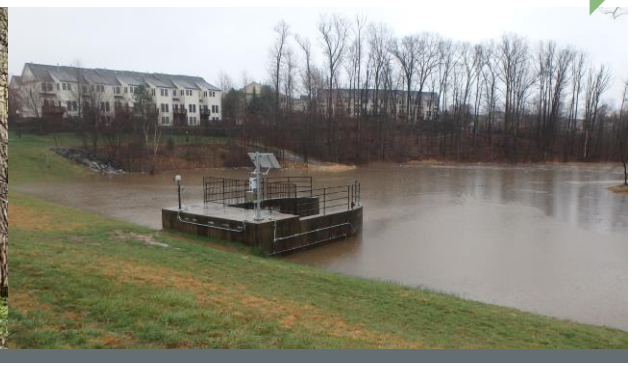
Improving visibility and operations to flood control facilities



CMAC Case Studies



Small **Medium** **Large**



Application	Application	Application
Water Reuse	Water Quality and CSO	Flood Control and CSO

Case Study: Albany NY, Addressing Flooding and CSOs with Coordinated Watershed Controls

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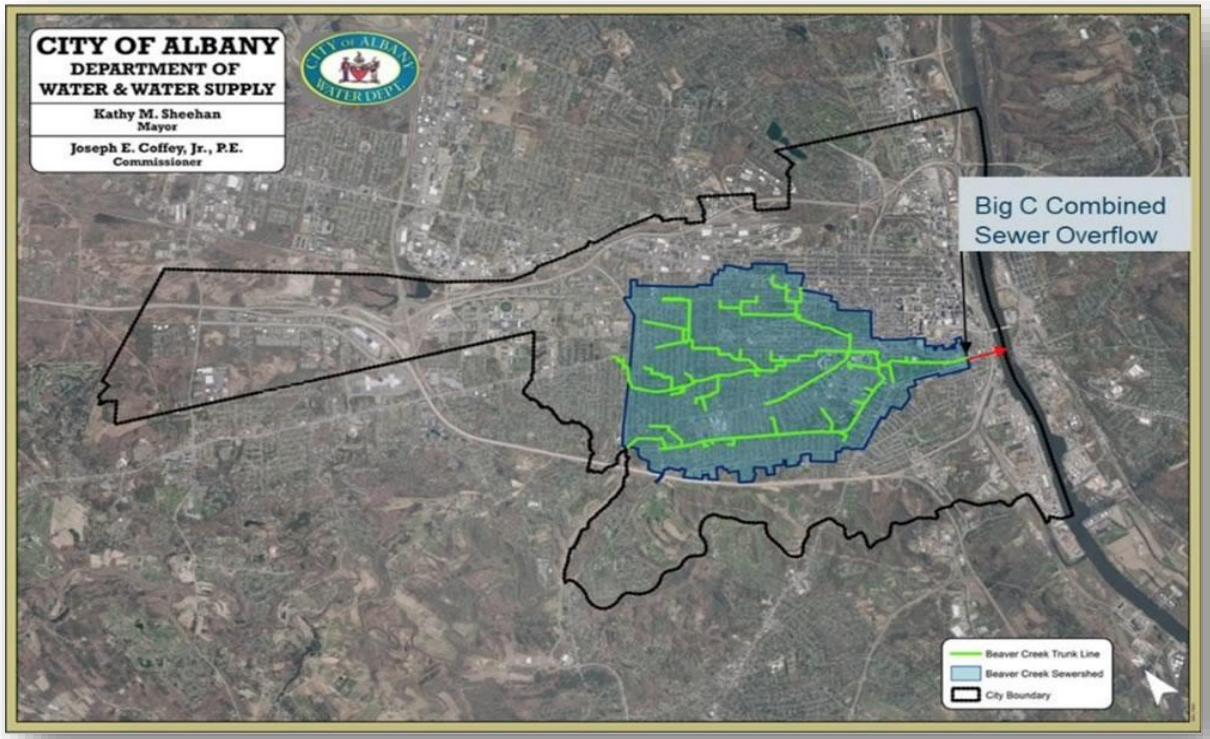
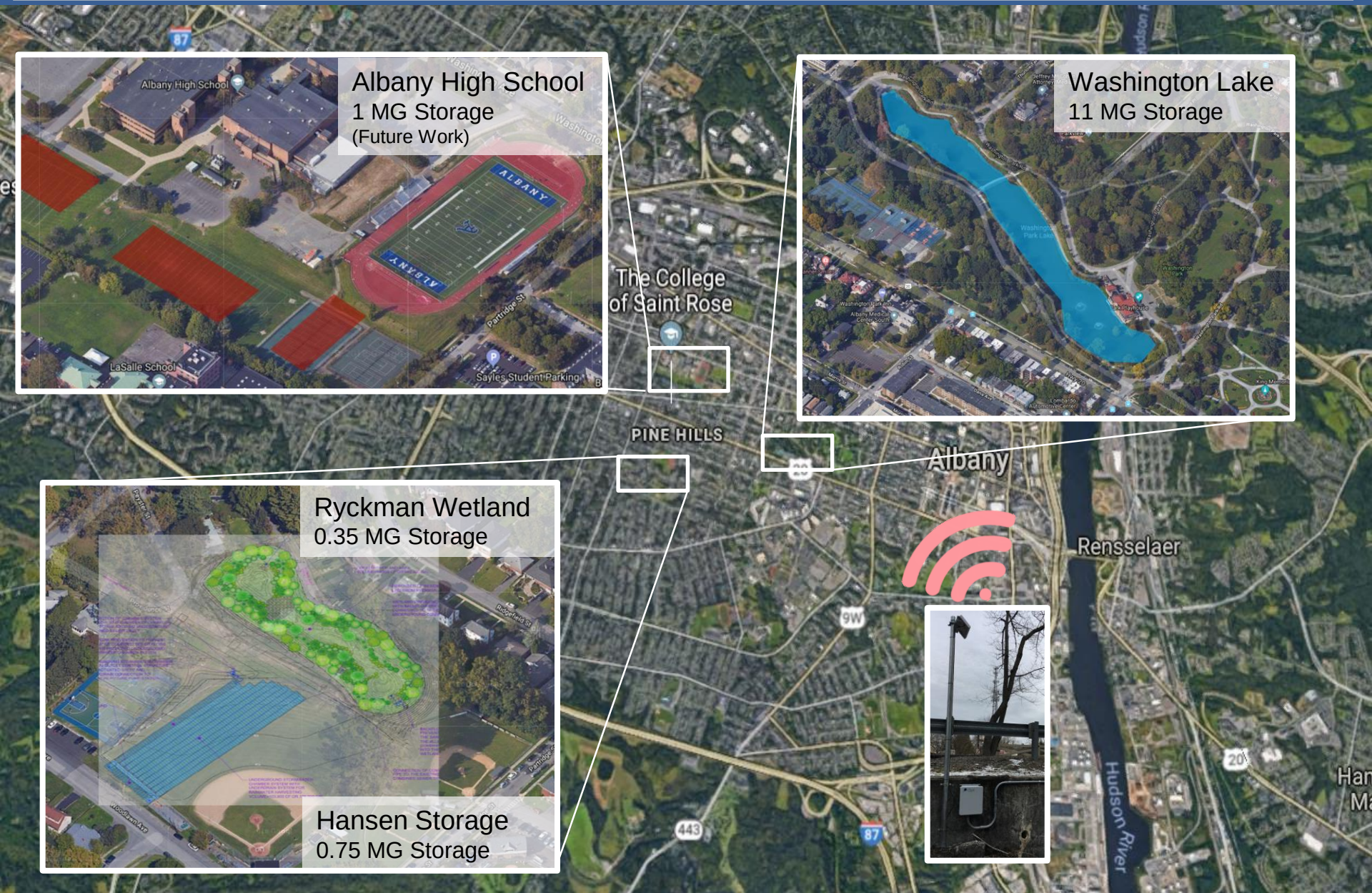
Objectives – Mitigate Flooding and CSOs



