CITY OF RICHMOND

DEPARTMENT OF PUBLIC UTILITIES

March 31, 2023

Ms. Somsiri Youngpattana
Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Rd.
Glen Allen, VA 23060

Re: Integrated Annual Report for the City of Richmond Municipal Separate Storm Sewer System (MS4) and the Combined Sewer System (CSS), Permit No. VA0063177

Dear Ms.Youngpattana,

As required by the Virginia Pollution Discharge Elimination System permit issued to the City of Richmond Department of Public Utilities in October 2018, the City submits its Integrated Annual Report for both the Combined Sewer System and the Municipal Separate Storm Sewer System for the permit period January 1, 2022 through December 31, 2022.

The city appreciates the opportunity to continue to report on our activities under the first ever integrated permit in the Commonwealth of Virginia.

Please contact me if any further information is required.

Thank you.

Sincerely,

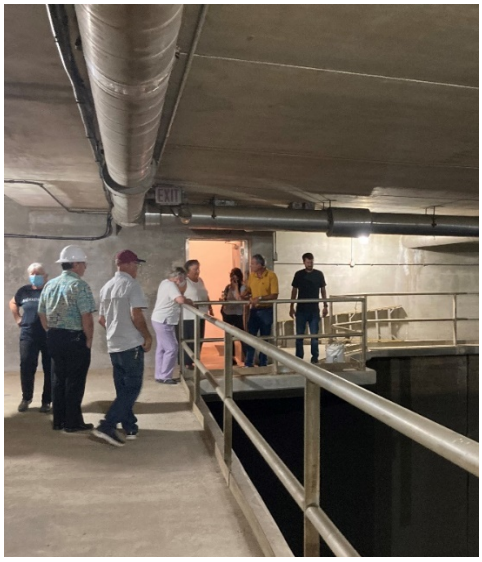
April N. Bingham

April N. Bingham, MPA
Director

Cc: Joy Abel - DEQ
Patrick Bishop - DEQ
Grace LeRose
Robert Stone

City of Richmond, Virginia
Department of Public Utilities
Integrated CSS and MS4
2022 Annual Report

March 31, 2023



Legend for Cover Photos:

1. Combined Sewer System Public Stakeholder Group Tour of Shockoe Retention Basin – September 2022
2. National Association of Clean Water Agencies National Environmental Achievement Award Ceremony – February 2023
3. Earth Day Volunteer Clean-Up with Virginia Water Environment Association at Ancarrow's Landing – April 2022

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List of Abbreviations

CSS	combined sewer system
DPU	Department of Public Utilities
DWF	dry weather flow
DWO	dry weather overflow
I/I	inflow and infiltration
MG	million gallons
MGD	million gallons per day
MS4	Municipal Separate Storm Sewer System
NMC	nine minimum controls
SCM	six minimum controls
WWTP	Richmond Wastewater Treatment Plant

Section 1

General Information

Permittee Name

City of Richmond

System Name

City of Richmond, Department of Public Utilities (DPU)

Richmond Wastewater Treatment Plant (WWTP), Richmond Combined Sewer System (CSS) and Richmond Municipal Separate Storm Sewer System (MS4)

VPDES Permit No.

VA0063177

Reporting Period

January 1, 2022 through December 31, 2022

Certification Statement

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

April N. Bingham March 31, 2023

April Bingham, Director of Public Utilities Date

Section 2

Combined Sewer System (CSS)

The metered results of the volume and number of overflows for each combined sewer overflow (CSO) outfall based on the measured storm event data for the 2022 reporting period is presented in Tables 2-1 and 2-2 below, respectively. A map of the CSS outfalls is presented in Appendix A.

