Briefing on:

Evaluating the Green Infrastructure Aspects of DC Water's Clean Rivers Project
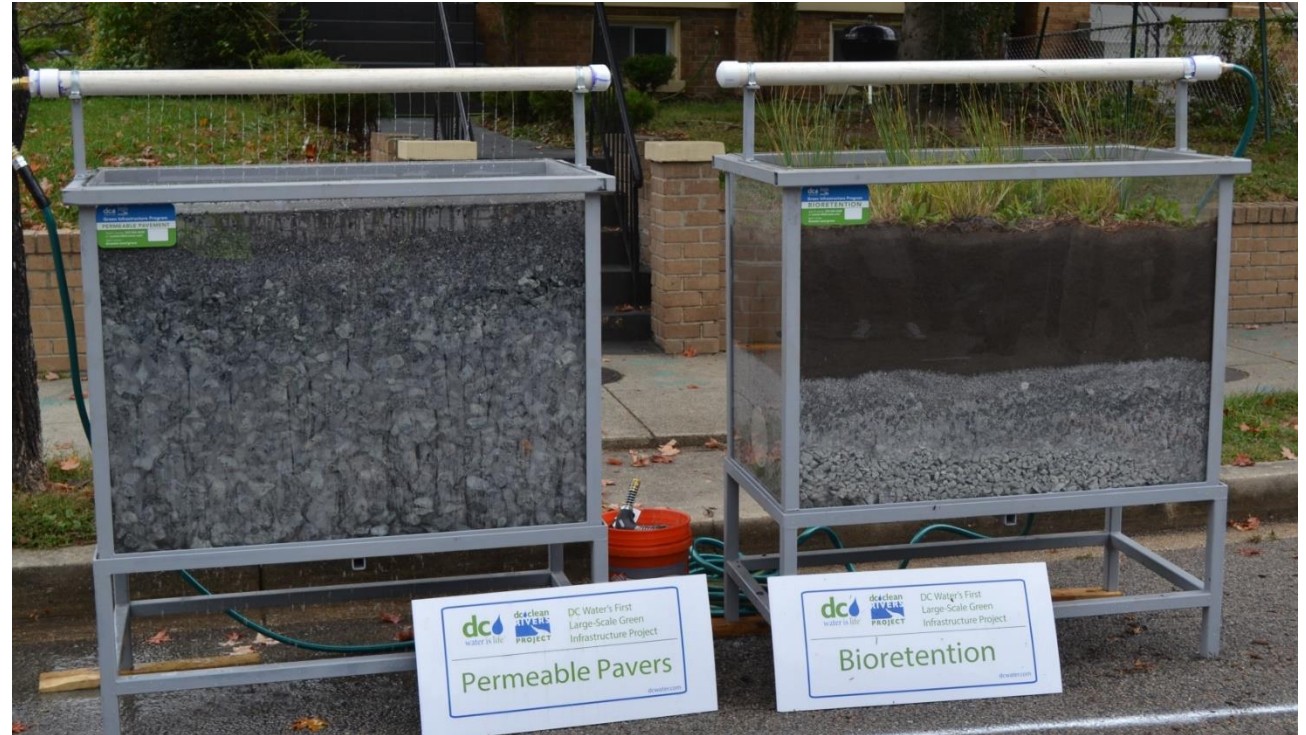
Briefing for:

Water Resources Tech Committee

November 6, 2020

Agenda

- Green Infrastructure Program
- 2020 Practicability Analysis
- Next Steps
- Questions

GREEN INFRASTRUCTURE PROGRAM
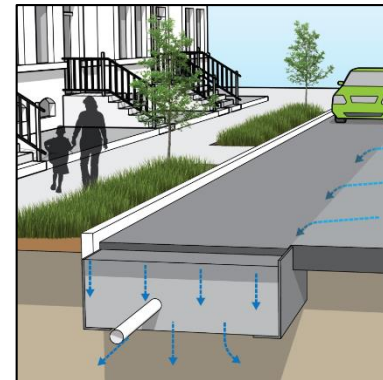
Green Infrastructure:
Program Drivers

