

Photo Credit:

Mark G. Lewis  
Senior Construction Inspector  
DPU Stormwater Utility

# TECHNICAL STAKEHOLDER MEETING

TUESDAY, OCTOBER 27, 2020



[RVAH2O.org](http://RVAH2O.org)



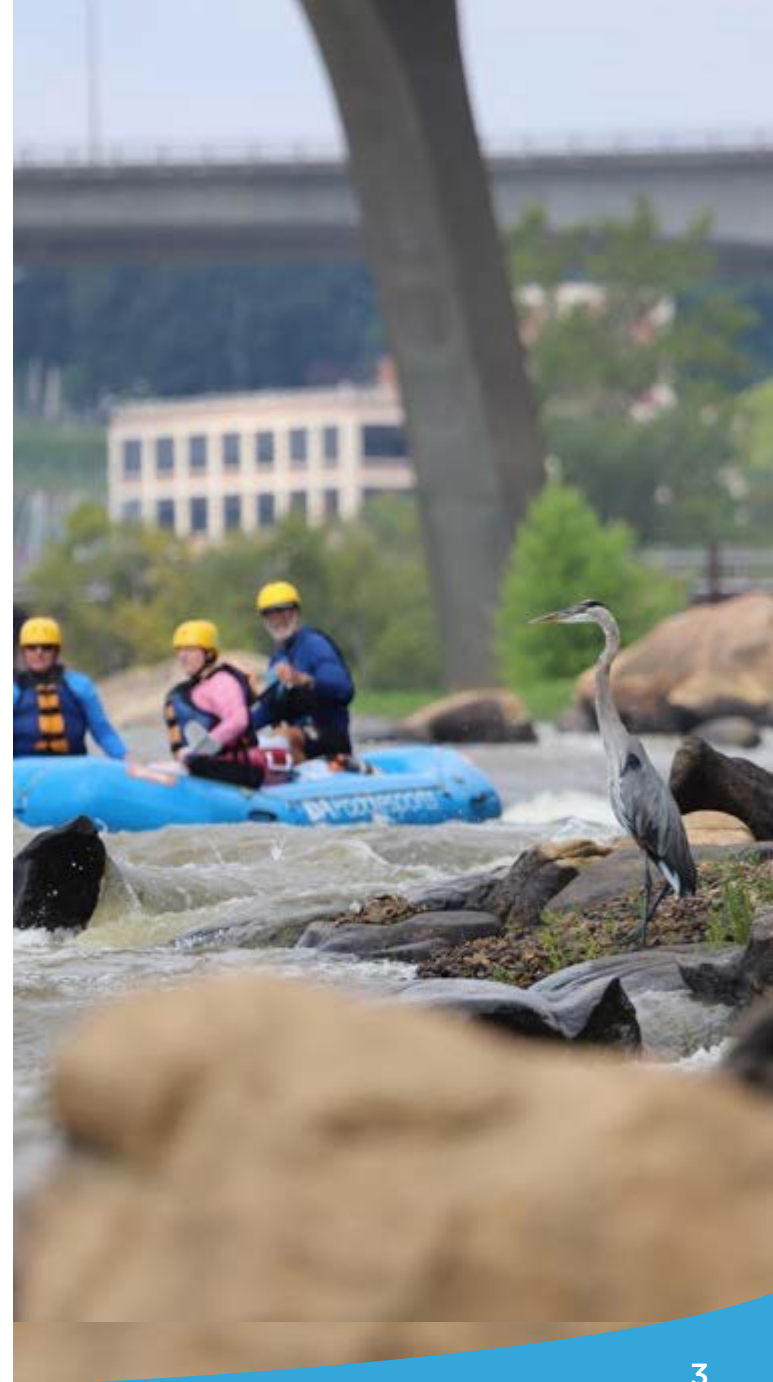
# Welcome!

Put your questions or comments in the  
Chat Box or Unmute yourself and speak up!

If you don't have access to  
the Chat Box, just **speak up!**

# Today's Agenda

- **Who's here today**
- **What's happening now?**
  - Amendment to the Special Order on Consent
  - Update on RT-DSS
  - Interim Plan
- **Update on RVA Clean Water Plan Strategies**
- **Partner Projects**
- **Let's hear from you!**



# Today's Presenters

- Grace LeRose, DPU
- Jeff Reynolds, DEQ
- Matt Pugh, Brown and Caldwell
- Scott Firestine, Richmond Public Libraries
- Ann Jurczyk, Chesapeake Bay Foundation
- Christopher Frelke, Parks, Recreation and Community Facilities
- Mark Van Auken, Arcadis

# Welcome



CHESAPEAKE BAY  
FOUNDATION  
*Saving a National Treasure*



CAPITAL REGION  
LAND CONSERVANCY



INSTITUTE for  
ENGAGEMENT & NEGOTIATION  
*Shaping Our World Together*



# Pat's back!

- **Patrick Bradley, DPU's Deputy Director**
- 35 years working on water quality/  
watershed issues, including:
  - EPA
  - Department of the Navy
  - Private Industry, and
  - City of Richmond



# Meet Alan

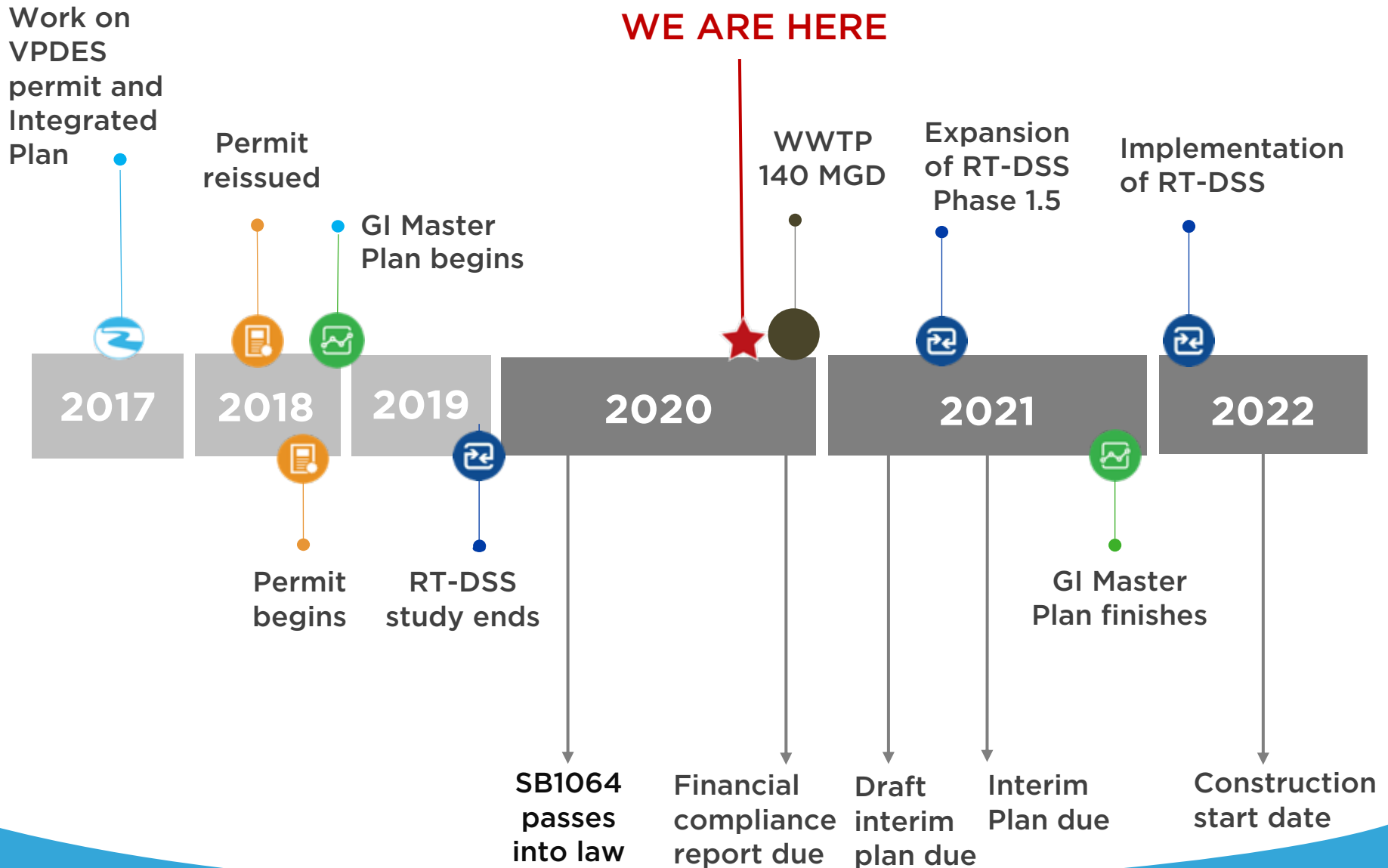
- **Alan Harrison, CSO Engineering Manager**
- 25 years' experience in water and wastewater including:
  - Design/construction
  - O&M
  - Virginia Department of Health
- Grew up in Tidewater and Chesterfield, graduated from Manchester High
- Hokie with a B.S. in Civil Engineering



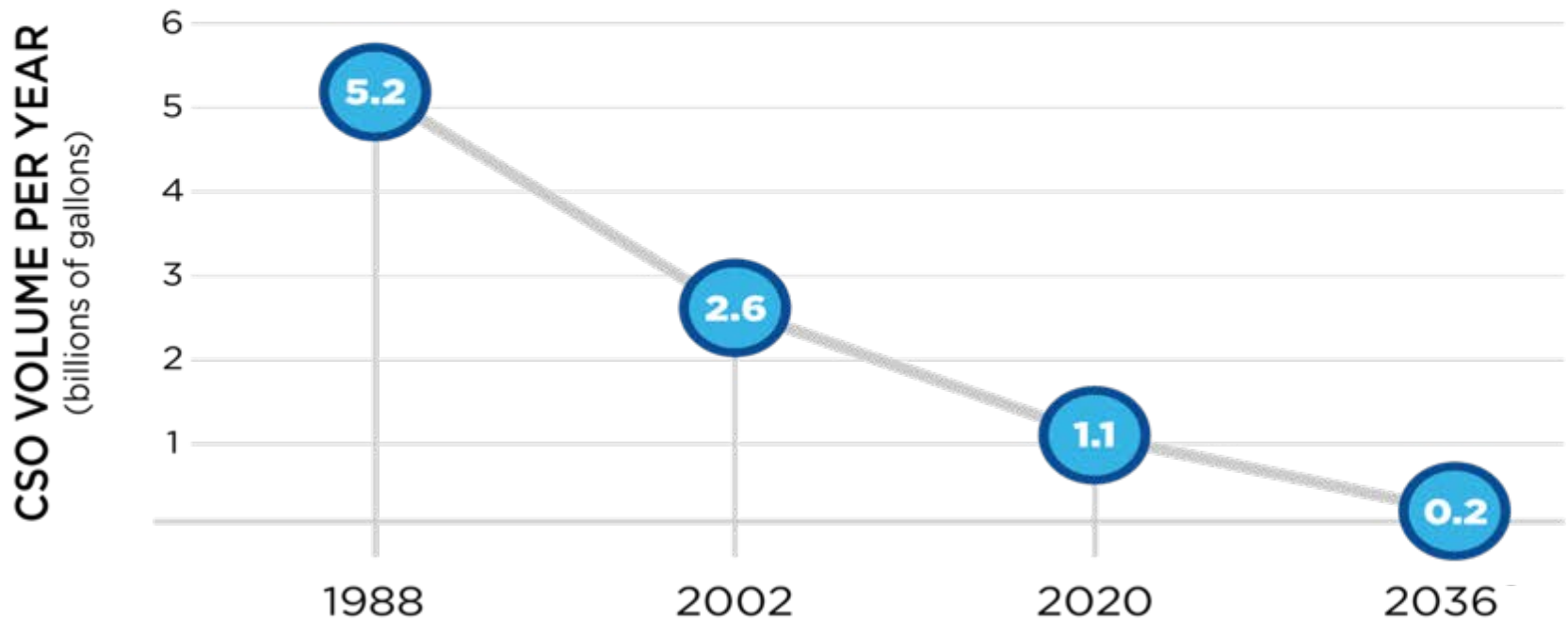
The background is a solid dark blue. On the left side, there are several concentric circles in lighter shades of blue, creating a spiral-like effect that draws the eye towards the center.