- 532 MG of CSO Annually from Albany (45% at Big C)
- Flooding in Residential Areas of Beaver Creek

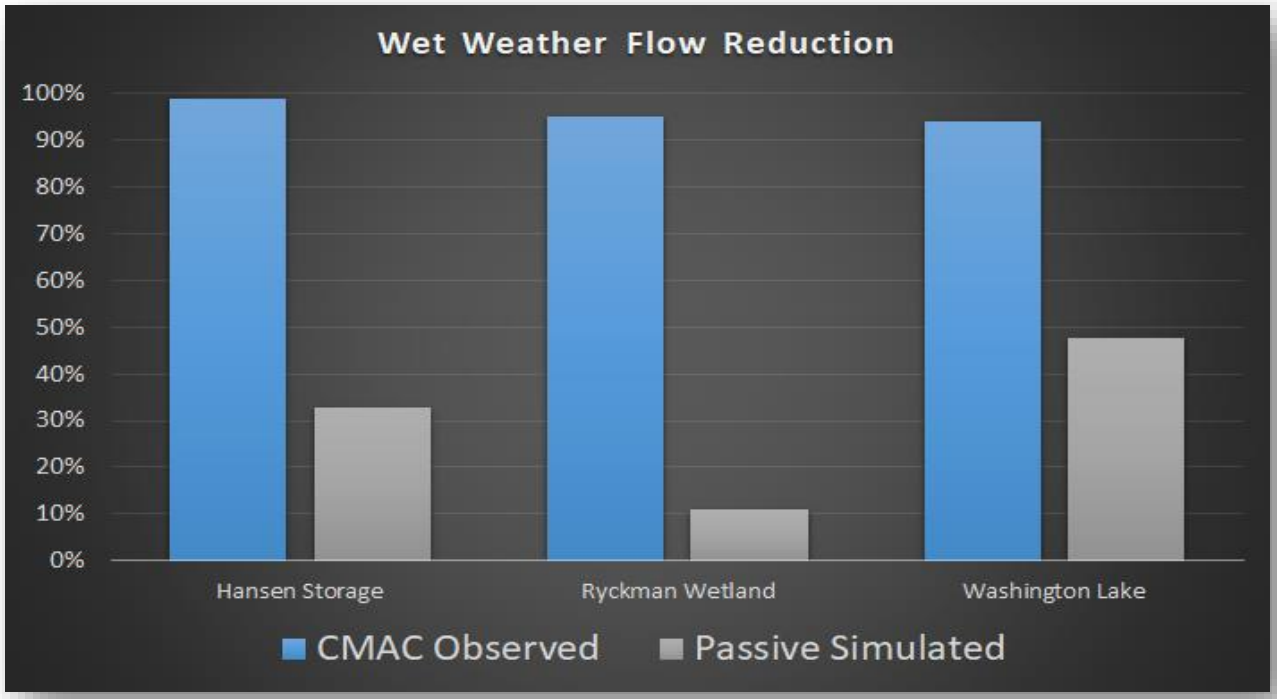
Albany, NY - Coordinated Watershed Controls