Table 2-1. Metered Overflow Volume (MG)

CSO Outfall	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022	Total FY22
Hampton Street CSO Area													
19	0	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0
McCloy Street CSO Area													
20	0	0	0	0	0	0	0	0	0	0	0	0	0
Northside James River Park CSO Area													
7	0	0	0	0.05	0.07	0.22	0.02	0.17	0.12	0	0.02	0	0.7
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0.14	0	0.1	0.02	0.14	0.53	0.05	0.59	0.72	0.17	1.78	0.55	4.8
Southside James River Park CSO Area													
15	0	0	0	0	0	0	0	0	0	0	0.08	0.29	0.4
16	0	0	0	0	0	0	0	0	0	0	0	0	0.0
17	0.02	0	0	0	0	0.07	0.24	0.27	0	0	0.02	0.03	0.7
18	0	0	0	0	0	0	0	0	0	0	0	0	0.0
40	6.37	0.13	2.31	2.15	2.86	2.88	2.23	5.97	1.5	1	2.8	7.34	37.5
Shockoe Creek CSO Area													
6	166.06	0.03	69.98	54.68	67.32	94.89	0.55	30.38	25.1	11.82	28.9	253.1	802.8
34	1.6	0	0.29	0.17	0.9	0.79	0.21	1.12	1.33	0.38	0.25	0.33	7.4
Wastewater Treatment Plant CSO Area													
14	0.98	0	0.03	0.15	0.2	0.71	0.14	1.23	0.28	0.09	0.16	0.45	4.4
21	16.78	2.48	1.96	2.31	1.85	3.86	0.07	1.38	0	0	0.98	12.78	44.5
Gillies Creek CSO Area													
4	1.1	0.02	0.73	0.34	0.92	1.04	0.12	0.65	1.01	0.34	0.9	1.54	8.7
5	0.76	0	0	0.42	0.24	0.85	0	0.24	0.01	0.02	1.1	4.7	8.3
24	0	0	0	0	0.02	0.1	0	0	0	0	0	0	0.1
25	0	0	0	0	0	0.04	0	0	0	0	0	0	0.0
26	0.01	0	0	0	0.01	0.4	0.42	0	0.1	0.03	0	0.07	1.0
31	0.88	0	0	0	2.46	3.93	0	1.29	2.63	0.51	0	1.29	13.0
35	0.17	0.02	0.2	0.19	0.29	0.25	0.06	0.16	0.16	0.05	0.12	0.29	2.0
39	2.3	0.04	1.12	0.49	1.46	2.49	0.27	0.66	0.58	0.29	0.59	2.88	13.2
Hilton Street CSO Area													
12	0.06	0	0	0	0.03	0.15	0.08	0	0.01	0.01	0	0.04	0.4

Table 2-2. Metered Number of Overflow Occurrences													
CSO Outfall	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022	Total FY22
Hampton Street CSO Area													
19	0	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0
McCloy Street CSO Area													
20	0	0	0	0	0	0	0	0	0	0	0	0	0
Northside James River Park CSO Area													
7	0	0	0	1	1	3	0	1	2	0	1	0	9
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	1	0	1	1	1	3	1	2	2	1	3	2	18
Southside James River Park CSO Area													
15	0	0	0	0	0	0	0	0	0	0	2	3	5
16	0	0	0	0	0	0	0	0	0	0	0	0	0
17	1	0	0	0	0	1	2	2	0	0	1	1	8
18	0	0	0	0	0	0	0	0	0	0	0	0	0
40	3	2	3	2	4	8	7	2	3	3	5	3	45
Shockoe Creek CSO Area													
6	6	1	4	2	4	5	4	9	4	5	5	5	54
34	4	0	4	1	3	2	3	2	4	3	3	4	33
Wastewater Treatment Plant CSO Area													
14	2	0	1	1	1	3	1	2	2	1	2	2	18
21	6	3	4	1	5	3	1	2	0	0	3	2	30
Gillies Creek CSO Area													
4	3	1	4	3	5	4	5	2	4	4	4	5	44
5	2	0	0	1	2	2	0	1	0	1	2	2	13
24	0	0	0	0	1	1	0	0	0	0	0	0	2
25	0	0	0	0	0	1	0	0	0	0	0	0	1
26	0	0	0	0	0	2	1	0	1	1	0	1	6
31	1	0	0	0	2	4	0	1	2	1	0	1	12
35	2	0	4	3	5	4	3	2	3	1	3	3	33
39	3	1	4	3	5	4	4	2	4	3	4	4	41
Hilton Street CSO Area													
12	1	0	0	0	2	2	1	0	1	1	0	1	9