**What's happening now?**

# RVA Clean Water Plan Timeline



# Reduction in CSS overflows from 1988 to 2020



# 2005 Consent Special Order and Senate Bill 1064 Overview

# Consent Special Order - 2005

- A Consent Special Order (“Order”) was entered between the State Water Control Board (“SWCB”) and the City of Richmond (the “City”) in 2005 pursuant to Va. Code §§ 10.1-1185 and 62.1-44.15(8a).
  - Order incorporates 2002 Long Term Control Plan (“LTCP”) in Appendix A.
  - Provides an implementation schedule and reporting requirements.
  - The City and the SWCB may amend the Order pursuant to Sections E(1)-(2).
  - “New, more cost-effective technologies or improvements in the performance of the LTCP” are grounds for an evaluation to determine if the LTCP and the Order should be amended pursuant to Section D(5).

# SB 1064 Key Requirements

- SB 1064 was enacted into Virginia Law by the General Assembly and is published in the 2020 Virginia Acts of Assembly.
- SB 1064 sets new LTCP implementation dates and spurs the City “to satisfy all requirements” of the Order by July 1, 2035. See SB 1064, Sections 1(B) and 2(E).
  - The City shall submit to DEQ by July 1, 2021 an interim plan detailing actions to partially satisfy the Order that can be initiated by July 1, 2022 and completed by July 1, 2027. See SB 1064, Sections 1(A) and 2(C).
  - The City shall submit to DEQ by July 1, 2024 a final plan detailing the actions to completely satisfy the Order that can be initiated by July 1, 2025 and completed by July 1, 2035. See SB 1064, Sections 1(B) and 2(E).

## SB 1064 Key Requirements – cont'd.

- SB 1064 allows the City to **substitute actions** in the Interim Plan and Final Plan in place of “proposed actions,” i.e., LTCP actions, to satisfy the Order, subject to DEQ approval and provided that the substitute actions are **at least as cost-effective** as the original LTCP actions replaced. See SB 1064, Section 1(B).
  - LTCP actions substitution allows the City **flexibility** to comply with timelines and utilize new technologies.
- Annual Report due December 1 each year to demonstrate progress and to facilitate State appropriations.

# SB 1064 - Deadlines

Requirements	Plan	Long Term Plan	TMDL Projects
<b>Objective</b>	Identify “short-term, easy win” projects to improve the CSS	Identify large infrastructure projects to bring the City’s CSS in compliance with water quality standards	Identify projects to meet the requirements of the “James River – Richmond Tributaries Bacteria TMDL”
<b>Plan Due Date</b>	July 1, 2021	July 1, 2024	July 1, 2030 <sup>1</sup>
<b>Construction Activities Start Date</b>	July 1, 2022 <sup>1</sup>	July 1, 2025 <sup>1</sup>	Not Specified
<b>Construction Activities End Date</b>	July 1, 2027 <sup>1</sup>	July 1, 2035 <sup>1</sup>	Not Specified

1. Deadlines may be extended

# Order Amendment to Conform with SB 1064

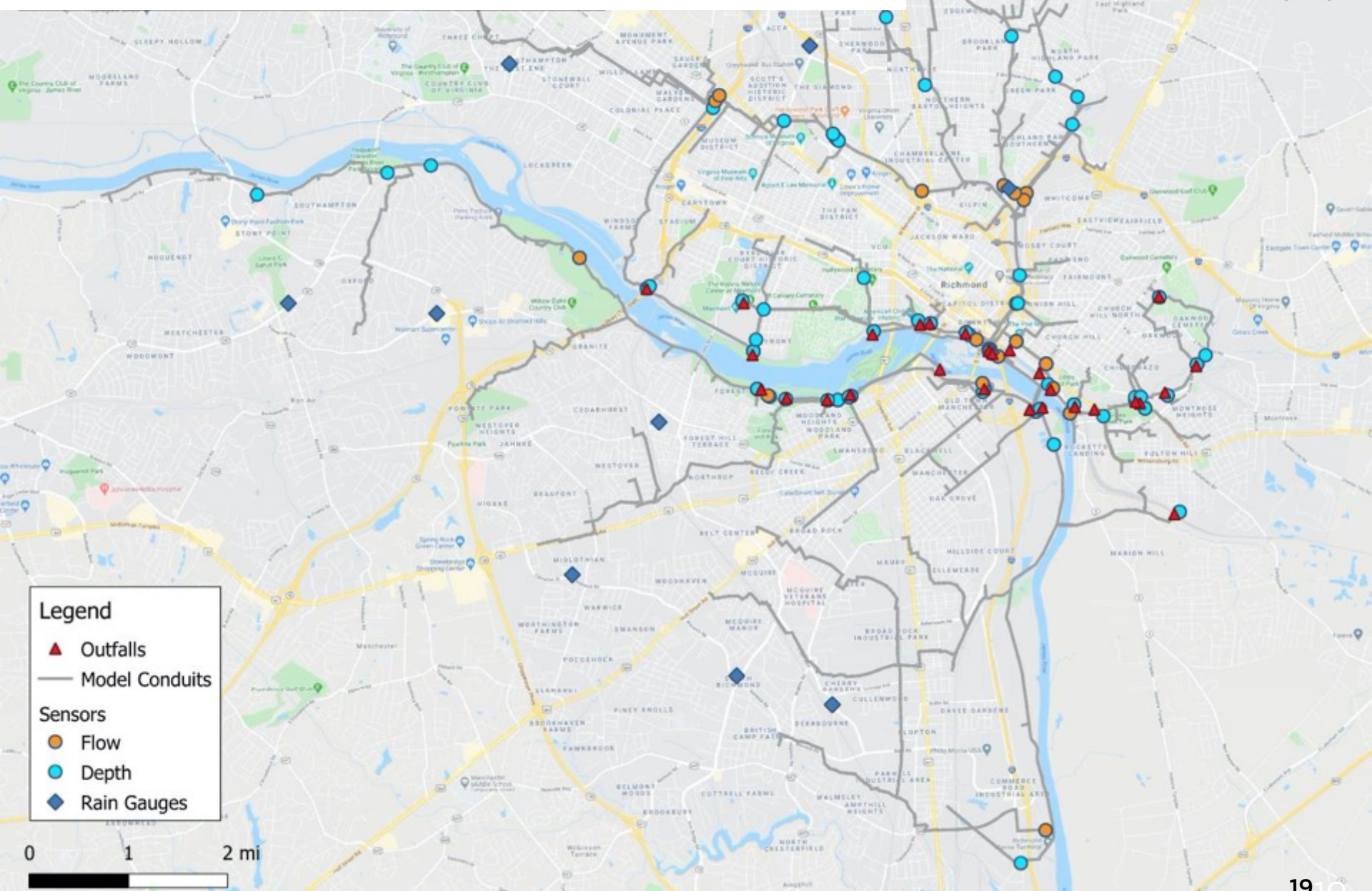
- An Amendment to the Order was initiated by the SWCB and the City to align the requirements of the SB1064 to the Board's 2005 Order, and to provide specific enforceable requirements under the Board's authority.
- The Amendment aligns and parallels each requirement of SB 1064 and, where appropriate, provides further context and definition for enforceability and applicability.
  - For purposes of substituting projects, the term “cost-effective” used in SB 1064 is defined in the Amendment to mean “CSO system performance measures including, without limitation, flow volume reduction and water quality improvement per dollar.”
  - For purposes of substituting projects, DEQ approval is “contingent upon a demonstration by City of Richmond that a proposed action achieves the same or improved CSO system performance measures as, at or below the cost of, an action substituted in the 2005 Order.”
- Amendment signed by City on October 19, 2020 and available for public comment beginning November 9, 2020 for 14 days.

# **Real Time- Decision Support System (RT-DSS)**

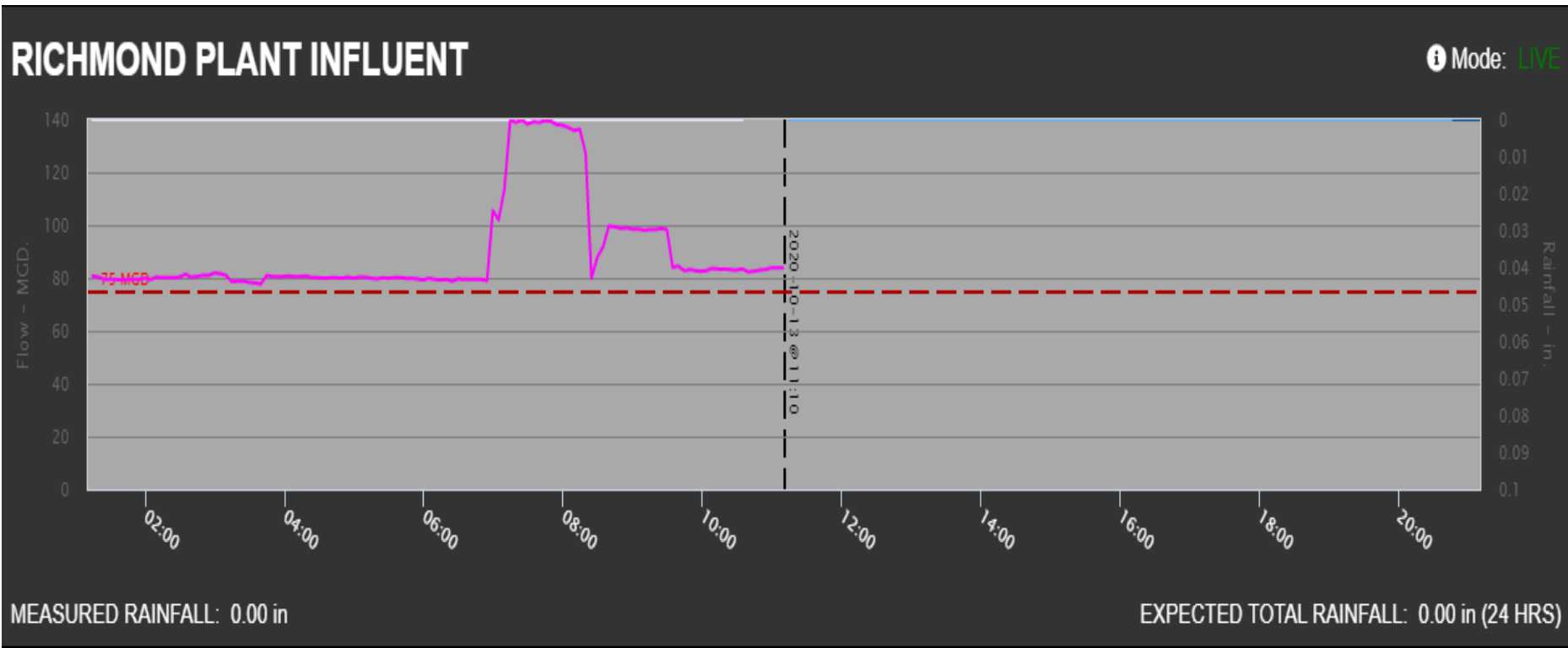
# Richmond Real Time Decision Support System Project Objectives

- Reduce system-wide combined sewer overflows.
- Optimize operations at the WWTP and Shockoe storage basin during storm events.
- Optimize utilization of system capacity while mitigating hydraulic restrictions during periods of wet weather.
- Quantify potential overflow reductions that could be accomplished through active flow management and coordination.

# Richmond Collection System Sensor Coverage



# October 11, 2020 Rain Event



# Introducing Matt Pugh

- Brown and Caldwell, Deputy PM
- 10 years experience working on:
  - Richmond's CSO Project
  - AlexRenew's CSO Program RiverRenew
  - Recent Richmond WWTP upgrades
- Hokie with a B.S. and M.S. in Civil and Environmental Engineering
- Currently holds four VA State Strongman records!



