

DC CLEAN RIVERS PROJECT CONSENT DECREE EVOLUTION

CWEA Collection Systems Committee Spring Seminar

May 24, 2018

***Brandon Flora
Greeley and Hansen***

Agenda

- Background
- Project Evolution
 - LTCP Base Plan
 - Total Nitrogen/Wet Weather Modifications
 - Summer 2012 Bloomingdale Flooding Response
 - Green Infrastructure
- Wrap-up and Current Status
- Questions





BACKGROUND

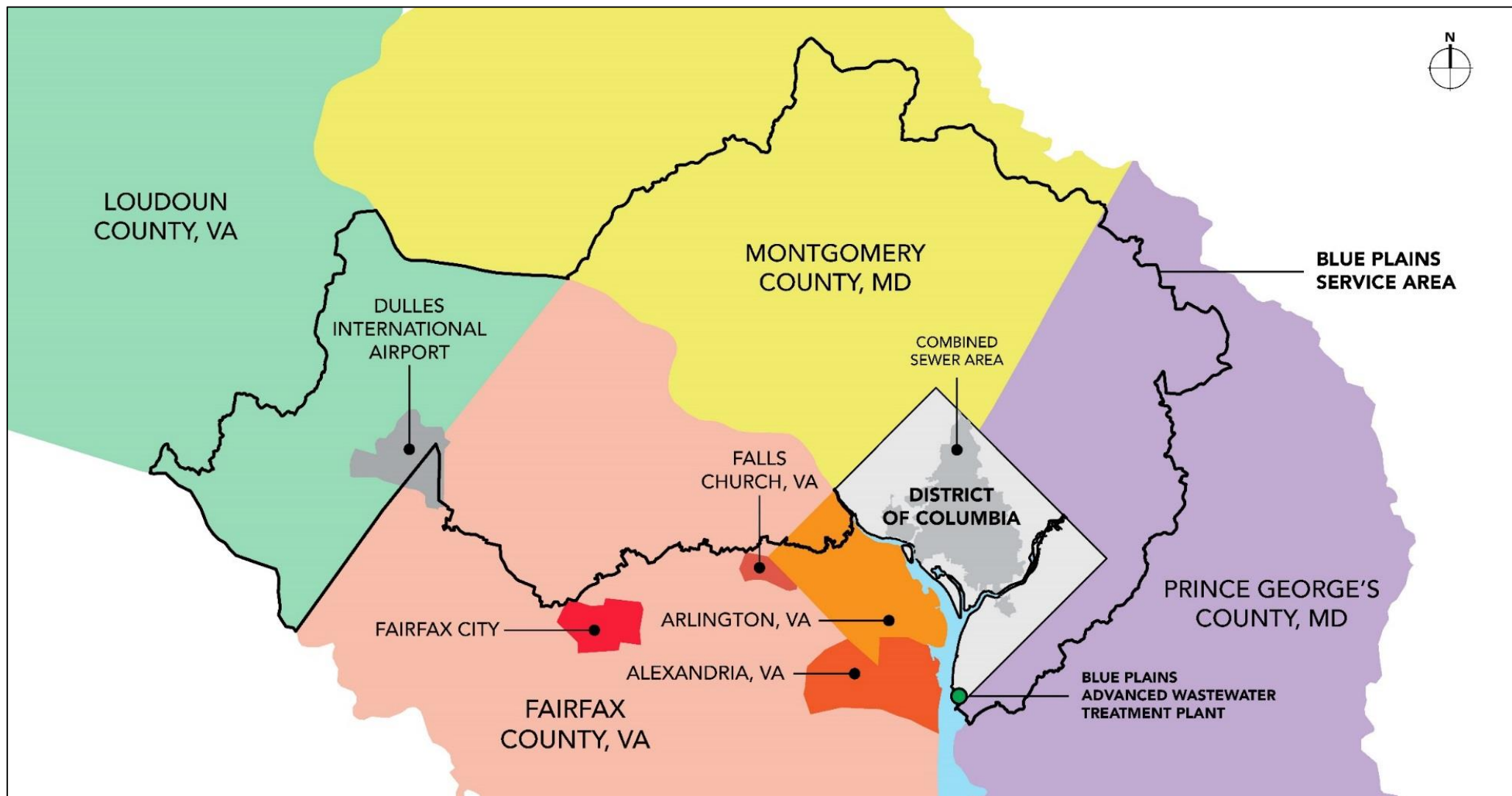
Background

DC Water Overview

- **Provides**
 - Drinking water distribution
 - 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**
- **Serves a regional area of approximately 725 mi²**



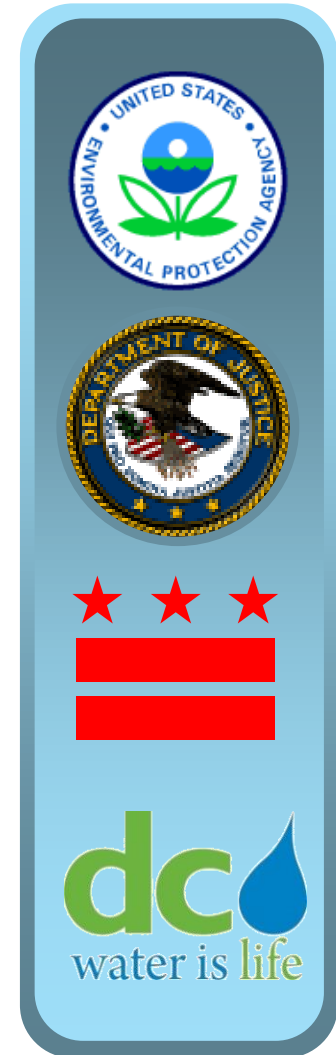
Background DC Water Service Area



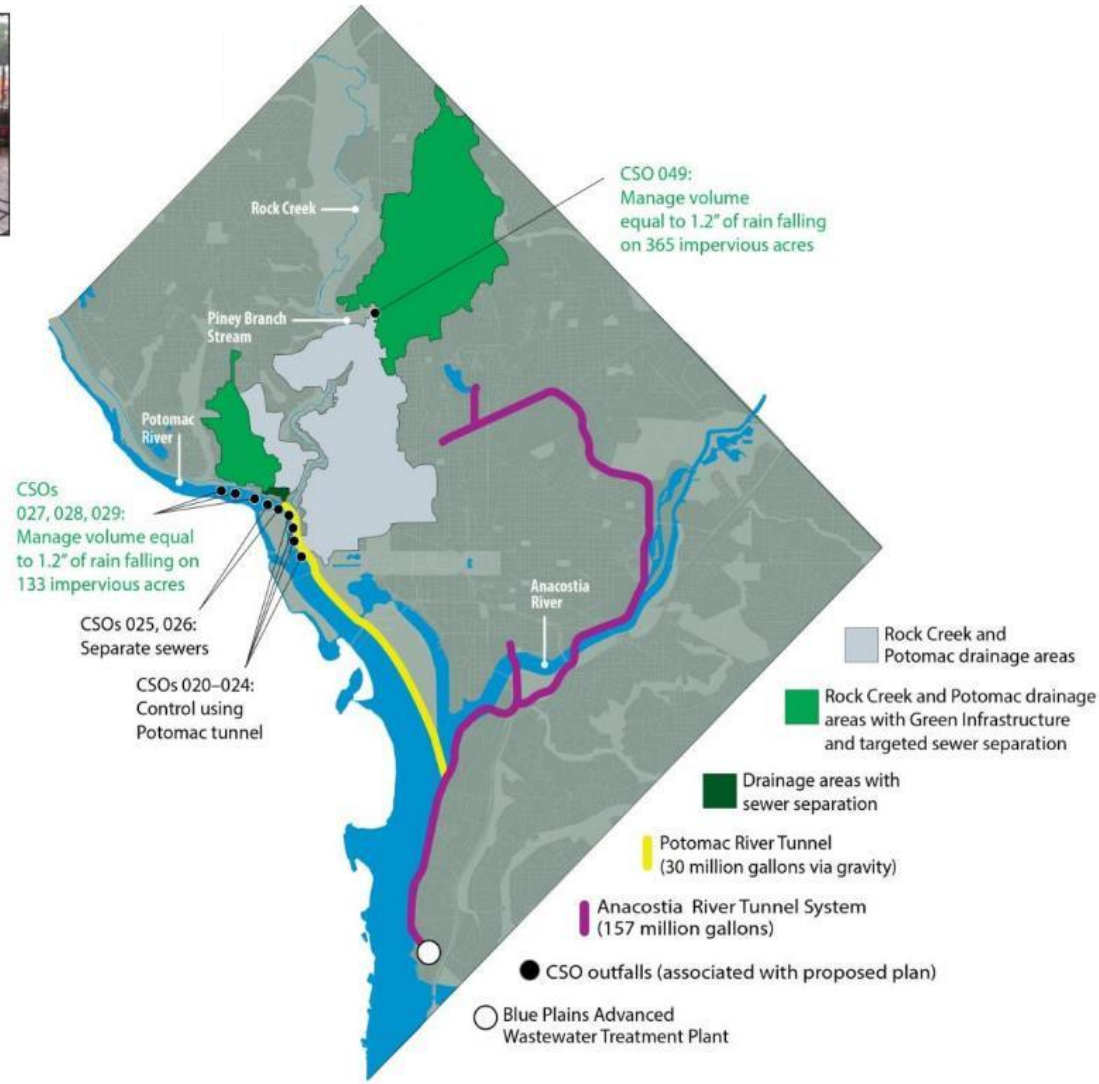
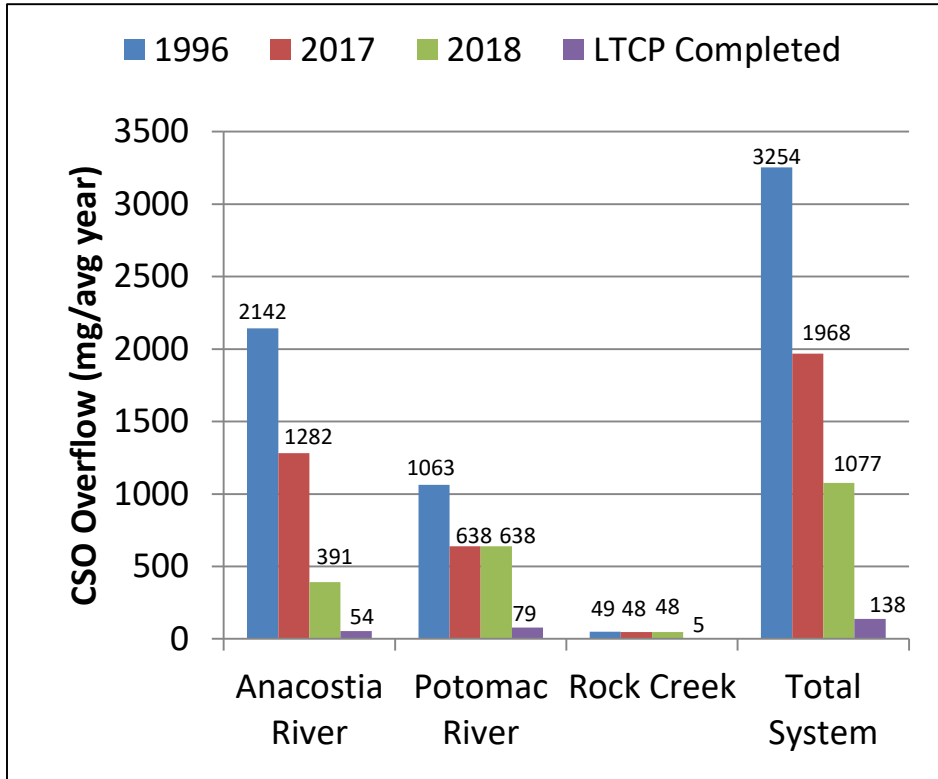
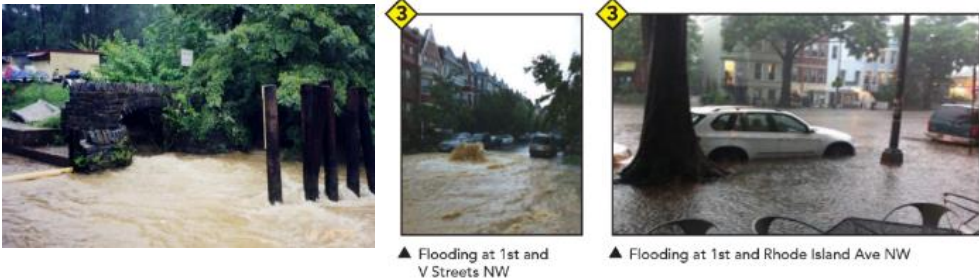
Background

