

The Metropolitan

Water Reclamation District

of Greater Chicago

**WELCOME
TO THE AUGUST EDITION
OF THE 2015
M&R SEMINAR SERIES**

BEFORE WE BEGIN

- PLEASE SILENCE CELL PHONES OR SMART PHONES
- QUESTION AND ANSWER SESSION WILL FOLLOW PRESENTATION
- PLEASE FILL EVALUATION FORM
- SEMINAR SLIDES WILL BE POSTED ON MWRD WEBSITE (www.MWRD.org: Home Page ⇒ Reports ⇒ M&R Data and Reports ⇒ M&R Seminar Series ⇒ 2015 Seminar Series)
- STREAM VIDEO WILL BE AVAILABLE ON MWRD WEBSITE (www.MWRD.org: Home Page ⇒ MWRDGC RSS Feeds)

Bethany Bezak, PE, LEED AP

Current: Green Infrastructure Manager , DC Water in Washington, DC.

- Experience:**
- Manage DC Water's GI implementation for the DC Clean River Project, which is \$2.6 Billion consent decree program to reduce CSO to the rivers in DC area; Responsible for planning and siting, engineering design, construction oversight, contract schedule management and budget
 - *Associate Engineer with Wetland Studies and Solutions, Inc. in Gainesville, VA.* Planning, design, and construction of GI, stormwater management and stream restoration
 - Presentations: rainwater harvesting, GI and low impact development, LEED and sustainable construction practices and stream restoration

Education: B.S. In Civil Engineering and Architecture, Lawrence Technological University, Southfield, MI
M.S. in Biological Systems Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA

Profession: Professional Engineer in VA and the District of Columbia
LEED (Leadership in Energy and Environmental Design) Accredited Professional



Briefing on:

***DC Clean Rivers Project: Large-Scale Green
Infrastructure Implementation in DC for
Combined Sewer Overflow Control***

Briefing for:

***Metropolitan Water Reclamation
District of Greater Chicago,
Seminar Series***



August 28, 2015

Agenda

- Background
- DC Clean Rivers Project
 - Overview
 - Consent Decree Modification Process
 - Green Infrastructure Implementation Next Steps
 - Drivers for Long-term Success



Background:

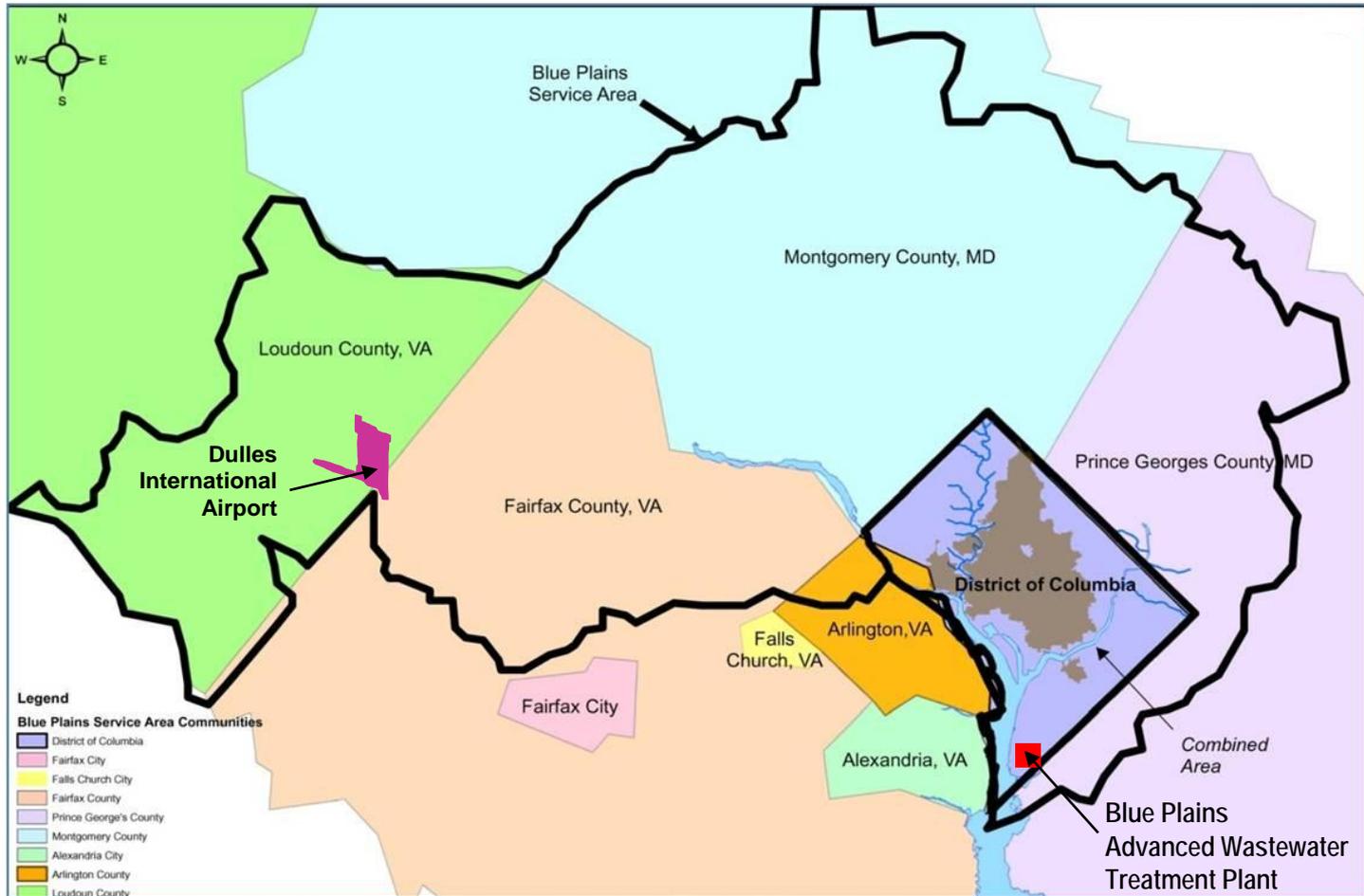
The District of Columbia Water and Sewer Authority (DC Water)

- Provides
 - Drinking water distribution for DC
 - Required wastewater collection and treatment
 - Stormwater collection and conveyance
- Treats wastewater for a population of 2.1 million
 - District of Columbia
 - Montgomery & Prince George's Counties, MD
 - Fairfax & Loudoun Counties, VA
- Operates the world's largest Advanced Wastewater Treatment Plant
 - Average daily capacity, 370 mgd
 - Peak daily capacity, 1 billion+ gallons
- Serves a regional area of approximately 725 Sq Mi



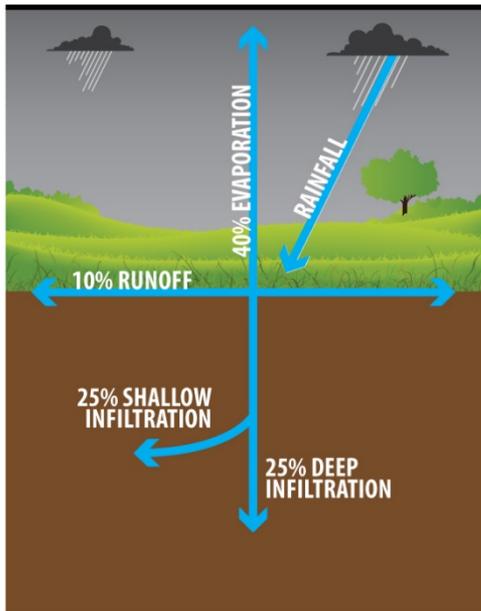
Blue Plains Advanced Wastewater Treatment Plant

Background: Who We Serve (Blue Plains Service Area)



Background: Comparing Natural vs. Built Environment

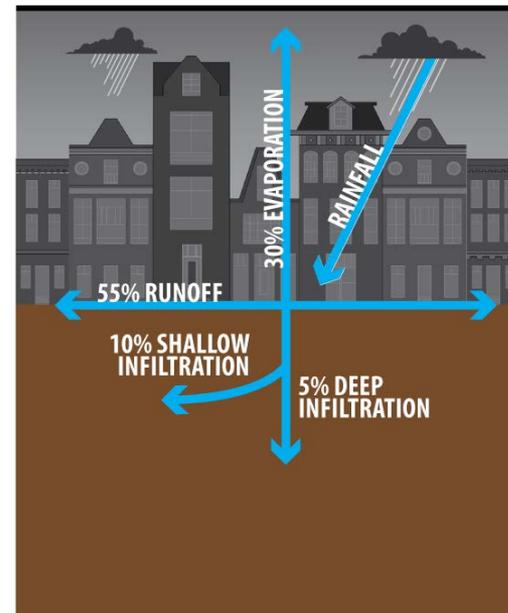
NATURAL ENVIRONMENT
(natural ground cover)



Natural Environment:

0% Impervious
Surface

URBAN ENVIRONMENT
(75% - 100% impervious cover)

