# RVAH2O Technical Stakeholder Meeting

Tuesday, November 9, 2021

# Welcome to the Discussion!

We're excited for you to join in this very important conversation. Please put questions or comments in the chat box as we go, or unmute.

**We'll have a Q&A at the end of the meeting today.**


DEQ
Virginia Department of Environmental Quality


Department of Public Works
City of Richmond
Virginia


Groundwork RVA
Changing Places Changing Lives

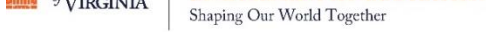

Capital Region Land Conservancy


Alliance for the Chesapeake Bay


Richmond City Health District


Southside ReLEAF


FOJRP
Friends of the James River Park


University of Virginia
Institute for Engagement & Negotiation
Shaping Our World Together

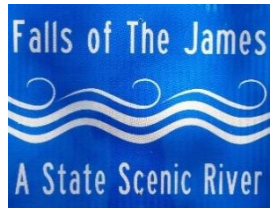

ARCADIS


PlanRVA
The Regional Commission


City of Richmond
RVAgreen 2050


Save the Bay
Chesapeake Bay Foundation
Saving a National Treasure


capital trees


Falls of The James
A State Scenic River


Brown AND Caldwell


Science Museum of Virginia


Richmond Planning & Development Review
PDR


LimnoTech


James River Outdoor Coalition
JROC.net
Supporting the park since 1997


xylem
Let's Solve Water


VDOT
Virginia Department of Transportation


Parks • Recreation
PRCF
& Community Facilities


James River Association


troutman pepper


Richmond Green City Commission


JRAC
James River Advisory Council


res


City of Richmond
Established 1737
City of Richmond
Department of Public Utilities


RPL


Richmond


VCU


Chesterfield County
1749
Virginia

# Today's Agenda

## Update on Green Infrastructure Master Plan

- Nissa Dean, Alliance for the Chesapeake Bay
- Chris Soldan, Arcadis
- Mark Van Auken, Arcadis

## Update on Combined Sewer System Interim Plan and Final Plan

- Matt Pugh, Brown and Caldwell

## Outreach Initiatives

- Grace LeRose, DPU

# Green Infrastructure Master Plan Update

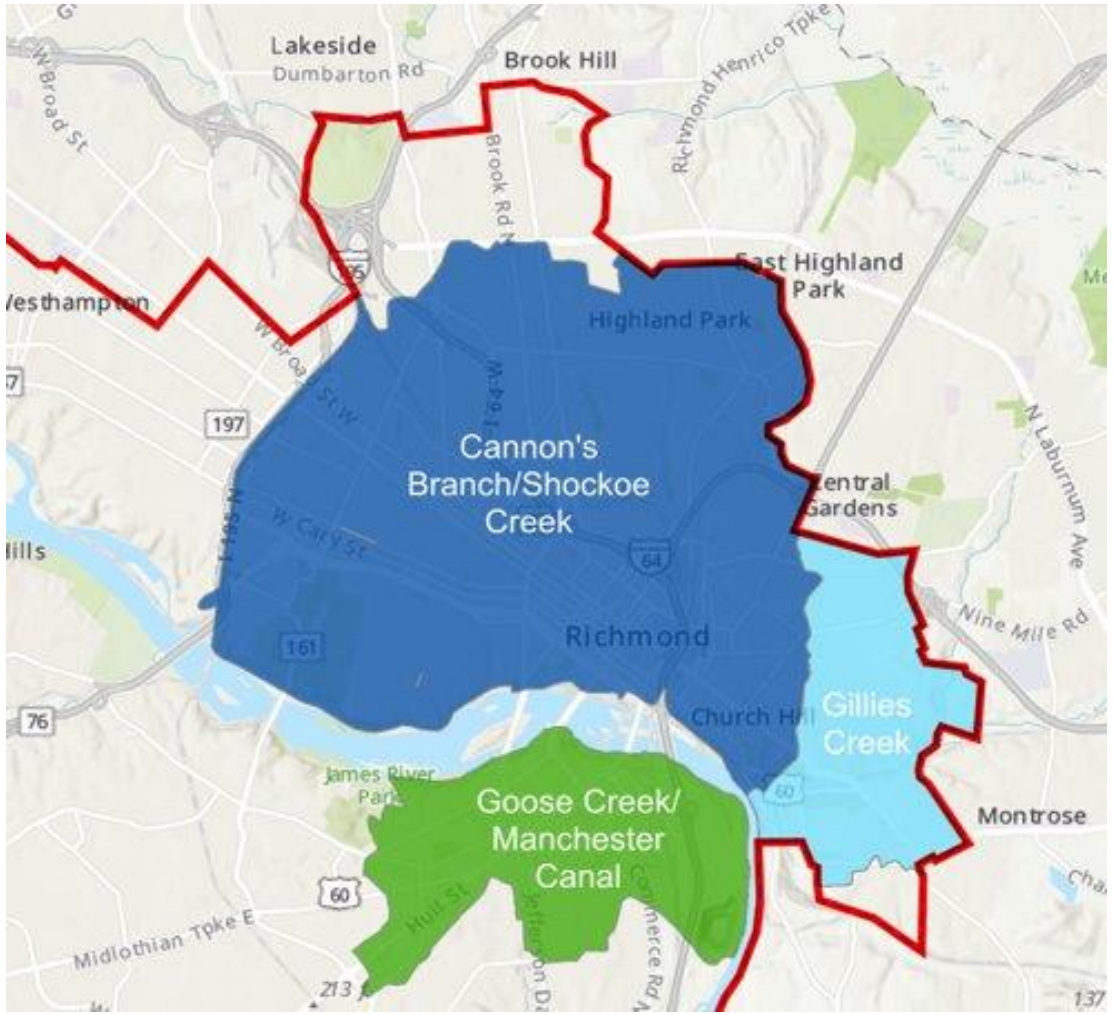
# RVAH2O

## Cleaner Water Faster

# Green Infrastructure Master Plan Update

# Current RVAH2O Partnership

- $1M NFWF INSR grant
- 2019-2022 timeframe
- Outcomes:
  - GI Master Plan
  - GI Ranking Tool
  - One GI Project
- Locations: 3 priority watersheds
  - Gillies Creek
  - Shockoe Creek
  - Manchester Canal/ Goose Creek



# Green Infrastructure (GI) Master Plan Project Team

ALLIANCE for the Chesapeake Bay

RVA H2O

CITY OF RICHMOND
DEPARTMENT OF PUBLIC UTILITIES

ARCADIS

UNIVERSITY of VIRGINIA

INSTITUTE for ENGAGEMENT & NEGOTIATION
Shaping Our World Together

# Green Infrastructure Master Plan Outline

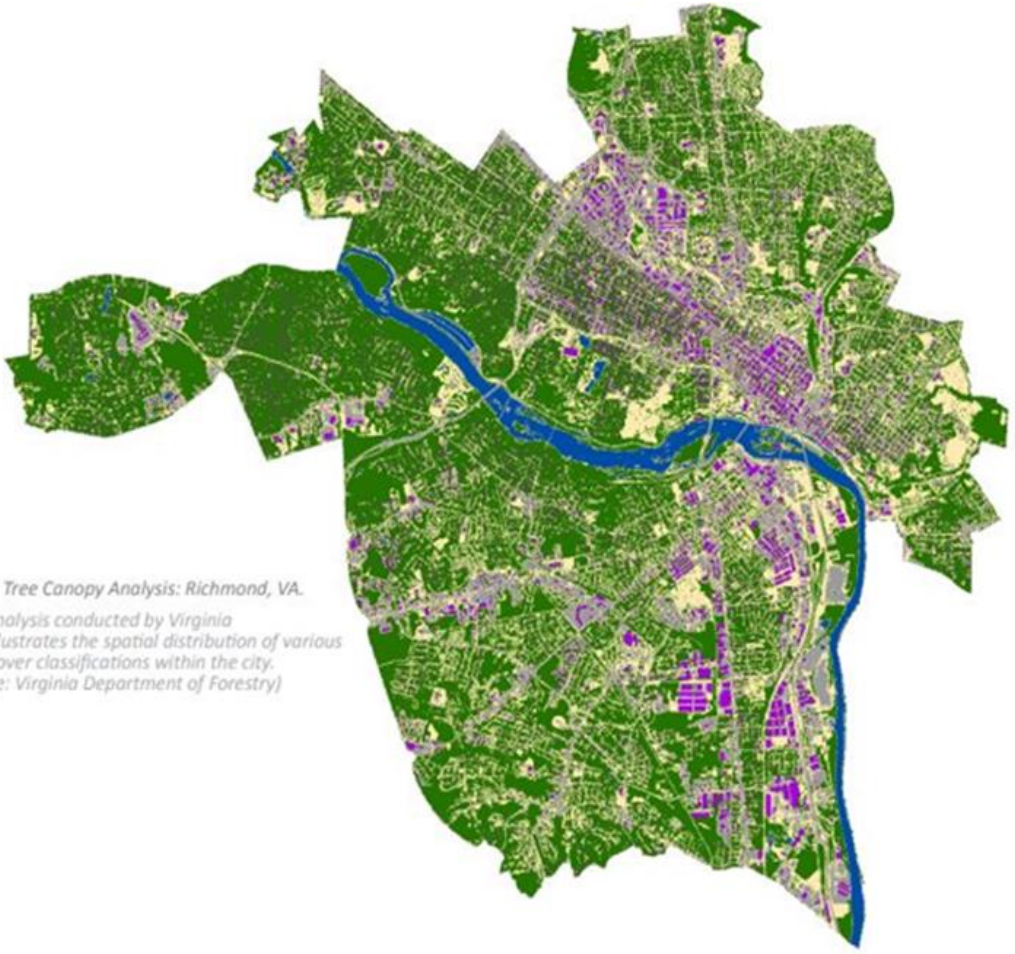
- Forward and Acknowledgements
- Executive Summary
- 1.0 Introduction
- 2.0 Existing Conditions/Review of Existing Information
- 3.0 Identification of Green Infrastructure Opportunities and Evaluation Criteria
- 4.0 Evaluation of Three Priority Watersheds
- 5.0 Project Ranking and Prioritization of GI Solutions
- 6.0 Conceptual Designs of Recommended Solutions/ Projects
- 7.0 Project Implementation Considerations
- Appendices