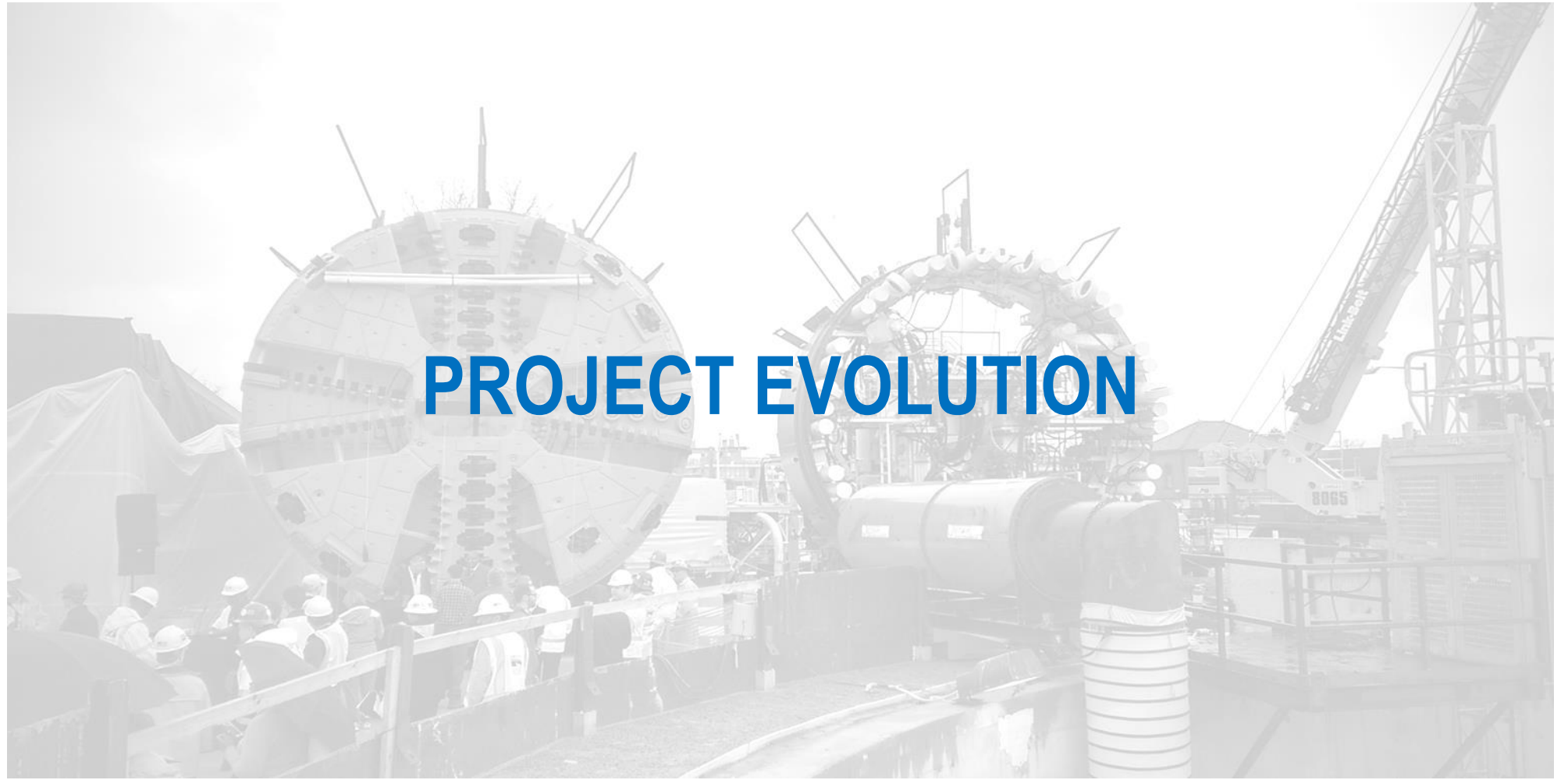
DC Clean Rivers Project Background

- Control combined sewer overflows to the:
 - Potomac River
 - Anacostia River
 - Rock Creek
- Relieve flooding in the Northeast Boundary Area
- Implemented under a Federal Consent Decree among:
 - US Environmental Protection Agency (US EPA)
 - US Department of Justice (US DOJ)
 - District of Columbia
 - DC Water
- Fully in operation by 2030
 - Major intermediate milestones in 2018 and 2025



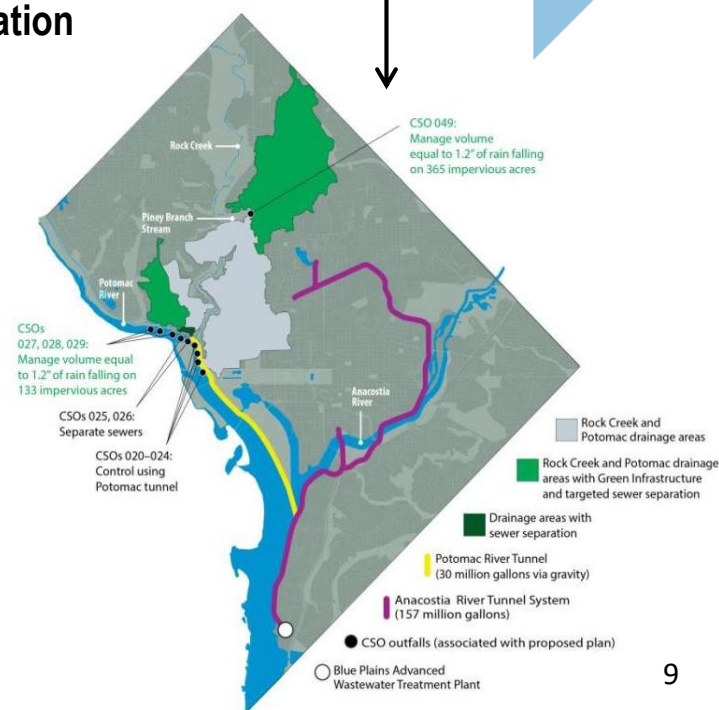
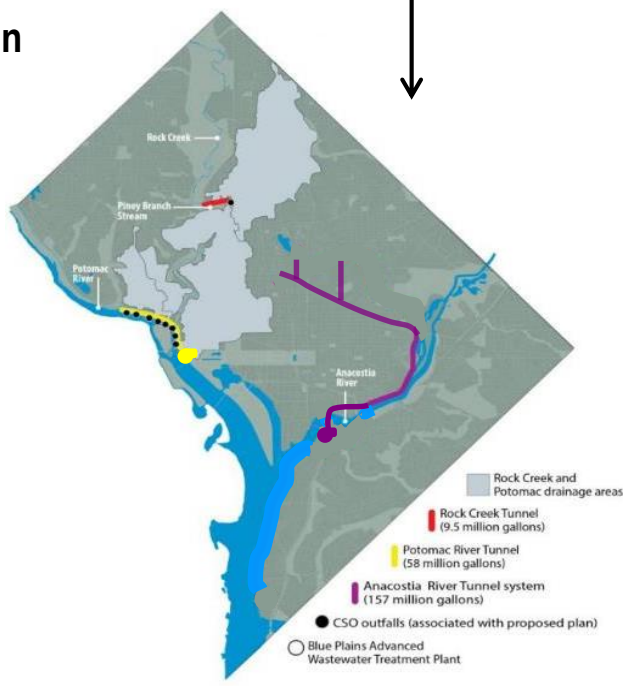
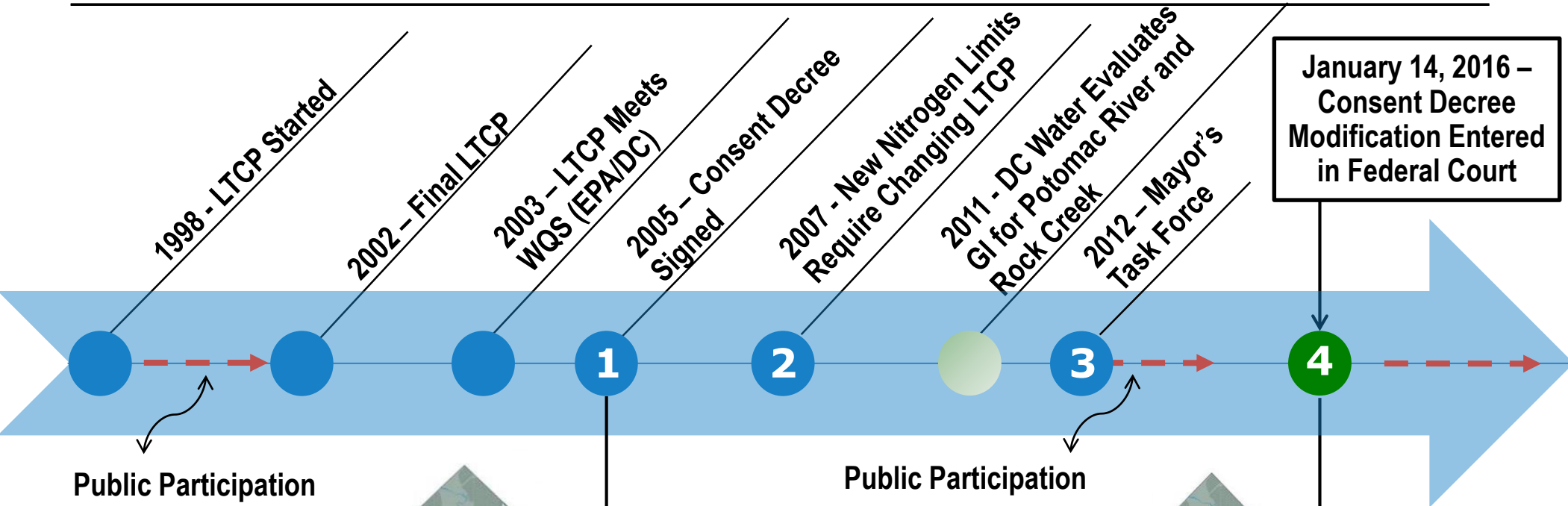
Background Magnitude of the Challenge