Site photos - Hansen & Ryckman

Site photos - Hansen & Ryckman

Comparing CMAC to Traditional Passive Infrastructure



Just downstream of Albany, North Hudson Sewerage Authority is changing their redevelopment requirements

CMAC Site

(existing and proposed)

Overflow Location

Case Study: Anacostia Watershed
Prince George's County, MD
peak flow reduction + water quality

2 ac-ft
Adaptively Controlled Detention/Retention

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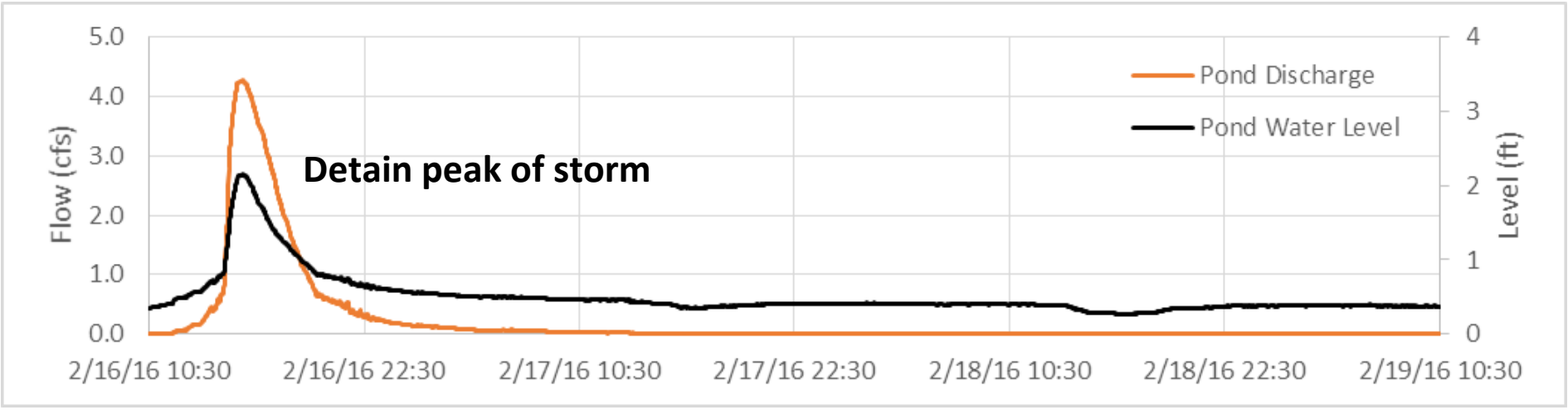
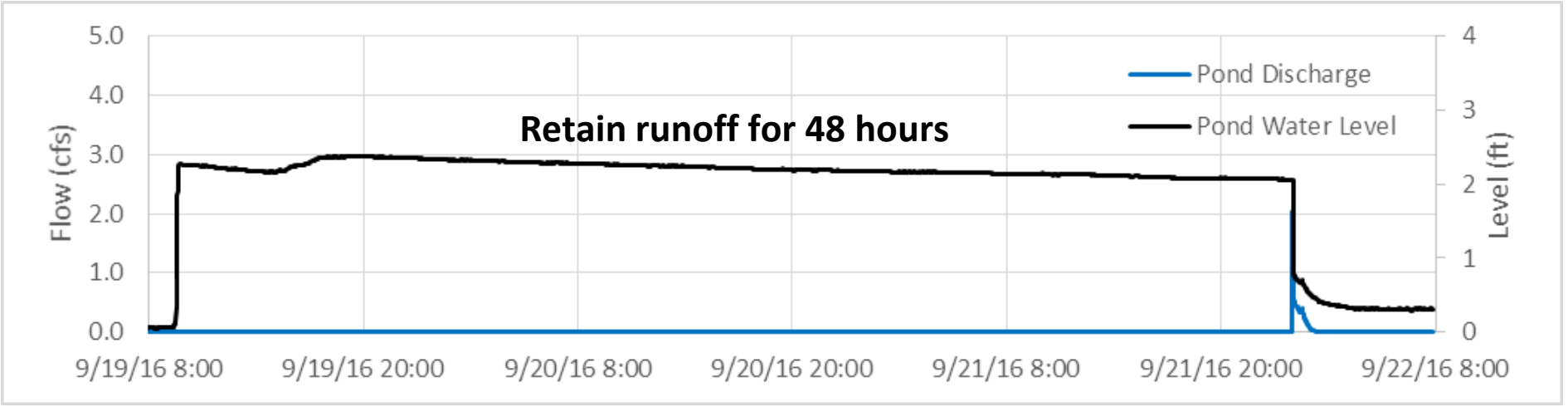
Performance Study – Frost Dry Pond