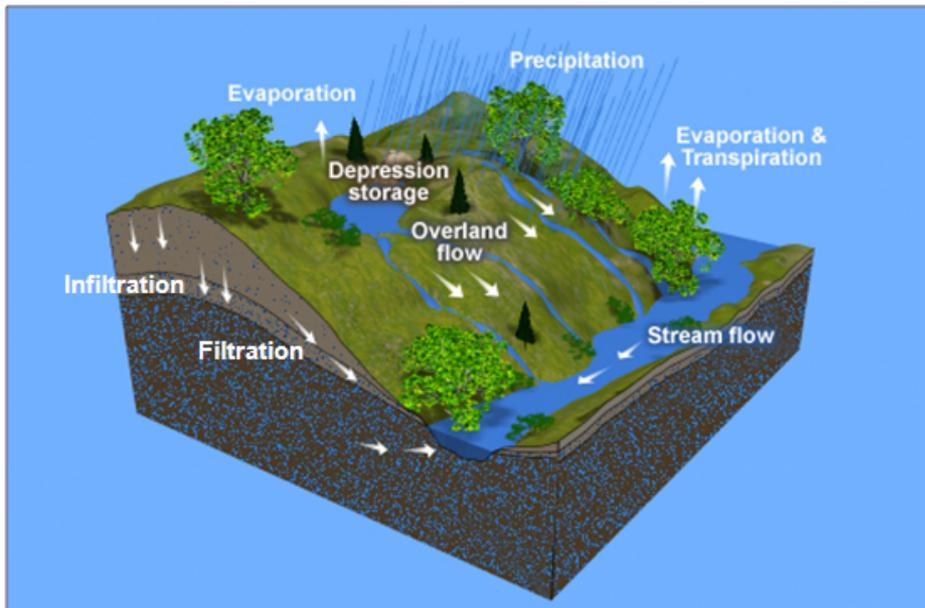


Built Environment:

75-100% Impervious
Surface

Background: Types of Green Infrastructure

- Green infrastructure technologies mimic natural processes by capturing, slowing and cleaning stormwater before it enters the sewer system.



Bioretention/Rain Gardens
*Infiltration, Filtration, Detention
Storage, Evapotranspiration*



Permeable Pavement
*Infiltration, Filtration, Detention
Storage*



**Cisterns/Rain
Barrels**
Storage



Vegetated Swales
*Filtration,
Infiltration,
Evapotranspiration*



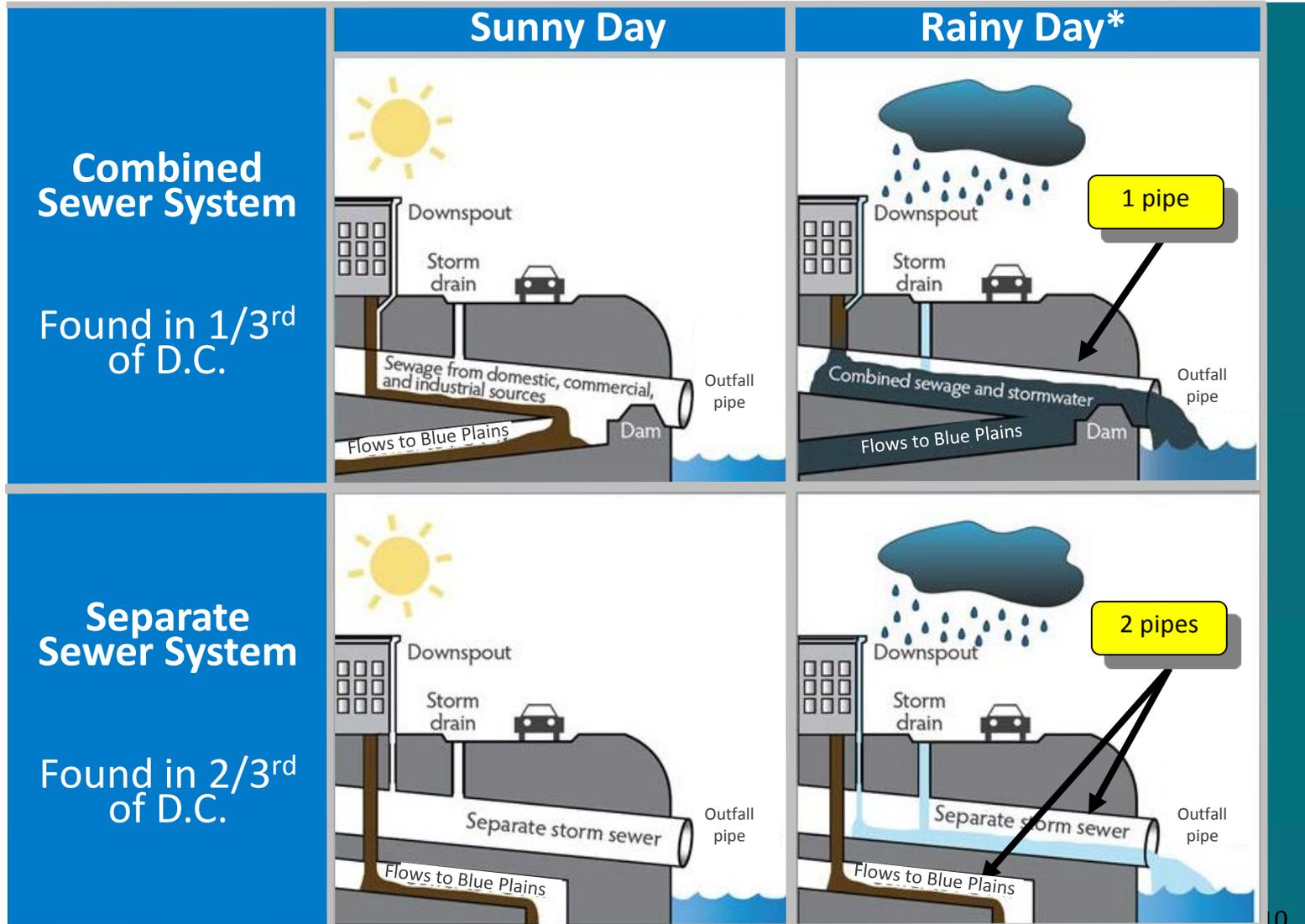
Native Landscaping
*Infiltration,
Evapotranspiration*



Green Roofs
*Filtration, Retention Storage,
Evapotranspiration*

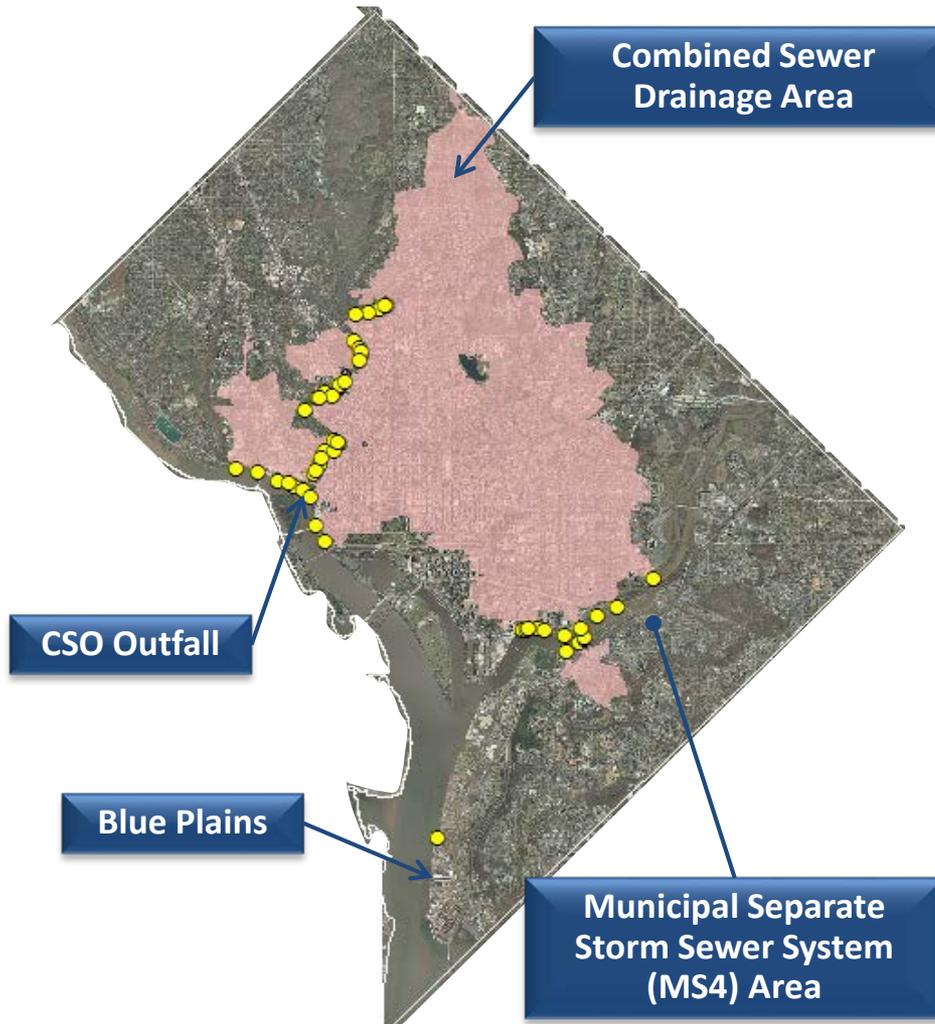


Background: Combined and Separate Sewer Systems



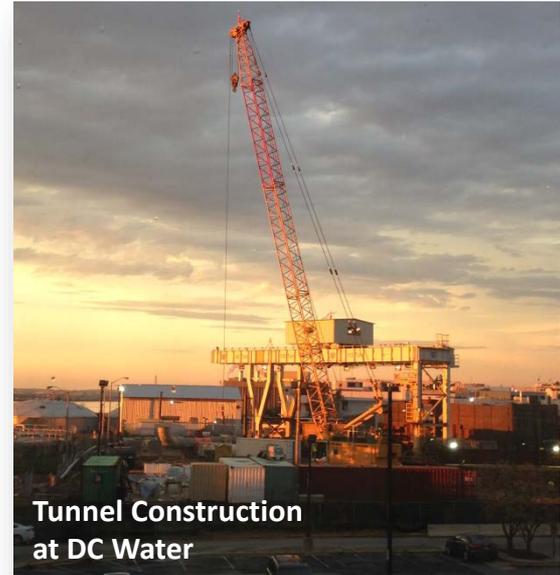
*Discharge occurs when pipe's capacity is exceeded

Background: Where are Combined Sewers Located?