- Volume Management (Gallons)
  - Control Combined Sewer Overflows
- Cost Effectiveness
  - Responsibility to Rate Payers
- Maintenance/Asset Management
  - Safety
  - Aesthetics
  - Performance
- Outreach
  - Build Public Awareness and Stewardship
- Triple Bottom Line Benefits
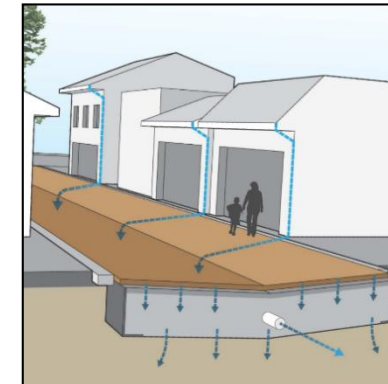 - Deliver Multiple Benefits to the Community
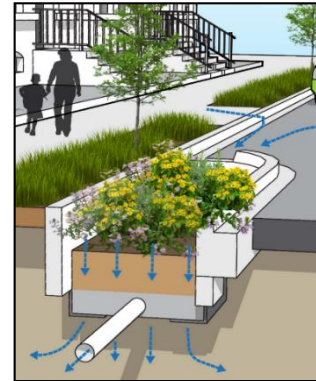
Curb Extension Bioretention

Planter Bioretention

Permeable Parking Lane

Permeable Alley

Green Infrastructure:
# First Projects are Complete!

Potomac River Initial Project:
- 1st of 3 Contracts
- Manages 44 of 133 Impervious Acres
- Construction 2018
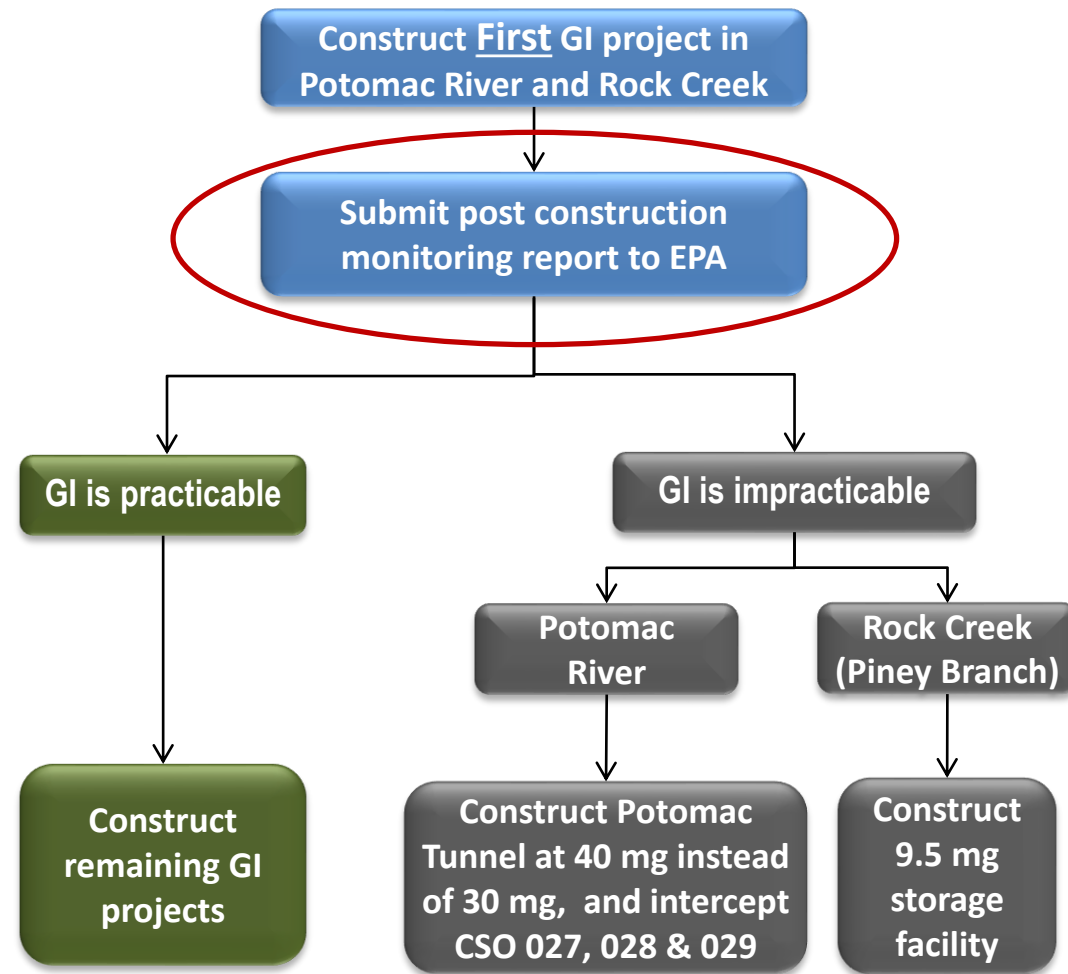- Construction Completed 2019
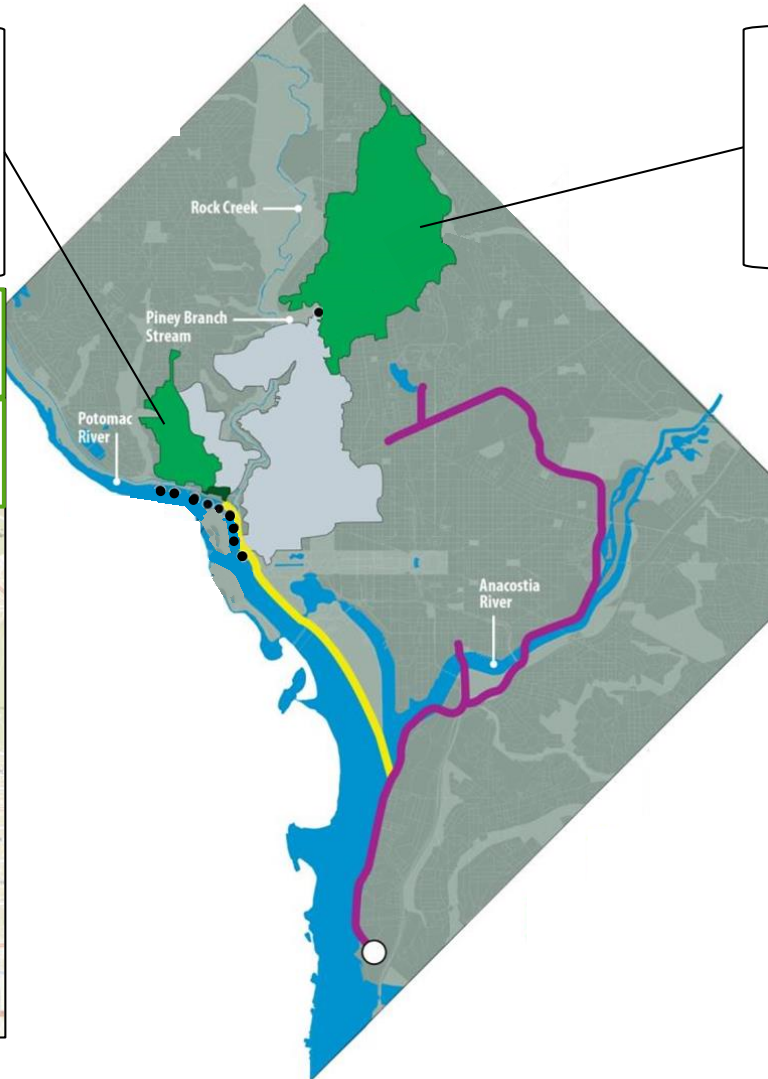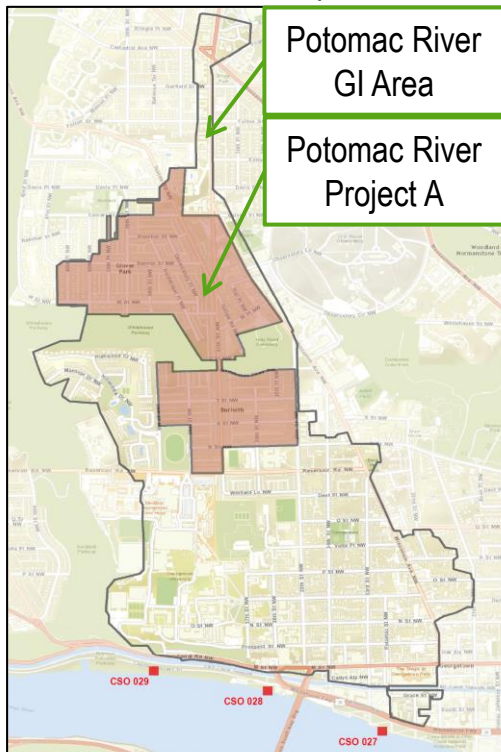
Rock Creek Initial Project:
- 1st of 5 contracts
- Manages 20 of 365 Impervious Acres
- Construction 2017
- Construction Completed 2019