Section 3

CSS and MS4 Nine Minimum Controls (NMC) and Six Minimum Controls (MCM)

3.1 Operation and Maintenance of the CSS (NMC 1)

3.1.1 Inspection and Maintenance of CSS Control Structures and Pump Stations

The City follows a regular schedule for inspection and maintenance of regulators, CSO outfalls, and pump stations. The schedule of performance of the City's O&M program is summarized in Table 3-1 and 3-2 below. Equipment inspection, screen cleaning and debris removal are part of the regular activities.

Table 3-1. CSS Control Structure O&M Program

CSO Control Structures	Inspection Interval	Maintenance	
		Interval	Type
Dry Weather Regulators (29) Wet Weather Regulators (10)	Monthly	Monthly	Preventative Maintenance
CSO Outfalls (25)	Monthly	Monthly	Preventative Maintenance

Table 3-2. CSS Pump Station O&M Program

Pump Station	Capacity (MGD)		Estimated Dry Weather Peak (MGD)	Inspection/ Maintenance Interval
	Firm	Installed		
Douglasdale	7.5	13.0	2.2	Daily
Hampton/McCloy	0.9	1.7	0.4	Daily
Upham Brook	8.6	13.0	0.3	Daily

If major repairs are deemed necessary at the inspection, a work order is initiated, and the repairs are scheduled. Rehabilitation efforts were performed for CSO Outfalls 15, 16, 17, 18, 19, and 20 by an annual contractor over the 2022 reporting period to restabilize the outfalls.

Figure 3-1: Restabilized CSO 17 Outfall

3.1.2 Sewer Flushing and Cleaning

The City follows a regular schedule for routine sewer line flushing and cleaning. Maintenance activities performed on the collection system during the 2022 reporting period are summarized in Table 3-3 below.

Table 3-3. Sewer System Maintenance Activities

Activity	Interval	Quantity
Sewer Cleaning	Annually (at a minimum)	24.7 miles
CCTV Inspection	Annually	24.9 miles

3.1.3 Catch Basin Cleaning

The City follows a regular schedule for routine catch basin cleaning. The City cleaned 2,896 catch basins throughout the CSS during the 2022 reporting period.

3.2 Use of Collection System for Storage (NMC 2)

3.2.1 Information regarding storage at Shockoe Retention Basin and Hampton/McCloy Tunnel

Storage is provided in the Shockoe and Hampton/McCloy CSO areas through existing retention facilities.

- The Shockoe facilities serve about 8,000 acres of the CSS and comprise a 35 million gallon (MG) retention basin with upstream in-line storage of approximately 15 MG in diversion structures and arch and box sewers.
- The Hampton/McCloy tunnel serves about 1,012 acres of the CSS and comprises a 7.2 MG retention tunnel.

3.2.2 Sewer Re-lining Activities to reduce Inflow and Infiltration (I/I)

The City implements a sewer lining program annually to reduce I/I. The City lined 30,620 feet of sewer during the 2022 reporting period.

3.2.3 Operation of WWTP influent pumping to fill intercepting system

During wet weather events the Main Pumping Station is operated at 140 MGD to maximize flow to the WWTP. A new Standard Operating Procedure (SOP) was developed in 2022 to maximize the use of the 140 MGD treatment capacity before the in-line storage in the interceptor system is utilized. The Main Pumping Station is operated ahead of anticipated wet weather events to the lower the hydraulic gradeline in the collection system to create additional storage capacity in the interceptor system. As the wet weather event begins, the Main Pumping Station's flowrate is increased to 140 MGD at a lower elevation to maximize flow through the WWTP, before the interceptor inline storage is utilized. As the wet weather event continues, combined sewage is stored in the interceptor system before overflows occur.

Portions of the intercepting sewers that convey flow to the WWTP are located at elevations below the lowest CSO outfall overflow elevation. The majority of these low-lying intercepting sewers are in the Shockoe CSO drainage area where the lowest overflow elevation is 1.00 feet. Table 3-4 below summarizes the intercepting sewers below the lowest CSO overflow elevation and the corresponding estimated storage capacity.