# Interim Plan

# Interim Plan – Development Steps



## **Project Identification**

**Complete: September 2020**

Identify Projects to evaluate

## **Project Evaluation**

**Complete: December 2020**

1. CSO Activation/Volume/Bacteria Reduction Benefit (Model)
2. Cost Estimates
3. Non-Monetary Factors

## **Project Ranking**

**Complete: January 2021**

## **Project Selection**

**Complete: March 2021**

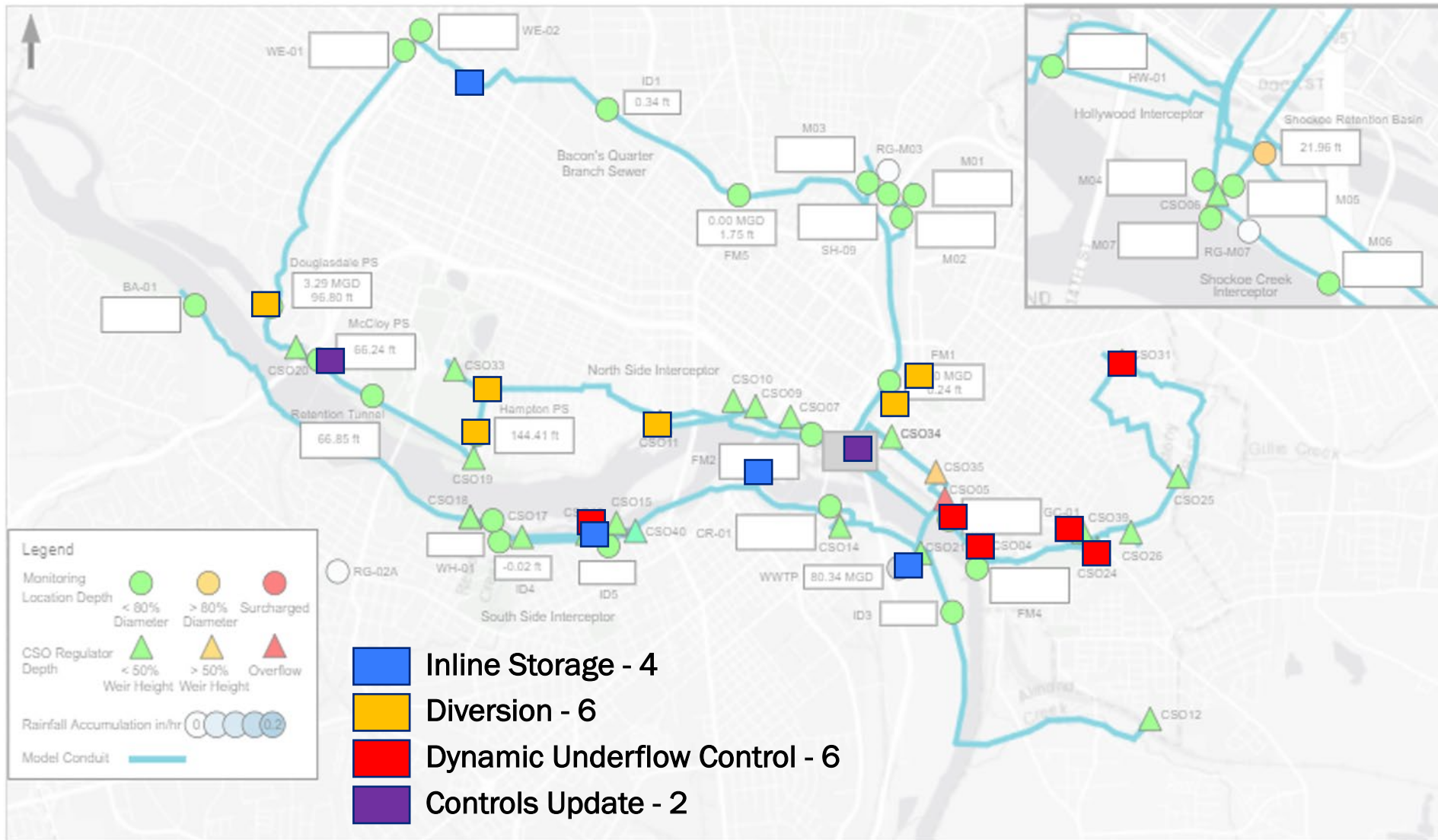