# 2.0 Existing Conditions/ Review of Existing Information

- 2.1 Location & Characteristics of Priority Watersheds
- 2.2 Inventory of Existing Public Lands/ Parcels
- 2.3 Inventory of Existing Utilities and Watershed Data
- 2.4 Drainage Issues/Historic Flooding Problems
- 2.5 Previous/Current Studies

# Previous/Current Studies

- Richmond Green Infrastructure Assessment (2010)
- RVA Clean Water Plan (2017)
- Green Infrastructure Initiative Plan (2019)
- STRATUM Sample Survey of Richmond Street Trees (2009)
- Proposed Capital Improvements Plan for FY 2020-2024 (2020)
- Richmond 300 (2020)
- Social Vulnerability Index (2020)
- Green Team (2020)



*Urban Tree Canopy Analysis: Richmond, VA.*

*This analysis conducted by Virginia DOF illustrates the spatial distribution of various land cover classifications within the city. (Image: Virginia Department of Forestry)*

# 5.0 Project Ranking and Prioritization of GI Solutions

- 5.1 Ranking of Parcels/Projects
- 5.2 Ranking of Watersheds
  - 5.2.1 Existing flooding problems
  - 5.2.2 Tree canopy
  - 5.2.3 Areas needing additional capacity
- 5.3 Recommended GI Solutions

# Development of GI Ranking Tool

Flow Availability

Parcel and RCs List

Site Availability

Sites List

Site Suitability

GIs List

Score GI Performance

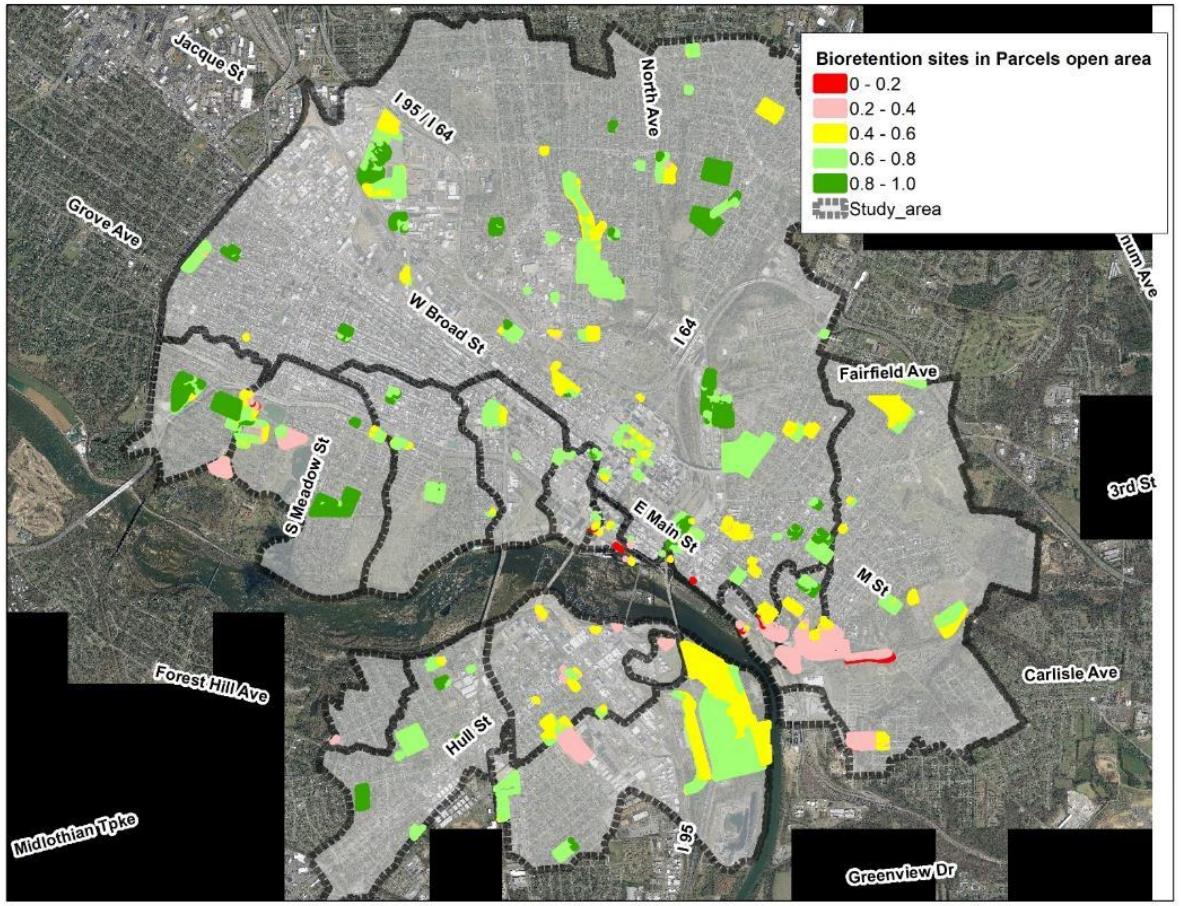
Final Score

Select Target GIs

# GI Ranking Tool Performance Criteria Scoring

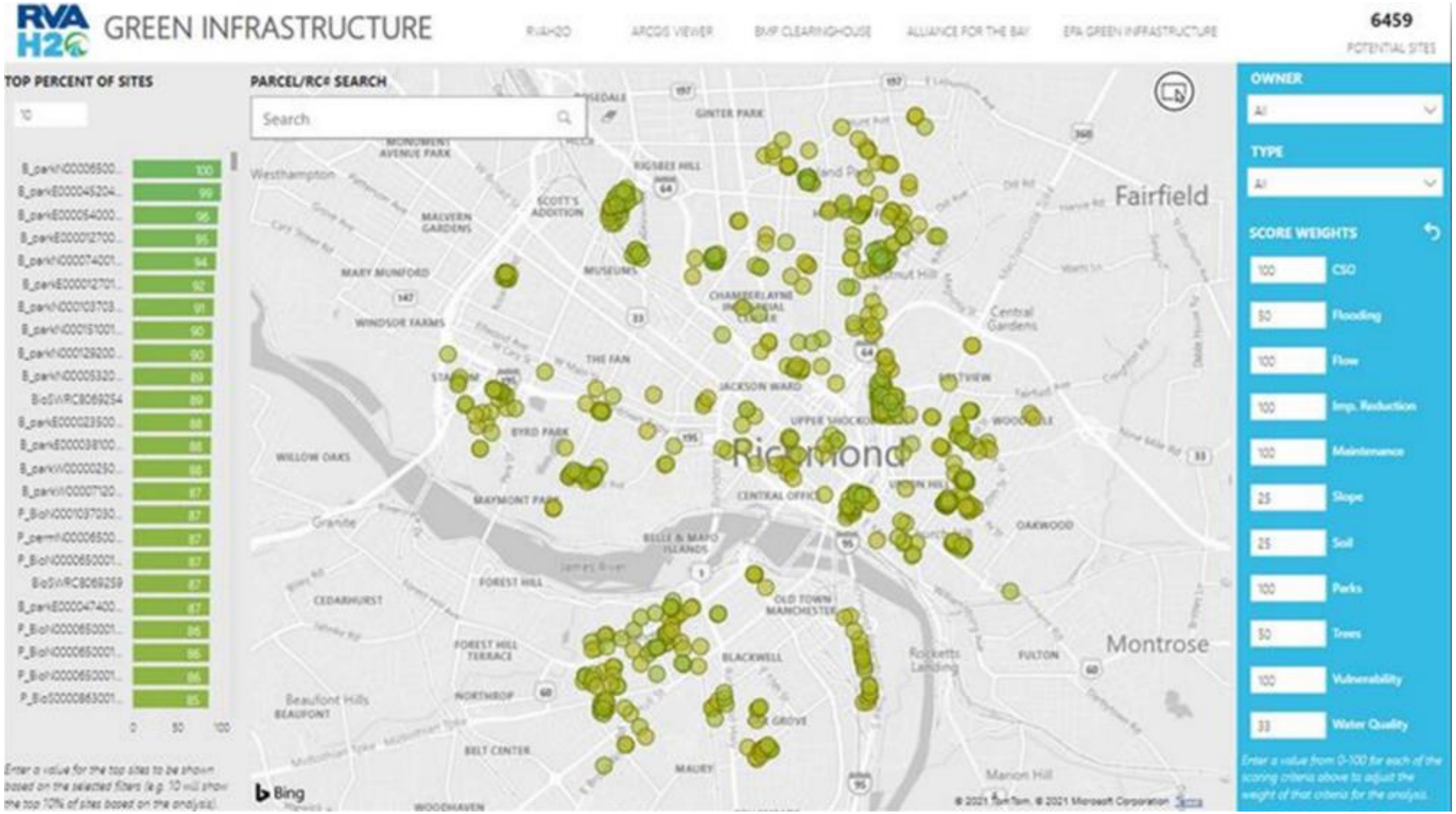
| Metric | Description | Tier | Max Score | Min Score | Weight % | Scoring |
|---|---|---|---|---|---|---|
| Runoff/Flow Reduction | Flow reduction | 1 | 10 | 1 | 100% | Proportional to runoff volume |
| | CSO activation reduction | 1 | 10 | 1 | 100% | CSO threshold for overflow |
| Impervious Area Reduction | Permeable pavement or bioretention in parking lots | 1 | 10 | 1 | 100% | Impervious area removed |
| Low Maintenance | - | 1 | 10 | 5 | 100% | BMP type |
| Socioeconomic Benefit | Near open space | 1 | 10 | 0 | 100% | Within 0.10 mile |
| | Social equity | 1 | 10 | 1 | 100% | City Social Vulnerability Analysis |
| Minimize Existing Flooding | - | 2 | 10 | 0 | 50% | ----- |
| Improve Urban Tree Canopy | - | 2 | 10 | 0 | 50% | Area to be used |
| Improve Water Quality | - | 3 | 10 | 0 | 33% | Proportional to area to be used |
| Slope Suitability | In open areas (<5%, 5% to 10%, 10% to 15%, 15% to 20%, >20%) | 4 | 10 | -10 | 25% | 10,7.5,2.5,0,-10 |
| Soil Infiltration | | 4 | 10 or 5 | -10 | 25% | Soil A or B (10), Soil C (5), Soil D or urban (-10) |