Potomac River GI Area

Potomac River Project A

Rock Creek GI Area

Rock Creek Project A
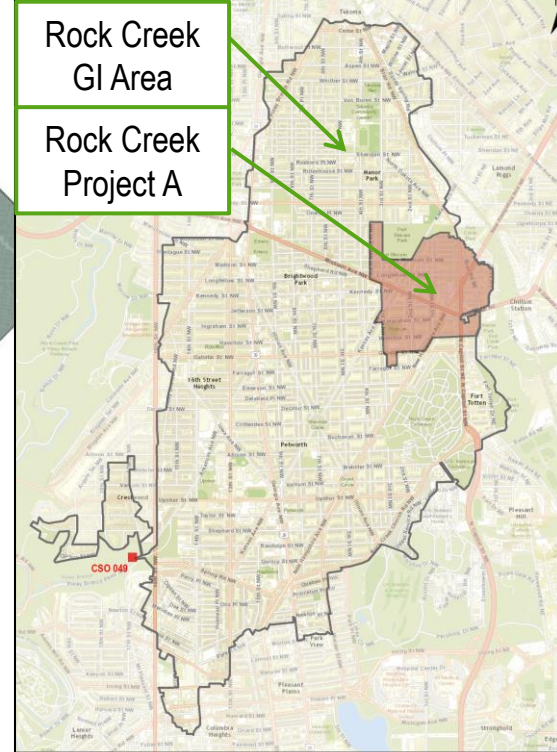
Green Infrastructure:
Consent Decree Requirements