## **Interim Plan Report**

**Complete: July 1, 2021**

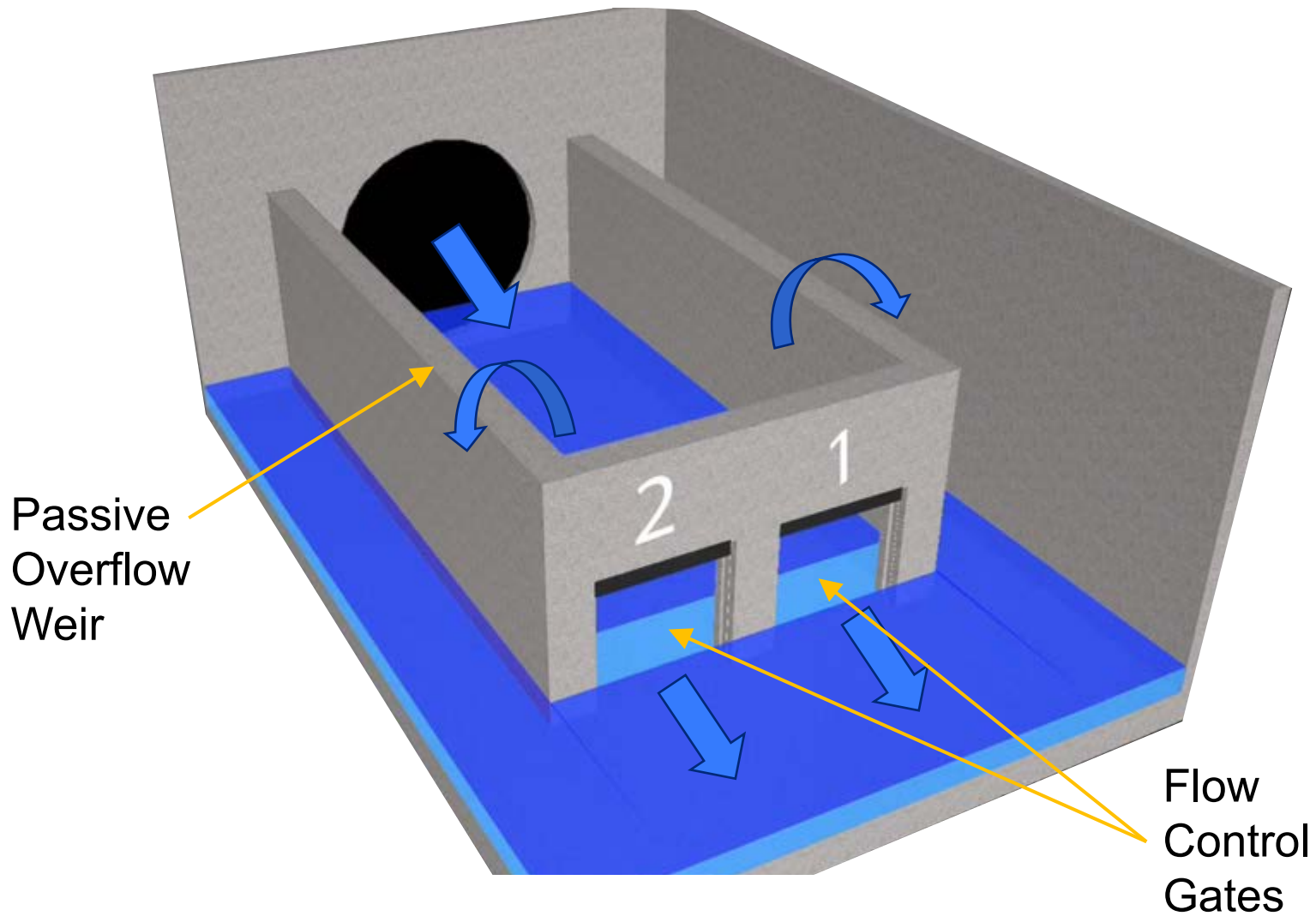


# Project Identification

# Interim Plan Projects

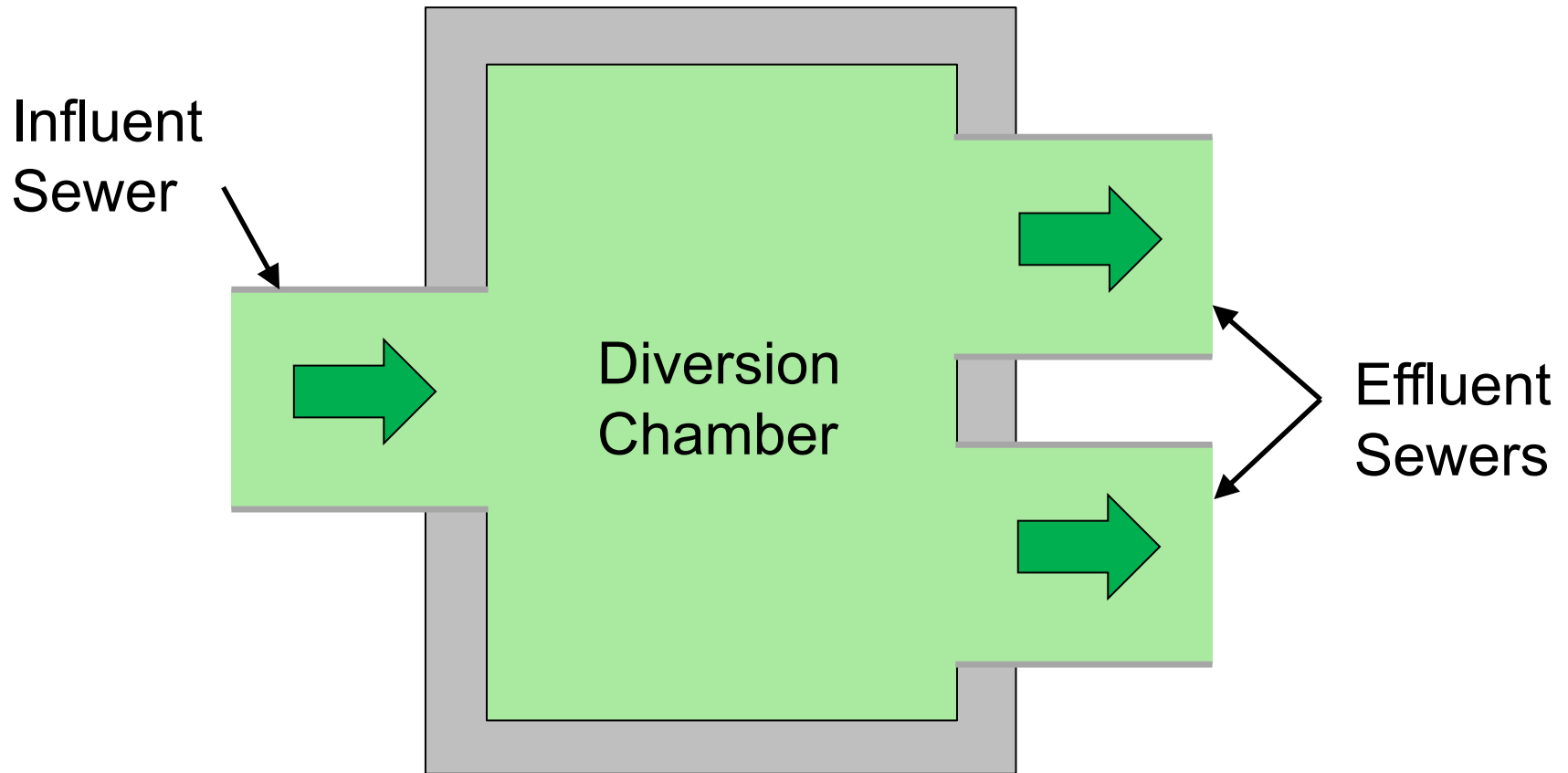


## RT-DSS Projects – Inline Storage



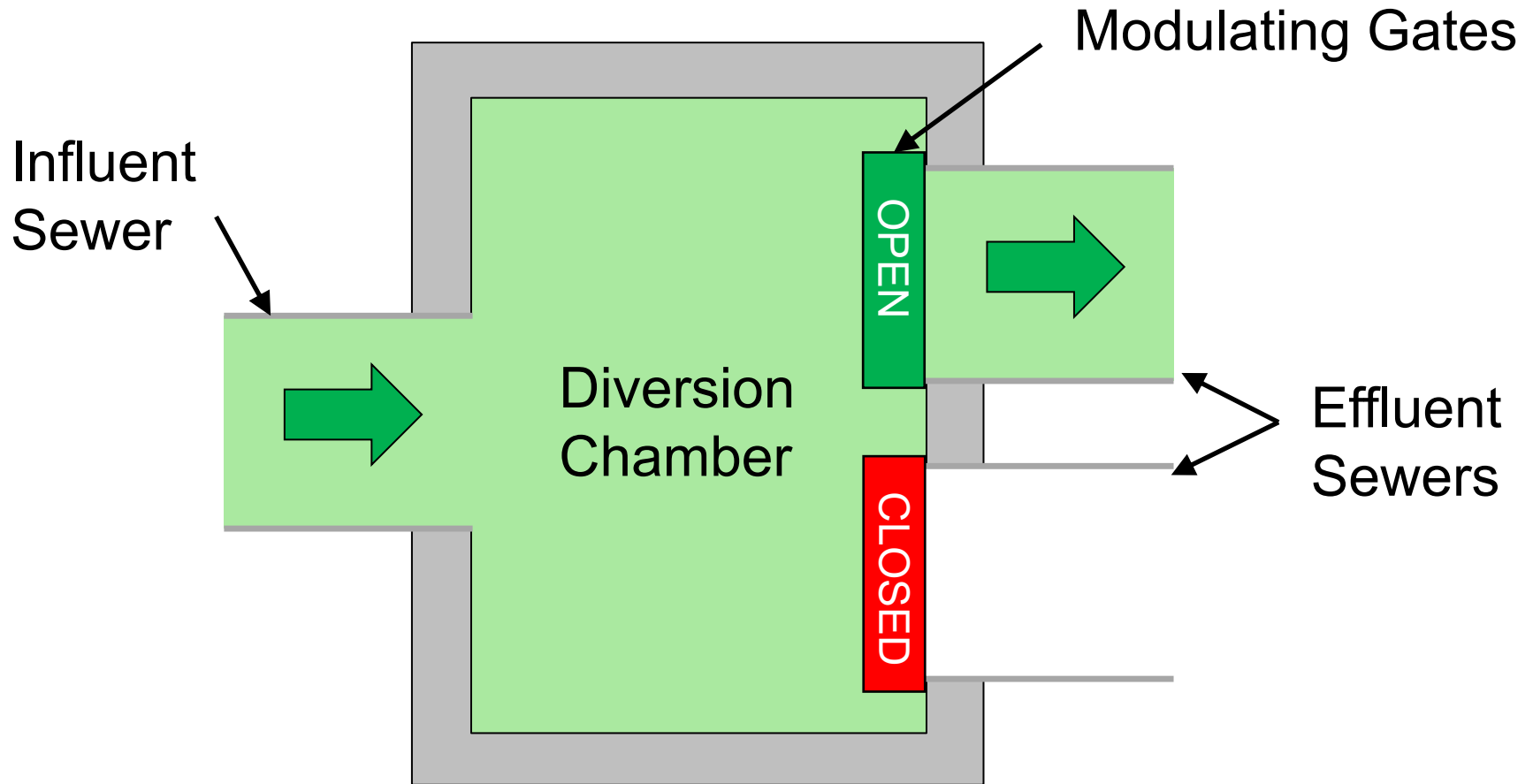
# RT-DSS Projects – Diversion

## Existing Condition



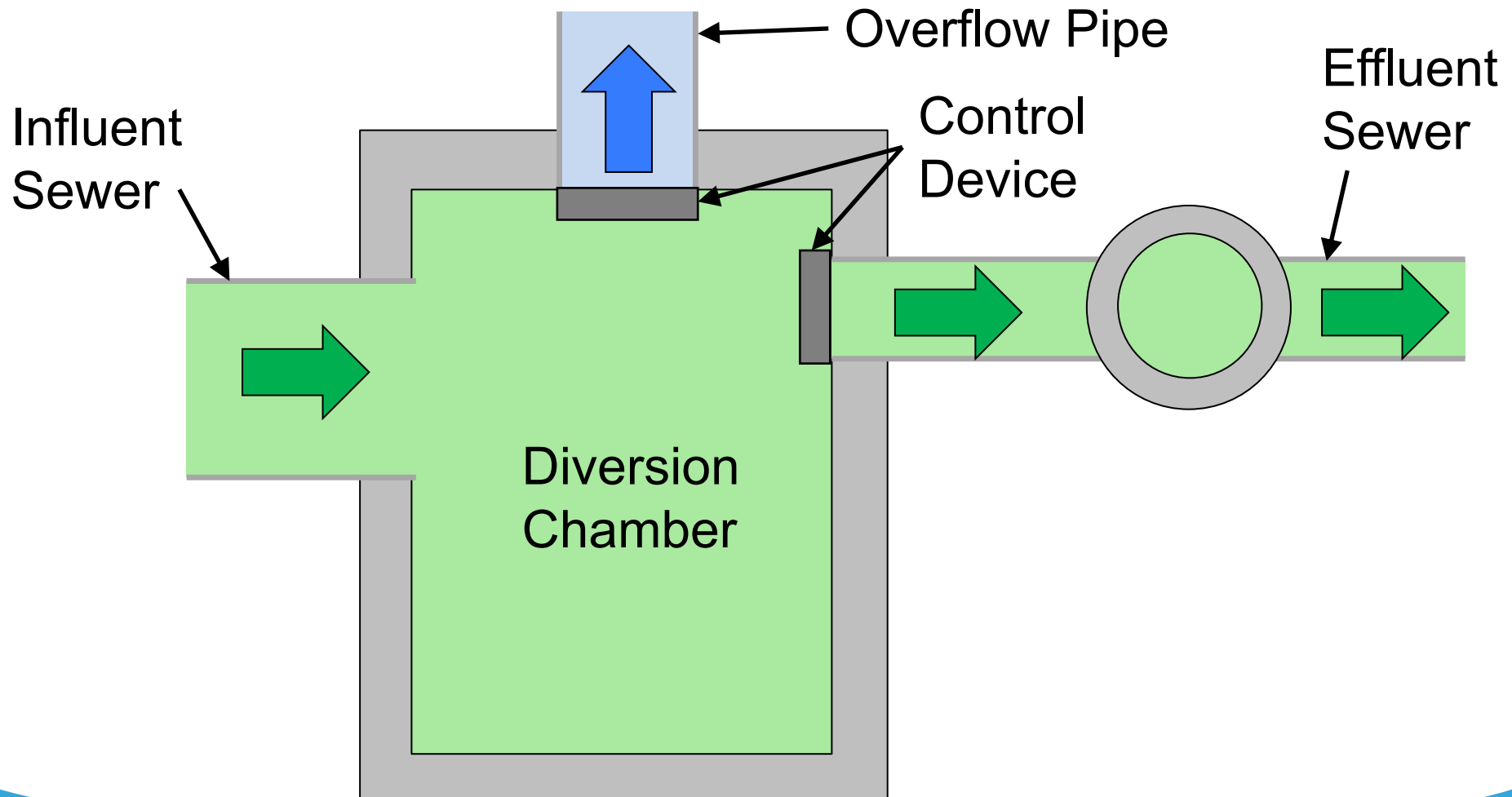
# RT-DSS Projects – Diversion

## Proposed Condition



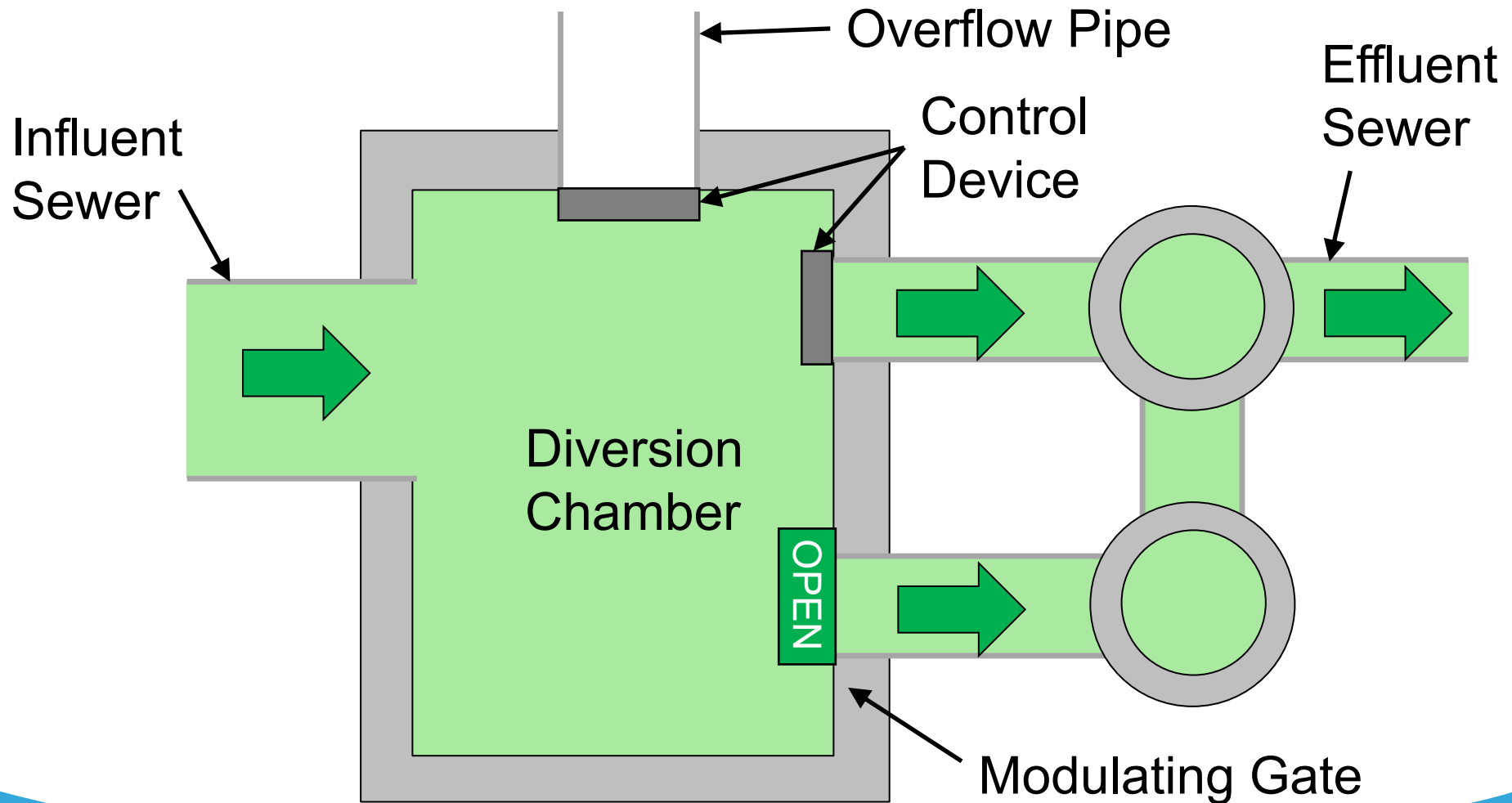
# RT-DSS Projects – Dynamic Underflow Control