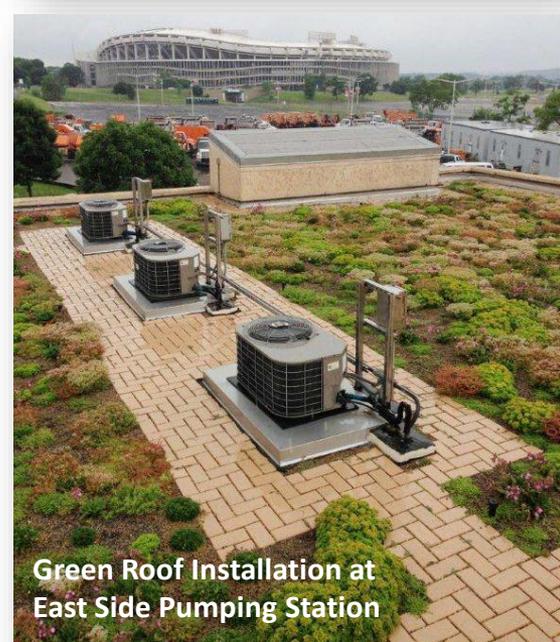


- 1/3 area is combined (12,478 acres)
- 47 Active CSO outfalls
 - 13 to Anacostia
 - 10 to Potomac
 - 24 to Rock Creek
- Three receiving waters
 - Anacostia River
 - Potomac River
 - Rock Creek