Table 3-4. Intercepting Sewers Below Lowest CSO Overflow Elevation

Intercepting Sewer	Diameter (inches)	Length Below (El + 1.00 (feet)	Storage Capacity (MG)
Lower Goodes Creek	72	10,905	2.61
Twin River Crossings	66	1,100	0.39
Hull Street	60	2,700	0.40
Shockoe	96	2,700	1.02
Gillies Creek	60	2,500	0.37
Northside CSO Conveyance (1)	96, 84, 60	2,850	0.89
		Total	5.68

(1) Northside CSO Conveyance stores CSS to an elevation of 16.0 feet

3.2.4 Tide Gate Inspections

The City routinely inspects and makes necessary repairs to tide gates to reduce tidal intrusion into the collection system. The City follows a regular schedule for inspection and maintenance of tide gates. The schedule of performance of the City's O&M program is summarized in Table 3-5 below. Equipment inspection, and debris removal are part of the regular activities.

Table 3-5. Tide Gate O&M Program

Gates	Inspection Interval	Maintenance	
		Interval	Type
CSO 04 (Bloody Run) Tide Gate	Monthly	Monthly	Preventative Maintenance
CSO 05 (Peach Street) Tide Gate	Monthly	Monthly	Preventative Maintenance
CSO 06 (Shockoe) Tide Gates (6)	Monthly	Monthly	Preventative Maintenance
CSO 14 (Stockton Street) Tide Gate	Monthly	Monthly	Preventative Maintenance
CSO 15 (Canoe Run) Tide Gate	Monthly	Monthly	Preventative/Corrective Maintenance
CSO 16 (Woodland Heights) Tide Gate	Monthly	Monthly	Preventative/Corrective Maintenance
CSO 17 (Reedy Creek) Tide Gate	Monthly	Monthly	Preventative/Corrective Maintenance
CSO 18 (42nd Street) Tide Gate	Monthly	Monthly	Preventative/Corrective Maintenance
CSO 19 (Hampton) Flap Gate (2)	Monthly	Monthly	Preventative/Corrective Maintenance
CSO 20 (McCloy) Flap Gate (3)	Monthly	Monthly	Preventative/Corrective Maintenance
CSO 21 (Gordon Avenue) Tide Gate	Monthly	Monthly	Preventative Maintenance

3.2.5 Use of Public and Private Stormwater Facilities in the CSS Area

Local retention facilities provide additional stormwater storage in the CSS area. Examples of these types of facilities are shown in Table 3-6 below.

Table 3-6. Local Stormwater Retention Facilities in the CSS Area

Site	Location	Owner
Brander St. Pump Station Holding Pond	Brander St.	City
Gordon Ave. Pump Station Holding Pond	Gordon Ave.	City
DPU Operations Parking Lot	Commerce Rd.	City
Sonoco Products Company	Commerce Rd.	Private (1)
BP Products North America	Commerce Rd.	Private (1)
Citgo Petroleum Corporation	Maury St.	Private (1)
First Energy Corporation	Maury St.	Private (1)
Magellan Terminals Holdings, L.P. Richmond Terminal	East First St.	Private (1)
Transmontaigne Terminaling	Commerce Rd.	Private (1)
(1) Industry that retains stormwater on-site during wet weather events and control releases to permit limits at the WWTP		

3.2.6 Use of Real Time Decision Support System to manage flows during CSO Events

DPU utilizes 102 depth sensors, 62 flow meters, and 14 rain gauges (shown below in Figure 3-2) to monitor the collection system.