Project	Imp acres managed @ 1.2"	Place in operation deadline
Potomac River Project 1	44	2019
Practicability assessment		
Potomac River Project 2	46	2024
Potomac River Project 3	43	2027
Subtotal	**133**	
Rock Creek Project 1	20	2019
Practicability assessment		
Rock Creek Project 2	75	2024
Rock Creek Project 3	90	2027
Rock Creek Project 4	90	2029
Rock Creek Project 5	90	2030
Subtotal	**365**	
Grand Total	**498**	

Construct First GI project in Potomac River and Rock Creek

Submit post construction monitoring report to EPA

GI is practicable

Construct remaining GI projects

GI is impracticable

Potomac River

Rock Creek (Piney Branch)

Construct Potomac Tunnel at 40 mg instead of 30 mg, and intercept CSO 027, 028 & 029

Construct 9.5 mg storage facility

dc clean RIVERS PROJECT
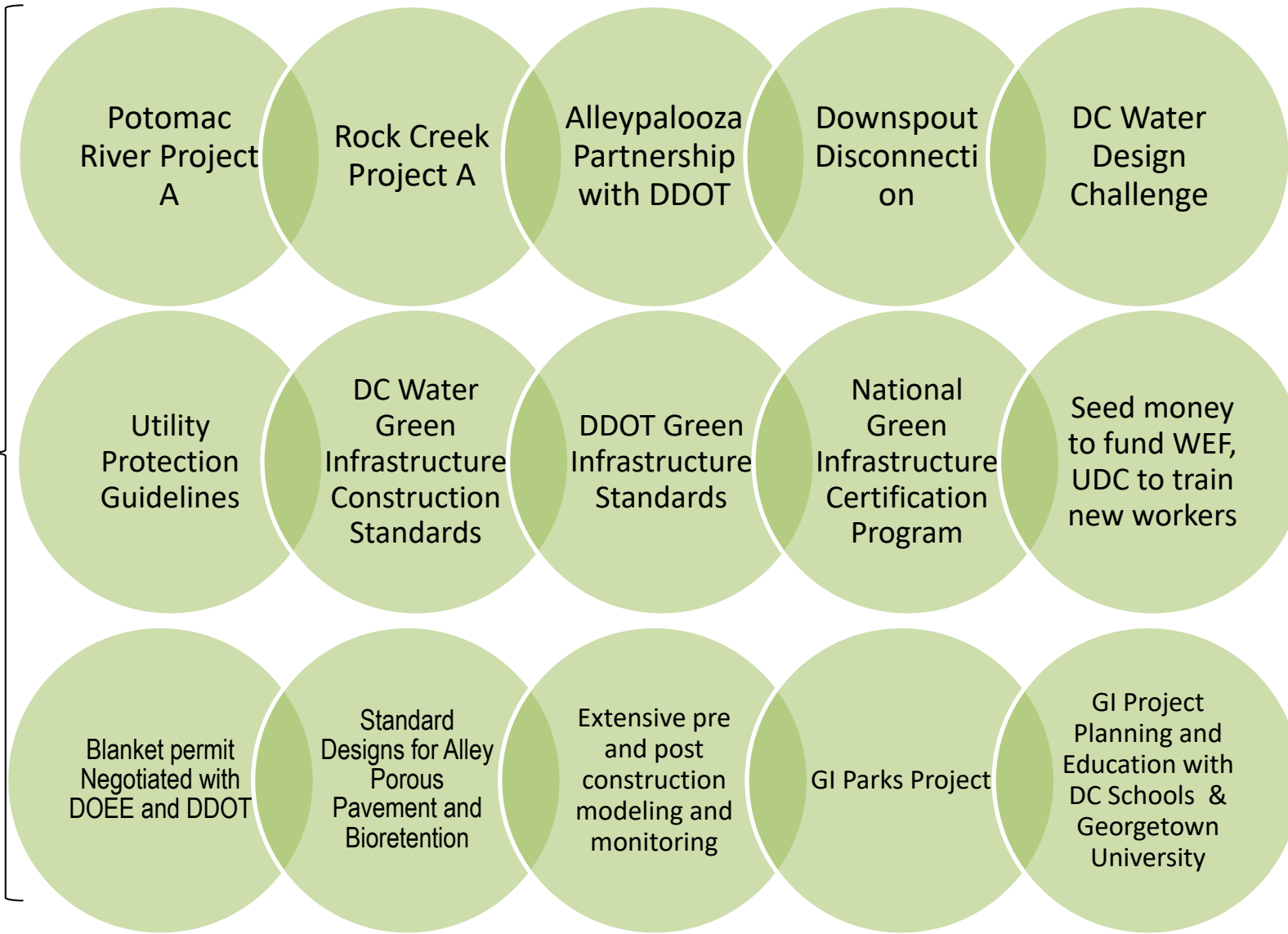
Other Considerations

