Clean Rivers, Green District

*a Partnership between DC Water, DC and EPA*

Briefing for:

Federal Water Quality Association

Three R’s of Water Infrastructure
“Recovery, Resiliency, Renewal"

Maureen Holman, Esq.

March 21, 2013
Agenda

- DC Clean Rivers Project Background
- Green Infrastructure Program Overview
- Partnership Agreement
- GI Demonstration Project
- Opportunities for Collaboration
- Proposed Consent Decree Modifications
Clean Rivers, Green District

DC CLEAN RIVERS PROJECT BACKGROUND
DC Clean Rivers Project Overview

- DC Clean Rivers Project: $2.6 Billion
- Nitrogen Removal: $950 Million
- Total: $3.5 Billion
- 20-year implementation (2005–2025)
- 96% reduction in CSOs

---

- SEPARATE LUZON VALLEY
- PINEY BRANCH STORAGE TUNNEL
- ROCK CREEK REGULATOR IMPROVEMENTS
- SEPARATE FOUR ROCK CREEK CSOs
- POTOMAC STORAGE TUNNEL
- NE BOUNDARY AREA
- LOW IMPACT DEVELOPMENT-RETROFIT
- STORAGE TUNNEL
- REHAB EASTSIDE PUMPING STATION
- SEPARATE CSO 006
- TUNNEL DEWATERING PUMP STATION
- IMPROVEMENTS TO BLUE PLAINS WASTEWATER TREATMENT PLANT
### Anacostia River Projects: Implementation on Schedule

<table>
<thead>
<tr>
<th>Year</th>
<th>M St Diversion Sewers</th>
<th>LID @ Various DC Water Facilities</th>
<th>Main PS</th>
<th>Blue Plains Tunnel PS</th>
<th>JBAB Overflow &amp; Diversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>$41M Apr</td>
<td>$3M Jan</td>
<td>$40M Feb</td>
<td>$333M Sept</td>
<td>$25M Aug</td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Months shown on timeline indicate construction start dates.**

- **CSO 019**: $40M Sept
- **CSO 007**: $5M Apr Const, Complete Jan 2013
- **Tingey St Diversion Sewer**: $17M Jan
- **Poplar Point PS**: $31M Oct

---

*Illustration showing the Anacostia River Tunnel and area projects, $606M Mar 2016 – Mar 2023.*
*NE Boundary Tunnel and area projects, $606M Mar 2016 – Mar 2023.*
*First Street Tunnel, Nov 2012 – Mar 2016.*
*After 2018.*
*Before 2018.*
*RFK Stadium.*
*Joint Base Anacostia-Bolling.*
*DC Water Blue Plains AWWTP.*
*Potomac River.*
*U.S. Capitol Building.*
*Before 2018.*
*After 2018.*
Anacostia River Projects are Being Implemented on Schedule

Project Status Legend:

- **Completed**
- **Construction**
- **Procurement**
- **Design**
- **Prelim Engineering**

A  Blue Plains Tunnel
C  CSO 019 Overflow and Potomac Outfall Sewer Diversion
D  JBAB Overflow and Potomac Outfall Sewer Diversion
E  M Street Diversion Sewer (CSOs 015, 016 and 017)
G  CSO 007 Diversion Structure and Diversion Sewer
H  Anacostia River Tunnel
I  Main Pumping Station and Tingey Street Diversions
J  Northeast Boundary Tunnel
K  Northeast Boundary Branch Tunnels
L  Northeast Boundary Diversions
M  Mt. Olivet Road Diversions
Y  Blue Plains Dewatering Pumping Station and ECF
Z  Poplar Point Pumping Station Replacement

---

A  Blue Plains Tunnel
C  CSO 019 ($40 M)
D  JBAB Overflow & Diversion ($25 M)
E  M St Div. Sewer ($41 M)
G  CSO 007 Diversion Structure and Diversion Sewer ($5 M)
H  Anacostia River Tunnel ($291 M)
J  Main PS Diversions ($40 M)
K  NEB Branch Tunnels & Diversions ($283 M)
L  Northeast Boundary Branch Tunnels ($283 M)
M  Mt. Olivet Rd Diversions ($41 M)
N  LID @ DC Water Facilities ($3 M)
Y  Blue Plains Dewatering Pumping Station and ECF ($333 M)
Z  Poplar Point PS ($31 M)