## Existing Condition



# RT-DSS Projects – Dynamic Underflow Control

## Proposed Condition



# 2019 Annual Reported (Modeled) Overflows

Outfall		Activations	Overflow Volume (MG)	
			MG	% Total
6	Shockoe	29	1,444.7	77.9%
21	Gordon Avenue	43	169.0	9.1%
14	Stockton St	38	74.7	4.0%
40	CSO 1 Outlet	34	66.5	3.6%
11	Park Hydro	26	31.9	1.7%
4	Bloody Run	20	13.6	0.7%
39	Government Rd	37	11.4	0.6%
12	Hilton St	37	9.3	0.5%
24	Varina St	12	7.3	0.4%
5	Peach St	16	7.3	0.4%
31	Oakwood Cem.	13	6.7	0.4%
10	Gambles Hill	3	4.2	0.2%
25	Briel St	0	2.4	0.1%
7	Byrd St	6	2.1	0.1%
35	25th and Dock St	15	1.2	0.1%
34	19th and Dock St	6	1.2	0.1%
9	7th St	4	0.8	0.0%
19	Hampton St	2	0.5	0.0%
20	McCloy St	1	0.1	0.0%
33	Shields Lake	2	0.1	0.0%
15	Canoe Run	0	0.0	0.0%
16	Woodland Hts	0	0.0	0.0%
17	Reedy Creek	1	0.0	0.0%
18	42nd St	0	0.0	0.0%
26	Government Rd	0	0.0	0.0%



**RT-DSS  
Projects in  
Service Area**



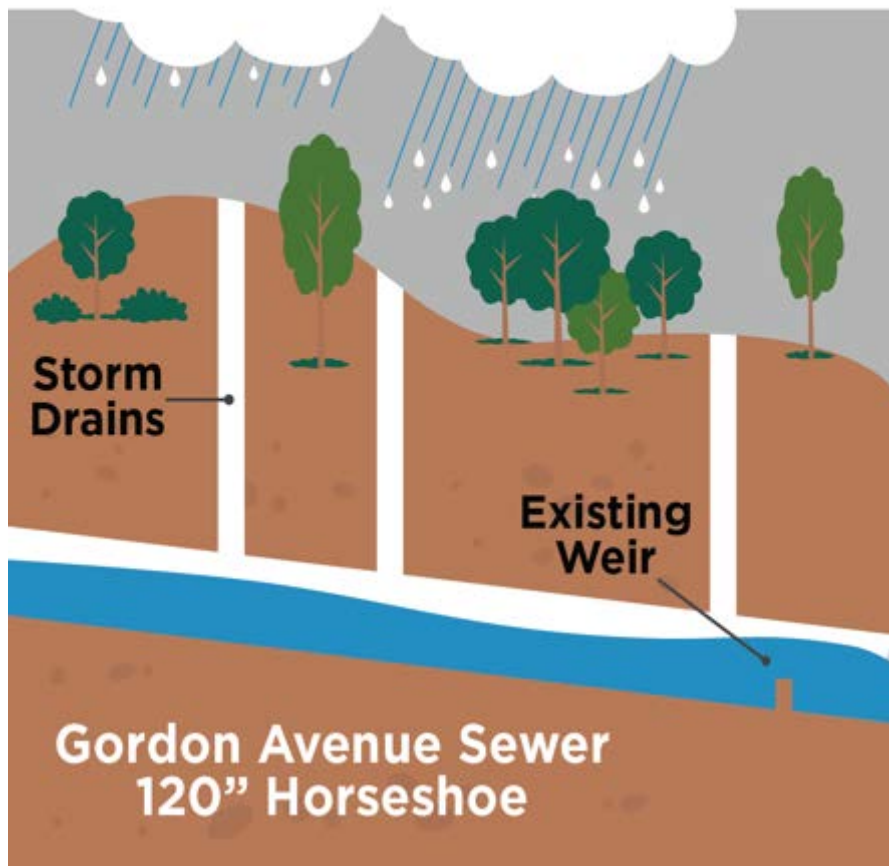
**RT-DSS  
Projects at  
these Sites**

# CSO 21 - In-Line Storage Project

Scenario	Activations	Overflow Volume (MG)
2019 Reported Values	43	169
WWTP @ 140 MGD	24	71
WWTP @ 140 MGD / with In-Line Storage	9	48

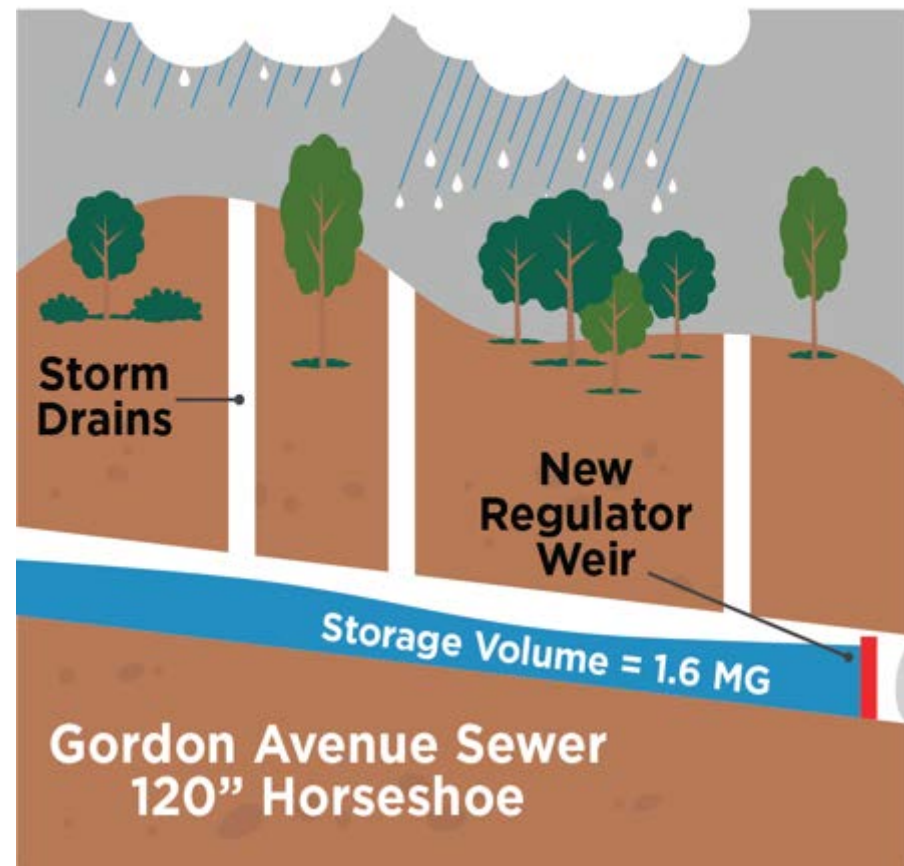


## CSO 21 Existing Infrastructure



Current Storage = 0.05 MG

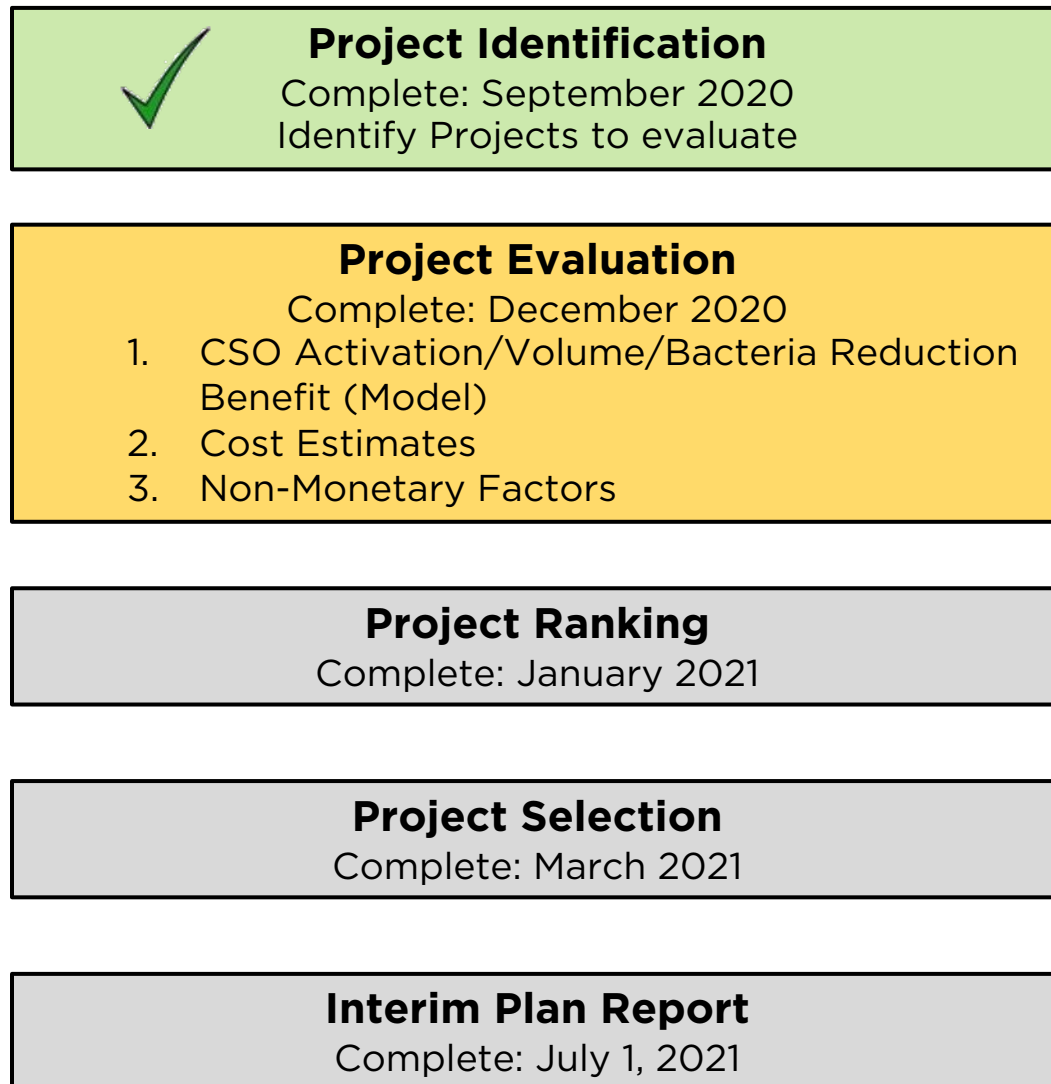
## CSO 21 Inline Storage Project Benefits



Potential Future Storage = 1.6 MG

# Next Steps

# Interim Plan – Next Steps





# Update on Strategies

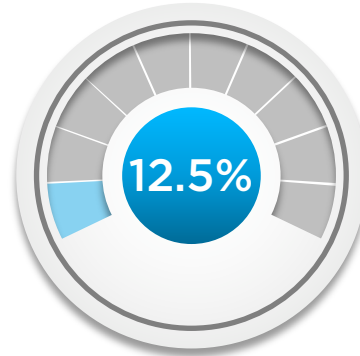
# Strategy Accomplishments (2017- 2020 YTD)

## CSS Infrastructure



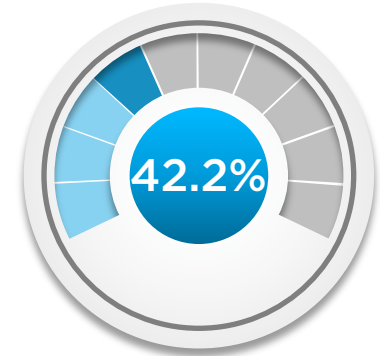
WWTP Nutrient Removal  
CSO Separation  
WWTP Flow Upgrade