- Decree requires practicability determination to consider "_constructability, operability, efficacy, public acceptability and cost per impervious acre treated_"

- EPA has 180 days to approve or disapprove DC Water's practicability determination

- DC Water can take credit for other acres controlled pursuant to District's Stormwater regulations provided "DC Water, the District or a private party has assumed operation and maintenance responsibilities in a legally binding document or as part of its statutory or regulatory authority"

- Regardless of the Determination decision, DC Water required to operate and maintain the GI Project 1 sites

GREEN INFRASTRUCTURE PRACTICABILITY ASSESSMENT

DC Water has Spared no Effort to Make GI Successful

More than **$80 M and several hundred thousand person-hours** have been spent on GI

- Potomac River Project A
- Rock Creek Project A
- Alleypalooza Partnership with DDOT
- Downspout Disconnection
- DC Water Design Challenge

- Utility Protection Guidelines
- DC Water Green Infrastructure Construction Standards
- DDOT Green Infrastructure Standards
- National Green Infrastructure Certification Program
- Seed money to fund WEF, UDC to train new workers

- Blanket permit Negotiated with DOEE and DDOT
- Standard Designs for Alley Porous Pavement and Bioretention
- Extensive pre and post construction modeling and monitoring
- GI Parks Project
- GI Project Planning and Education with DC Schools & Georgetown University

dc clean RIVERS PROJECT

Adaptive Management Approach:
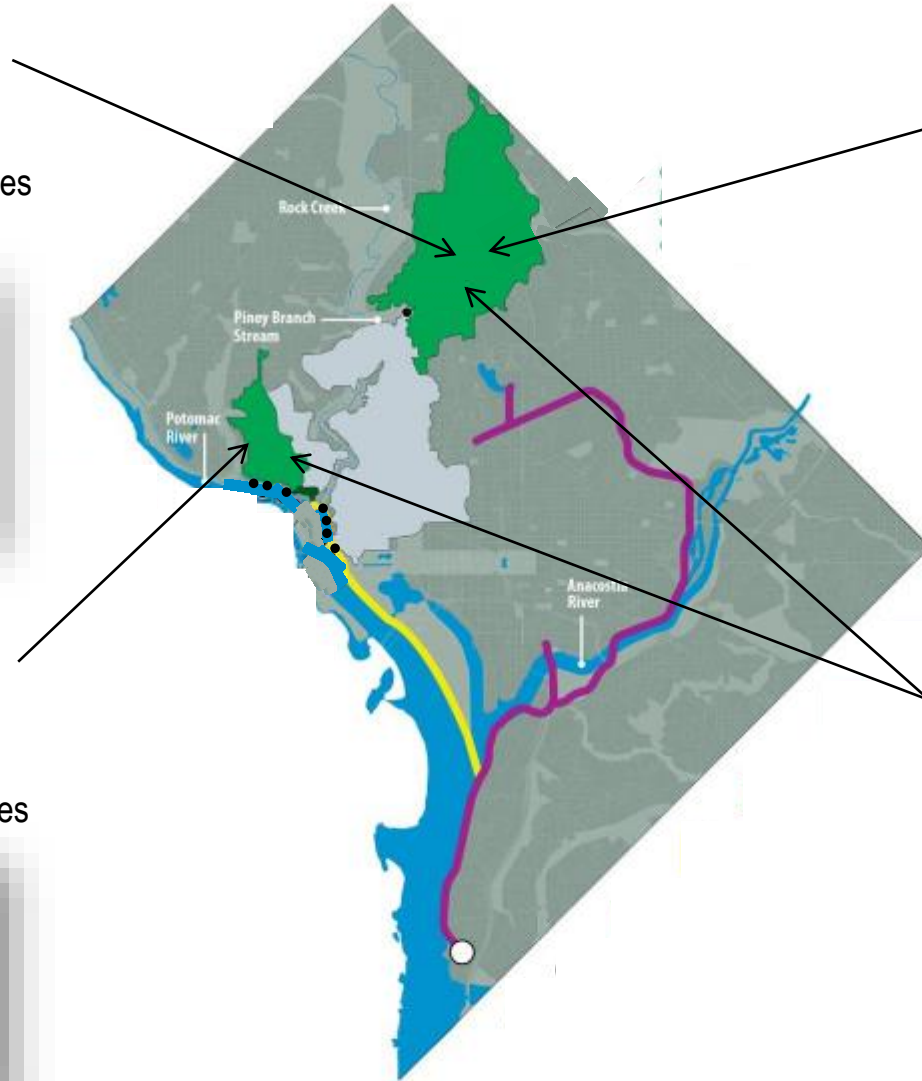# Projects Used to Assess Practicability