# Ranking of Parcels by GI Type




- Permeable pavement in parking lots
- Permeable parking lanes
- Permeable pavement in local roads
- Bioretention in parking lots
- Bioretention in open areas
- Bioretention in rights-of-way
- Green alleys

# GI Ranking Tool PowerBI Interface

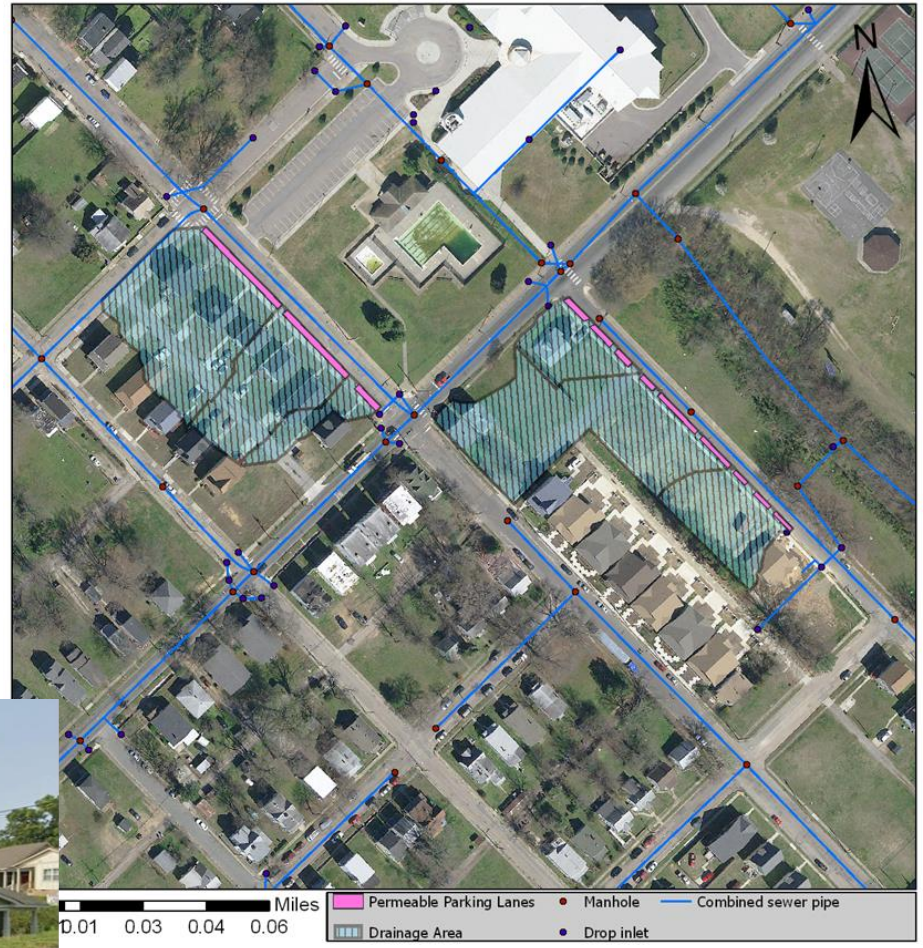


# 6.0 Conceptual Designs of Recommended Solutions/Projects

- 6.1 Conceptual Design Development Process
  - 6.1.1 Sizing criteria and site constraints
  - 6.1.2 Capital costs and maintenance requirements
  - 6.1.3 GI Project Selection
- 6.2 Annie Giles Community Resource Center – Permeable Pavement and Rain Garden
- 6.3 15th/16th Street – Permeable Parking Lanes

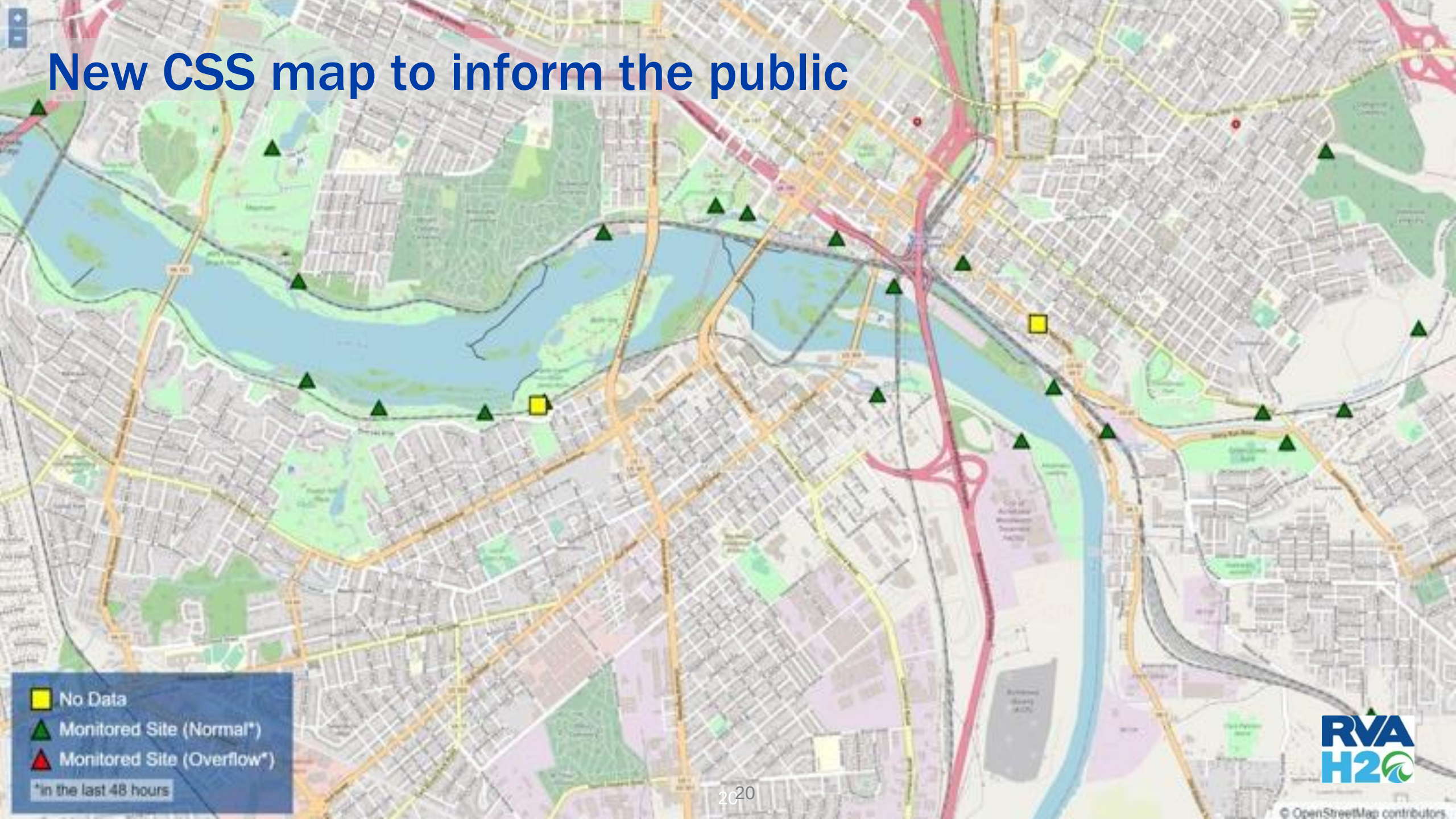
# Example Conceptual Design of GI Project