PROJECT EVOLUTION

Project Evolution Program History



Project Evolution Program History

1 Original LTCP



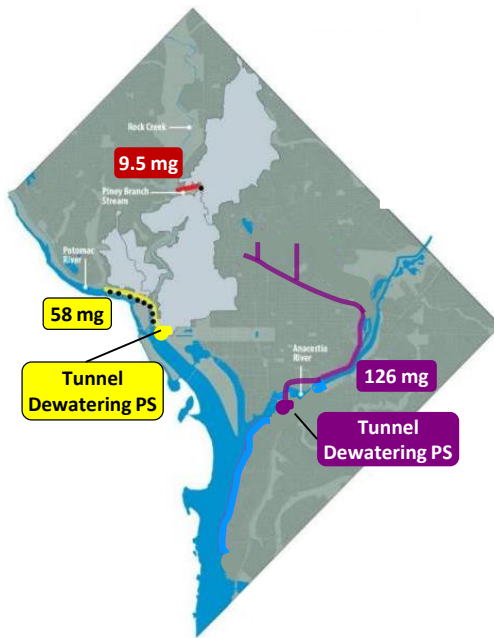
2 TN/WW Plan



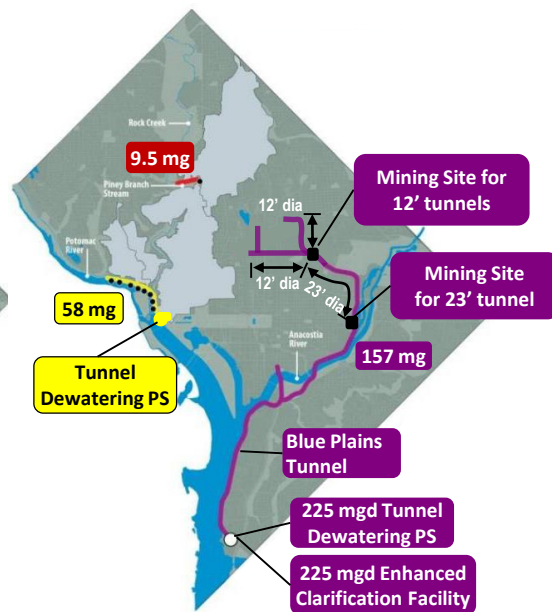
3 Bloomingdale Flooding



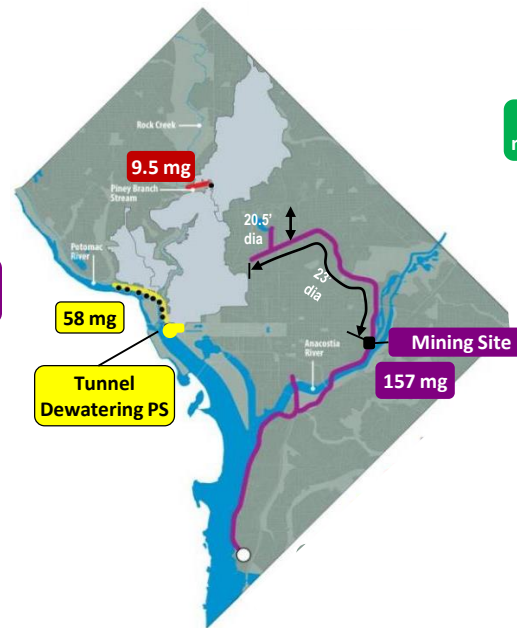
4 Green Infrastructure



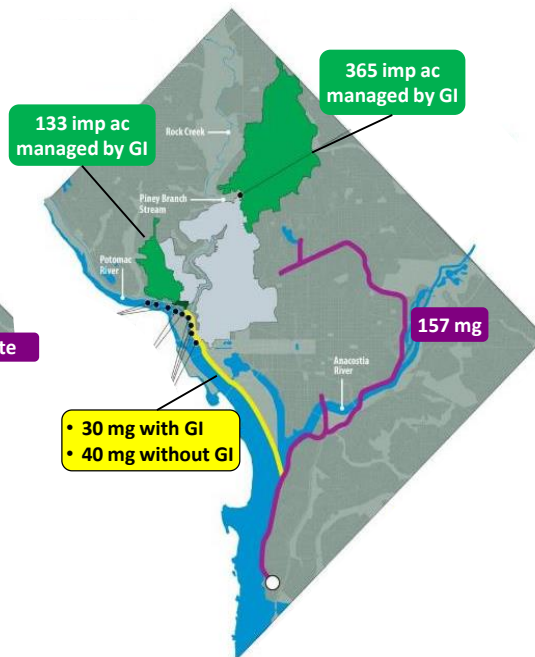
Base Plan



Challenge:
New effluent limit in NPDES permit for Blue Plains due to Chesapeake Bay TMDL



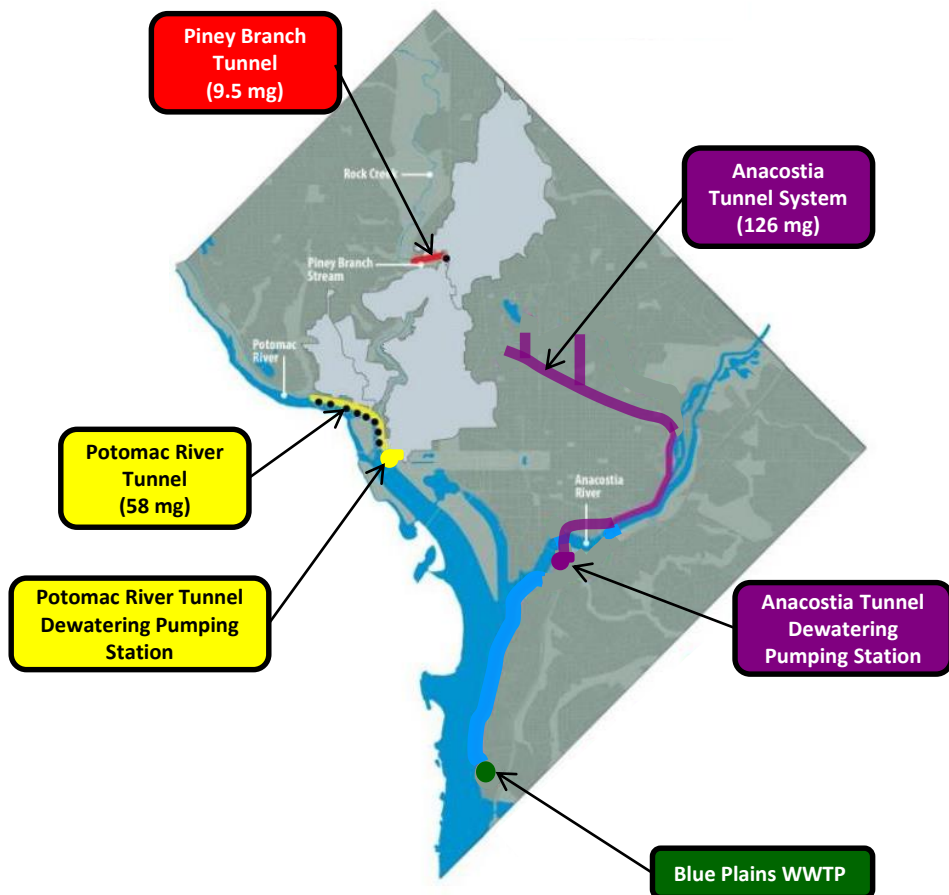
Challenge:
Flooding demands urgent action for an undersized sewer that's existed for 135+ years



Challenge:
Modify Consent Decree to incorporate Green Infrastructure

Project Evolution

Original LTCP (1999-2002) 1



- **126 MG Anacostia River Tunnel System**
 - Dewatered to existing system via deep pumping station near Poplar Point
 - Smaller diameter branch tunnels for flood relief in Northeast Boundary

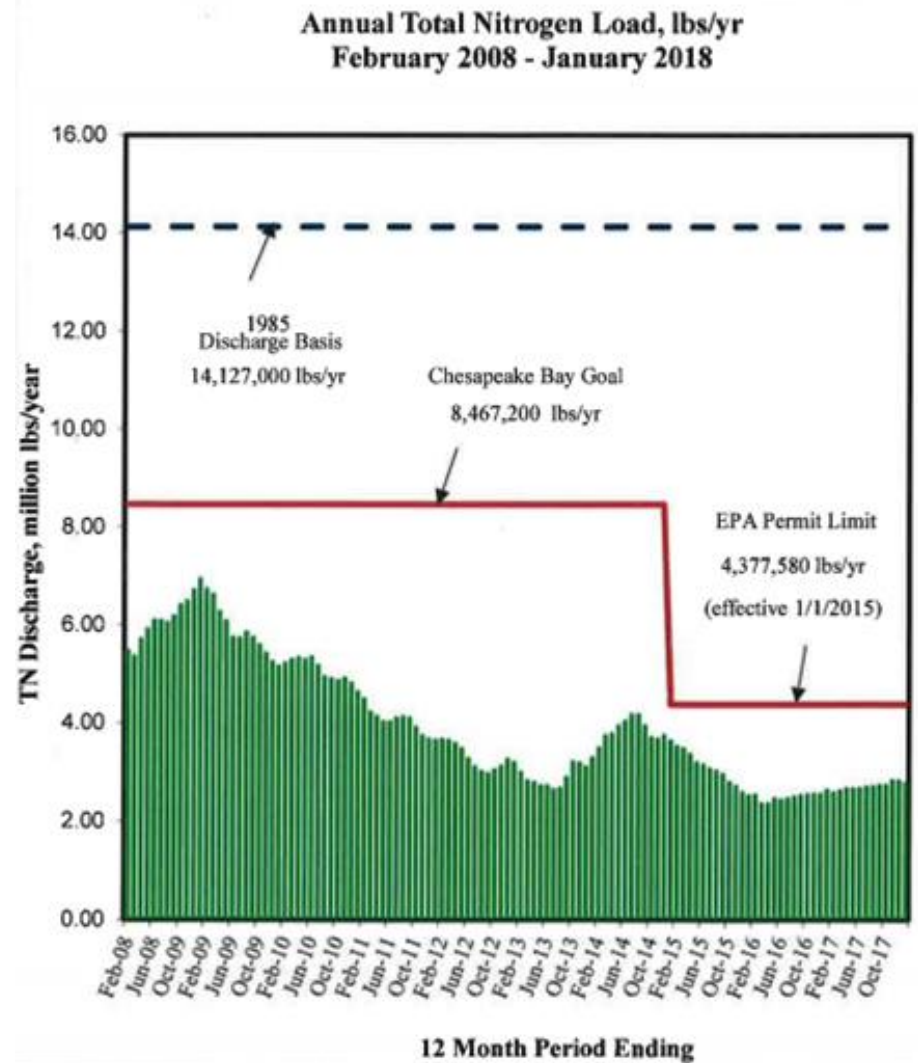
- **58 MG Potomac River Tunnel**
 - Dewatered to existing system via deep pumping station near Lincoln Memorial