DC CLEAN RIVERS PROJECT OVERVIEW

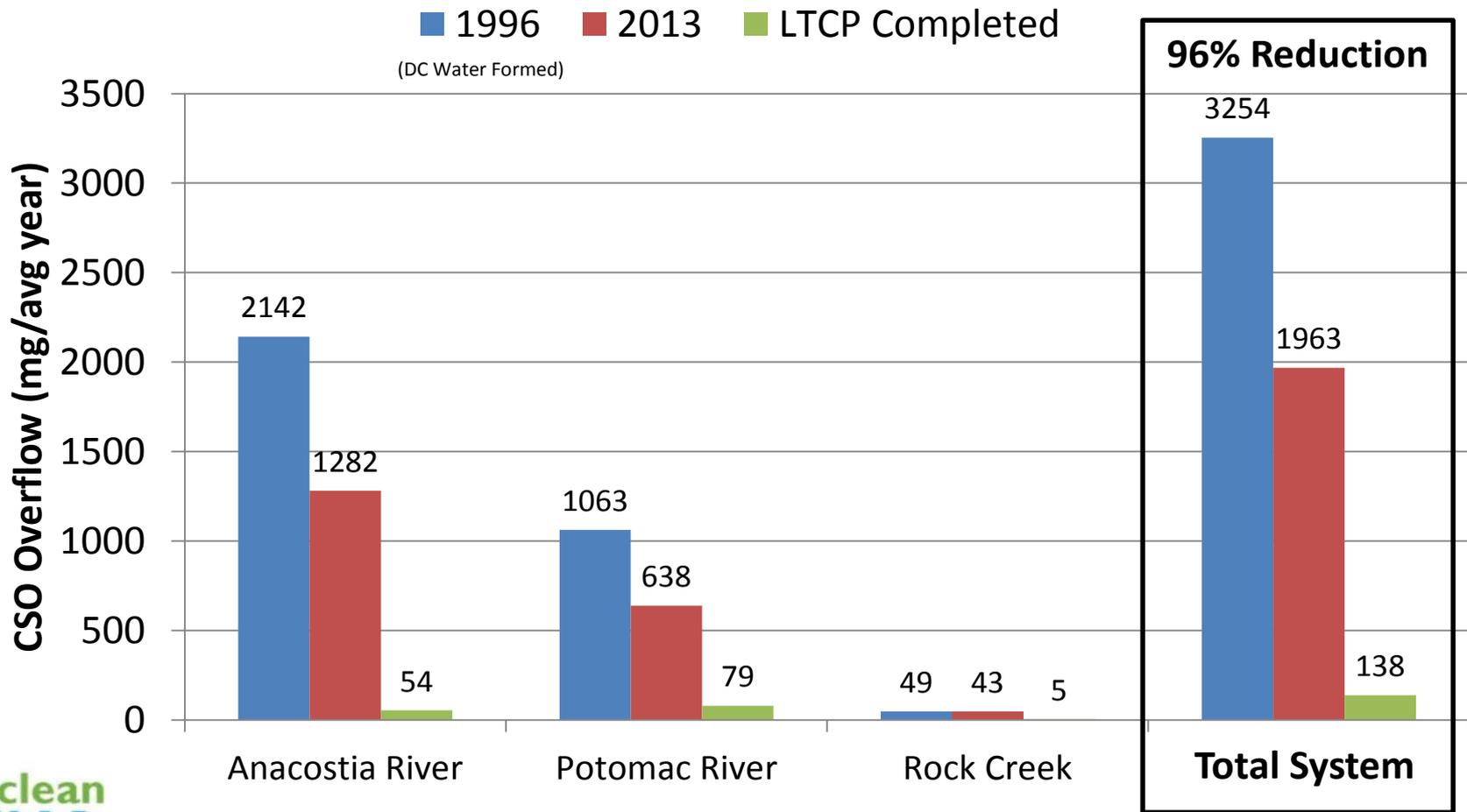


Tunnel Construction
at DC Water

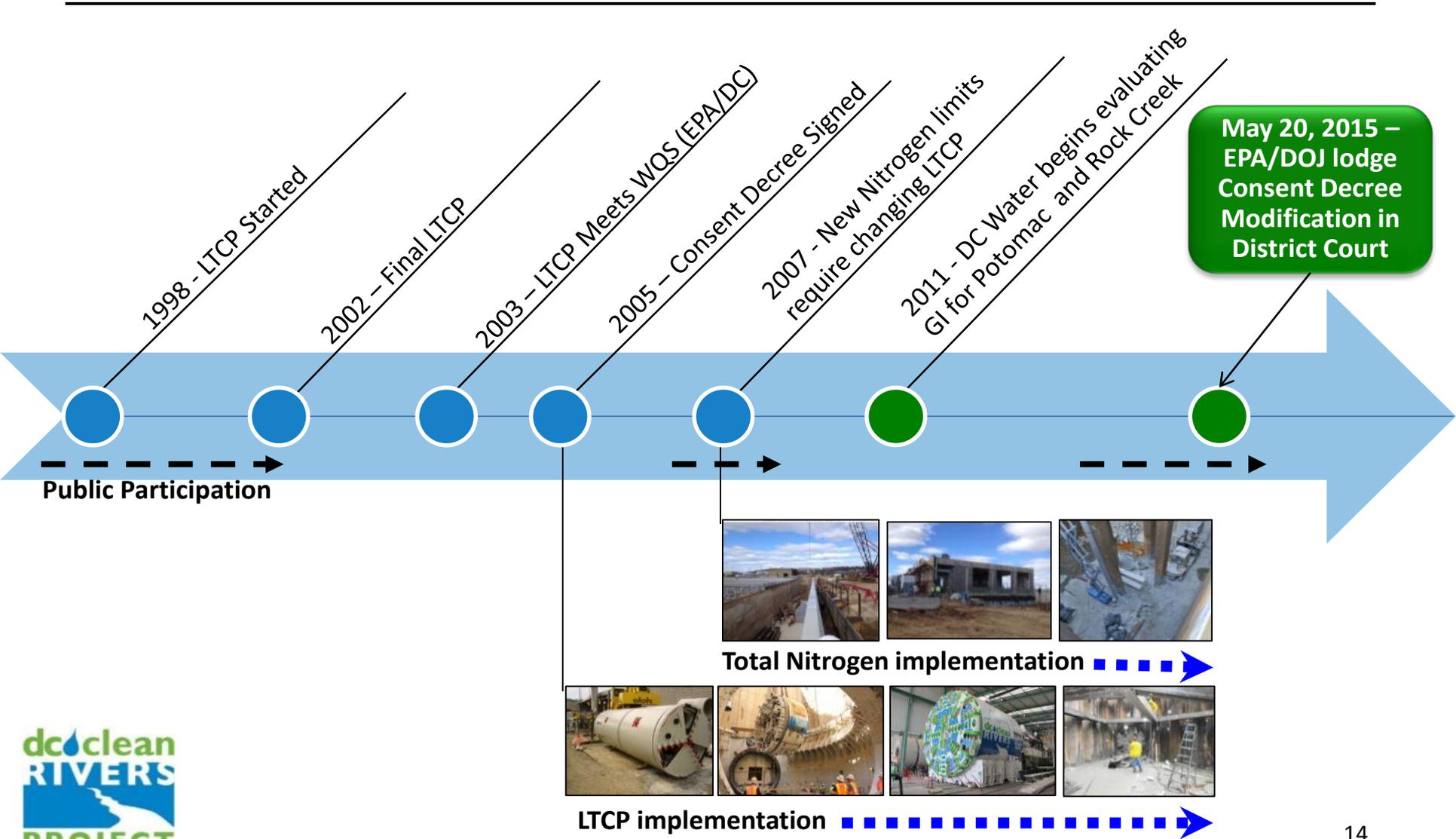


Green Roof Installation at
East Side Pumping Station

DC Clean Rivers Project: Magnitude of the Problem, DC Water's Solution



DC Clean Rivers Project: Long Term Control Plan Timeline



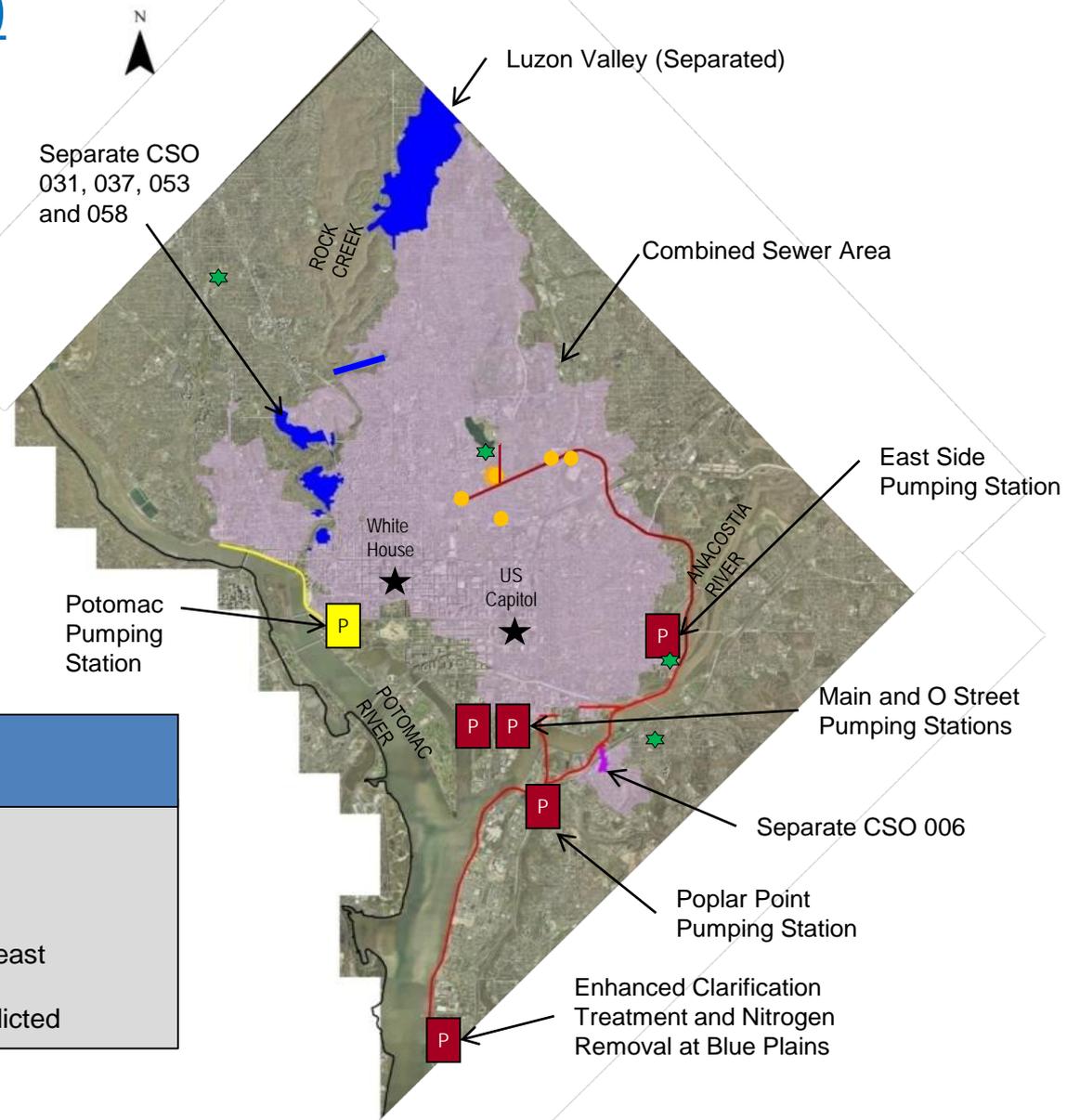
DC Clean Rivers Project (and Nitrogen Removal Programs): Scope (Prior to Modification)

LEGEND

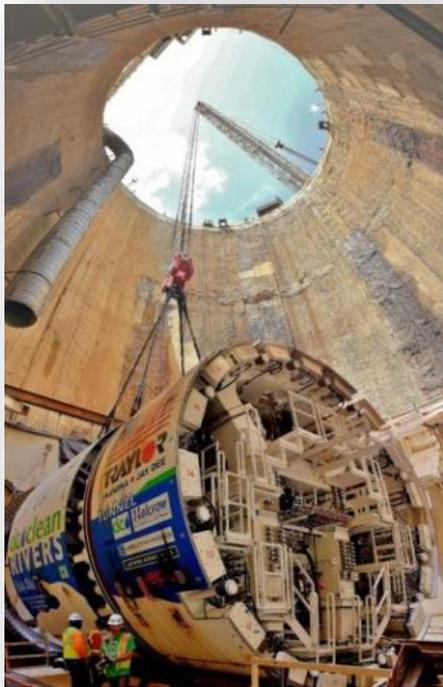
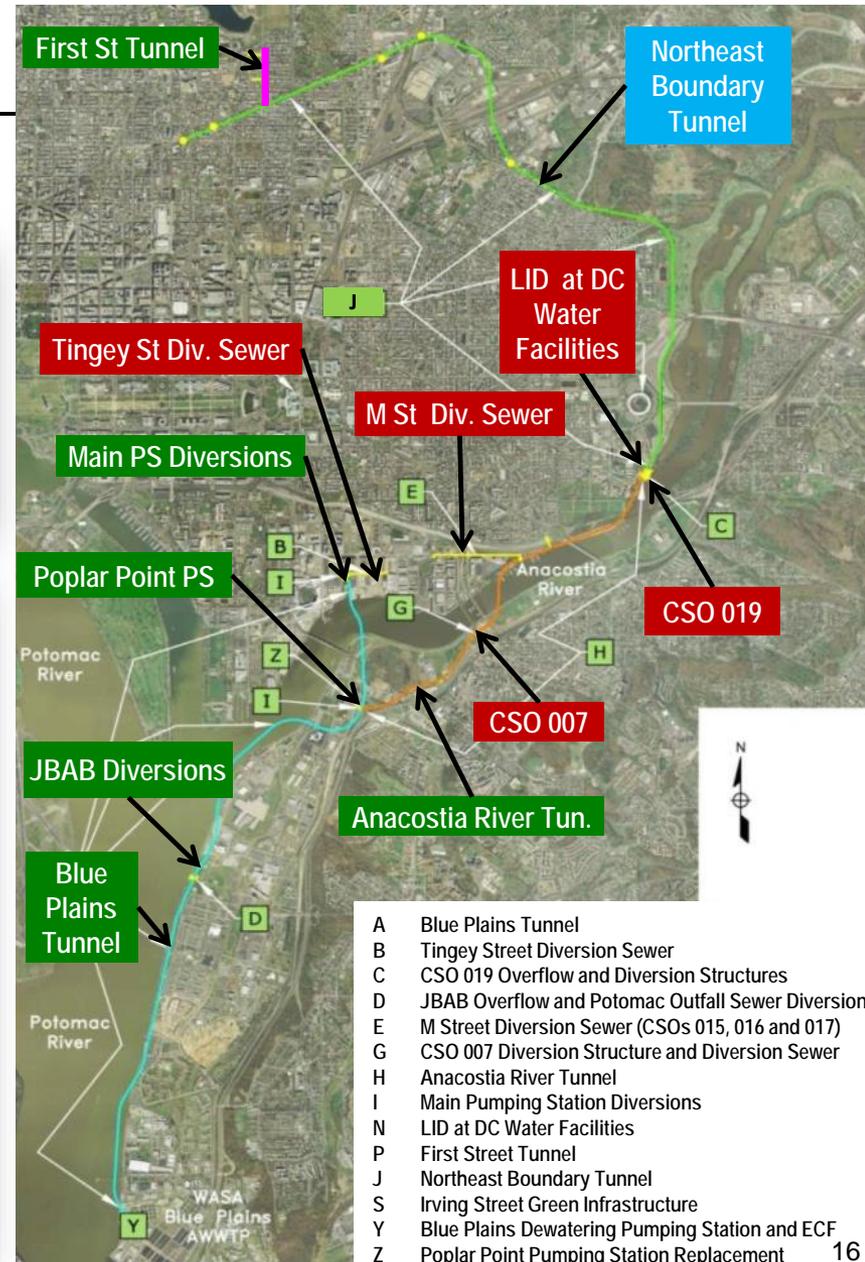
-  Anacostia River Tunnel System
-  Potomac River Tunnel
-  Piney Branch Tunnel
-  Pumping Station Rehabilitation
-  Known Flood Area
-  Green Infrastructure at DC Water facilities