15th/16th Street – Permeable Parking Lanes

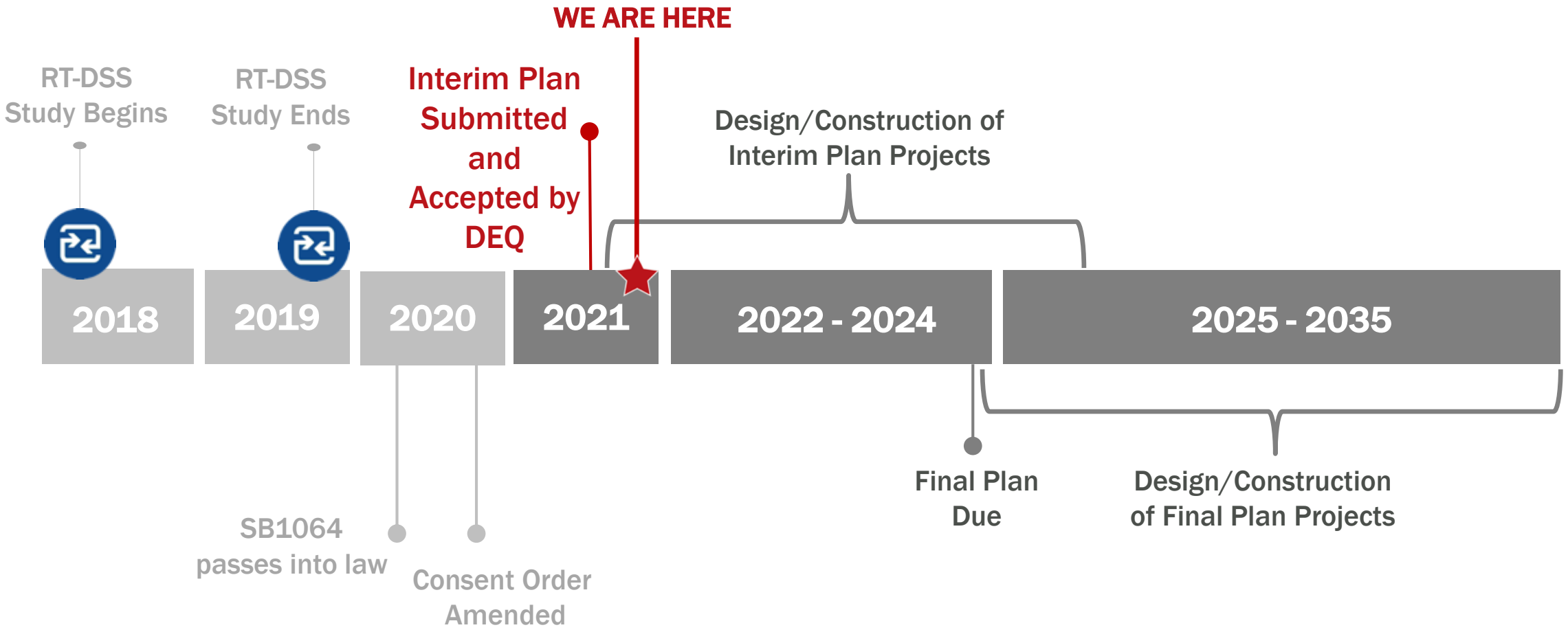



# Combined Sewer System Update

# New CSS map to inform the public



# Timeline


WE ARE HERE
RT-DSS Study Begins
RT-DSS Study Ends
Interim Plan Submitted and Accepted by DEQ
Design/Construction of Interim Plan Projects
2018
2019
2020
2021
2022 - 2024
2025 - 2035
SB1064 passes into law
Consent Order Amended
Final Plan Due
Design/Construction of Final Plan Projects

# Interim Plan Selected Project Overview

## 10 Projects

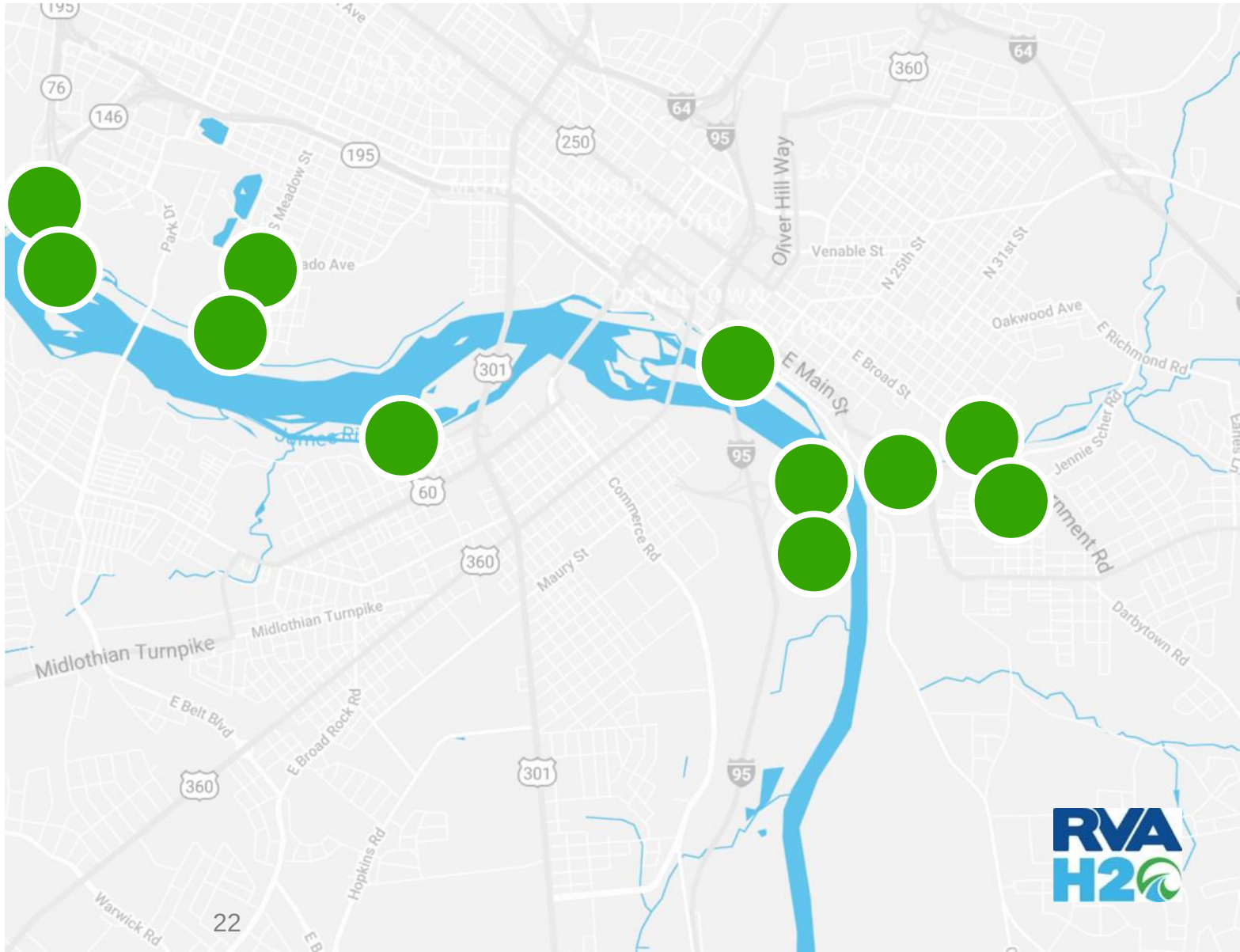
- Control overflows by using existing capacity in the combined sewer system
- Estimated 182.3 MG capture

## 92% CSO Capture

Estimated Annual Basis

## $33.1M*

*In 2021 dollars



# Interim Plan Projects Level 1 Controls

60% Design

## Purpose

Automate the drainage of the Shockoe Retention Basin

## Major Improvements

(8) Drain Gates
Control Improvements

| | |
|---|---|
| Overflow Volume Reduction (MG) | 78.8 |
| Overflow Event Reduction (#) | 7 |
| Capital Cost | $1.3M |
| Construction Completion | Spring 2023 |