---

**Costs:**

- Blue Plains Tunnel ($397 M)
- NEB Branch Tunnels & Diversions ($283 M)
- M St Div. Sewer ($41 M)
- CSO 007 Diversion Structure and Diversion Sewer ($5 M)
- CSO 019 ($40 M)
- Northeast Boundary Tunnel ($282 M)
- NEB Branch Tunnels & Diversions ($283 M)
- Northeast Boundary Branch Tunnels ($283 M)
- Mt. Olivet Rd Diversions ($41 M)
- LID @ DC Water Facilities ($3 M)
DC Water has Made Major Investments in the DC Clean Rivers Project

- Since consent decree signed, more than $600 M in engineering and construction contracts have been let for DC Clean Rivers Project
- On schedule, on budget

Tunnel Mining Site at Blue Plains

TBM Fabrication

Slurry Wall Construction at Shafts

CSO 019 H-Pile Foundation & Coffer Dam
# Mayor’s Task Force Report on the Prevention of Flooding in Bloomingdale and LeDroit Park

## Mayor’s Task Force Report (Dec 2012)

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul 2012</td>
<td>Bloomingdale Streets Report: Flood Mitigation Plan</td>
</tr>
<tr>
<td>Dec 2012</td>
<td>Mayor’s Task Force Final Report: Recommendations</td>
</tr>
<tr>
<td>Mar 2014</td>
<td>Nutall Street project Complete</td>
</tr>
<tr>
<td>Spring 2016</td>
<td>First Street Tunnel Complete</td>
</tr>
<tr>
<td>2022</td>
<td>North and South Tunnel Complexes Complete</td>
</tr>
</tbody>
</table>
Green Infrastructure Program Overview

Clean Rivers, Green District

GREEN INFRASTRUCTURE PROGRAM
OVERVIEW
Vision

Anacostia River Projects

DC Water is Implementing Tunnels

Most severely impacted by CSOs

GI will provide additional CSO control

Potomac & Rock Creek Projects

There is a brief window of time to consider new approaches

Green
Gray
Hybrid

- 74% of tunnel storage volume (116 mg) in service by 2018 (Blue Plains to RFK)

- Remainder of 157 mg in service by 2025
Approach

CD Modification Process
- Propose modification
- Public participation
- Respond to comments
- DCW & District seek EPA/DOJ support
- Federal Judge decides whether to accept

GI Demonstration Project
- Performance
- How much can be installed
- Cost effectiveness
- Address institutional Issues

Evaluate CSO Control Alternatives
- Evaluate degree of control
- Predict water quality
- Evaluate Triple Bottom Line benefits

Partnership Agreement

Implement

LTCP Update
Green Infrastructure (GI) Partnership Agreement

- **What it IS**
  - An agreement that establishes a framework and working relationship between EPA, the District and DC Water to advance GI
  - Joint support for sustainable storm water management yielding multiple benefits for community livability
  - An agreement that demonstrates the parties’ commitment to GI

- **What it is NOT**
  - A commitment of funds
  - A detailed plan or project agreement
  - A commitment to modify the consent decree
  - A public outreach plan
GI Initiative Complements District Visions of Sustainable DC

Supports Mayor Gray’s Vision for a Sustainable DC

- Green Economy – more local jobs
- Water – improve stormwater capture
- Climate – heat island reduction
- Nature – increased tree canopy
- Energy – less reliance on pumps

If fully implemented, GI would create over 3,500 jobs in the District over a 35-yr period (average of about 100 jobs per year)

Principal Provisions of the Agreement

All Parties (EPA, District, DC Water)

- Implement a Green Design Challenge to engage private sector in demonstrating and advancing GI
- Enlist participation by public and private organizations in a collaborative effort to develop next generation GI designs
- Facilitate participation by local academic institutions in various aspects of the GI Demonstration Project
- Actively involve the environmental community in the GI initiative to facilitate implementation based on an agreed upon course of action
- Review and assess the water quality benefits and impacts of alternative green and gray/green controls compared to the benefits and impacts of the controls now required in the Potomac and Rock Creek watersheds.
Intention of Revisions

- Need it to be a large scale demonstration – address entire subsewersheds
- Representative sites - not “cherry picked” so scale-up is realistic
- Sound technical basis
- Potential for innovative solutions and creative alliances
- Targeted performance is high degree of CSO control
- Resolution of institutional issues
- Analysis of other factors
  - Triple bottom line benefits
  - Public acceptability
  - Testing over several meteorological / climate cycles
  - O&M impacts