Frost Dry Pond – 1 inch Rainfall Event

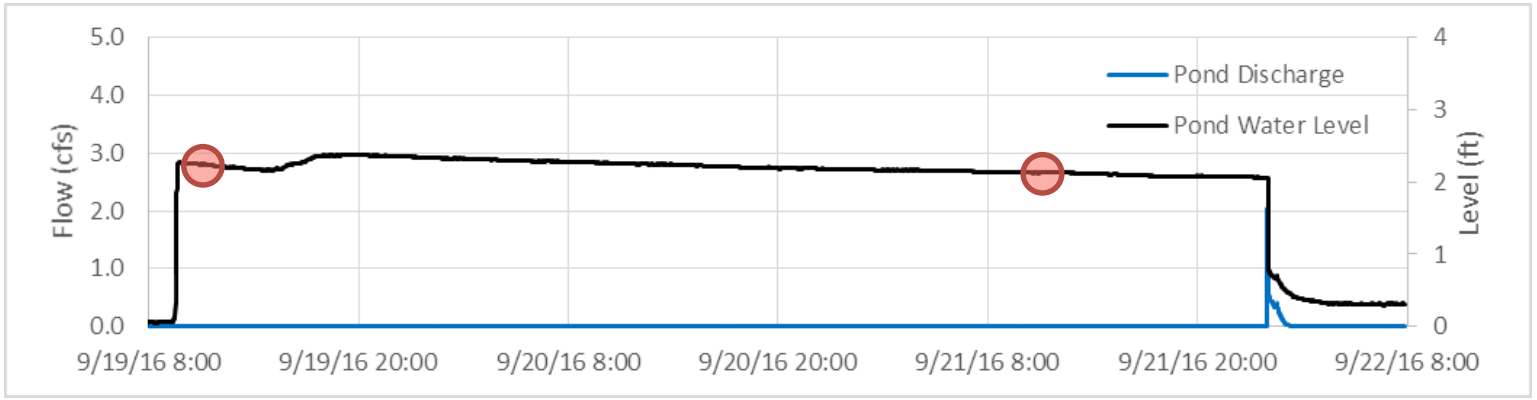
No Outflow Control



CMAC Retrofit



Frost Dry Pond – September 19, 2016 Rainfall Event



9/19/2016 9:35AM

9/21/2016 10:04AM

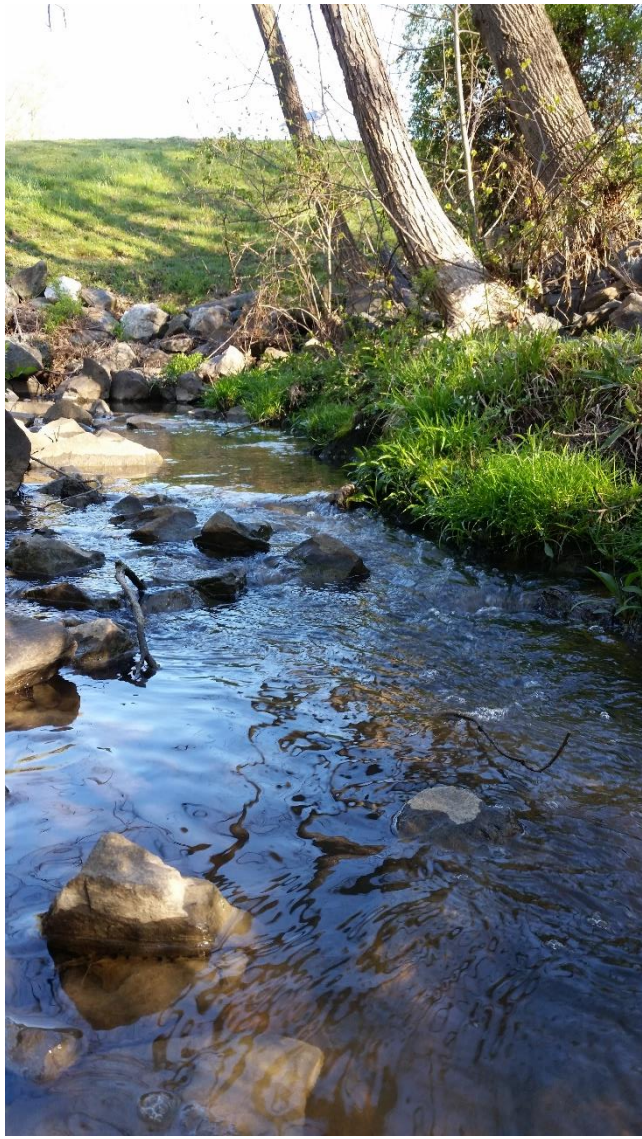
Case Study: Montgomery County, MD

peak flow reduction + water quality

15 ac-ft

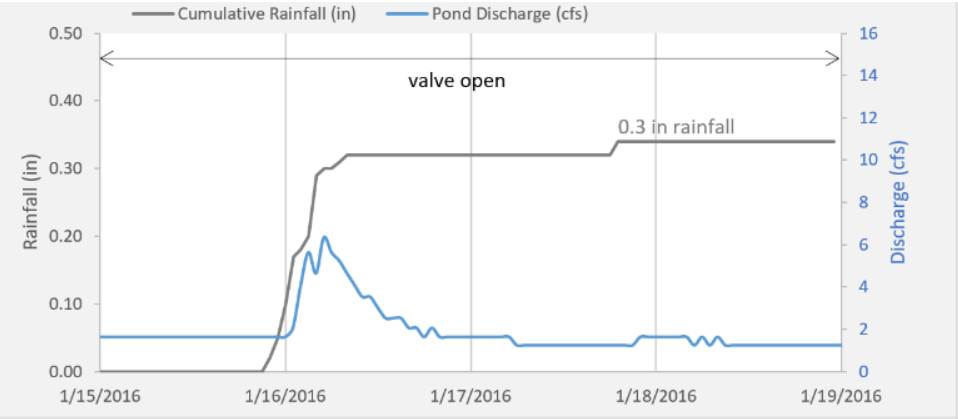
Adaptively Controlled Detention/Retention