# Interim Plan Projects Level 2 Controls

## Purpose

Maximize flow to the new Wet Weather UV Disinfection Facility

## Major Improvements

Main PS Pump Improvements
Control Improvements

| | |
|---|---|
| Overflow Volume Reduction (MG) | 41.2 |
| Overflow Event Reduction (#) | 7 |
| Capital Cost | $11M |
| Construction Completion | Spring 2026 |

# Interim Plan Projects
# CSO 21

30% Design

## Purpose

Store wet weather flow in the existing 120” Gordon Avenue Sewer

## Major Improvements

New CSO 21 Regulator Structure

| | |
|---|---|
| Overflow Volume Reduction (MG) | 16.2 |
| Overflow Event Reduction (#) | 17 |
| Capital Cost | $5.4M |
| Construction Completion | Winter 2024 |

# Interim Plan Projects
# CSO 40 #1

30% Design

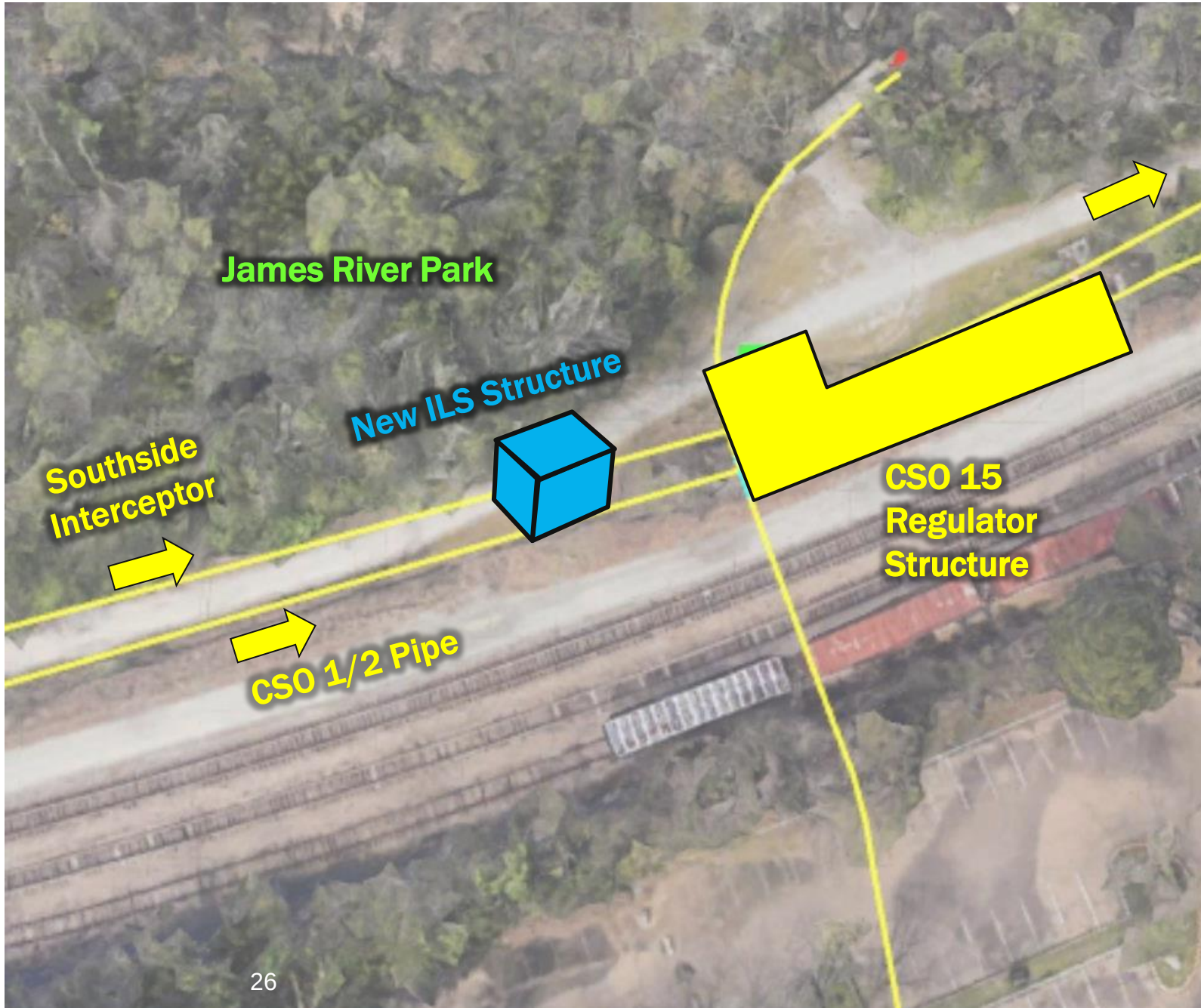
## Purpose

Store wet weather flow in existing 78” CSO 1/2 Conveyance Pipe

## Major Improvements

New In-Line Storage Structure

| | |
|---|---|
| Overflow Volume Reduction (MG) | 12.3 |
| Overflow Event Reduction (#) | 1 |
| Capital Cost | $3.8M |
| Construction Completion | Summer 2025 |



# Interim Plan Projects
# CSO 19A

## Purpose

Divert flow to the existing Hampton/McCloy Retention Tunnel

## Major Improvements

New equipment in existing structure

| | |
|---|---|
| Overflow Volume Reduction (MG) | 10.3 |
| Overflow Event Reduction (#) | 2 |
| Capital Cost | $0.8M |
| Construction Completion | Winter 2024 |

30% Design

# Interim Plan Projects
# CSO 19B

## Purpose

Divert flow to the existing Hampton/McCloy Retention Tunnel

## Major Improvements

New equipment at Hampton PS

| | |
|---|---|
| Overflow Volume Reduction (MG) | 2.2 |
| Overflow Event Reduction (#) | 2 |
| Capital Cost | $0.3M |
| Construction Completion | Summer 2022 |

30% Design

# Interim Plan Projects
# CSO 20

30% Design

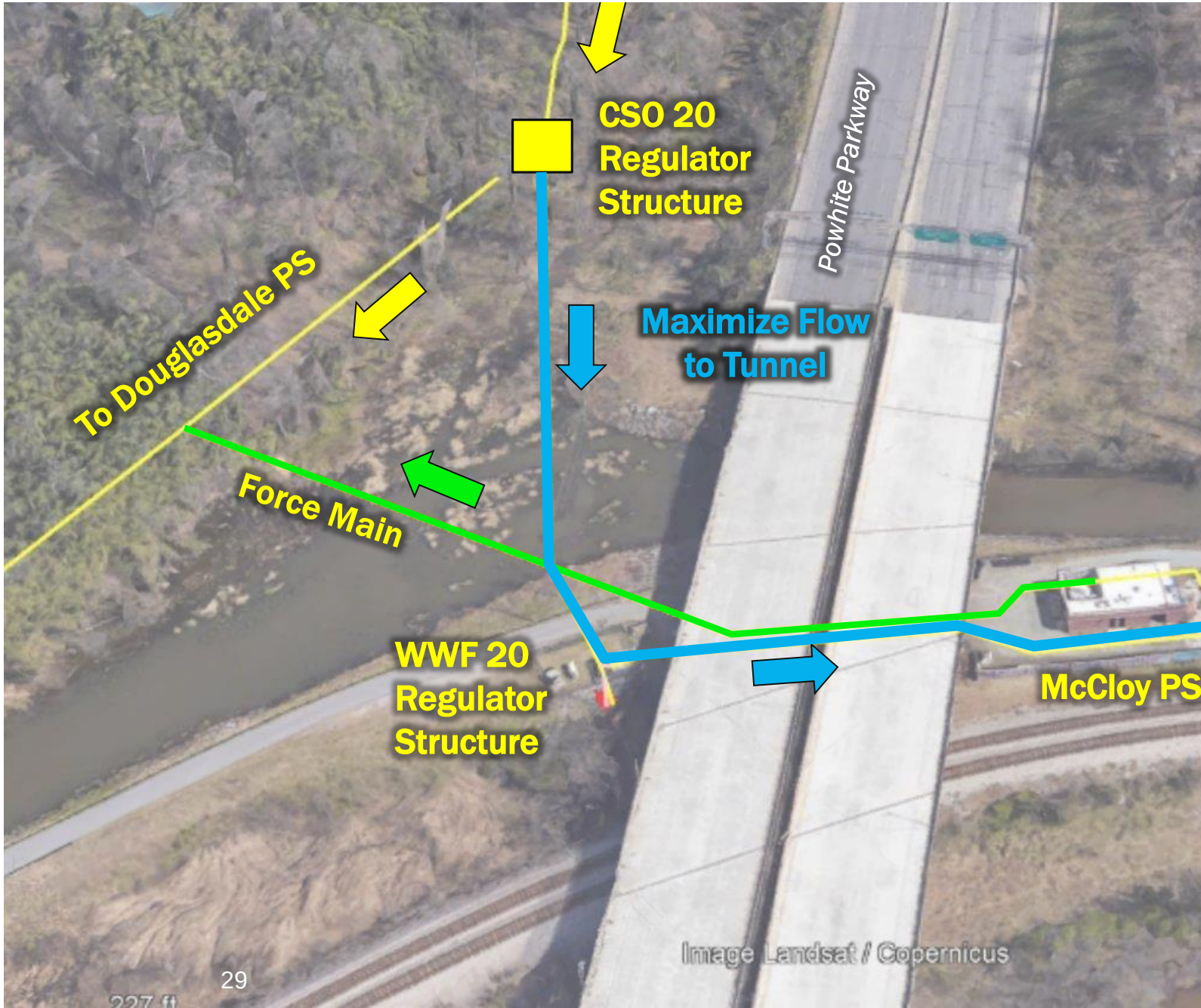
## Purpose

Divert flow to the existing Hampton/McCloy Retention Tunnel

## Major Improvements

New equipment in existing structure

| | |
|---|---|
| Overflow Volume Reduction (MG) | 8.9 |
| Overflow Event Reduction (#) | 1 |
| Capital Cost | $0.8M |
| Construction Completion | Winter 2024 |