DC CLEAN RIVERS PROJECT AND NITROGEN REMOVAL PROGRAMS

- DC Clean Rivers Project: \$2.6 Billion
- Nitrogen Removal: \$950 Million
- Total > \$ 3.5 Billion
- 20 yr implementation (2005 – 2025)
- 96% reduction in CSOs & flood relief in Northeast Boundary
- Approx 1 million lbs/yr nitrogen reduction predicted



DC Clean Rivers Project: More than **\$1.3 Billion** in Construction and Engineering Contracts Let



DC Clean Rivers Project: DC Water Typical Residential Customer Bill

	Current \$ (FY2015)	FY 2016 \$ Uniform	FY 2016 \$ Proposed
DC Water and Sewer Retail Rates	57.67	61.41	59.12
DC Water Clean Rivers IAC	16.75	20.30	20.30
DC Water Customer Metering Fee	3.86	3.86	3.86
DC Water Infrastructure Fee	-	6.30	6.30
Subtotal: DC Water Rates & Charges	78.28	91.87	89.58
Increase / Decrease		13.59	11.30
District of Columbia PILOT	3.08	3.14	3.14
District of Columbia Right-of-Way Fee	1.14	1.14	1.14
District of Columbia Stormwater Fee	2.67	2.67	2.67
Subtotal District of Columbia Charges	6.89	6.95	6.95
Total Amount Appearing on DC Water Bill	85.17	98.82	96.53
Increase / Decrease Over Prior Year		13.65	11.36
Percent Increase in Total Bill		16.03%	13.34%

Discount Application Available at:
<http://ddoe.dc.gov/riversmartrewards>

* Assumes 6.69 Ccf consumption, 1 ERU and 5/8" meter



MOVING TOWARD GREEN... CONSENT DECREE MODIFICATION PROCESS



Consent Decree Modification: Green Infrastructure for CSO Control is a Proven Technology

City	LTCP Time Frame (years)	Consent Decree w/ Green?	Annual Overflow Volume (Million Gallons)		
			Before LTCP	After LTCP	% Reduction
Kansas City (WSD)	25	Yes; 2010	6,400	768	88%
Cleveland (NEORSO)	25	Yes; 2010	4,500	500	89%
New York (DEP)	25	State approved; 2012	30,000	TBD – City wide LTCP due 2017	TBD – City wide LTCP due 2017
Philadelphia (PWD)	25	State approved (State – 2011) (EPA Admin order – 2012)	10,307 to 15,873	5,100 to 7,900	50% ±

Other cities with Consent Decrees that include Green Infrastructure:

Atlanta St. Louis Louisville Cincinnati Onondaga County, NY



Consent Decree Modification: DC Water's Approach to CSO Control

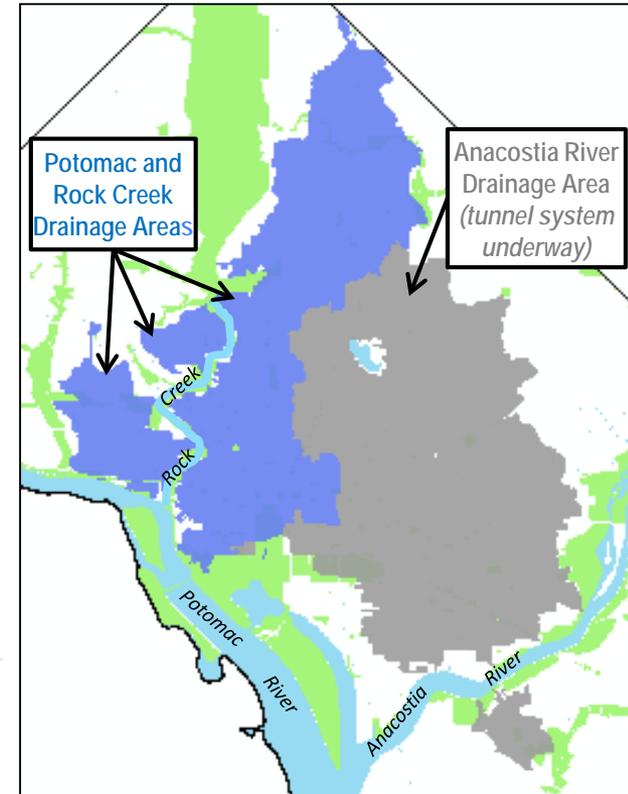


Anacostia River Projects

- DC Water is implementing tunnels
- Most severely impacted by CSOs
- GI will provide additional control

Potomac & Rock Creek Projects

- New approaches could be considered for these areas



Consent Decree Modification: GI Benefits (Environmental, Social and Economic)



Environmental

- Reduce runoff
- Improve air quality
- Reduce summer temperatures
- Reduce energy usage
- Offset climate change
- Habitat improvement



Social

- Enhance aesthetics
- Improve livability through green space
- Reduce scope and duration of disruption during construction



Economic

- Create green jobs
- Enhance property values
- Improve quality of life

Consent Decree Modification: DC Water invested more than \$14 M in GI

Planted more than 5500 trees via UFA, rain garden at Irving & North Capitol St.

\$1.7 M



Green Roofs, Pervious Pavement, and Bioretention at Three DC Water Facilities

>\$3.5 M



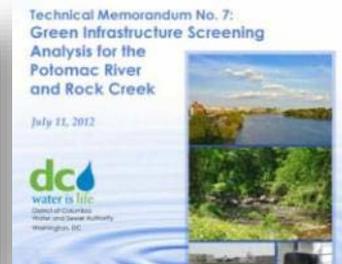
Funded RiverSmart Washington Demonstration Project

\$1 M



GI Challenge, LTCP Modification, and Early Action Projects

>\$4 M



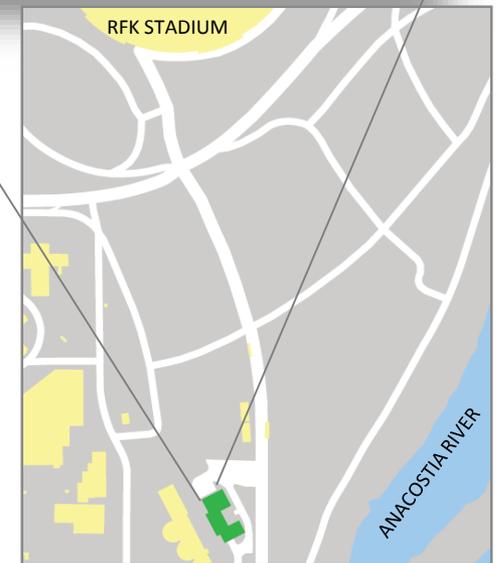
Irving Street Bioretention

>\$2.75 M



Consent Decree Modification: GI Retrofits at DC Water Facilities

- Goal:
 - Demonstrate green infrastructure implementation at DC Water Facilities
- Scope:
 - East Side Pumping Station
 - 6,570 sf Green Roof
 - Fort Reno Reservoir
 - 42,400 sf Green Roof
 - 8,400 sf of Pervious Pavement
 - Anacostia Water Pumping Station
 - 1,000 sf of Pervious Pavement
 - 1,500 sf bioretention area
- Status:
 - Projects completed
 - 1 year of post-construction monitoring underway
 - 5 year initial maintenance (contractor-performed) underway

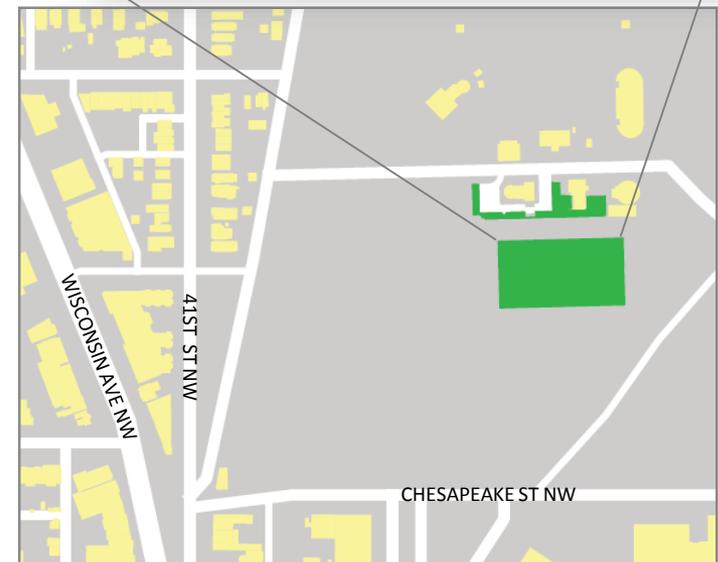


For more information please visit:

<http://www.dewater.com/giatdewater>

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Consent Decree Modification: GI on District Property