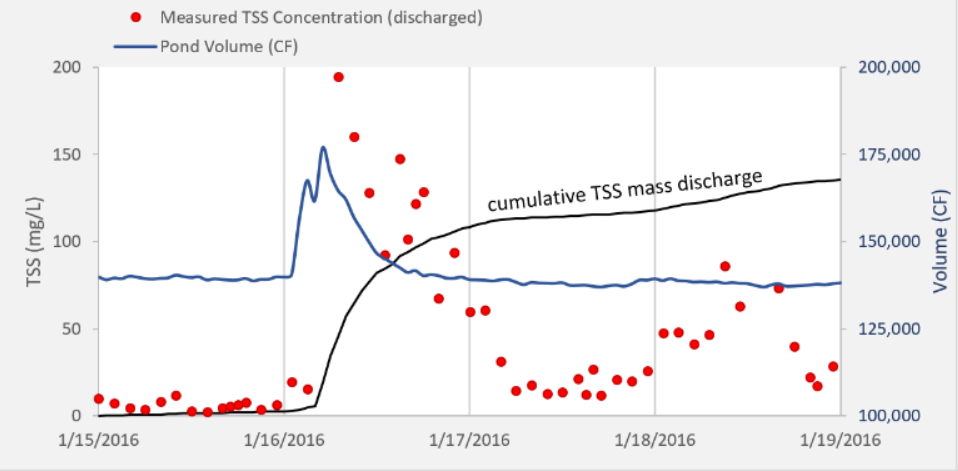
Performance Study – University Blvd Wet Pond



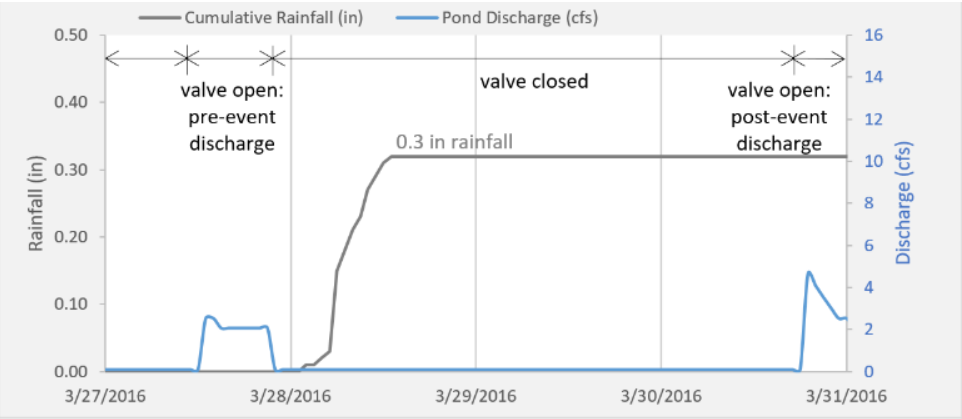
University Blvd Wet Pond – TSS Removal Comparison