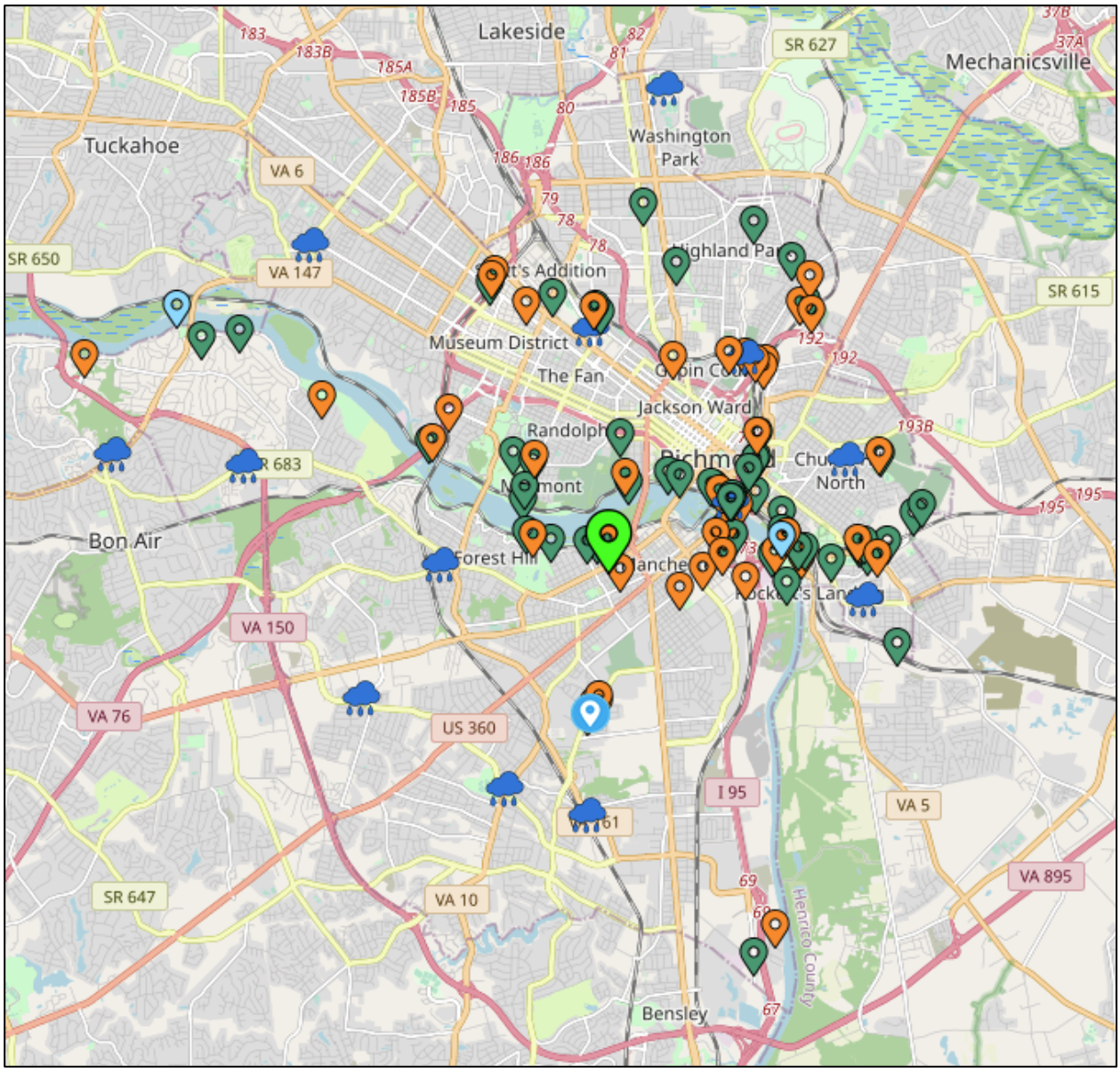

Figure 3-2: Collection System Monitoring System

The data can be displayed in real time, as shown below in Figure 3-3.