- **9.5 MG Piney Branch Tunnel**
 - Dewatered to existing system via gravity

Project Evolution

2007 – New Nitrogen Discharge Limit for Blue Plains

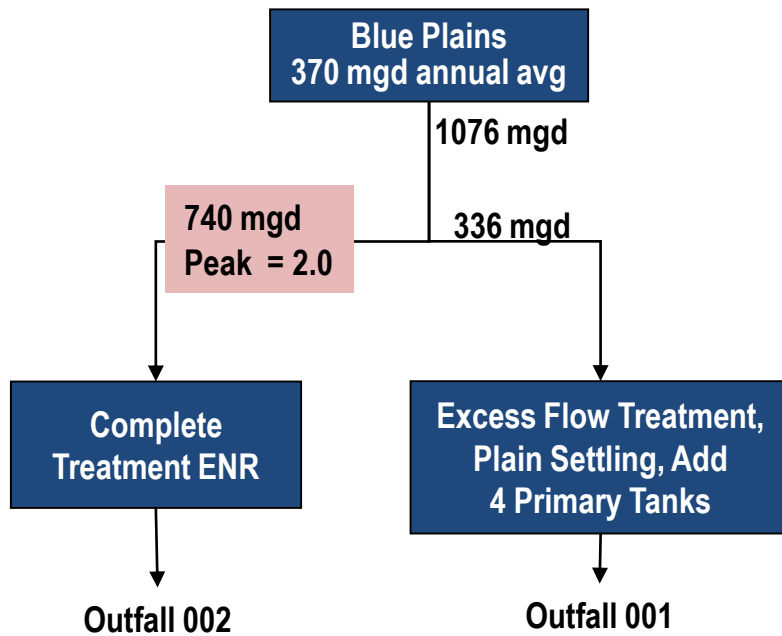
- Before 2007
 - No permit limit - effluent goal of 8.4672 million lbs/yr or 7.5 mg/L
- 2007 NPDES Permit Modification
 - Nitrogen limit of 4.689 million lbs or 4.2 mg/L (reduction of 44%)



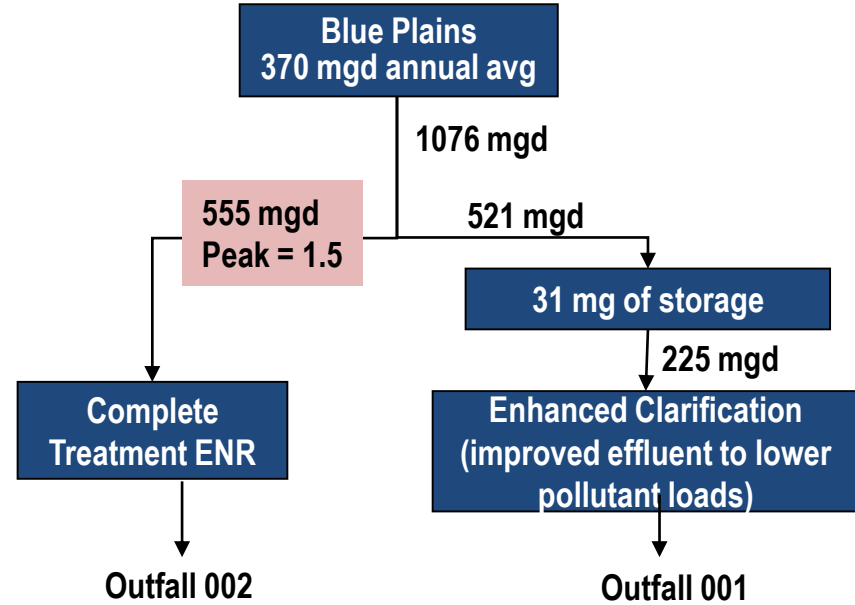
Project Evolution

Nitrogen Removal Alternatives

Conventional Approach



Selected Approach



Total Cost to DC Water \$ 1,600 M
 Additional Cost to CSO Program \$ 0

\$ 800 M
 \$ 239 M

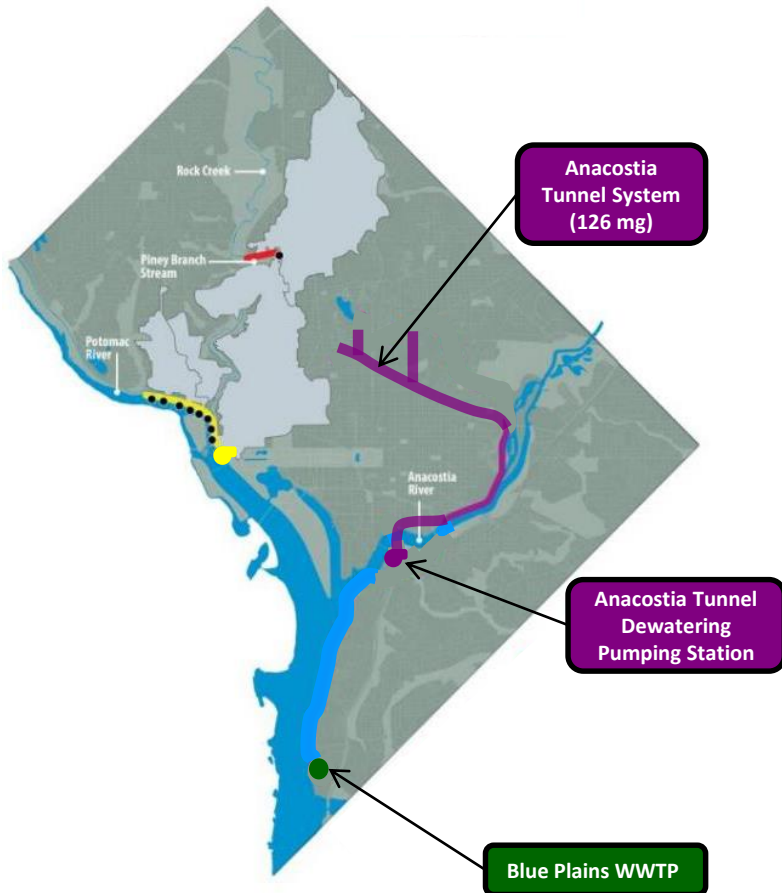
Significant Savings by Integrating Nitrogen Removal Goals into CSO Program



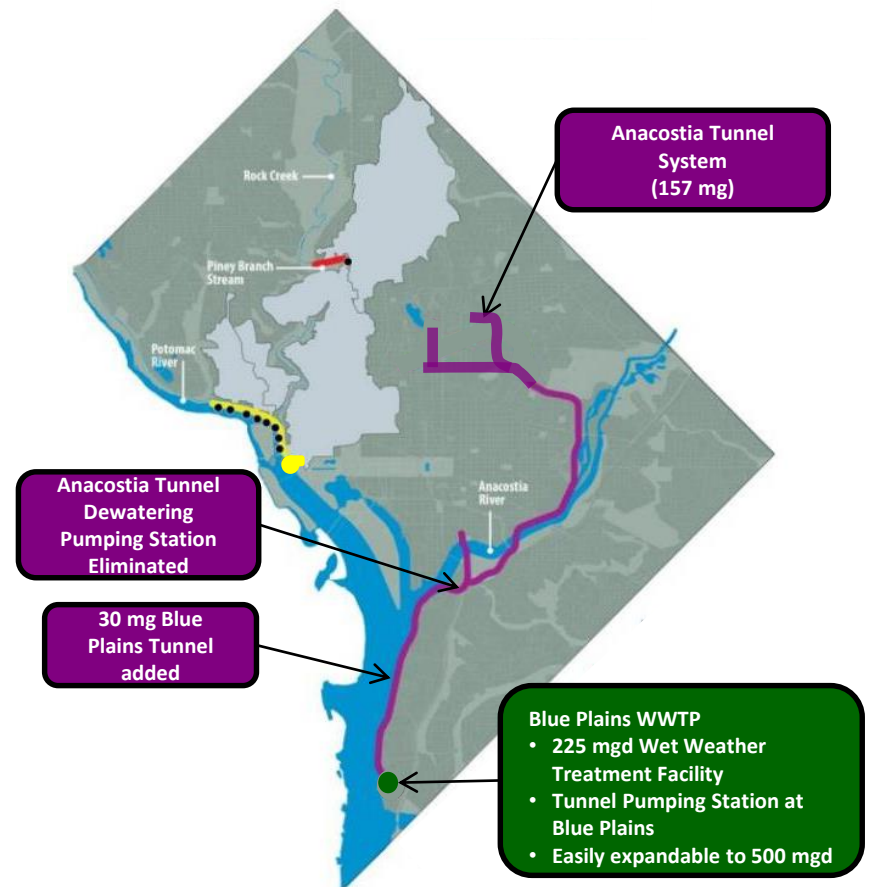
Project Evolution

Project Changes for Blue Plains Nitrogen Control 2

Before 2007 Nitrogen Permit Limits



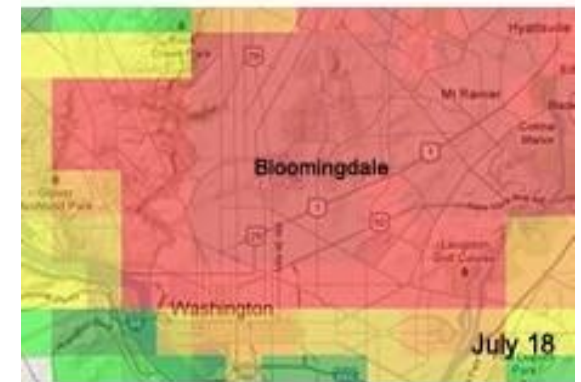
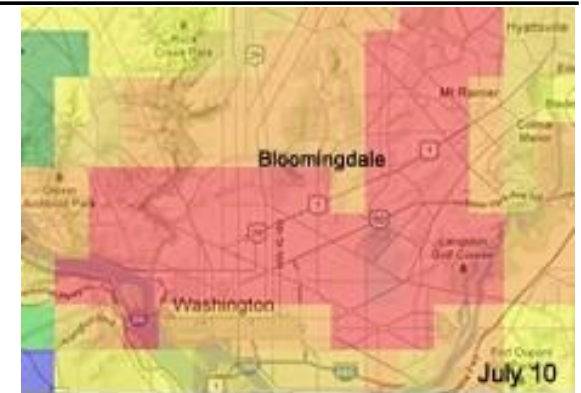
After 2007 Nitrogen Permit Limits