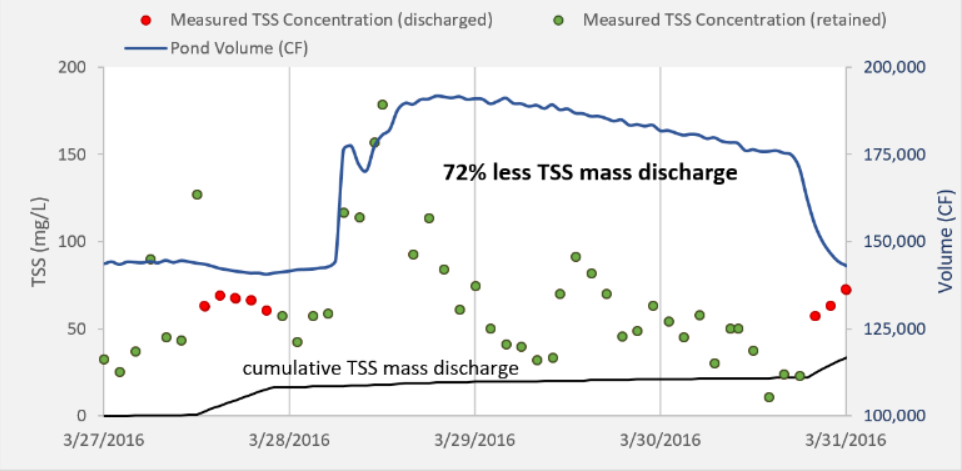
Passive Baseline



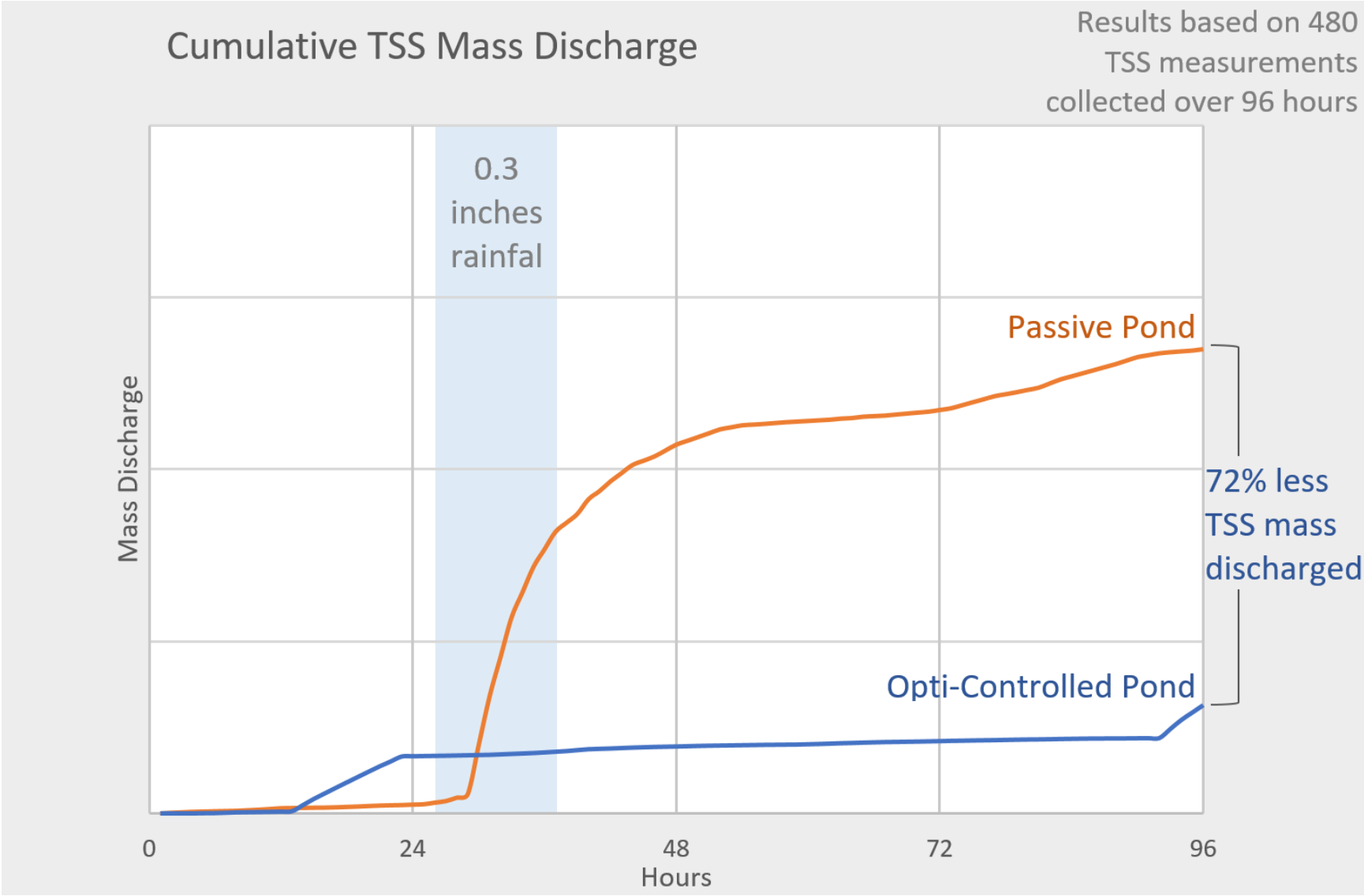


Active Control





University Blvd Wet Pond – TSS Removal



Case Study: CMAC on Cintas Property for CSO Mitigation - Philadelphia

8-acre Drainage Area
Adaptively Controlled Retention

Opti

PHILADELPHIA WATER

Case Study: CMAC Cintas Property - Philadelphia

Land Cover	Area		CN*
	Square Feet	Acres	
Impervious - Parking, Building, Islands**	225,546	5.18	98
Stone	72,519	1.66	89
Grass/Vegetated	42,038	0.97	74