# Interim Plan Projects
# CSO 04

50% Design

## Purpose

Relocate Regulator Structure and store flow in the 60” pipe

## Major Improvements

Relocation of Regulator Structure
New connecting sewers

| | |
|---|---|
| Overflow Volume Reduction (MG) | 5.1 |
| Overflow Event Reduction (#) | 48 |
| Capital Cost | $8.7M |
| Construction Completion | Summer 2023 |

# Interim Plan Projects
# CSO 24

30% Design

## Purpose

Divert additional wet weather flow to the Gillies Creek Interceptor

## Major Improvements

New connection to existing structure
New connecting sewers

| | |
|---|---|
| Overflow Volume Reduction (MG) | 3.8 |
| Overflow Event Reduction (#) | 26 |
| Capital Cost | $0.4M |
| Construction Completion | Summer 2023 |

# Interim Plan Projects
# CSO 39

30% Design

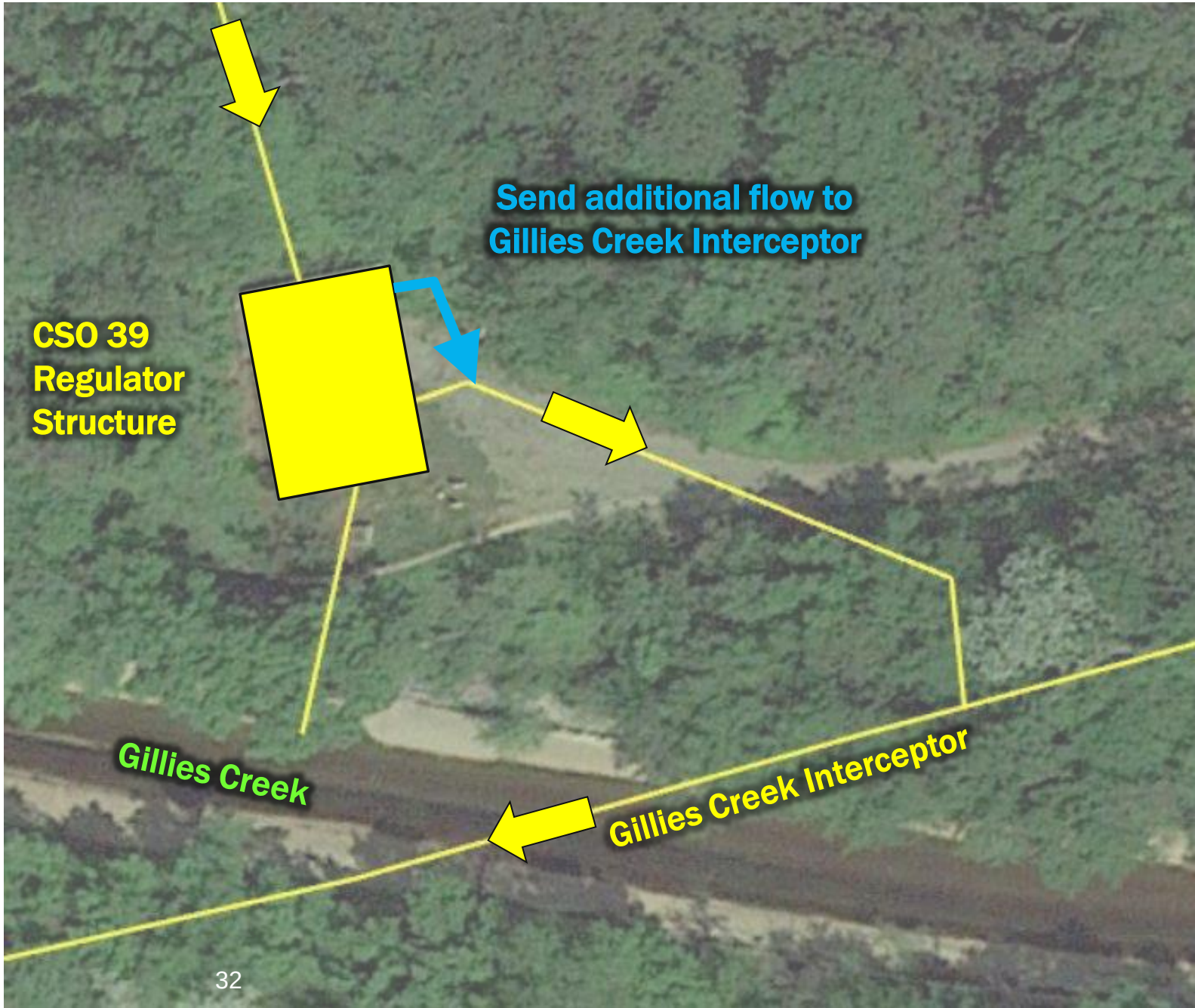
## Purpose

Divert additional wet weather flow to the Gillies Creek Interceptor

## Major Improvements

New connection to existing structure
New connecting sewers

| | |
|---|---|
| Overflow Volume Reduction (MG) | 3.6 |
| Overflow Event Reduction (#) | 13 |
| Capital Cost | $0.8M |
| Construction Completion | Summer 2023 |



# Final Plan Development Update

# Final Plan – Three alternatives currently being evaluated

The three alternatives will need to capture, convey and treat up to **5 billion gallons** per year.