Project Evolution

2012 Bloomingdale Flooding

Date	Duration	Rainfall (inches)	NOAA Point Precipitation Frequency (Nearly)
7/10/2012	1-hour	1.96	10-year storm
7/18/2012	30-minute	1.35	5-year storm
7/19/2012	15-min	0.94	5-year storm
9/2/2012	2-hour	2.78	10-year storm



Storm Intensity Map Courtesy of:
Washington Post

Project Evolution

2012 Bloomingdale Flooding

Photo source unknown



1st St NW

Photo source unknown



Rhode Island & T St NW

Photo courtesy of: Greg Roberts



Rhode Island & 1st St NW

Photo source unknown



Rhode Island Metro

Photo courtesy of myfox.com



Rhode Island & T St NW

Photo source unknown



1st & V St NW

Photo courtesy of myfox.com



Flagler St NW

Photo source unknown



Rhode Island Between 1st & 2nd St NW

Photo courtesy of huffintonpost.com



Project Evolution

2012 Bloomingdale Flooding

- Over 200 property owners affected
- Flood clean-up costs ranged from \$3,000 to \$18,000 per household
- Major concerns regarding public health and safety

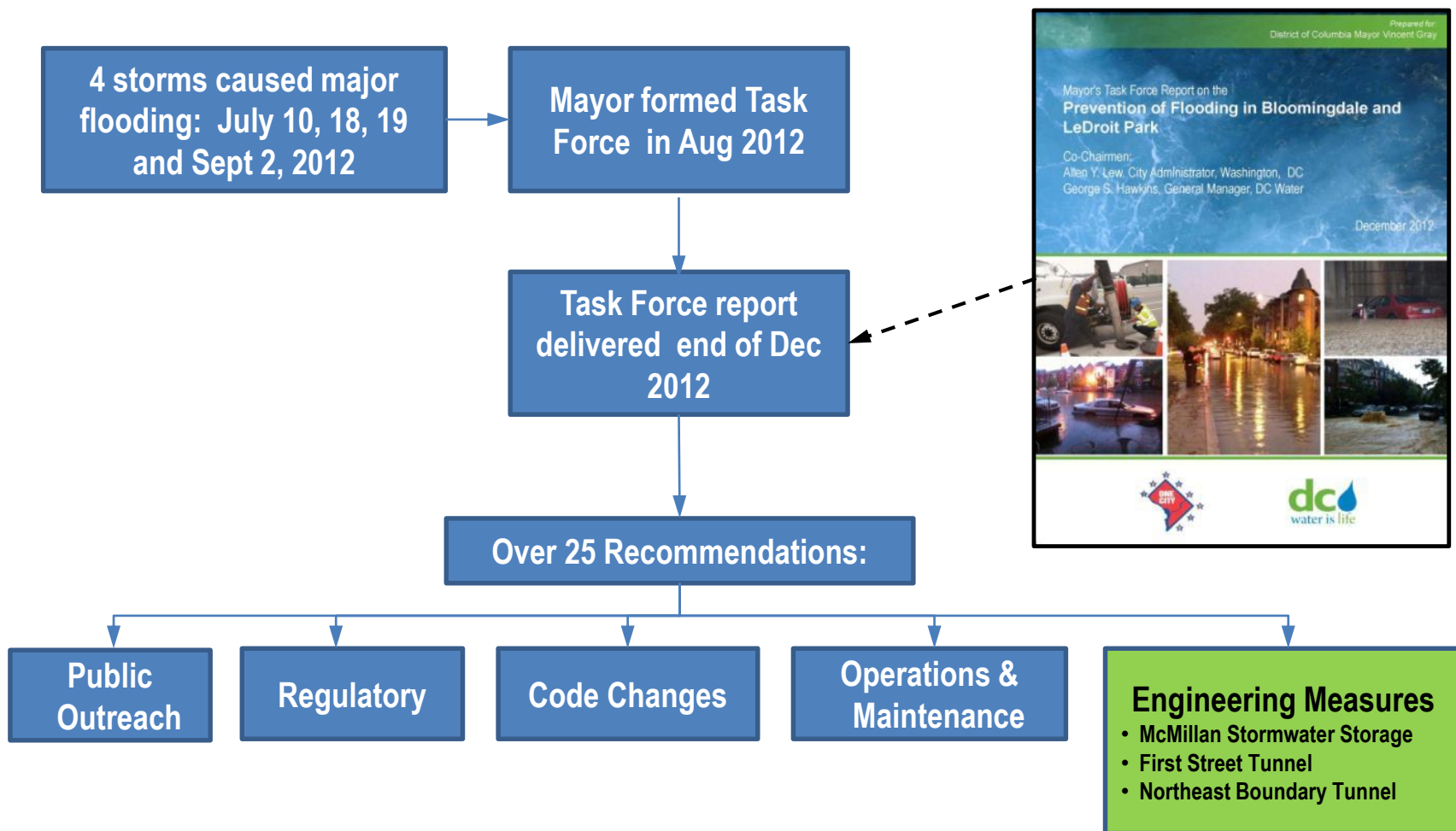


- OVERLAND FLOODING ONLY REPORTED
- SEWER BACKUPS ONLY REPORTED
- OVERLAND FLOODING AND SEWER BACKUPS REPORTED
- UNSPECIFIED TYPE OF FLOODING REPORTED

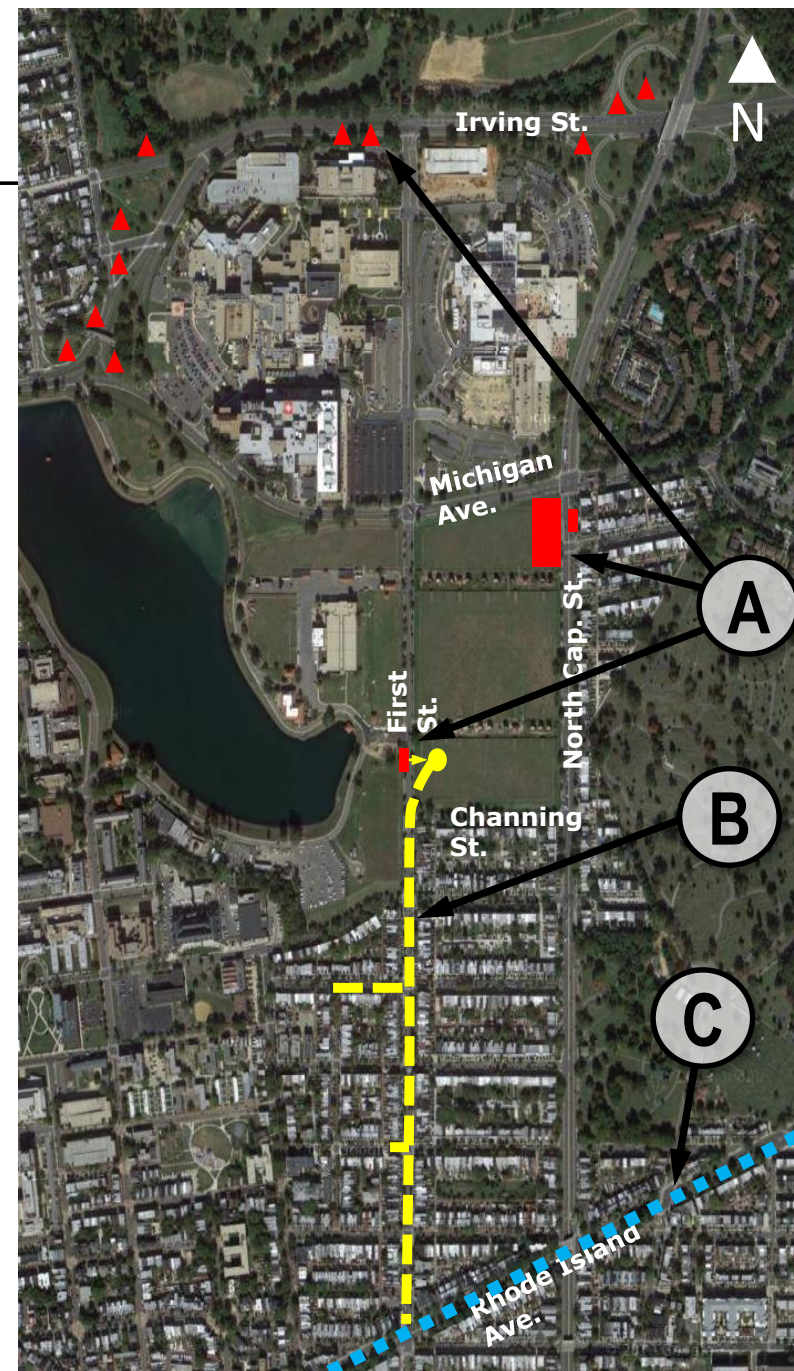
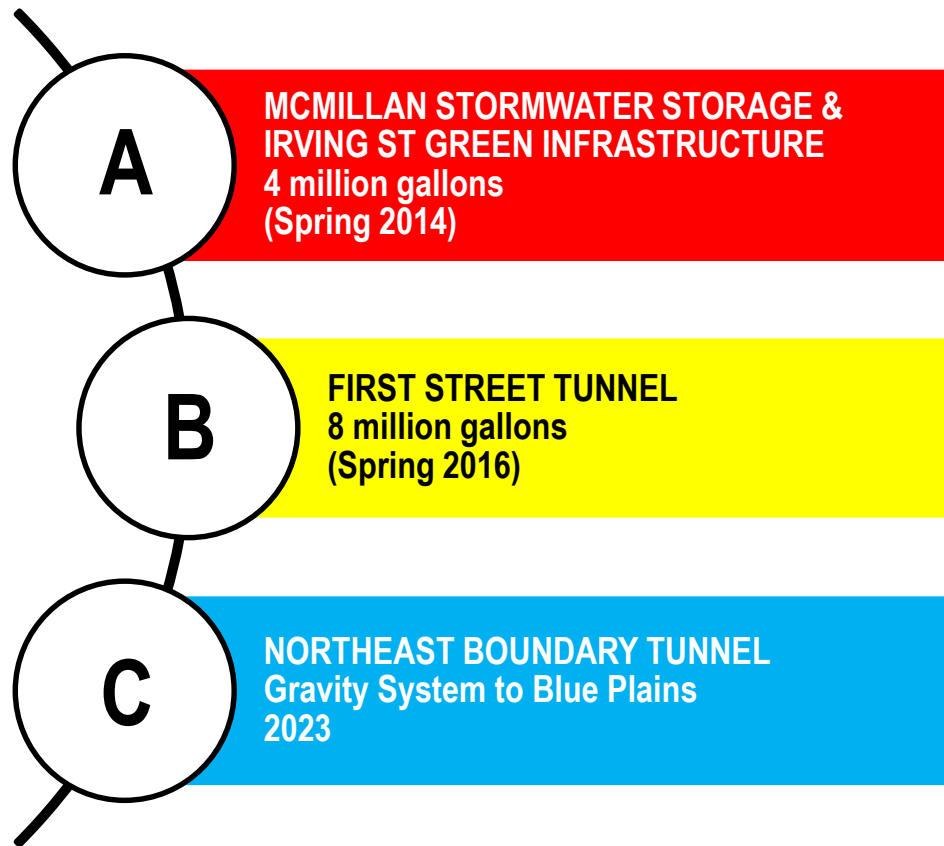
Map of Reported 2012 Flooding