Rock Creek Project A
- 22 acres constructed and operated for a year
- 38 bioretention facilities
- 39 porous pavement facilities
- 2 other facilities

Potomac River Project A
- 8 acres constructed and operated for a year
- 5 bioretention facilities
- 38 porous pavement facilities

Alleypalooza Partnership w/DDOT
- Partnership to incorporate green alleys in Alleypalooza work
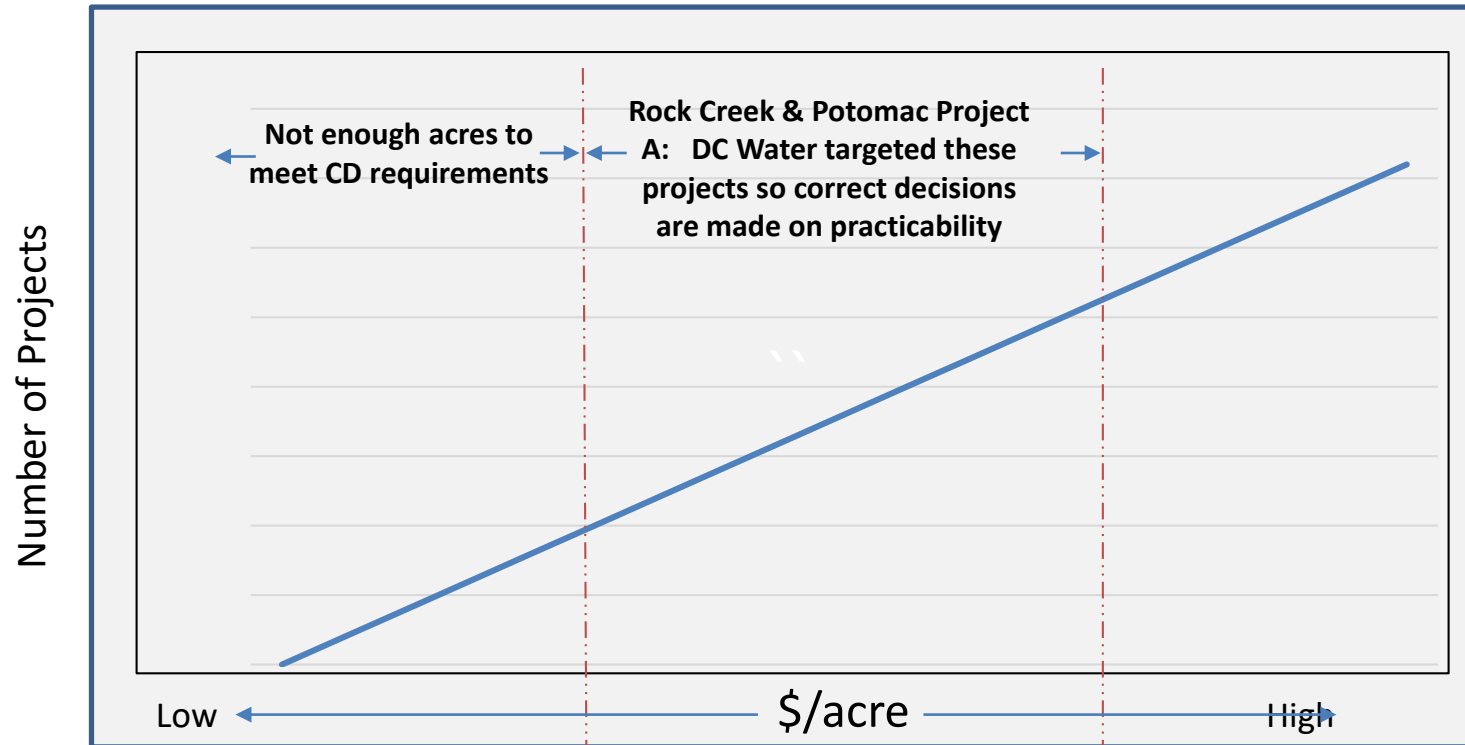- 7 alleys managing 3 acres of runoff