Objective:
Prevent Wet
Weather Flow

Case Study: CMAC Cintas Property - Philadelphia

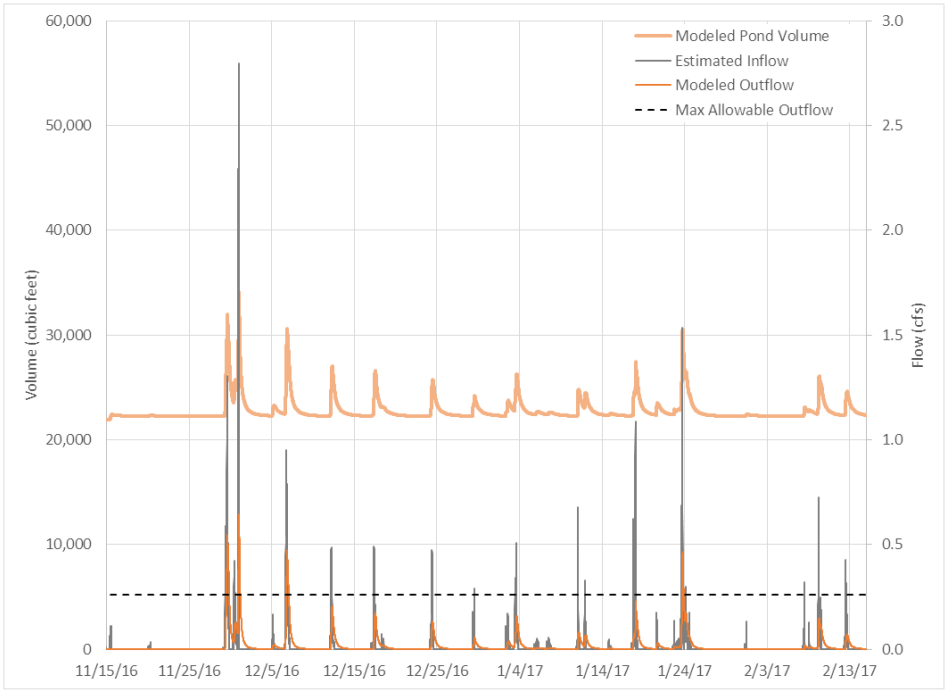
Project Timeline (award to run)	**6 months**
Incremental Benefit	**3.3 Green Acres**
Capital Cost	**$48,000/GA**
Net Savings for Cintas	**~$17,000/yr**

CINTAS®
READY FOR THE WORKDAY®

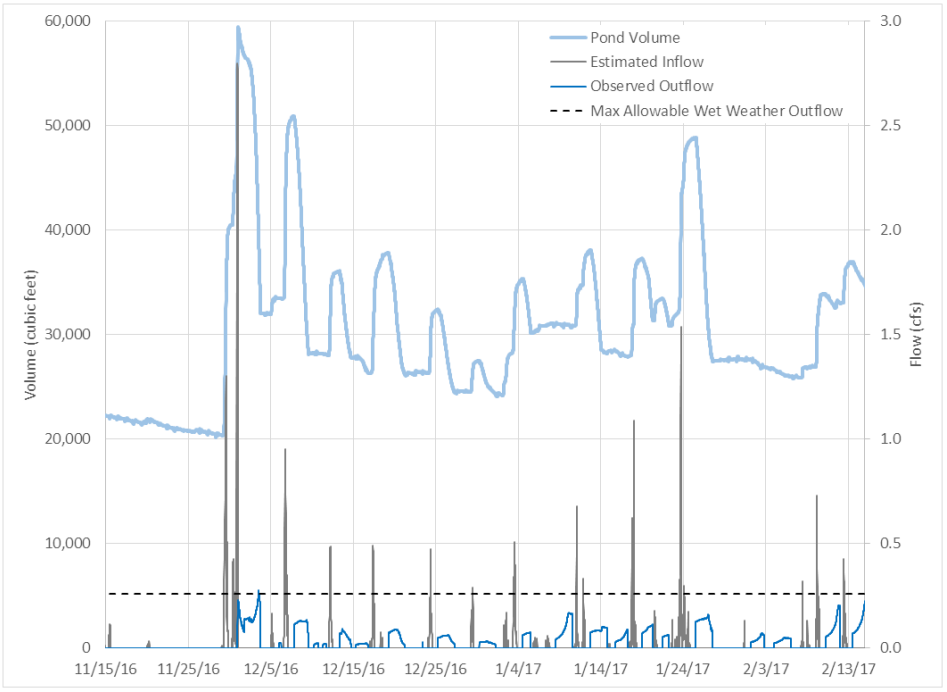
Case Study: CMAC Cintas Property - Philadelphia

The Opti-enabled pond prevented 0.97 million gallons of wet weather flow during a 3 month period

PASSIVE POND



ACTIVE CONTROL POND



Thank you

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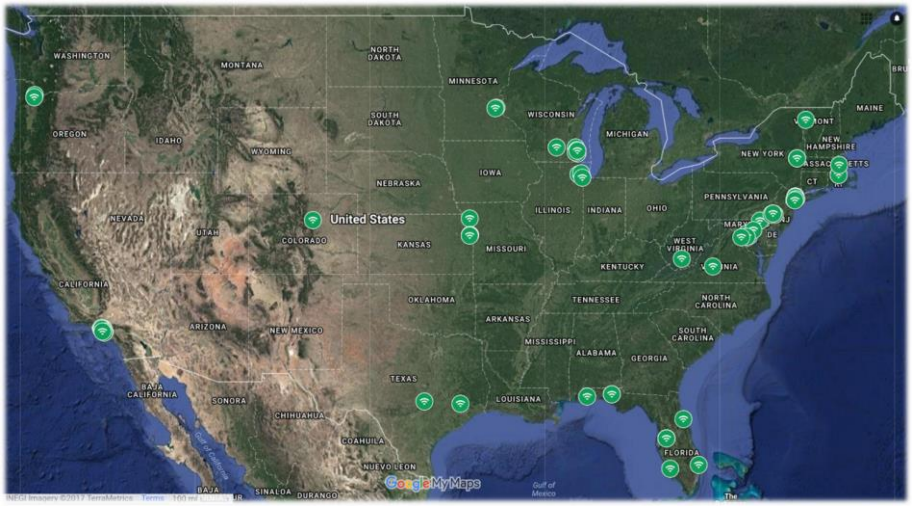