Project Evolution

Response to Bloomingdale Flooding



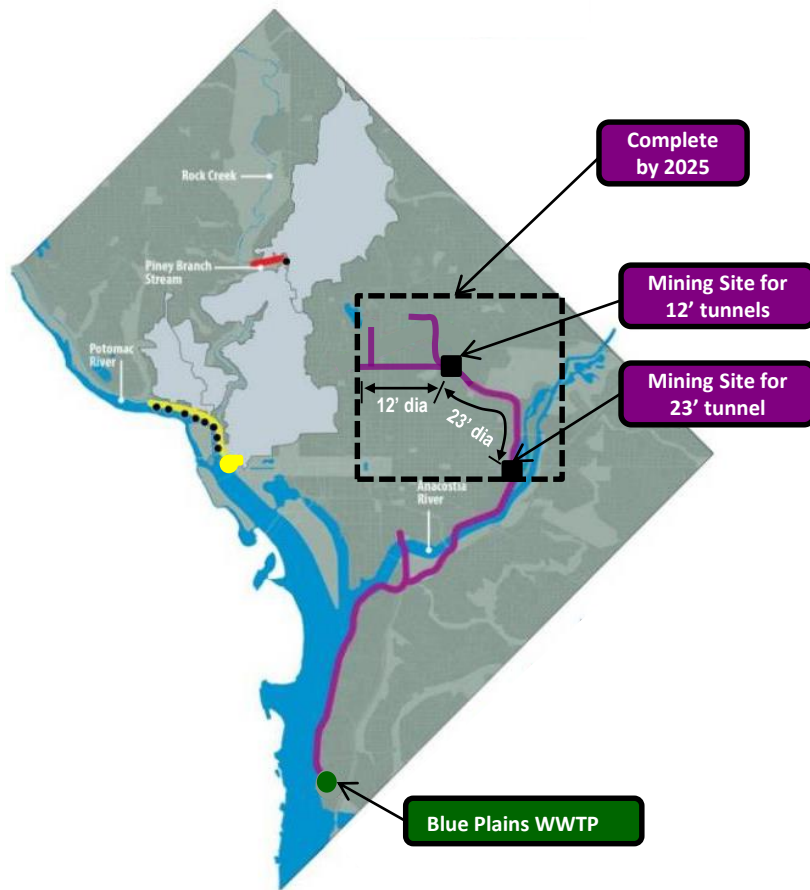
Project Evolution Engineering Measures to Mitigate Bloomingdale Flooding