- Goal:
 - Built for flood mitigation as part of Mayor's Task Force on the Prevention of Flooding in Bloomingdale and LeDroit Park
- Scope:
 - 14 bioretention areas to capture runoff from roads and sidewalks
- Status:
 - Bioretention completed in 2014
 - 1 year initial maintenance period (contractor-performed) underway

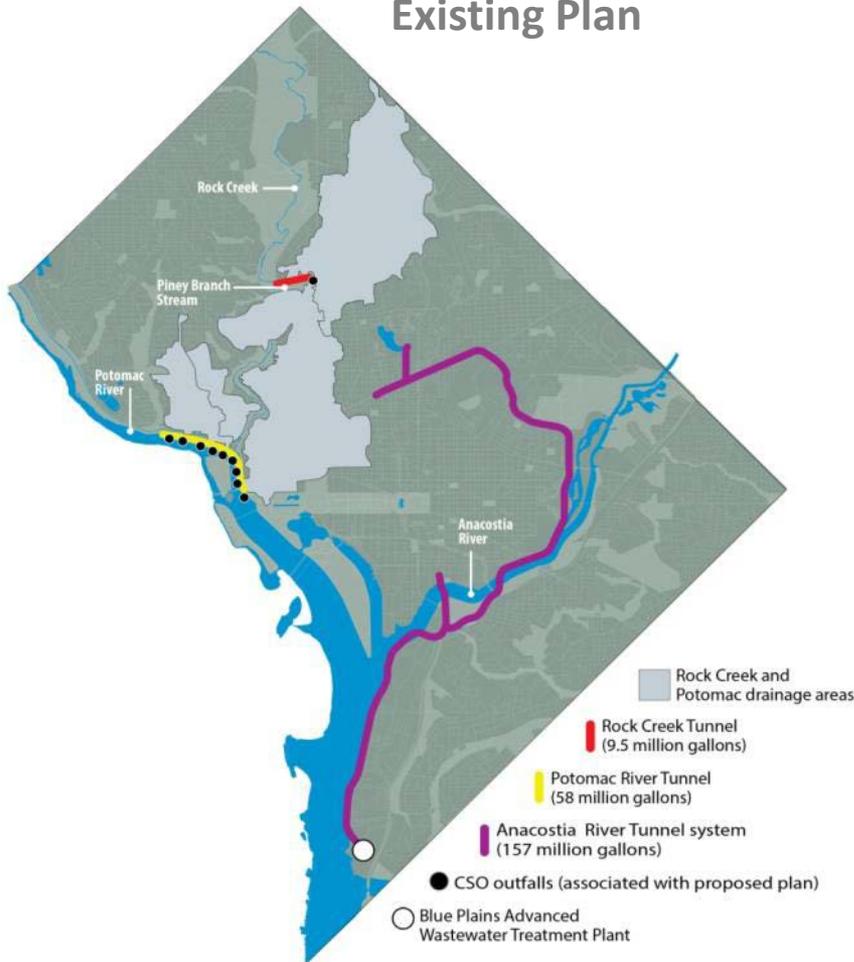


For more information please visit: <http://dcwater.com/irvingstreet>

Consent Decree Modification: Public Notice Plan (Draft Plan – 2014)

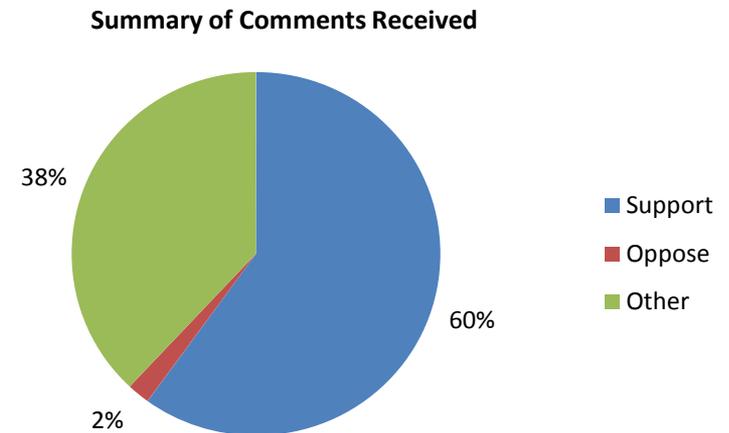
Existing Plan

Draft Proposed Plan



Consent Decree Modification: Public Comments on Modification

- Major public outreach effort
 - GI Summit
 - More than 14 public and ANC meetings
 - NPR radio interview
 - Social media, news articles, Youtube video and information depositories at libraries
 - Website
 - Dedicated e-mail address for receipt of digital comments
- Public notice – Jan 12, 2014
- Comment period ended – April 14, 2014
- 92 day period (extended once by 30 days)
- 366 commenters submitted 471 comments



Consent Decree Modification: Summary of Commenters

Environmental Groups	Governmental	ANCs, Civic Assoc.	Other	Citizens
<ul style="list-style-type: none"> American Canoe Assoc. Anacostia Watershed Society DC Env. Network Derek Booth, PE, PG, PhD consultant for EarthJustice Friends of Earth National Resources Defense Council Potomac Conservancy Potomac Riverkeeper Public Employees for Environmental Responsibility Rock Creek Conservancy Sierra Club Wentworth Green Strategies 	<ul style="list-style-type: none"> Mayor Gray DC Council MWCOG NCPC Nat'l Park Service 	<ul style="list-style-type: none"> ANC 1, 2A, 2E, 3B, 4A, 4C10 Citizens Assoc. of Georgetown Friends of Georgetown Waterfront Kennedy St. Development Assoc. Kingman Park Civic Assoc Ward 3 	<ul style="list-style-type: none"> Apartment & Office Bldg Assoc. DC Building Industry Assoc. DC Greenworks Georgetown University NACWA Washington Parks and People Design firms/consultants 	<ul style="list-style-type: none"> 177 letters via Wash. Interfaith Network Many citizen letters, e-mails and notes via survey monkey

Consent Decree Modification: Summary of Key Comments

1. Nature of Commitment

- Commit to performance measures (acres, gallons, CSO reduction) in lieu of financial commitment

2. Feasibility/ Effectiveness of GI

- Concern that GI may not be feasible to construct at scale required
- Concern that CSO control objectives would not be achieved

3. Schedule

- Concern about 7 year schedule extension
- Identify items that can be accelerated

4. Disruption due to Tunnel

- Concern about disruption due to tunneling, especially in Georgetown and National Park areas

5. Stewardship for Ratepayer Dollars

- Concern about costs and impact on ratepayers

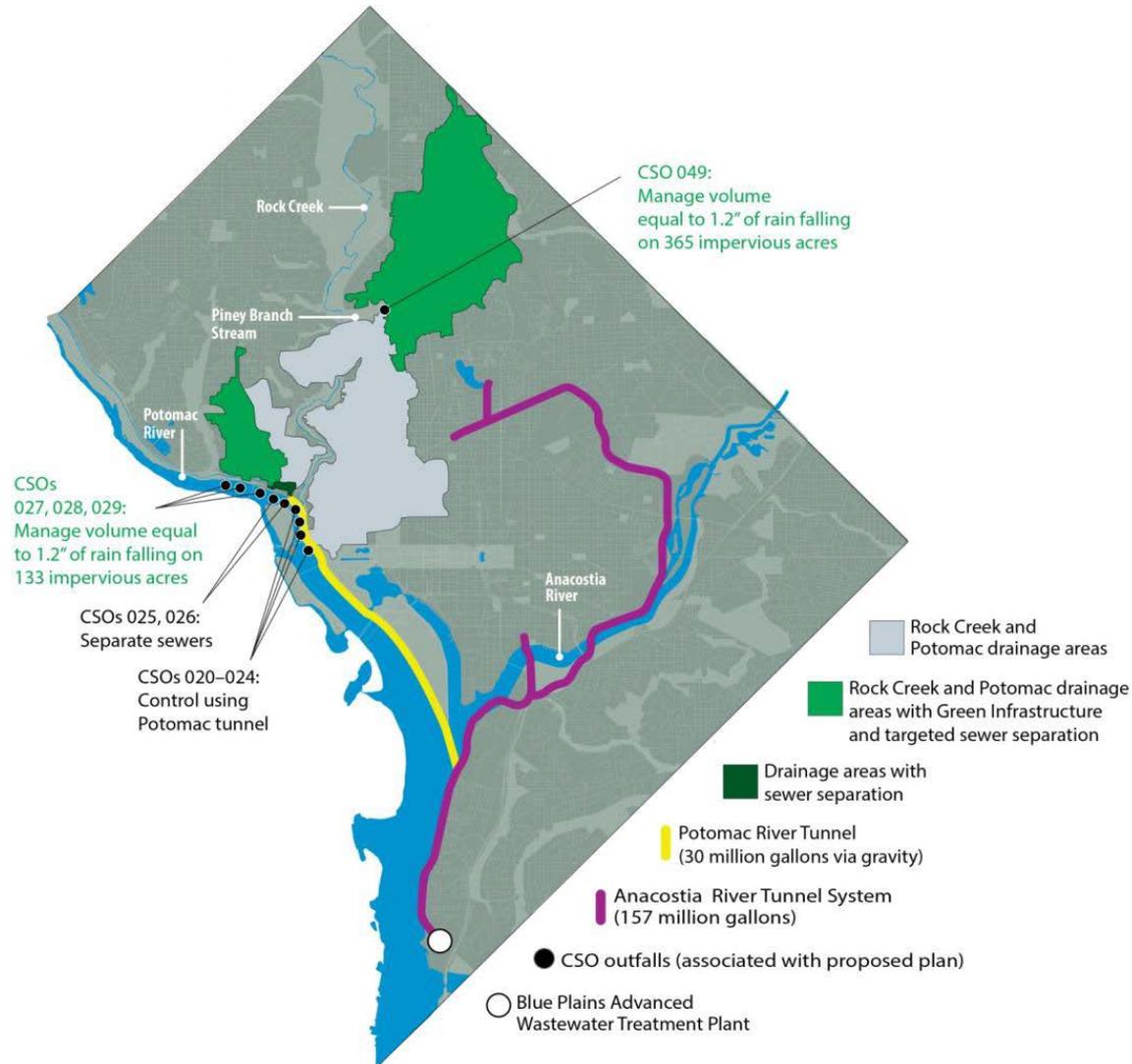
6. Maintenance

- Concern about commitment to maintenance to ensure long-term effectiveness

7. Green Jobs

- Support for green jobs at a living wage

Consent Decree Modification: Recommended Plan (2015)