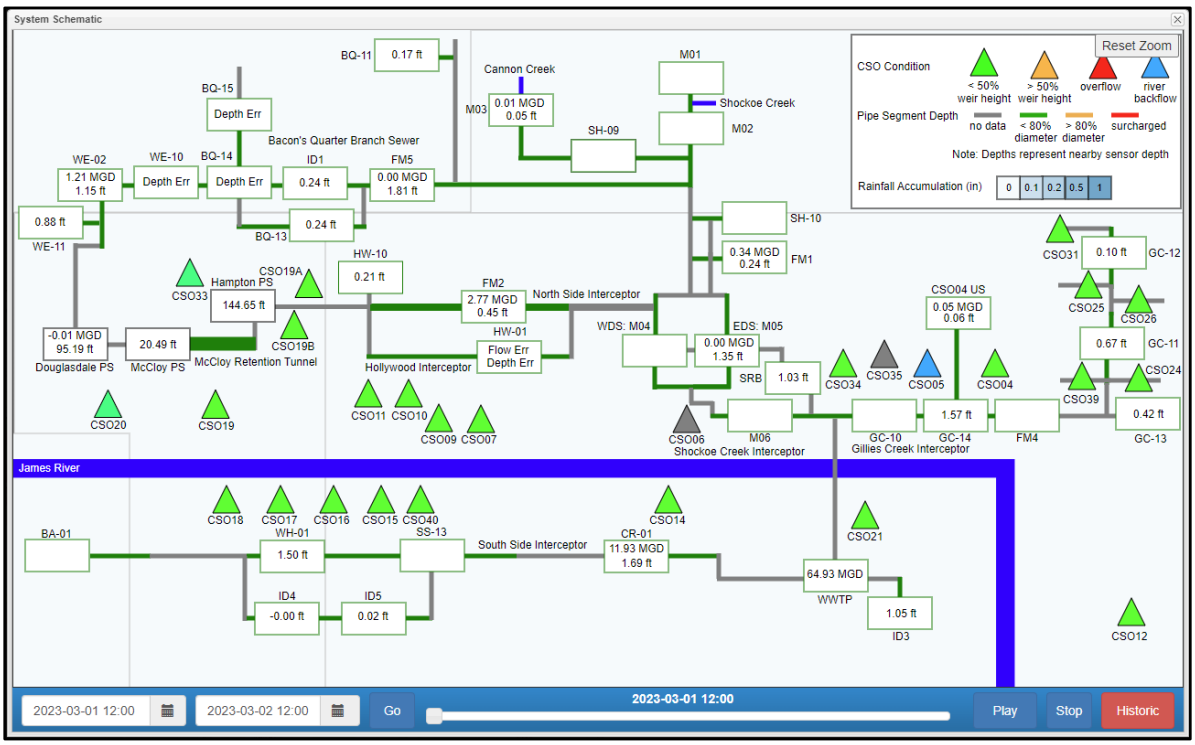

Figure 3-3: Real Time Collection System Data Display

The collected data is also utilized in the *Richmond CSO Map Notification*, which is available to the public, that displays outfalls that are currently overflowing or have overflowed in the past 48 hours.

https://apps.emnet.net/richmond-pub-map-app/?city=47&config=5c0cacee-7e95-4eea-922d-c736c83eb4b9