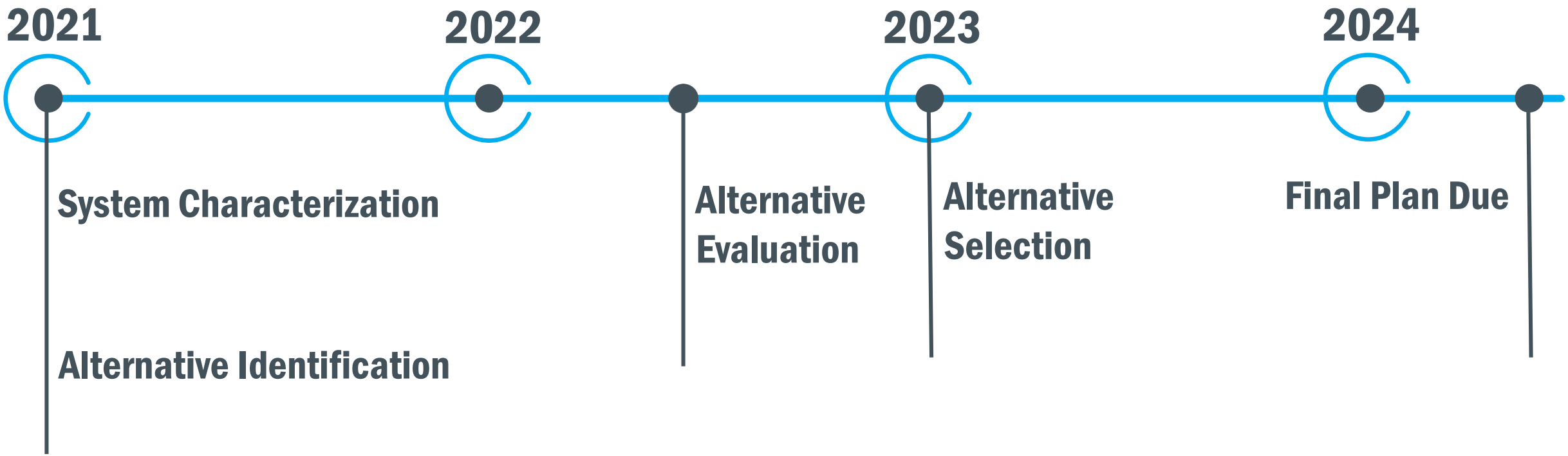
## 99% CSO Capture

Estimated Annual Basis

## $1.3B*

*In 2021 dollars

# Schedule Update



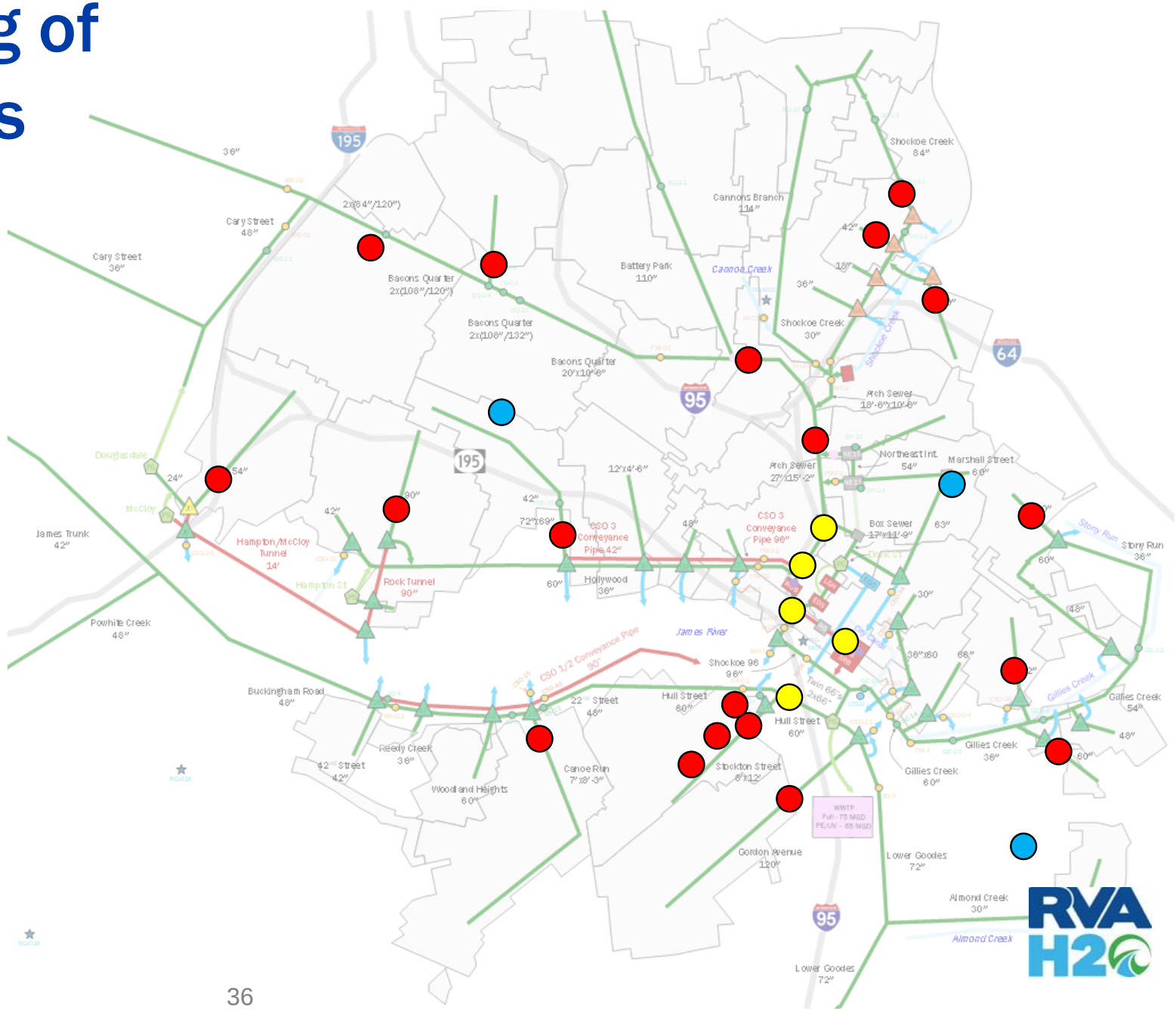
# Additional monitoring of rainfall and CSS flows

## Purpose

Improves our understanding of CSS capacity and overflow volumes

## Additional Meters

- **Flow Meter (19)**
- **Level Sensor (5)**
- **Rain Gauge (3)**

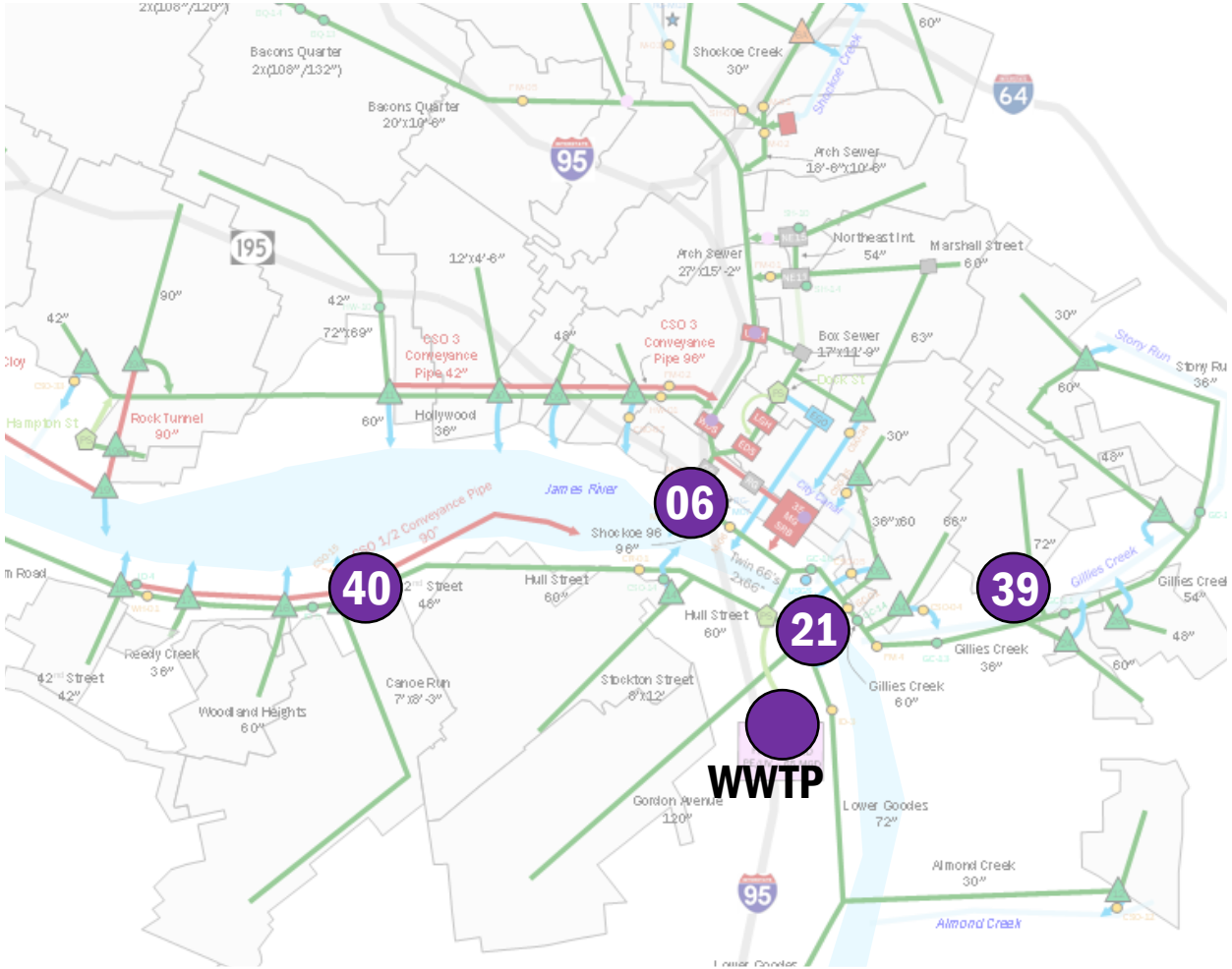


# Additional bacteria sampling of CSO discharges

## Purpose

Collect new data to better reflect current conditions

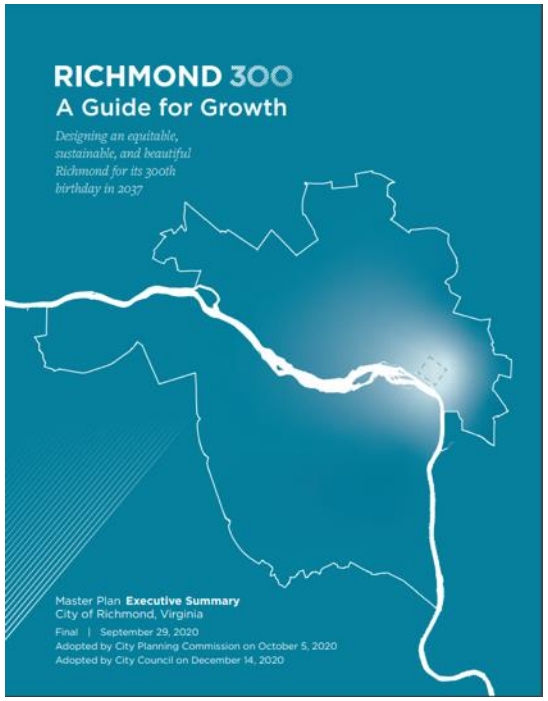
- **Samples**
  - 4-6 storms
  - 3 samples at each outfall / storm