Consent Decree Modification: Predicted CSO Reduction = Equivalent to Existing

Receiving Water	Parameter	Before LTCP ¹	LTCP	Recom. Plan ^{2,3}
Rock Creek (Piney Branch CSO)	No. Overflows (#/average year)	25	1	1
	Overflow Volume (million gallons/average year)	39.73	1.41	0.6
	% Reduction from Before LTCP	--	96%	>96%
Potomac River	No. Overflows (#/average year)	74	4	4
	Overflow Volume (million gallons/average year)	953	79	59
	% Reduction from Before LTCP	--	92%	≥92%

Notes:

1. Results shown for “Before LTCP” are without Phase 1 Controls in place (no Swirl, Inflatable Dams or Pumping Station rehabilitations)
2. The model predictions do not change the level of CSO control determined to be adequate to meet water quality standards which was included by DC Water in its LTCP, and subsequently approved by EPA and DDOE
3. Recommended Plan assumes full implementation of GI

Consent Decree Modification: Next Steps

- Obtain documents & more information at <http://www.dcwater.com/green>
 - LTCP Modification for Green Infrastructure
 - Executive Summary
 - Complete document (includes responses to comments in Appendix K)
 - Comments received
- U.S. Government-established public comment period on LTCP Consent Decree Modification lodged with Court
 - May 26 – July 27
 - Information on comment period available at: www.justice.gov/enrd/consent-decree/us-v-district-columbia-water-and-sewer-authority
- Modification entered with Court

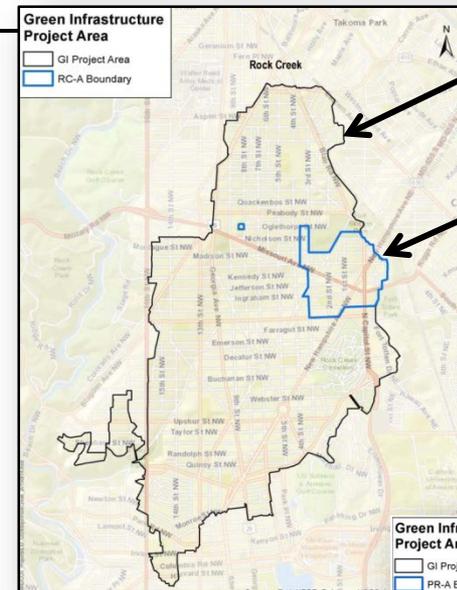


GREEN INFRASTRUCTURE IMPLEMENTATION NEXT STEPS



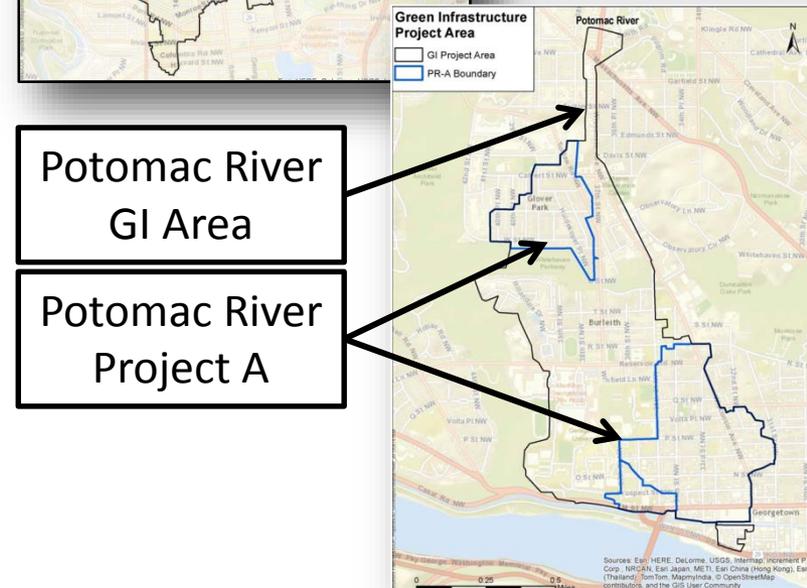
Green Infrastructure Implementation: Next Steps

- Development of Program Plan (or Facility Plan)
- Identification of first two GI projects under modified consent decree (Rock Creek Project A and Potomac River Project A)
 - Maximized Volume Capture
 - Feasibility of Design and Construction
 - Synergy with DC Agencies (DDOT, DOEE)
 - Maximizing Triple Bottom Line Benefits
 - Pre- and Post- Construction Monitoring
 - Facilitation of Maintenance
 - Minimized Cost
 - Compatibility with neighborhood needs and aesthetics



Rock Creek
GI Area

Rock Creek
Project A

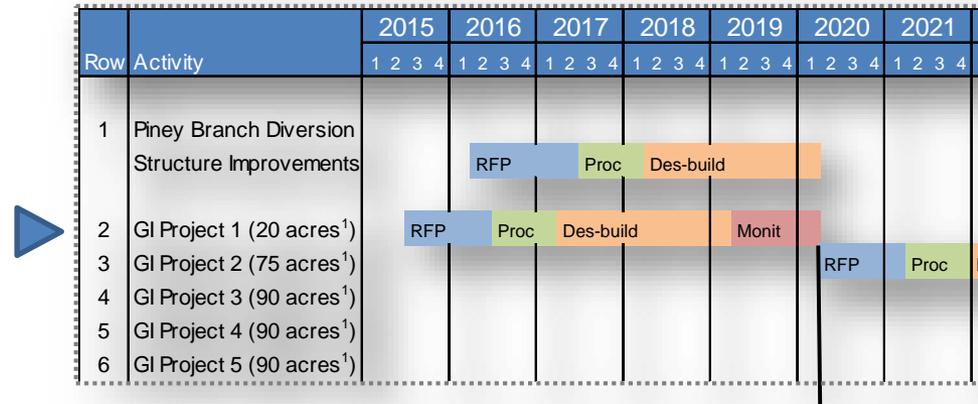


Potomac River
GI Area

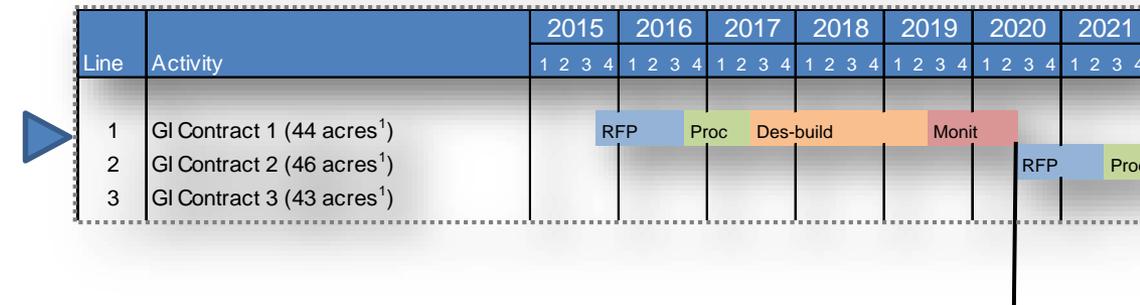
Potomac River
Project A

Green Infrastructure Implementation: Rock Creek and Potomac River Project A Schedules

- Rock Creek Project A:
 - RFP Development:
2015 – mid 2016
 - Procurement:
mid 2016 – early 2017
 - Design-Build:
early 2017 - 2019
 - Monitoring:
2019 – 2020



- Potomac River Project A:
 - RFP Development:
2015 - late 2016
 - Procurement:
late 2016 – mid 2017
 - Design-Build:
mid 2017 - 2019
 - Monitoring:
2019 - 2020



BEYOND VOLUME... DRIVERS FOR LONG-TERM SUCCESS



Pilot Green Roof Maintenance
Training Program



Beyond Volume Management: Adaptive Management and Innovation

- Adaptive Management approach built in to program schedule to:
 - Allow for lessons learned to be incorporated from subsequent projects
 - Gain cost and performance efficiencies over time
 - Facilitate maintenance
 - Incorporate new and innovative technologies
- One innovation example - GI Challenge:
 - Advance innovative technologies
 - Demonstrate cost effective solutions
 - Propose practical and implementable solutions that can be constructed