Trusted Technology Partners

Microsoft

SIDEWALK LABS

Appendix

Case Study: Chicago

Smart Green Infrastructure Monitoring

Microsoft AECOM UI LABS SENFORMATICS Sensing • Informatics • Innovation Opti

Pilot at UILabs' bioswale - Goose Island, Chicago

Mayors Explore Data-Driven Sustainability Solutions with Opti, City Digital Partners

Mayor of London Sadiq Khan tours green technology pilots in Chicago with Mayor Rahm Emanuel

NEW CLOUD-BASED PLATFORM ADDRESSES URBAN FLOODING THROUGH GREEN INFRASTRUCTURE PERFORMANCE MONITORING

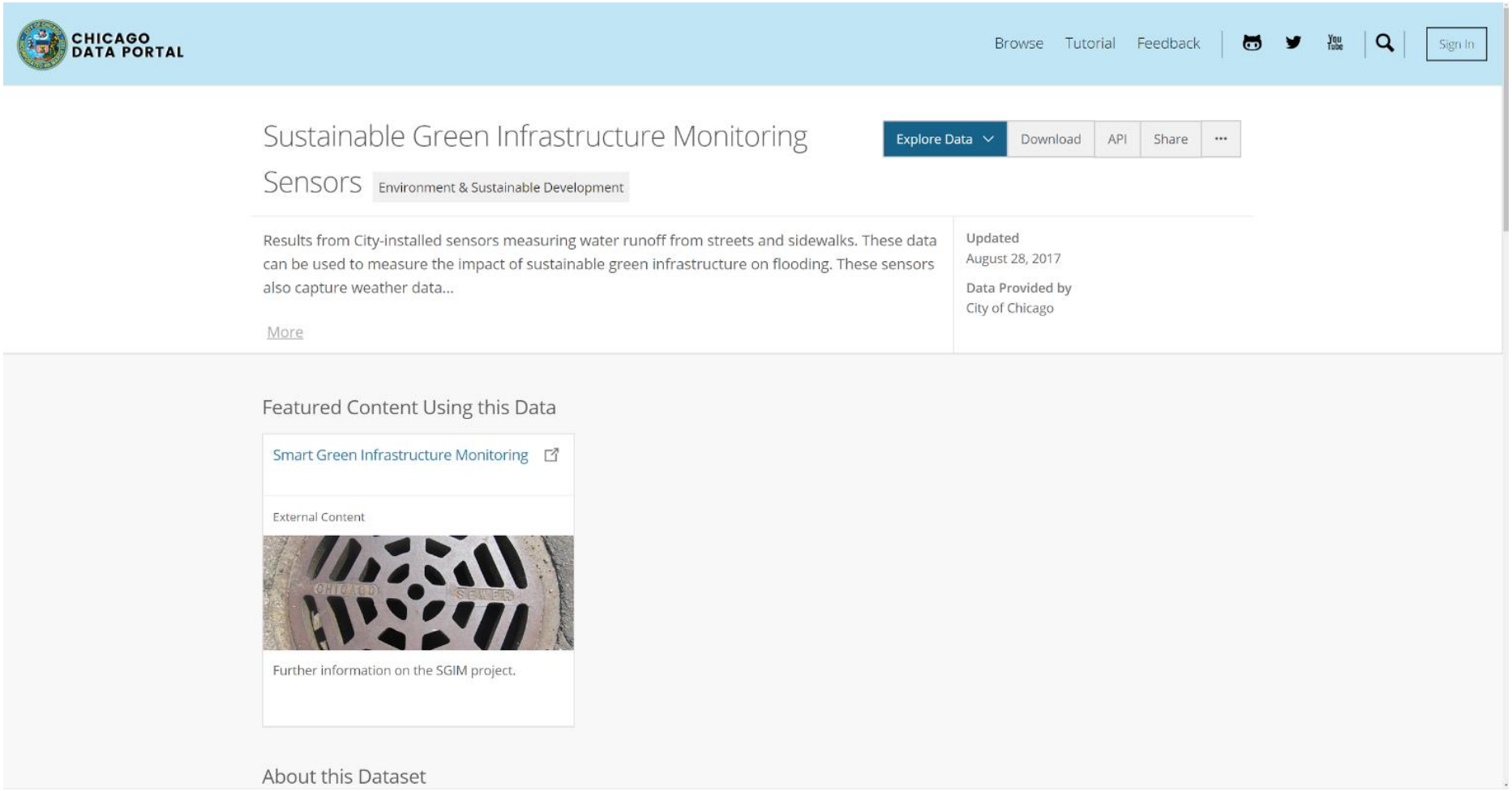
December 6, 2016

City Digital has assembled technology to enable citywide sustainable stormwater management

CHICAGO (December 6, 2016) – City Digital today announced the successful deployment of a new solution that combines sensors and cloud-based analytics to evaluate the performance of sustainable stormwater management techniques. Using data collected from green infrastructure sites in Chicago, the platform helps to reduce urban flooding and prevent millions of dollars in property damage.

Opti monitoring platform

Data is Currently Flowing to the Public Live on the Chicago Data Portal



Field View of Typical Hardware Components