## GI in MS4



Target: 104 acres  
Achieved: 13 acres

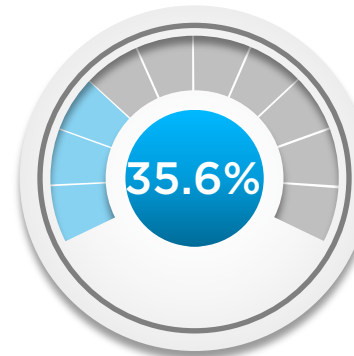
## GI in CSS



Target: 18 acres  
Achieved: 7.6 acres

## Stream Restoration

Target: 2,500 lf  
Achieved: 15,580 lf



## Tree Canopy

Target: 80 acres  
24,000 trees  
Achieved: 28.49 acres  
8,547 trees

# Strategy Accomplishments (2017- 2020 YTD)

## Land Conservation



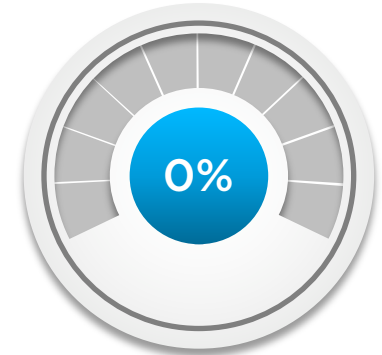
**Target:** 10 acres of City property  
**Achieved:** 113 acres

## Natives & Invasives



**Target:** 80% of plantings native  
**Achieved:** 100% of tracked plants (1647 plants)

## Riparian Area Restoration



**Target:** 10 acres  
**Achieved:** 0 acres

## Water Conservation



**Target:** 10% reduction of potable water consumption



## Pollution Identification & Reduction

Will be modeled in 2022



# Partners Helping to Address Strategies

# Greening of RVA Libraries

North Avenue Branch

West End Branch

Broad Rock Branch

Scott Firestine  
Director

Richmond Public Libraries

# Greening of RVA Libraries

## Westover Hills Branch



# Greening Richmond Public Libraries

IMPROVING THE HEALTH OF THE JAMES RIVER BY REDUCING STORMWATER POLLUTION

## Welcome to Westover Hills Branch Library!



### What is a rain garden?

Rain gardens are shaped like bowls to capture stormwater after it rains or snows. After stormwater enters the gardens, it is filtered by layers of soil and absorbed by native plants. The rain gardens here at Westover Hills Branch Library act like sponges and contribute to a healthy environment by reducing the amount of stormwater pollution entering Reedy Creek and the James River.

### What are native plants?

This rain garden contains native trees, shrubs, and grasses that are naturally found in Richmond. These native plants are adapted to thrive in our area and provide food and habitat for wildlife, such as insects and birds. You can become a River Hero Home by using native plants at home! Learn more at: [JamesRiverHero.org](http://JamesRiverHero.org)



EASTERN REDBUD  
(CERCIS CANADENSIS)



VIRGINIA SWEETSPIRE  
(Itea virginica)



SWITCHGRASS  
(Panicum virgatum)

*"If you have a garden  
and a library, you have  
everything you need."*

-CICERO

### What is green infrastructure?

Green Infrastructure practices include rain gardens, green roofs, and street trees that enhance our built environment for the benefit of humans and the ecosystem of which we are a part. Green infrastructure contributes to healthier communities by absorbing stormwater before it enters our rivers and streams, improving air quality, and reducing the urban heat island effect. It also provides habitat for wildlife living among us.

### What is Stormwater Pollution?

- Stormwater is a threat to the health of the James River and its tributaries.
- When rain and snow fall on impervious surfaces, such as roads or sidewalks, it picks up pollutants such as dirt, lawn fertilizers, bacteria from pet waste, or toxics like oil from cars, and becomes stormwater pollution.



Join Ripple's Reading Buddies, inside the library!

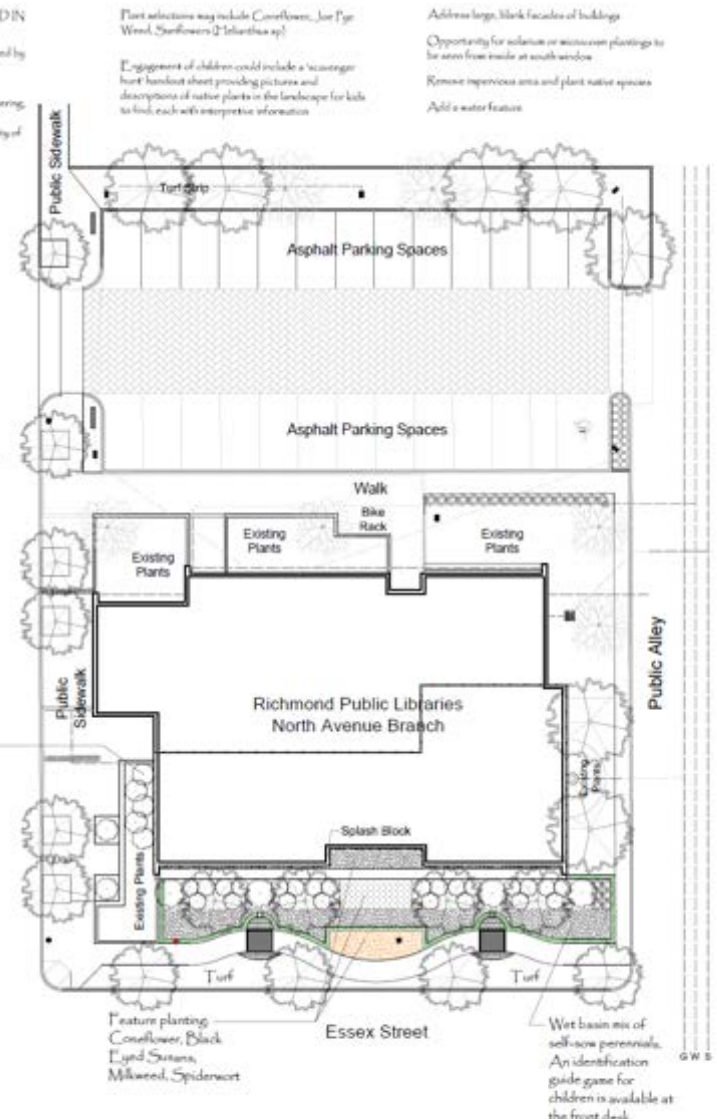
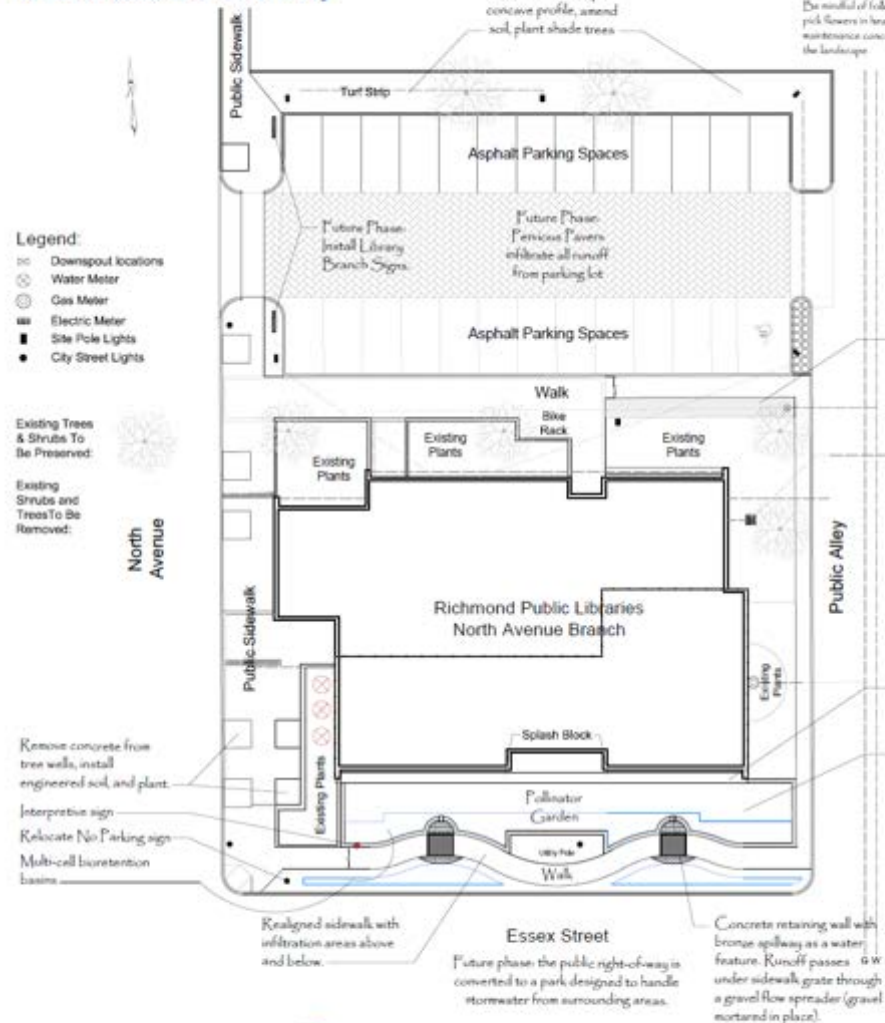
The vegetation in front of you was planted as part of a greening initiative undertaken by Richmond Public Libraries with support from these organizations:



# Greening Richmond Public Libraries

IMPROVING THE HEALTH OF THE JAMES RIVER BY REDUCING STORMWATER POLLUTION

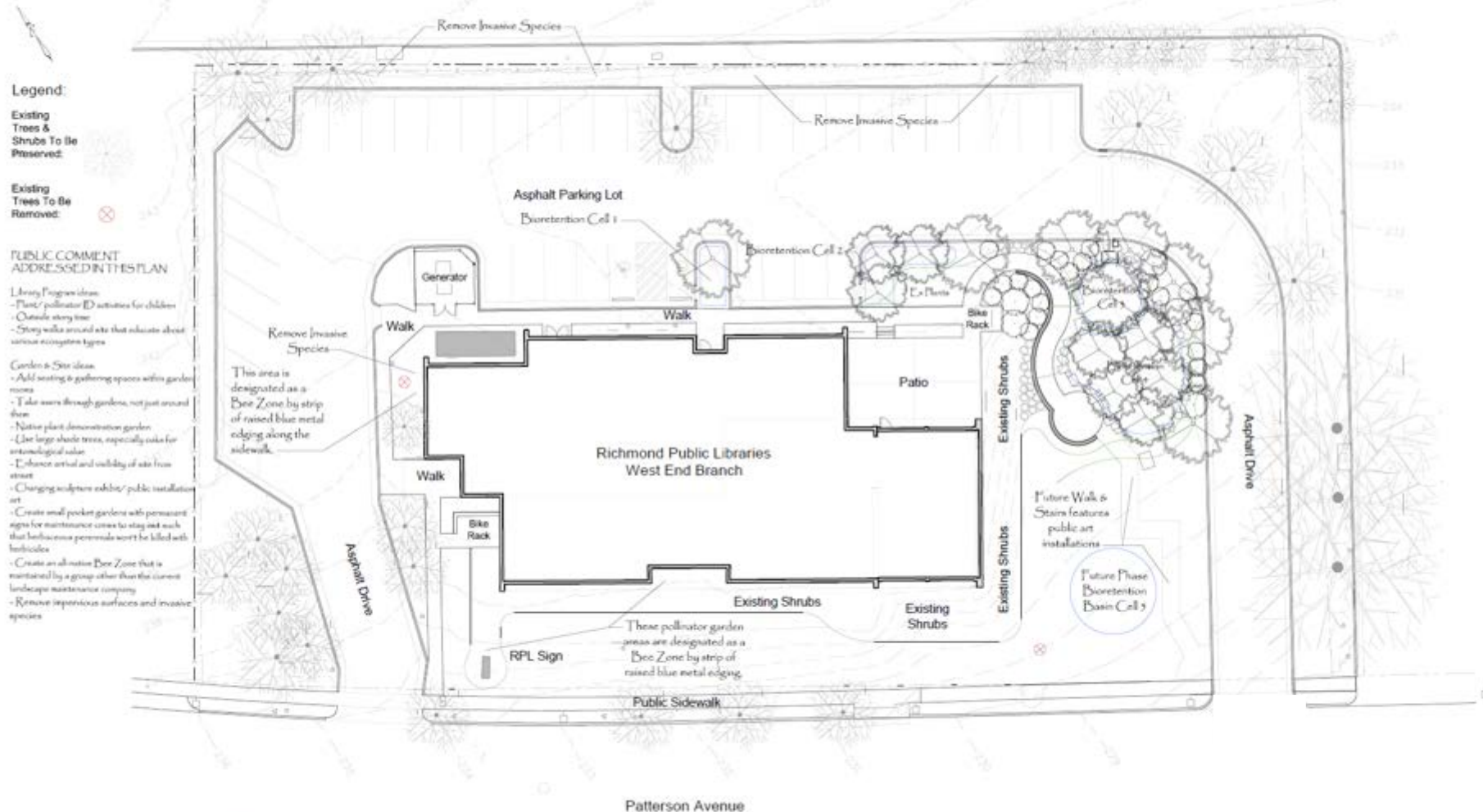
## North Avenue Branch Library



# Greening Richmond Public Libraries

IMPROVING THE HEALTH OF THE JAMES RIVER BY REDUCING STORMWATER POLLUTION

## West End Branch Library



Conceptual Site Plan



Date: 10-6-20 Sheet 2 of 2

# Greening Richmond Public Libraries

IMPROVING THE HEALTH OF THE JAMES RIVER BY REDUCING STORMWATER POLLUTION

## Broad Rock Branch Library



### Legend:

- ⊞ Downspout locations
- ⊞ Water Meter
- ⊞ Gas Meter
- ⊞ Electric Meter
- ⊞ Site Pole Lights
- ⊞ Telephone Pedestal
- ⊞ Clean Out
- ⊞ Fire Hydrant
- ⊞ Water Valve
- ⊞ Irrigation Valve
- ⊞ Sewer Manhole
- ⊞ Storm Manhole
- ⊞ Storm Inlet
- ⊞ Sign
- ⊞ Utility Pole