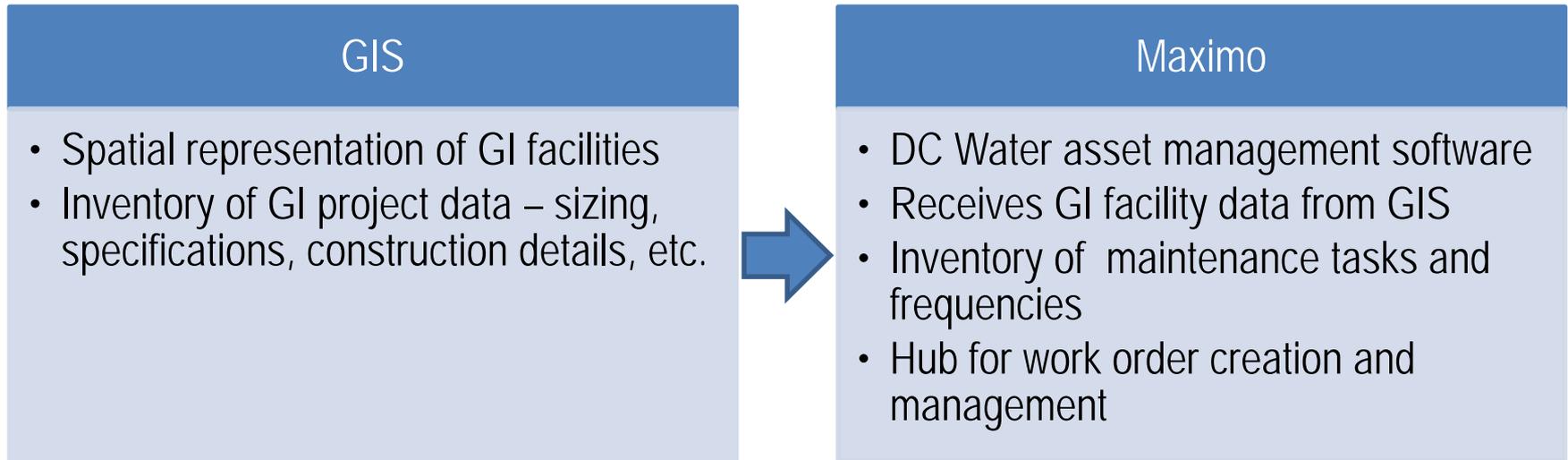


Beyond Volume Management: DC Water Maintenance Program Goals

- Green Infrastructure is maintained and managed just as grey infrastructure assets
- DCCR's Green Infrastructure Maintenance Program goals:
 - Function
 - Ensure GI function to meet performance requirements.
 - Safety
 - Ensure public and maintenance crew safety.
 - Aesthetics
 - Ensure GI maintains the original project aesthetic goal.

Beyond Volume Management: DC Water Maintenance Program Implementation

- To meet maintenance goals, DCCR is developing a comprehensive GI asset management program
- DC Water's Asset Management Program uses a combination of GIS and Maximo:



- Mobile application of Maximo under development to allow for maintenance activities to be logged in field and tracked in real time

Beyond Volume Management: Maintenance and Green Jobs

- Protect DC Water's GI investment and support long-term performance by ensuring trained maintenance staff have skill sets required and are available
 - 2014 Pilot Program Scope:
 - Green Roof Focus
 - Program ran in summer 2014
 - Recruited 10 underemployed candidates from soft skills training programs
 - 4 in-class technical sessions
 - 4 in-field sessions: DC Water Ft. Reno green roof and in-field "job shadowing" with local green roof contractors

For additional Information visit:

<http://www.dewater.com/giatdewater>



Beyond Volume Management: Opportunity for Local, Green Jobs

- Green Jobs Memorandum of Agreement
 - District of Columbia and DC Water
- Overall Goal
 - 51% of new jobs created by contracts or procurements entered into by DC Water with third parties to implement GI required by modified decree are filled by District residents
 - Applies to professional services, construction, inspection and maintenance activities

**Graduates of
Pilot Green Roof
Maintenance
Training Program**



Beyond Volume Management: Green Infrastructure Public Outreach and Partnerships

- DCCR GI Program engages with local environmental groups, DC Agencies and the community throughout all phases of a project:
 - Planning, Design, Construction, Monitoring and Maintenance
- Goals of the outreach include:
 - Information Sharing, Education/Raise Awareness, Participation/Call to Action, Partnership Building, Collaboration, etc.
- Highlighted partnerships include:
 - Universities, District Agencies, Community-Based Organizations, Local Schools



Beyond Volume Management: Outreach with Middle Schools

Goal:

- Educate and engage with students and teachers on STEM curriculum
- Build relationships with the community

Strategy:

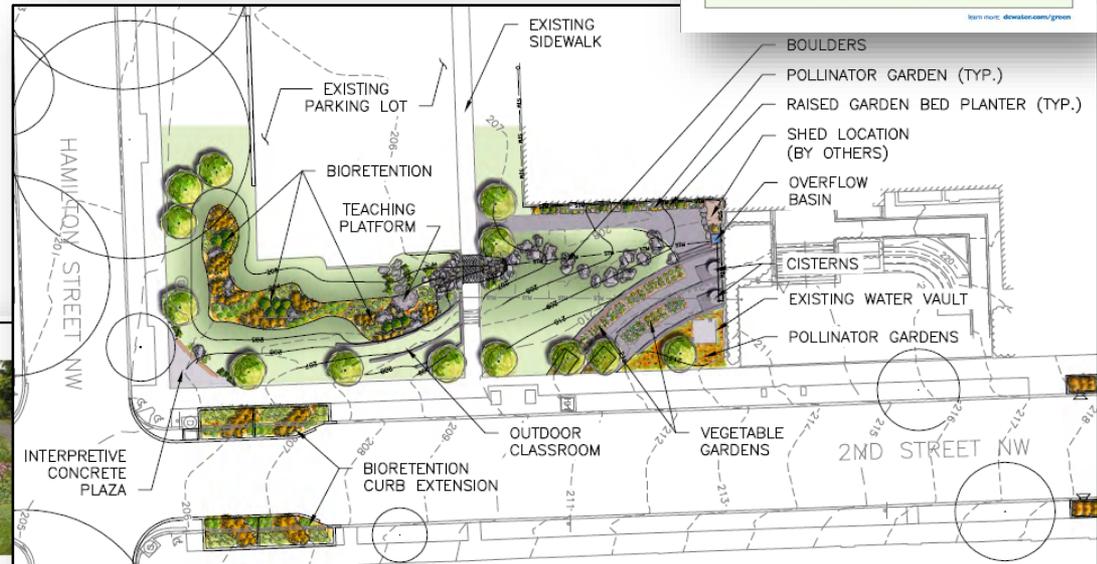
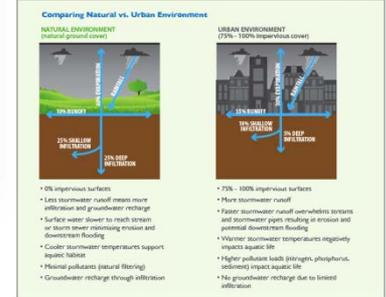
- Fact Sheets and Curriculum Building
- Videos
- Tours and Virtual Field Trips
- GI Designs for Campus



dc clean RIVERS water is life® PROJECT GREEN INFRASTRUCTURE FACT SHEET

What is Stormwater?
Stormwater is the water generated by rain or melted snow on "impervious surfaces" or surfaces that do not allow the water to soak into the ground such as roads, sidewalks, parking lots, and buildings.
Stormwater runoff occurs when rain or snowmelt flows over these impervious surfaces.

Why is stormwater runoff a problem?
Stormwater can pick up trash, excess nutrients such as nitrogen and phosphorus, sediment and other pollutants that flow into a storm sewer system or directly to a lake, stream, river, or wetland. Unreated stormwater runoff ends up in the waterbodies we use for swimming, fishing and providing drinking water.
Polluted stormwater runoff can have many adverse effects on plants, fish, animals and people. For example, trash can clog waterbodies, nutrients can cause algae blooms, and sediment impacts aquatic life.



Beyond Volume Management: Outreach with Wangari Community Gardens and District Agencies

Goal:

- Coordinate with Community Garden and District Agencies to build bioretention in public space

Strategy:

- DC Water partnered with Wangari Community Gardens to develop concept design of bioretention facilities such that garden space was preserved and pollinators/bird habitat was supported
- Provided members with rain barrels in partnership with Department of Energy and Environment (DOEE)
- Coordinated closely with Urban Forestry Administration (UFA) to achieve increased tree canopy with bioretention plantings
- Supported Wangari Community Gardens' activities via workshops, festivals, and monthly newsletters



Bioretention Installation
at Irving ST NW

Beyond Volume Management: Other Public Outreach Successful Strategies

Goal:

- Support overall DCCR goals and long-term success

Strategies:

- GI Summit
- Public and ANC Meetings
- Radio Interviews
- Festivals and Fairs
- Webpages
- Social Media, Press Releases, News Articles, and YouTube
- Dedicated Email Addresses
- Ribbon Cutting and Ground Breaking Ceremonies
- Many Others...



Questions?

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DC Water

DC Clean Rivers Project

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PARK(ing) Day, 2014