The magnitude of investment by DC ratepayers to control Potomac and Rock Creek CSOs requires a sound technical and institutional basis for making decisions
Systematic Analysis will be Documented in Technical and will be Vetted by Project Review Board

Technical Memoranda

- TM 1 – Public Participation
- TM 2 – Model Documentation & Approach to Modeling Green Infrastructure
- TM 3 – Proposed Green Infrastructure Project Plan
- TM 4 – District Green Infrastructure Experience
- TM 5 – Green Infrastructure Experience – Foreign & Domestic
- TM 6 – Green Infrastructure Technologies
- TM 7 – Sewershed Characterization
- TM 8 – Quantifying Added Benefits of Green Infrastructure
- TM 9 - Private Property Initiatives
- TM 10a – District and Federal Institutional Issues – Identification of Issues and Obstacles
- TM 10b – District and Federal Institutional Issues – Identification of Possible Solutions
- TM 10c – District and Federal Institutional Issues – Selection of Remedies
- TM 10d – District and Federal Institutional Issues – Legislation and MOUs
- TM 11 – Final Report on Demonstration Projects
- TM 12 – Bases for Cost Estimating
- TM 13 – Alternatives & Water Quality Standards Evaluation
What is the Green Infrastructure (GI) Partnership Agreement?

- **What it IS**
  - An agreement that establishes a framework and working relationship between EPA, the District and DC Water to advance GI
  - Joint support for sustainable storm water management yielding multiple benefits for community livability
  - An agreement that demonstrates the parties’ commitment to GI

- **What it is NOT**
  - A commitment of funds
  - A detailed plan or project agreement
  - A commitment to modify the consent decree
  - A public outreach plan
Clean Rivers, Green District

DEMONSTRATION PROJECT
Overall Site Selection Process

Demonstration Project Site Selection Scale:

- Project Region (Anacostia, Rock Creek, Potomac, Piney Branch)
- Sewershed
- Subshed

Tier 1: Existing "gray" infrastructure engineering plans

Tier 2: Sewershed "gray" infrastructure benefit

Tier 3: Monitoring capacity

Tier 4: Land cover and land use representativeness

Tier 5: Land cover and land use completeness

Tier 6: Estimated capital cost

Tier 7: Feasibility assessment

Tier 8: Redelineation based on field conditions
Site Selection Process – Tier 1

- Tier 1: Existing “gray” infrastructure engineering plans
  - Eliminate areas where “gray” infrastructure plans are substantially complete

- Possible areas narrowed down to:
  - Piney Branch
  - Rock Creek
  - Potomac
Site Selection Process – Tier 2

- Tier 2: Sewershed “gray” infrastructure benefit
  - Eliminate sewersheds where Green Infrastructure implementation will likely have negligible effect on the required implementation of gray infrastructure

- Possible areas narrowed down to:
  - 10 sewersheds
Site Selection Process – Tier 3

- Tier 3: Monitoring capacity
  - Eliminate portions of each CSO that contain major ambiguities between the GIS database and actual field conditions

- Possible areas narrowed down to:
  - 108 subsheds
Site Selection Process – Tier 4

- Tier 4: Land cover and land use representativeness
  - Eliminate subsheds that are not representative of their parent CSOs in terms of:
    - Land cover (perviousness and imperviousness)
    - Land use (public, public/private, and private)

- Possible areas narrowed down to:
  - 48 subsheds
## Acceptable Range of Representativeness

<table>
<thead>
<tr>
<th></th>
<th>Potomac</th>
<th>Piney Branch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall Sewershed Coverage*</td>
<td>Overall Sewershed Coverage*</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation ((\sigma)) of the Subshed Coverage</td>
<td>Standard Deviation ((\sigma)) of the Subshed Coverage</td>
</tr>
<tr>
<td></td>
<td>Acceptable Range for Representative Subsheds** (Sewershed % +/- (\sigma))</td>
<td>Acceptable Range for Representative Subsheds** (Sewershed % +/- (\sigma))</td>
</tr>
<tr>
<td><strong>Land Cover</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impervious Area</td>
<td>68%</td>
<td>52%</td>
</tr>
<tr>
<td></td>
<td>18%</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>51 - 86%</td>
<td>41 - 63%</td>
</tr>
<tr>
<td>Pervious Area</td>
<td>31%</td>
<td>48%</td>
</tr>
<tr>
<td></td>
<td>18%</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>13 - 49%</td>
<td>36 - 59%</td>
</tr>
<tr>
<td><strong>Land Use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>53%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>23%</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>31 - 76%</td>
<td>33 - 68%</td>
</tr>
<tr>
<td>Public / Private</td>
<td>14%</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>27%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>0 - 41%</td>
<td>0 - 11%</td>
</tr>
<tr>
<td>Private</td>
<td>32%</td>
<td>47%</td>
</tr>
<tr>
<td></td>
<td>24%</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>8 - 57%</td>
<td>30 - 64%</td>
</tr>
</tbody>
</table>
Site Selection Process – Tier 5