Existing Trees & Shrubs To Be Preserved:  
Existing Shrubs and Trees To Be Removed:

### PUBLIC COMMENT ADDRESSED IN THIS SCHEME:

Remove impervious area and plant native species

Create an all-weather Bee Zone that is maintained by a group other than the current landscape maintenance company

Add bilingual signs, picnic tables, additional seating, pollinator garden, opportunities for children's programming revolving around plants and ecosystems

Enhance the existing tree canopy and plan for a successive forest to maintain that canopy in the future

Enhance the main entrance area for multi-use, a sense of arrival, and additional useable space

Protect nearby wetlands/ forest, be mindful of future park renovations to include a different entrance situation that may affect the north end of the site



Conceptual Site Plan



Date: 10-6-20  
Sheet 2 of 2

# Greening Southside Richmond

Southside Richmond

Ann Jurczyk  
Virginia Director of Advocacy and Outreach

Chesapeake Bay Foundation



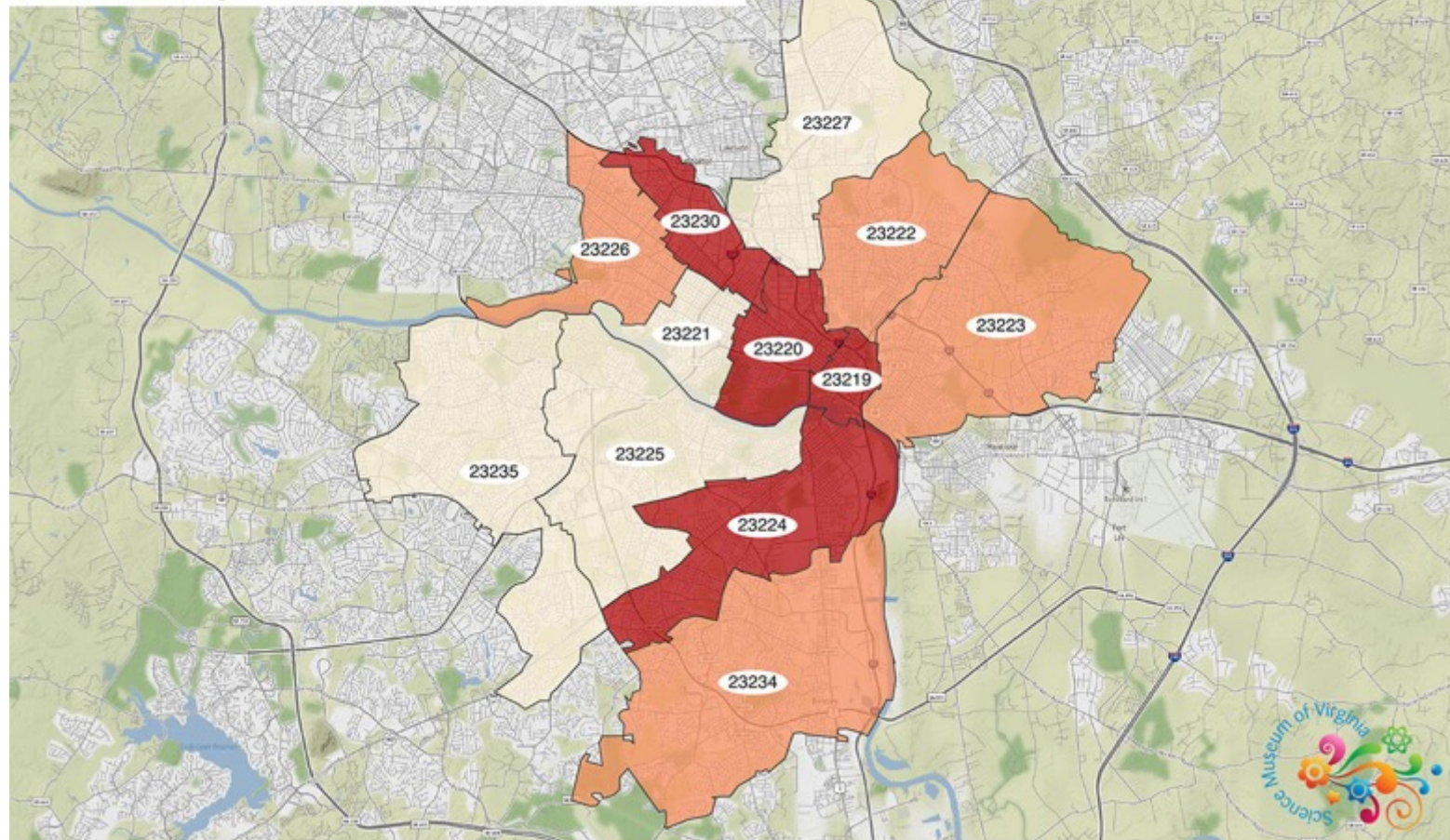
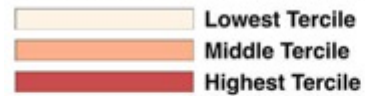
CHESAPEAKE BAY  
FOUNDATION

*Saving a National Treasure*

# Greening Southside Richmond: Why Here?

## Urban Heat Islands in Richmond Zip Codes

Median Afternoon Temperatures, 7/13/2017



# Greening Southside Richmond: Why Here?

RICHMOND, VA

## URBAN HEAT VULNERABILITY



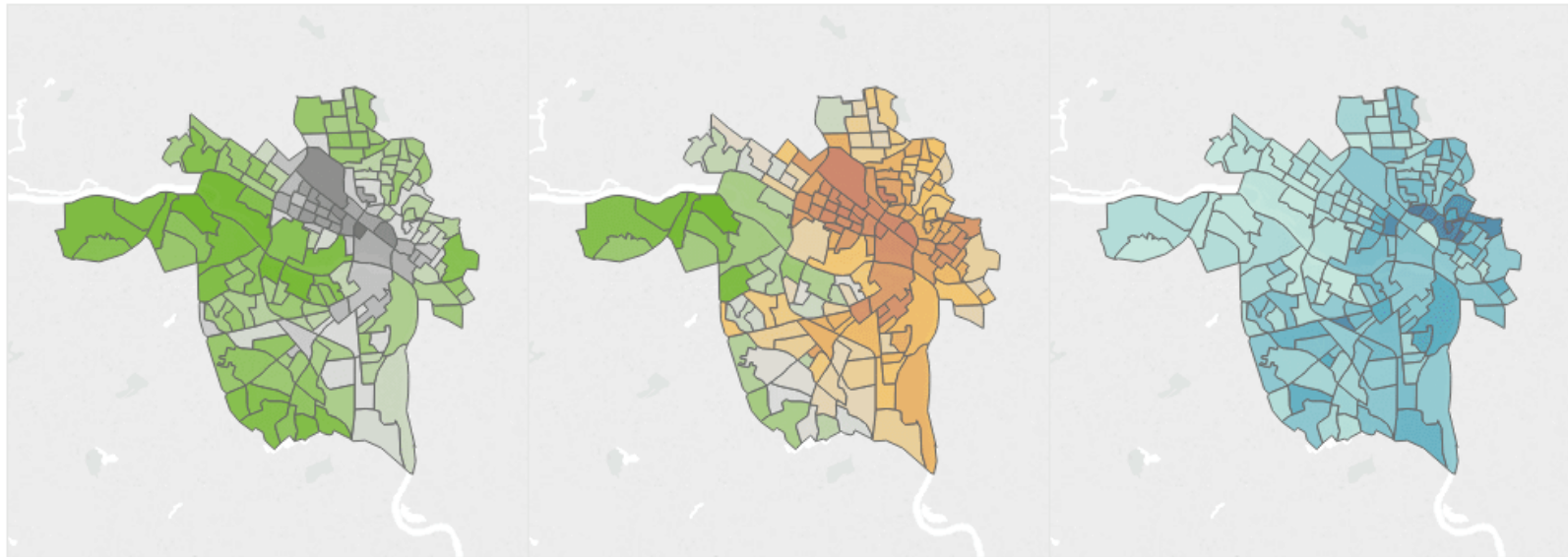
### Sensitivity

### Adaptive Capacity

High Impervious Areas

Low Canopy Areas

High Poverty Areas



Mean Impervious




Mean Canopy



Poverty %



Hoffman et al. 2018

Powered by  dataimprint

# Greening Southside Richmond: Collaborative Effort





## Greening Southside Richmond: Replacing Pavement with Green Space at Branch's Baptist Church



## Greening Southside Richmond: Tree Plantings & Tree Giveaways, Workforce Development, Workshops

## Greening Southside Richmond: Future Outlook

# Mayor's Green Team – Park Expansion

Christopher Frelke  
Director

Department of Parks, Recreation and  
Community Facilities

# Broad Rock Creek Park

Richmond, VA



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community











# Green Infrastructure Master Plan

Mark Van Auken  
Stormwater Practice Leader

Arcadis

## *GI Master Plan Project Team*

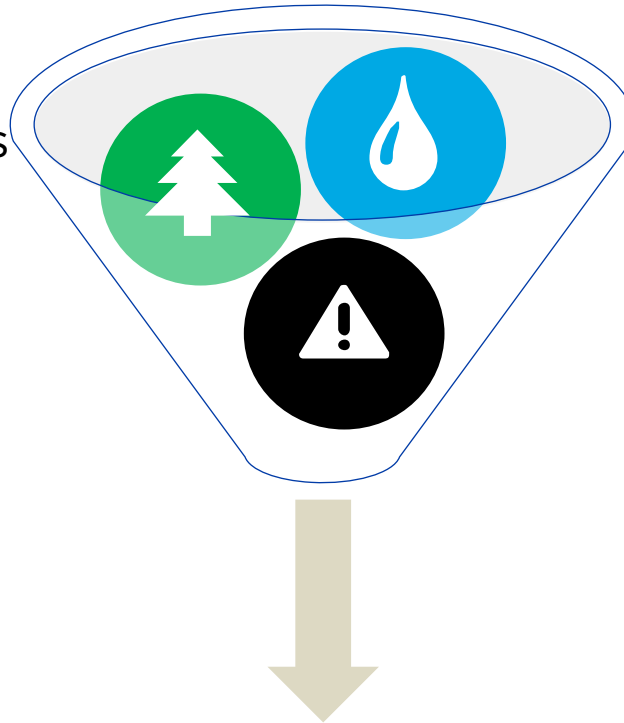


## GI Master Plan Goals



### Increase Green Space

- impervious to pervious
- Plant trees and native plants
- Bioretention & other practices