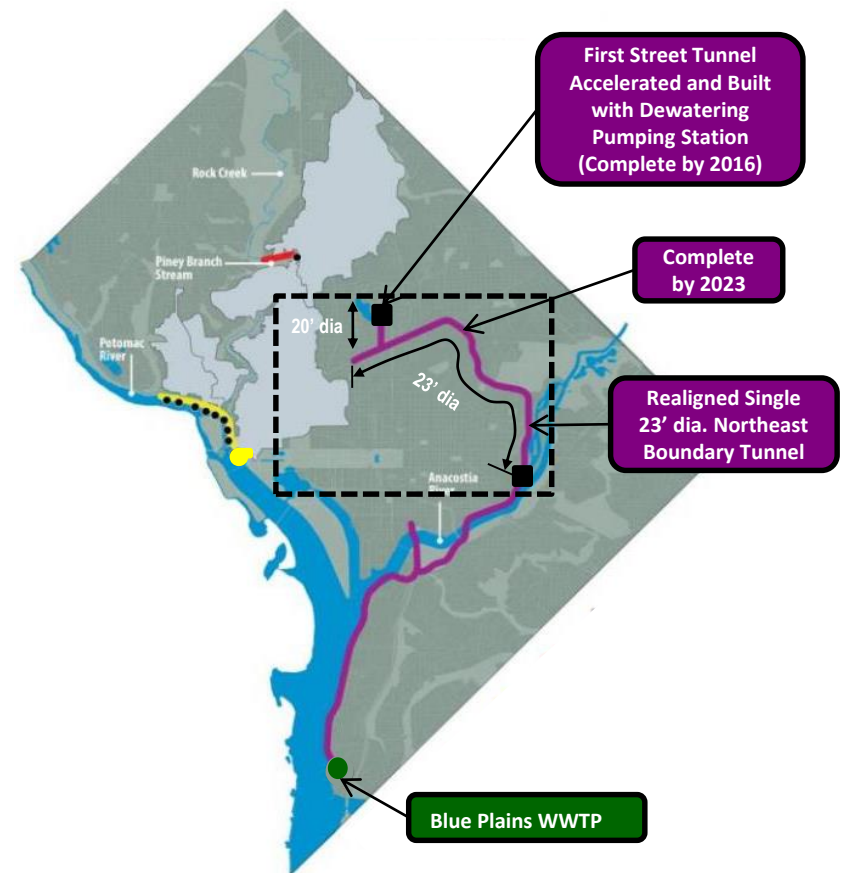
Project Evolution

Project Changes for Bloomingdale Flood Mitigation **3**

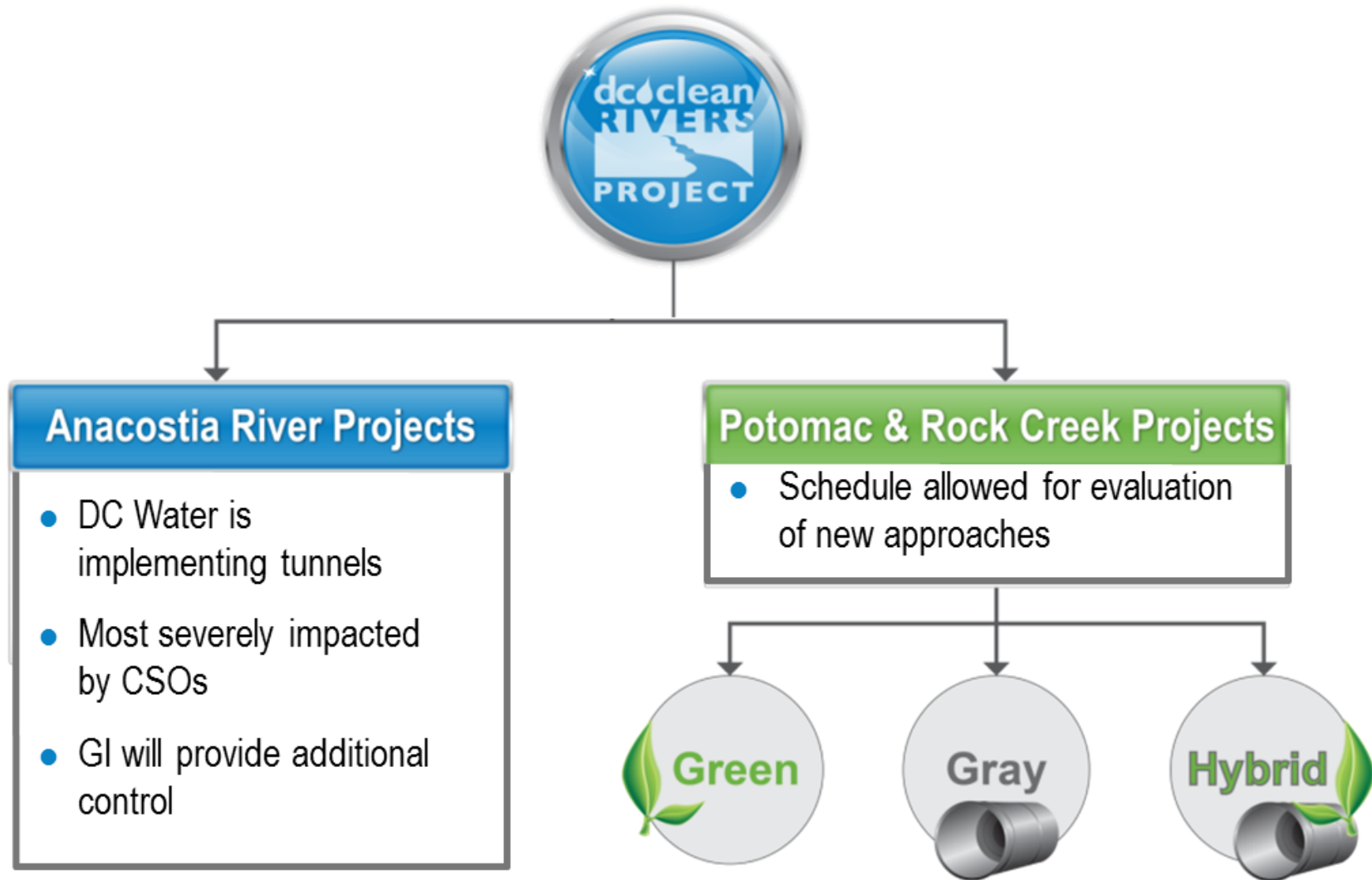
Before Bloomingdale Flooding



After Bloomingdale Flooding



Project Evolution Green Infrastructure

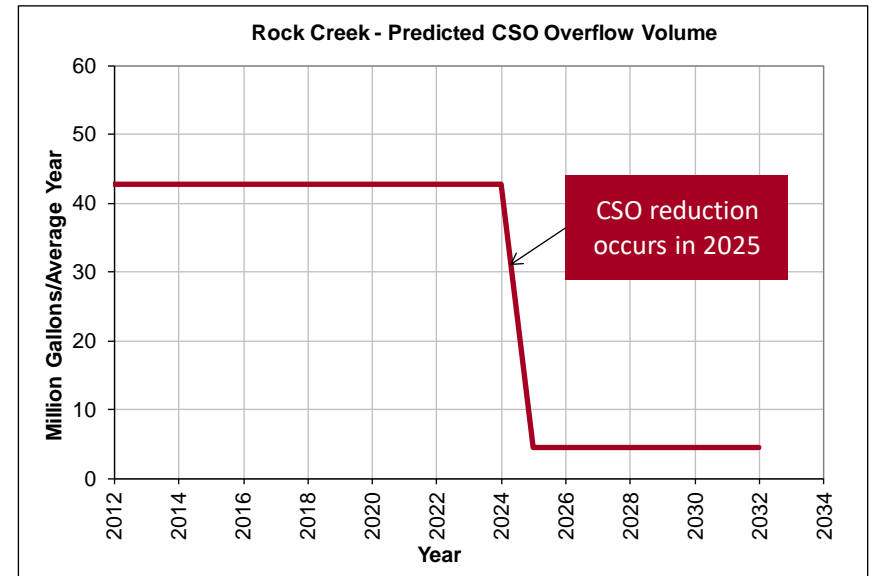


Project Evolution

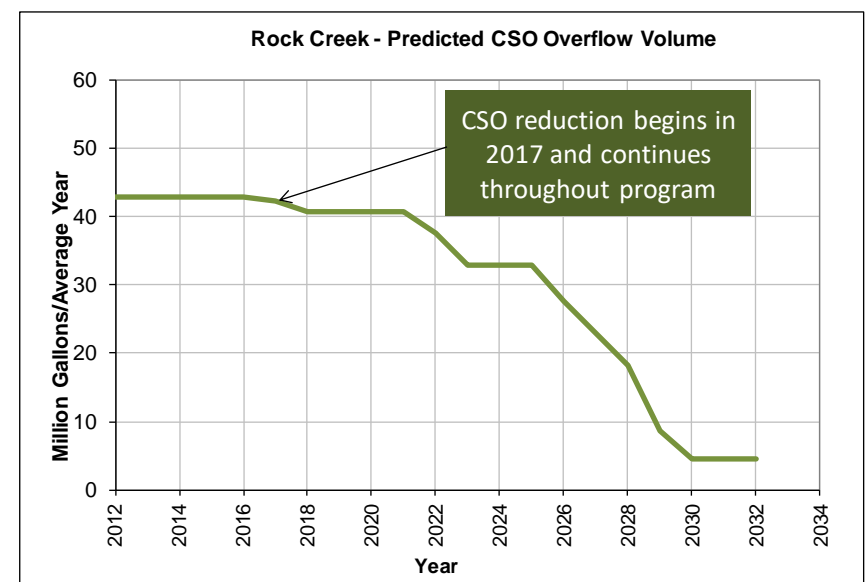
Benefits of Green Infrastructure

- Added environmental, social and economic benefits
 - Heat island reduction
 - Improved air quality
 - Enhanced aesthetics
 - Opportunity for local, green jobs
- Supports Sustainable DC Plan

Existing Plan



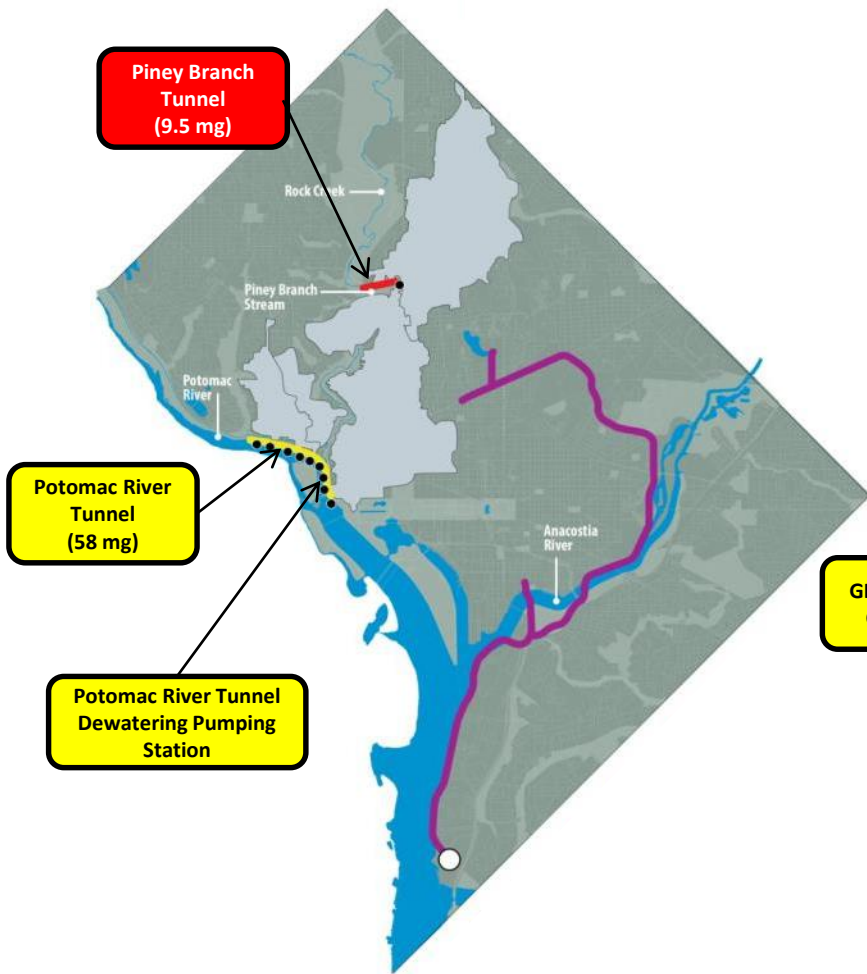
Recommended Plan



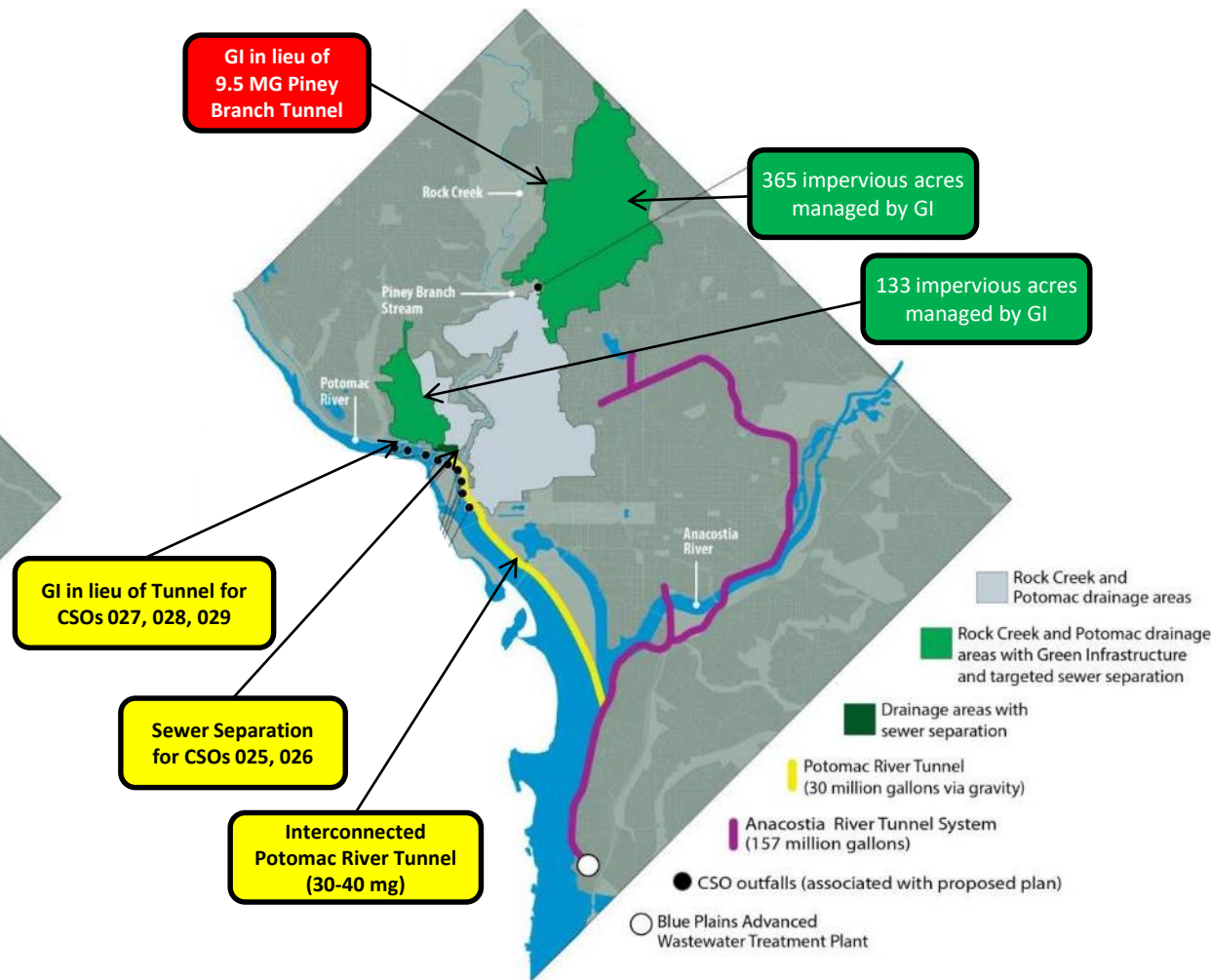
Project Evolution Changes due to GI Amendment and Potomac River Tunnel Gravity Extension

4

Before GI Amendment



After GI Amendment



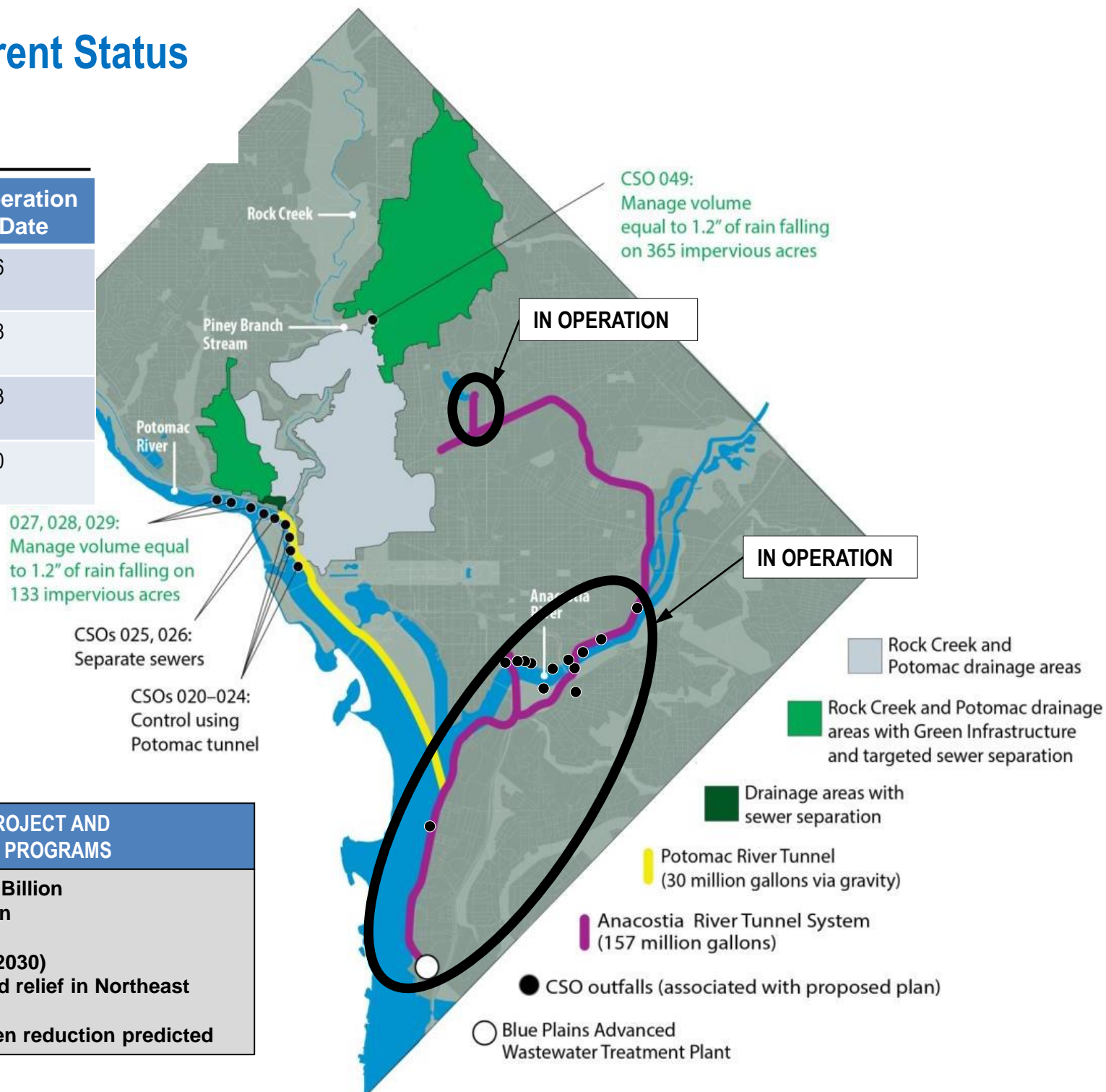
- Full GI build-out pending practicability determination based on first project in each sewershed