Downspout Disconnection
- 6,471 homes visited, 293 homes participated
- 1.2 acres managed

Green Infrastructure Cost Ranges

Targeted:
- "Low hanging fruit"
- Construct as part of a District Project

Adapted to Public Space:
- Adjust practices to space available
- Representative of typical city blocks

Retrofit Public Space
- Change public space
- Utility Relocation

Rock Creek:
Qualitative Assessment of GI

Criteria	Assessment	Basis
Constructability	Good	• Projects are constructible with normal construction practices
Public Acceptance	Good	• Survey conducted of homes in project area • Survey results: 64% of residents would like more GI in their neighborhood
Efficacy	Good	• Can be designed and constructed to perform as predicted • Lessons learned can be applied going forward
Operability	Moderate	• Maintenance is simple, but is essential to assure performance • If not maintained adequately, performance can suffer
Cost Effectiveness • Targeted GI	Good	• Cost can be competitive with gray
Cost Effectiveness • Retrofit Public Space	Negative	• Costs much higher than gray
Other – Triple Bottom Line and Economic Benefits	Good	• Community and economic benefits substantially higher with Green Infrastructure
Other – Protection of future infrastructure (GI MOU)	Moderate	• Agreement with District not reached on GI MOU

Rock Creek:
Quantitative Assessment of Alternatives

Alt.	Description		Capital Cost ($M)	O&M Cost ($M/yr)	NPV 30 years ($M)	% Over Low
1	All Gray (9.5 mg storage)		$ 185	$ 0.28	$ 211	**+2%**
2	All Green (365 ac of GI) • 27.4 ac Project 1 • 266.6 new ac • <u>71 ac DC Stormwater Regs</u> 365 ac total		$ 206	$ 4.3	$ 401	**+94%**
3	Hybrid (9.5 mg) • 92 ac of GI (27 ac Project 1 + 65 new ac, including downspout disconnect • Gray storage • BMPs per DC Stormwater Regs Total	3.0 mg 4.2 mg <u>2.3 mg</u> 9.5 mg	$ 133	$ 1.5	$ 207	**0%**

Recommended ⬅

Hybrid alternative achieves:
- **Same level of control as LTCP**
- **Equivalent total storage volume (9.5 mg) with green + gray together**

Recommendation:
- **Most cost-effective approach**
- **Provides CSO performance certainty**
- **Maintains DC Water stature being green leader utility**
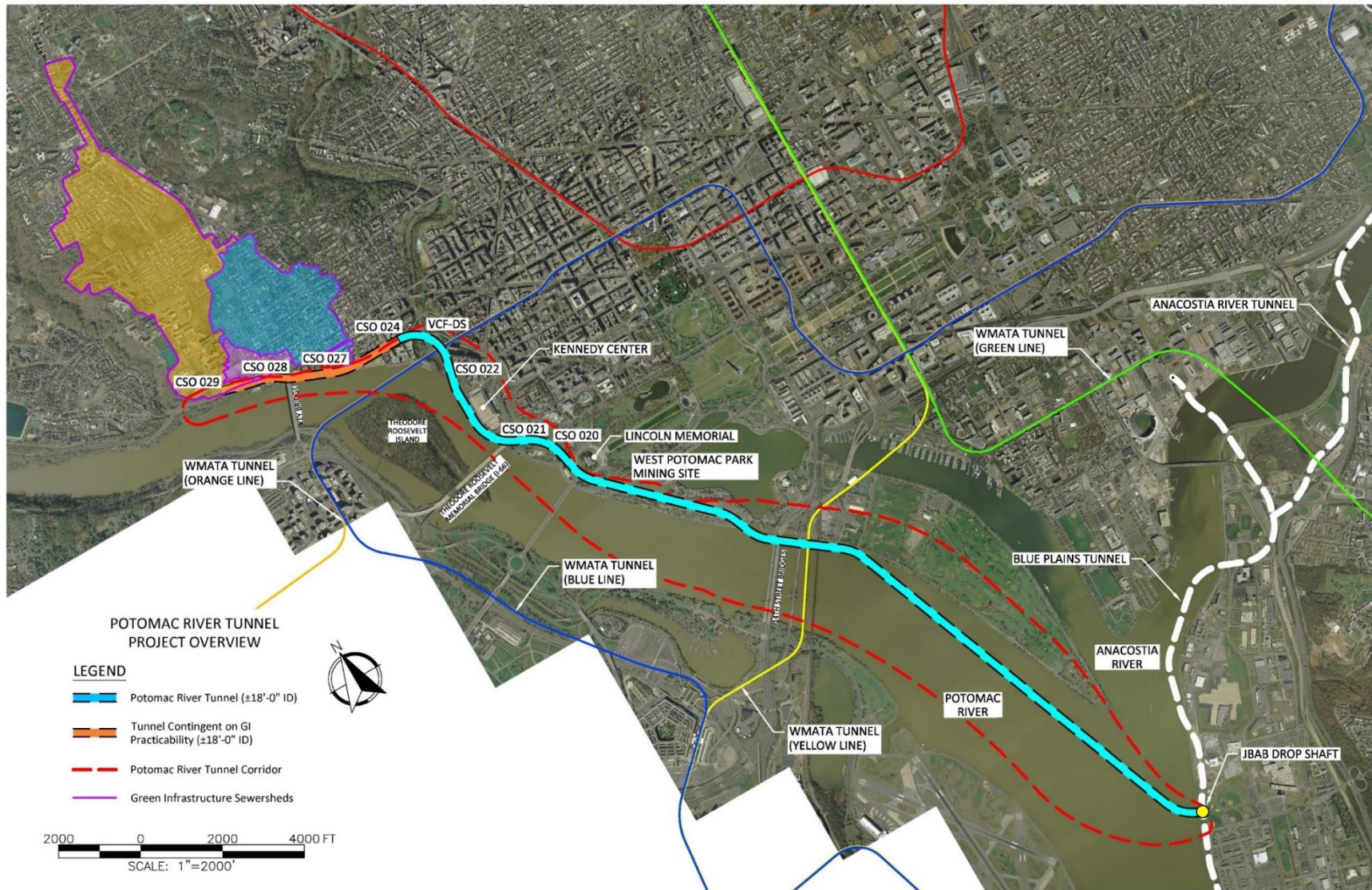- **Submit practicability proposing hybrid approach**