### Reduce Runoff Volume

- Reduce stormwater volume
- Reduce CSOs
- Increase infiltration



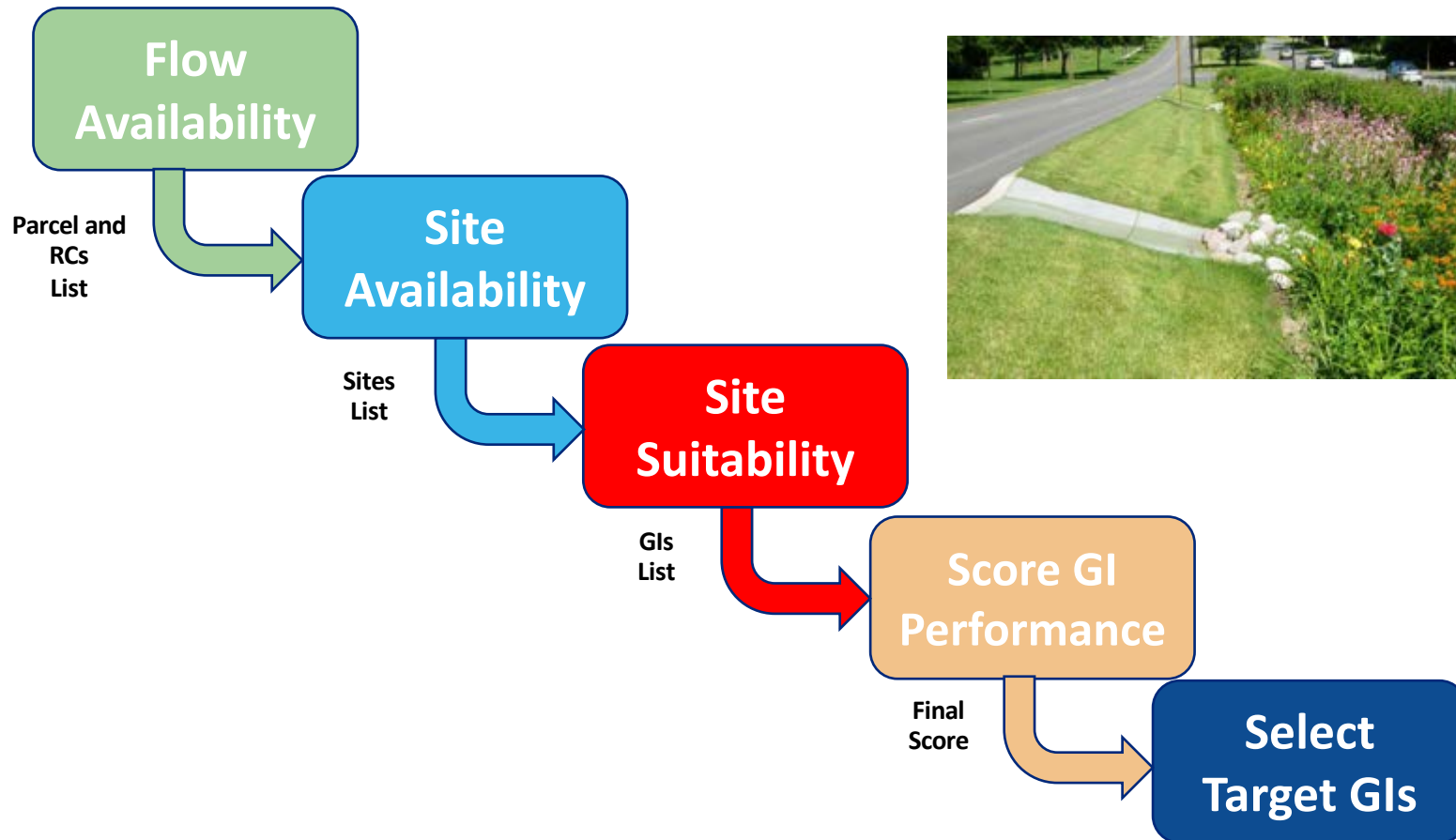
### Reduce Pollution

- Nitrogen
- Phosphorus
- Sediment
- Bacteria

## Green Infrastructure Master Plan

CLEANER WATER FASTER

# Green Infrastructure Ranking Procedure Workflow

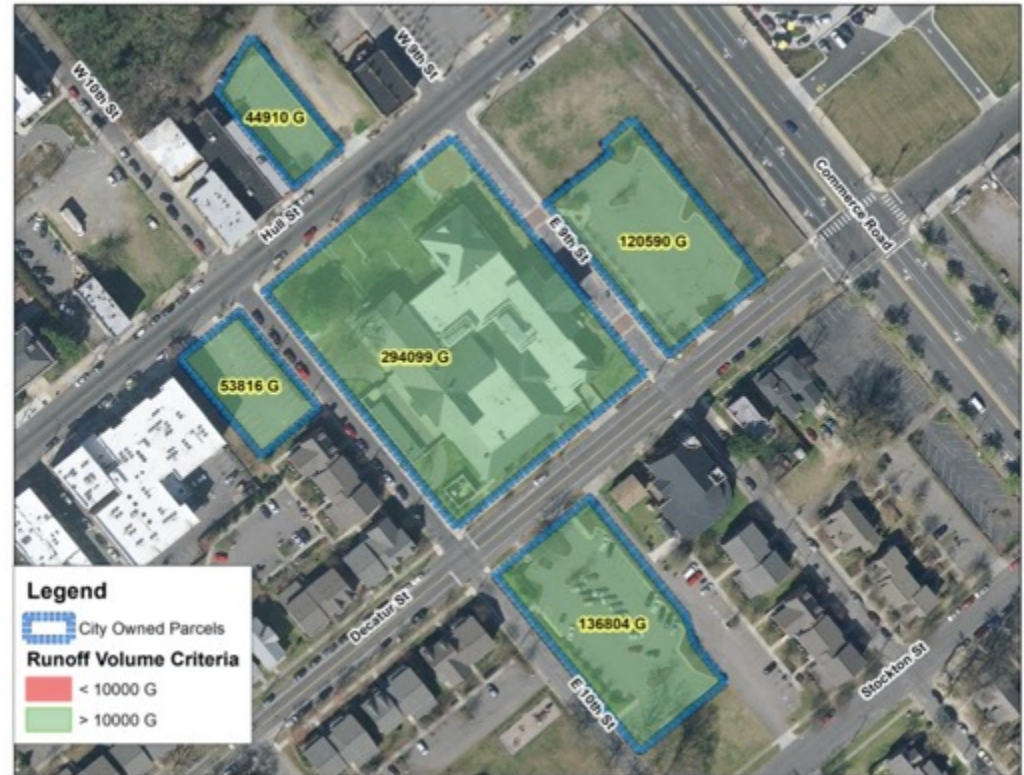


## Phase 1 – Flow Availability

621 City Owned

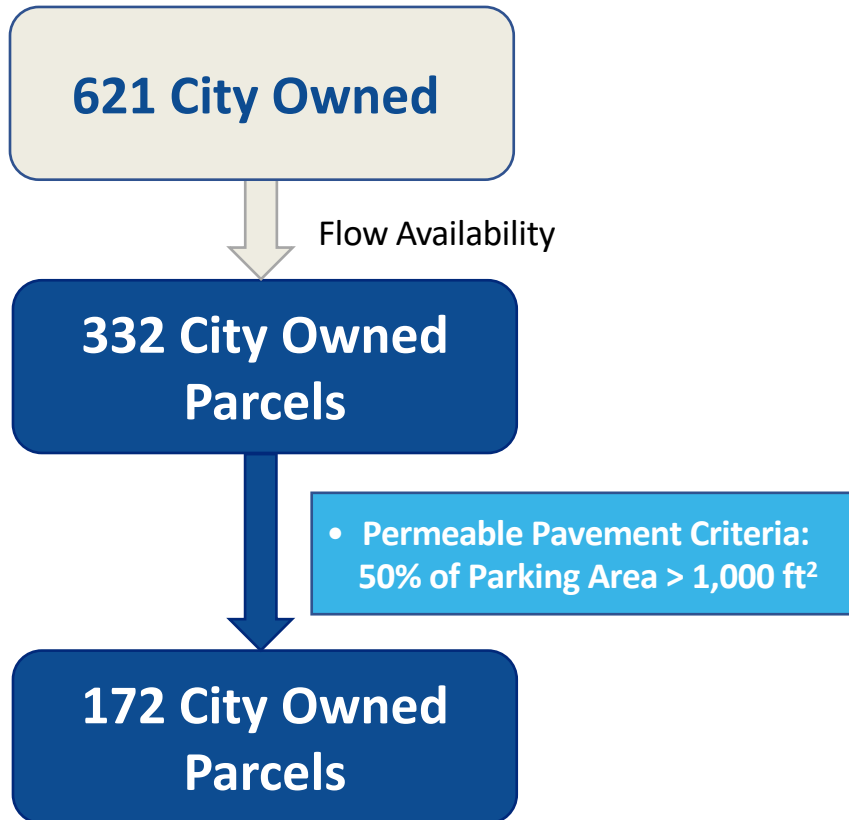
- Criteria:
- Runoff Volume > 10,000 Gallons

332 City Owned  
Parcels



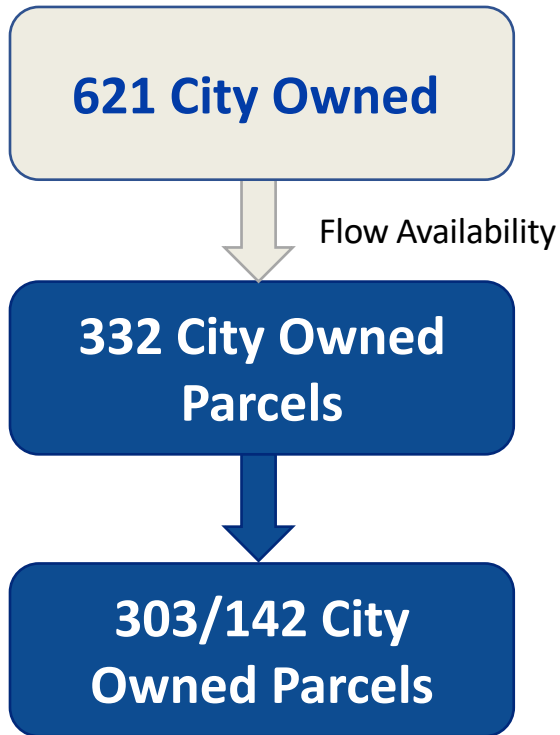
## Phase 2 – Site Availability

### Permeable Pavement



## Phase 2 – Site Availability

### Bioretention



## Phase 3 – Site Suitability Criteria



## *Phase 3 – Site Suitability Criteria*



## Phase 4 – Score GI Performance



Criteria	Score
Amount of Flow Reduction	7.5/10
Impervious Area Reduction	10/10
Low Maintenance	10/10
Socioeconomic Benefits – 10-minute walk to green space	0/10
Socioeconomic Benefits connection to greenway /bikeways	0/10
Socioeconomic Benefits – increase resiliency of infrastructure	10/10
Minimize Existing Flooding	10/10
Improve Urban Tree Canopy	5/10
Improve Water Quality	10/10
<b>TOTAL</b>	<b>62.5/90</b>



Let's hear from you

# Questions? Updates?

Put your questions in the Chat Box or  
Unmute yourself and speak up!

**If you don't have access to  
the Chat Box, just speak up!**

# Water Quality Update for Richmond Citizens

## **We're proposing to host a virtual conversation for all City residents in February 2021**

- Communicate the history of Richmond's water quality and what's been done to date
- Talk about what's ahead: Updates to Consent Order

## **Would you be willing to help us?**

- Help get the word out
- Present your partner story
- Answer questions in the Q&A

# Resources

A PDF of this presentation will be distributed

Visit [RVAH2O.org](http://RVAH2O.org)



**NEXT  
MEETING**

**MARCH 2021**