WRAP-UP AND CURRENT STATUS

Wrap-Up and Current Status Overview

Tunnel System	Status	Operation Date
First Street Tunnel	In Operation	2016
Anacostia River Tunnel	In Operation	2018
Northeast Boundary Tunnel	Construction	2023
Potomac River Tunnel	Planning	2030

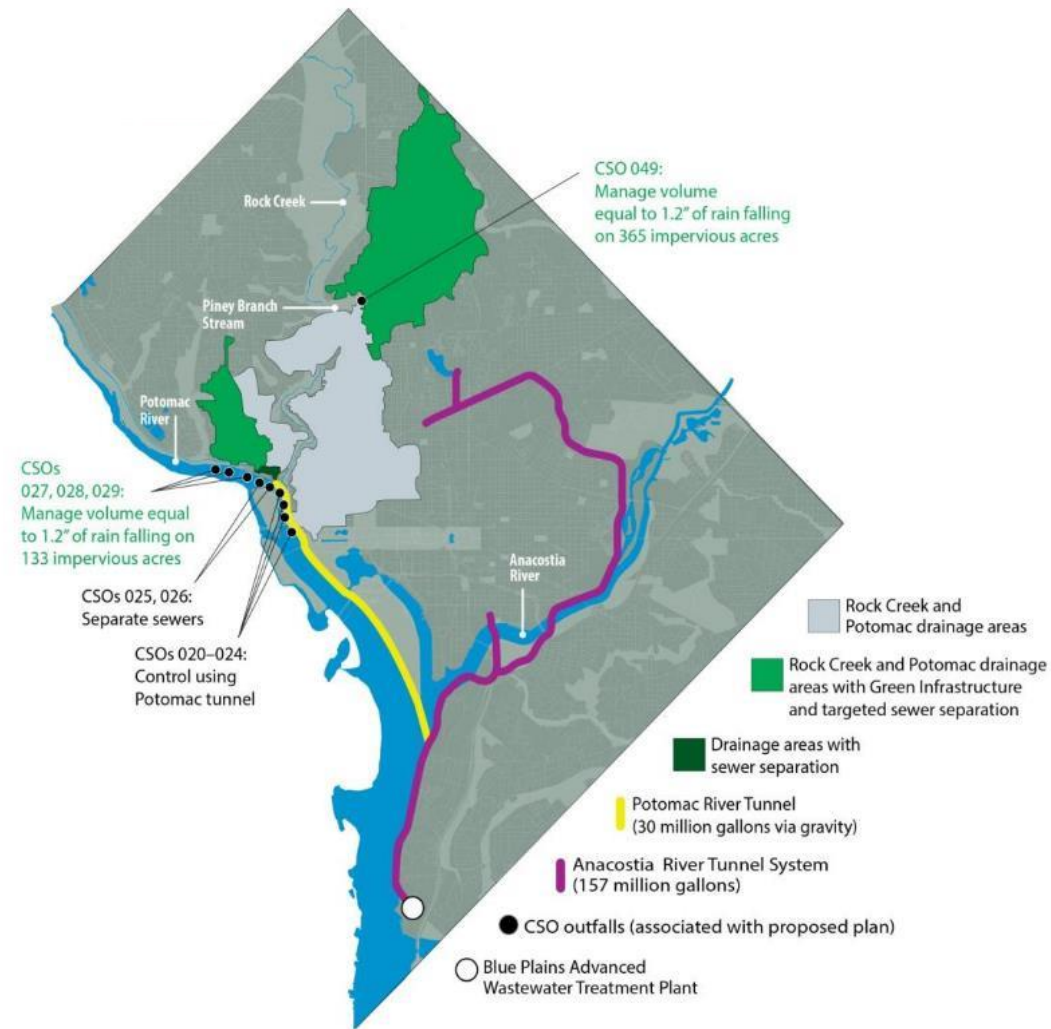


DC CLEAN RIVERS PROJECT AND NITROGEN REMOVAL PROGRAMS
<ul style="list-style-type: none"> • DC Clean Rivers Project: \$2.7 Billion • Nitrogen Removal: \$950 Million • Total > \$ 3.5 Billion • 25 yr implementation (2005 – 2030) • 96% reduction in CSOs & flood relief in Northeast Boundary • Approx 1 million lbs/yr nitrogen reduction predicted

Wrap-Up and Current Status

Major Benefits of Project Changes

- Significantly more economical approach to meeting Blue Plains nitrogen limits
- Accelerated flooding relief for Bloomingdale
- Triple-bottom line benefits of Green Infrastructure
- Interconnected tunnel system operates entirely by gravity
 - Single dewatering pumping station at Blue Plains
 - Interconnection provides better control for localized storms
 - System provides operational redundancy for existing pumping stations
 - Allows for elimination of inflatable dams



Wrap-Up and Current Status Anacostia River Tunnel in Operation

- Anacostia system was placed into operation March 20, 2018
- April 16 rain event
 - 2 inches of rain in 3 hours (2- to 5-year storm)
 - Tunnel filled to capacity
 - Tunnel captured 180 MG of combined sewage
- May 13-19 rain events
 - ~6" of rain over 7 days
 - Tunnel captured 650 MG of combined sewage
 - Tunnel did not overflow
 - Smaller overflows from existing CSOs (greatly reduced by tunnel)


wtop NEWS TRAFFIC WEATHER LISTEN

Home » Weather News » Marooned motorists, transport woes...

Marooned motorists, transport woes after morning floods in DC area

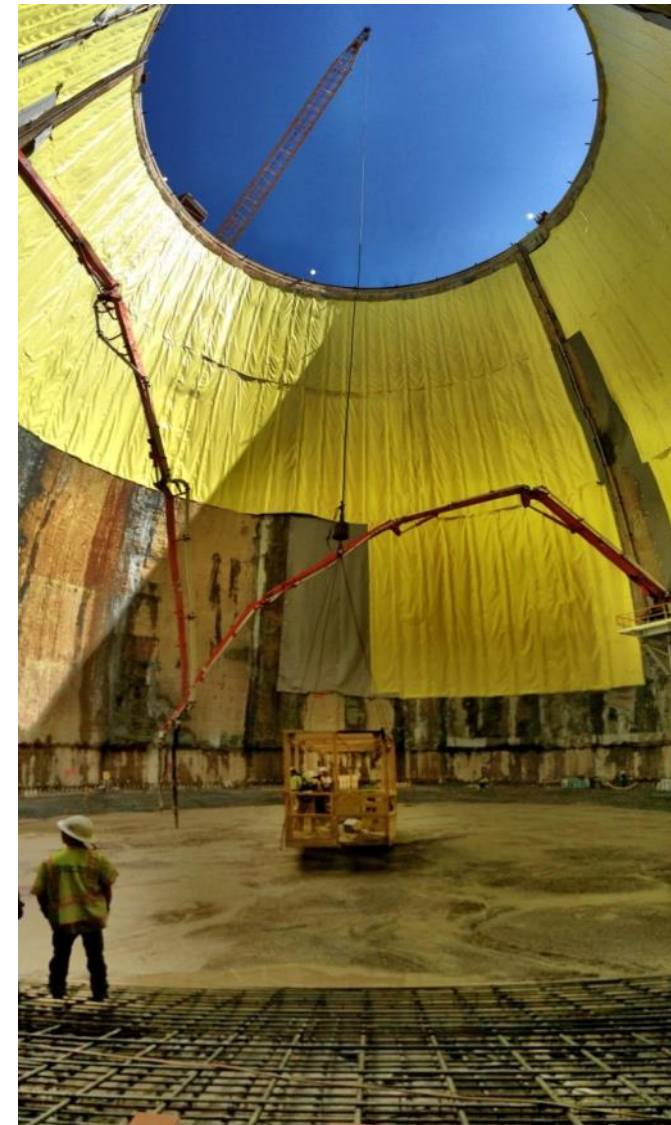
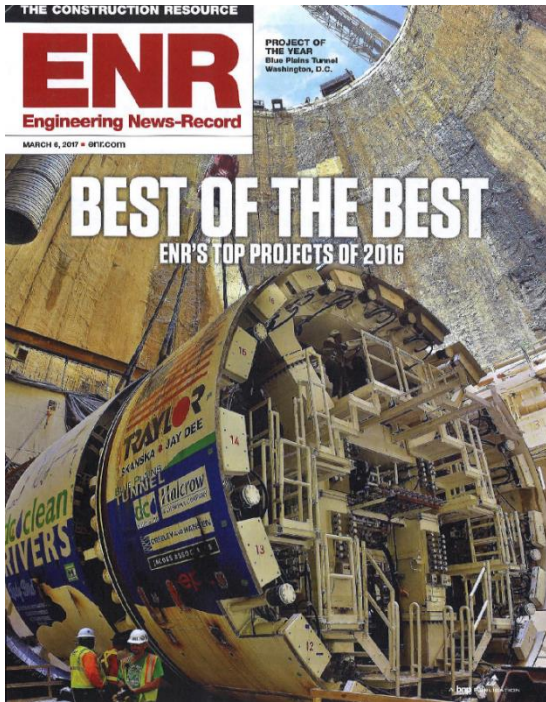
By Chantalle Edmunds | @chantallenews
April 16, 2018 5:56 pm

Roads are being cleared, but the heavy rain Sunday night and Monday morning caused many problems in the D.C. area, including blocked roads and half-submerged cars. Thunderstorms gave way to localized flash flooding Monday and caused large pools of standing water in the D.C. area.



Crews pumping water out of the Va. express lanes work zone. (WTOP/Dave Dildine)

Questions and Answers



Brandon Flora
email: brandon.flora@DCWATER.COM
phone: 202-787-4414