dc clean
RIVERS
PROJECT

13

Rock Creek:
Predicted CSO Performance

CSO Performance at Piney Branch (CSO 049):

Parameter	Before LTCP	LTCP
No. Overflows (#/average year)	25	1
Overflow Volume (million gallons/average year)	39.7	1.4
% Reduction from Before LTCP	--	96%

- Proposed plan provides **same performance as LTCP**
- Same performance that was determined to meet water quality standards by DOEE and EPA

Potomac GI Area Addresses Three CSO areas:
CSO 027, 028 and 029

Potomac River:
Qualitative Assessment of GI

Criteria	Assessment	Basis
Constructability	Negative	• Limited space in Georgetown area • GI not constructible in CSO 027 and 028
Public Acceptance	Negative	• Objections in Historic District, significant opposition from Commission of Fine Arts, Old Georgetown Board, National Capital Planning Commission, DC State Historic Preservation Office, Advisory Neighborhood Commission and residents
Efficacy	Good	• Can be designed and constructed to perform as predicted
Operability	Moderate	• Maintenance is simple, but is essential to assure performance • If not maintained inadequately, performance can suffer
Cost Effectiveness	Negative	• Extremely high costs to construct green infrastructure in historic District
Other – Triple Bottom Line and Economic Benefits	Negative	• Due to lack of space, most GI would be porous pavement (not green) with little triple bottom line benefit
Other – Protection of future infrastructure (GI MOU)	Moderate	• Agreement with District not reached on GI MOU

Potomac River:
Hybrid Quantitative Assessment of Alternatives

Alt.	Description	Capital Cost ($M)	O&M Cost ($M/yr)	NPV 30 years ($M)	% Over Low
1	Extend Potomac Tunnel from CSO 027/028 to CSO 029	$ 28	$ 0.07	$ 31	0%
2	• Potomac Tunnel stops at CSO 028 • Green Infrastructure for CSO 029	$ 25	$0.50	$ 49	+58%

← **Recommended**

Potomac Conclusion:

- GI is not practicable in CSO 027 and 028 due to historic district and community concerns

- In CSO 029, GI is approximately equivalent on a capital cost basis, but is 58% more expensive on a NPV basis

- GI constructed in CSO 029 is mostly alleys – minimal green expression and minimal triple bottom line community benefits

Recommendation: submit practicability stating GI is *impracticable* on Potomac

GI Program Next Steps

- Rock Creek Practicability – Pending approval from USEPA (180 days)

  - Begin Planning next projects within Rock Creek

- Potomac River Practicability – Pending approval from USEPA (180 days)

- Continue drive towards greater design standardization and cost effectiveness

- Full scale rollout of GI maintenance program

- Ongoing NGICP training commitment. Work with local agencies and contracting community to increase number of trained individuals.

- Continue to implement Downspout Disconnection Program

Questions?

Seth Charde
DC Clean Rivers Project
Sr. Advisor, Green Infrastructure
Seth.Charde@dcwater.com
(202) 787-4730

RC-A Kickoff Event - October 23, 2017
Permeable Parking Lane – It Works!