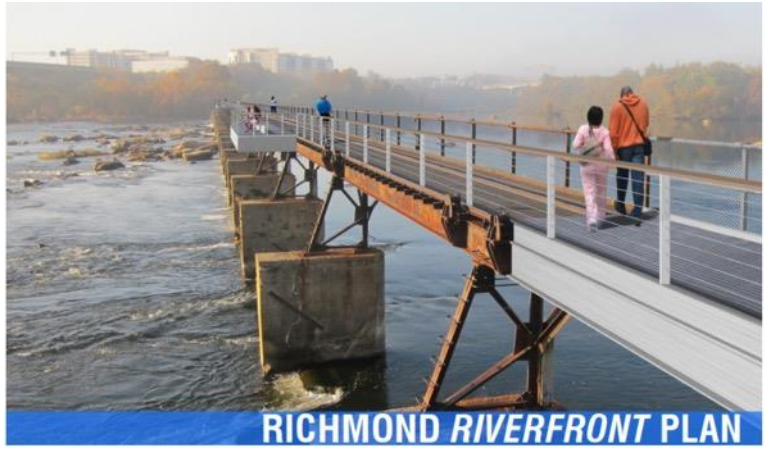



# Coordination with existing plans

## Purpose

Build off and consider previous planning work

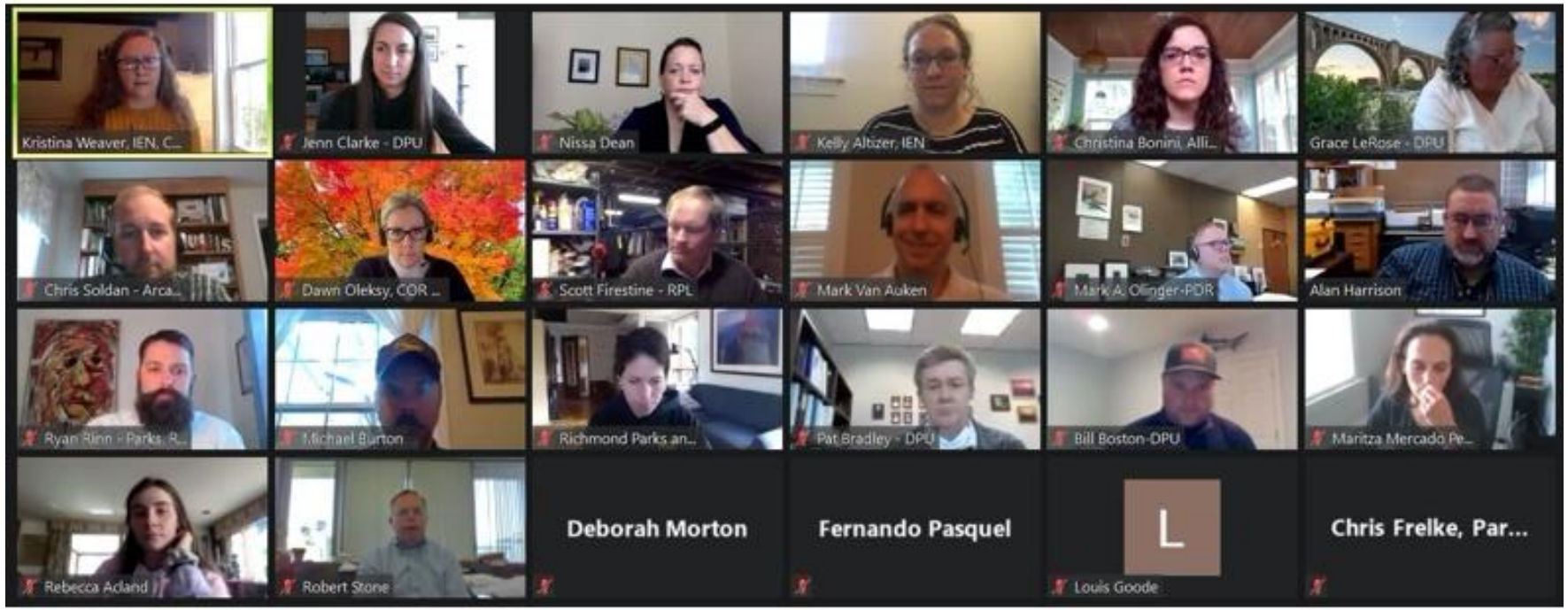

# Formation of a Public Stakeholder Group begins Jan. 1

## Purpose

Community representation

New perspectives and insights

Learning about what the community needs to know to support this program



# RVA Clean Water Plan
# Strategy Accomplishments

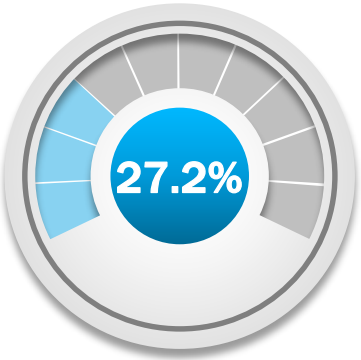
# 2017 – 2021 YTD


## CSS Infrastructure

- WWTP Nutrient Removal
- CSO Separation
- WWTP Flow Upgrade


## GI in MS4

- Target: 104 acres
- Achieved: 19.6 acres




## GI in CSS

- Target: 18 acres
- Achieved: 4.9 acres

# 2017 – 2021 YTD


## Stream Restoration

- Target: 2,500 linear feet
- Achieved: 11,608 linear feet


## Tree Canopy

- Target: 80 acres; 24,000 trees
- Achieved: 117.4 acres; 35,231 trees


## Land Conservation

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

# 2017 – 2021 YTD


## Natives & Invasives

- Target: 80% of plantings
- Achieved: 86.5% of tracked plants (16,553 native plants)

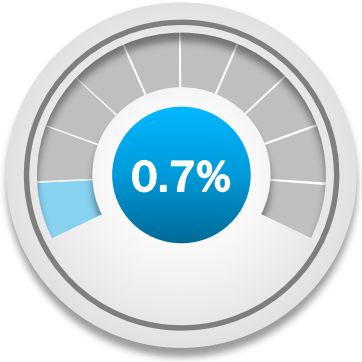

## Water Conservation

- Target: 10% reduction of potable water consumption


## Pollution Identification & Reduction

- Will be quantified in 2022

# 2017 – 2021 YTD




## Riparian Area Restoration

- Target: 10 acres
- Achieved: 0.07 acres

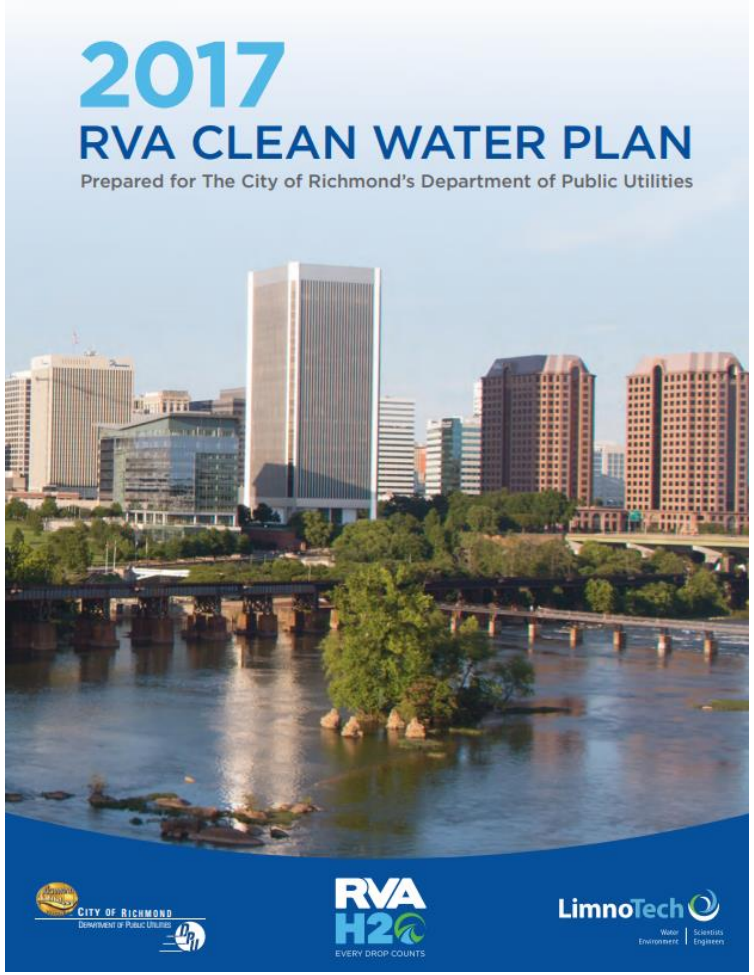
## Your projects help us all to reach these RVA Clean Water Plan goals!

# Partnership Applications

## Annual $200,000 budget for Green Infrastructure Matching Grants

**Application** → **City Review**

1. RVA Clean Water Plan Alignment
2. Strategy Metric Achievement



# Any questions?

Please comment in the chat box
or unmute.

# Resources

A PDF of this presentation will be distributed.
Also, visit RVAH20.org

# NEXT MEETING
## APRIL 2022

Grace.LeRose@rva.gov