- Tier 5: Land cover and land use completeness
  - Eliminate subsheds that are not complete (at least 1%) in terms of:
    - Land cover ( perviousness and imperviousness)
    - Land use (public, public/private, and private)

- Possible areas narrowed down to:
  - 24 subsheds
Site Selection Process – Tier 6

- Tier 6: Estimated capital cost
  - Eliminate subsheds whose gross estimated capital cost exceeds $11 million

- Possible areas narrowed down to:
  - 13 subsheds
Site Selection Process – Tier 7

- Tier 7: Feasibility assessment
  - Eliminate subsheds in which field conditions indicated that monitoring would be prohibitively difficult

- Possible areas narrowed down to:
  - 10 subsheds
Site Selection Process – Tier 8

- Tier 8: Redelineation based on field conditions
  - Adjust the subshed boundaries based on field conditions (downspouts, flow direction, monitoring points, etc), and eliminate adjusted subsheds whose parameters fall outside of the Tier 1-6 selection criteria

- Possible areas narrowed down to:
  - 9 subsheds
Site Selection Process – Final Candidate Sites

- Select final concept plan sites based on:
  - Field knowledge of potential Green Infrastructure opportunities
  - Potential monitoring locations
  - Political representation (Wards 2, 3, and 4)
  - Demographic representation

- Total of 6 concept plan subsheds were selected
Site Selection Process – Final Candidate Sites
## Demonstration Project

### Proposed subsheds:

<table>
<thead>
<tr>
<th>Rec. Water</th>
<th>Sub-shed</th>
<th>Total Acres</th>
<th>Imp. Acres</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pot. River</td>
<td>020-007</td>
<td>10.0</td>
<td>8.1</td>
<td>High density “down town” land use</td>
</tr>
<tr>
<td></td>
<td>026-001</td>
<td>1.8</td>
<td>1.6</td>
<td>High density Georgetown waterfront</td>
</tr>
<tr>
<td></td>
<td>027-003</td>
<td>16.6</td>
<td>10.5</td>
<td>Georgetown historic area</td>
</tr>
<tr>
<td></td>
<td>029-003</td>
<td>14.4</td>
<td>8.9</td>
<td>Medium density Georgetown commercial</td>
</tr>
<tr>
<td>Piney Branch (Rock Creek)</td>
<td>049-018</td>
<td>6.6</td>
<td>3.6</td>
<td>Low to medium density residential</td>
</tr>
<tr>
<td></td>
<td>049-019</td>
<td>5.1</td>
<td>3.0</td>
<td>Low to medium density residential</td>
</tr>
</tbody>
</table>

**Scope includes GI in public and private space**
Green Infrastructure Practices

- Green Infrastructure practices were grouped into 4 categories:

<table>
<thead>
<tr>
<th>BIORETENTION PRACTICES</th>
<th>ROOFTOP COLLECTION PRACTICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioretention cells</td>
<td>Green roofs</td>
</tr>
<tr>
<td>Bioswales</td>
<td>Blue roofs</td>
</tr>
<tr>
<td>Vegetated filter strips</td>
<td>Downspout disconnections</td>
</tr>
<tr>
<td>Tree box filters</td>
<td>Rain barrels</td>
</tr>
<tr>
<td></td>
<td>Cisterns</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PERMEABLE PAVEMENTS</th>
<th>LARGE-VOLUME UNDERGROUND STORAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Concept Plan Approach

Green Infrastructure Practice Summary Sheets were developed for each practice:
- Siting (land uses and development types)
- Maintenance considerations
- Cost
- Typical details
- Photos

Green Infrastructure Practice Summary Sheets were developed for each practice:
- Siting (land uses and development types)
- Maintenance considerations
- Cost
- Typical details
- Photos
Concept Plan Approach

Typical Concept Plan

- **Roof Treatment 2**: (Green/blue roof; downspout disconnection; and cistern/rain barrel)
- **Roof Treatment 1**: (Downspout disconnection and cistern/rain barrel)
- **Large-volume underground storage**: (with slot drain)
- **Permeable pavement**
- **Tree box filter**
- **Vegetated filter strip**
- **Bioretention**
Concept Plan Approach
# GI Project Schedule

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Potomac</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start Facility Plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/23/15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Award Design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/23/18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place in Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/23/25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rock Creek</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start Facility Plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/23/16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Award Design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/23/19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place in Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/23/25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GI Demonstration Projects</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Selection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institutional Issues</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design &amp; Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Re-Evaluation of CSO Controls**

<table>
<thead>
<tr>
<th>LTCP Supplement</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

**Potomac and Rock Creek Implementation**

| Start Facility Planning   |      |      |      |      |      |      |      |      |      |      |      |      |

8 years

Select Appropriate CSO Controls
Clean Rivers, Green District

OPPORTUNITIES FOR COLLABORATION
# Local Academic Institutions

<table>
<thead>
<tr>
<th>Local Institution</th>
<th>Sewershed Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgetown University</td>
<td>Potomac CSO</td>
</tr>
<tr>
<td>George Washington University</td>
<td>Potomac/Rock Creek CSO</td>
</tr>
<tr>
<td>Howard University</td>
<td>Anacostia CSO</td>
</tr>
<tr>
<td>University of the District of Columbia</td>
<td>Separate Sewer Area</td>
</tr>
</tbody>
</table>
Opportunities for Collaboration

- Participate in Project Review Board
- Provide Staff for Monitoring
- Perform Private Property Outreach
- Study How to Assess Triple Bottom Line Benefits
- Implement Demonstration Projects on University Property
Provide Staff for Monitoring

- Demonstration Project Pre and Post Construction Monitoring
  - Recommend monitoring locations
  - Recommend additional monitoring attributes (infiltration, soil moisture, etc)
  - Perform flow data tracking, analysis and summary
## Demonstration Project Monitoring

### Pre and Post Construction Monitoring

<table>
<thead>
<tr>
<th>Monitoring Goal</th>
<th>Data Needed</th>
<th>Potential University Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Measure stormwater runoff reduction across each demonstration project site</td>
<td>Local precipitation, inflow to (if any) and outflow from the sewershed</td>
<td>Flow data tracking, analysis and summary.</td>
</tr>
<tr>
<td>2 Measure stormwater runoff reduction for each major GI type</td>
<td>Local precipitation, inflow to (if any) and outflow from selected representative practices</td>
<td>Recommend monitoring locations. Review and summarize data. Compare against other studies.</td>
</tr>
<tr>
<td>3 Measure other performance attributes of each major GI type</td>
<td>Soil moisture, evapotranspiration rates, infiltration/exfiltration rates, temperature outflow, water quality, pollutant storage in media</td>
<td>Recommend attributes and locations. Review and summarize data. Support model inputs.</td>
</tr>
</tbody>
</table>
Studies to Assess Triple Bottom Line Benefits

- Establish property value baseline for demonstration areas
- Perform temperature studies for heat island (heat stress) reduction
- Measure changes in CO₂ emissions associated with energy use reductions
- Monitor air quality improvements related to health benefits
Private Property Strategies

- Work with community organizations to establish outreach meetings
- Develop education programs
- Coordinate mailings and door-to-door outreach
- Support RiverSmart Homes
Clean Rivers, Green District

PROPOSED CONSENT DECREE MODIFICATIONS
What Will DC Water’s Proposed Consent Decree Modifications Include?

- **Green Infrastructure**
  - $10-$40M Demonstration Project
  - Extend Potomac and Rock Creek deadlines
  - Establish 0, 2, and 5-year decision points
  - 5 year decision point includes alternatives evaluation, site selection process and final review by public and regulatory agencies
  - Second CD Modification will be required if GI is proposed instead of tunnels or as part of a hybrid solution (will address controls and schedule)
What Will DC Water’s Proposed Consent Decree Modifications Include?

- **Acceleration of Green Infrastructure Implementation**
  - GI Proposal is not about avoiding costs or delayed compliance
  - DCW will reinvest any savings from the schedule extension to GI projects
  - For a hybrid or green approach, supplemental GI projects will permit early compliance with water quality goals.
  - For existing approach, supplemental GI projects will provide greater certainty on achieving water quality goals.