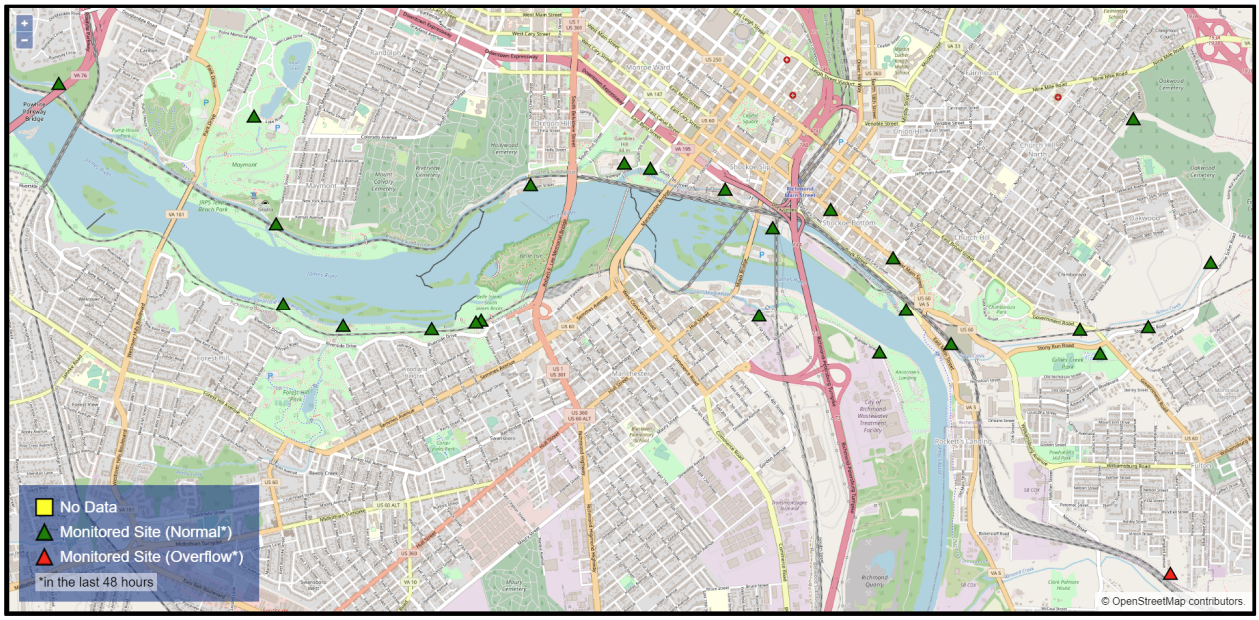

Figure 3-4: Richmond CSO Notification Map

3.3 Review of Pretreatment Program (NMC 3)

3.3.1 Changes or Use of Pretreatment Program Authority to minimize flows during CSO Events

The City administers an industrial pretreatment program as required by the VPDES permit. Industries discharging to the CSS retain stormwater on-site during wet weather events and control releases to permit limits at the WWTP. Information on individual industries which utilize retention facilities is summarized in Section 3.2.5 – Use of Public and Private Stormwater Facilities in the CSS Area. Each industry is issued an Industrial User Permit which includes a section on Discharge of Stormwater. The below statement was added to the Industrial User Permits:

> E. Storm water runoff collected within the containment dike structure shall be released to the City's Treatment System in accordance with the following criteria:
>
> 1. There shall be no discharge of floating solids, visible foam or oily sheen in other than trace amounts; and
> 2. During storm events where the accumulation of rainfall is in excess of 2.2 inches; the permittee will use the installed precipitation gauge system to determine the volume of rainfall at the terminal; which would then trigger the terminal to call the City of Richmond's Department of Public Utilities Publicly Owned Treatment Works (POTW) at (804) 646-8721 to inform them of the level of rainwater retained in the diked area. It is at this time that the POTW will advise whether the plant is able to handle your facility's effluent. Nevertheless, neither your facility's nor the POTW's welfare will be jeopardized.
> 3. The Terminal Manager shall contact the City's Environmental Compliance Officer on 804.646.8661 and notify him/her of the intent to discharge, at least 24 hours prior to initiating any discharge other than in 2 above.

During this reporting period, there have been no additional changes to the program to minimize flow during a CSO event.

3.4 Maximize Flow to the WWTP for Treatment (NMC 4)

3.4.1 Operation of WWTP during Precipitation events to show Maximization of Treatment of Wet Weather Flows

The City maximizes flow to the WWTP during wet weather events by performing the following actions:

- Influent flow at the WWTP is increased to 140 MGD in wet weather conditions based on the newly developed SOP (see Figure 3-5).
- Flows up to 140 MGD are treated at the WWTP to permit limits.
    - 75 MGD receives full treatment and disinfection (Primary, Secondary, Tertiary and UV Disinfection)
    - 65 MGD receives primary treatment and UV disinfection (Primary and UV Disinfection)
- Combined sewage is stored in the Shockoe Retention Basin (see Figure 3-5), Hampton/McCloy Tunnel (see Figure 3-6) and the collection system prior to overflow.
- The Shockoe Retention Basin and Hampton/McCloy tunnel are drained as soon as possible once overflow conditions are concluded. During the draining process the WWTP continues to operate at 75 MGD.

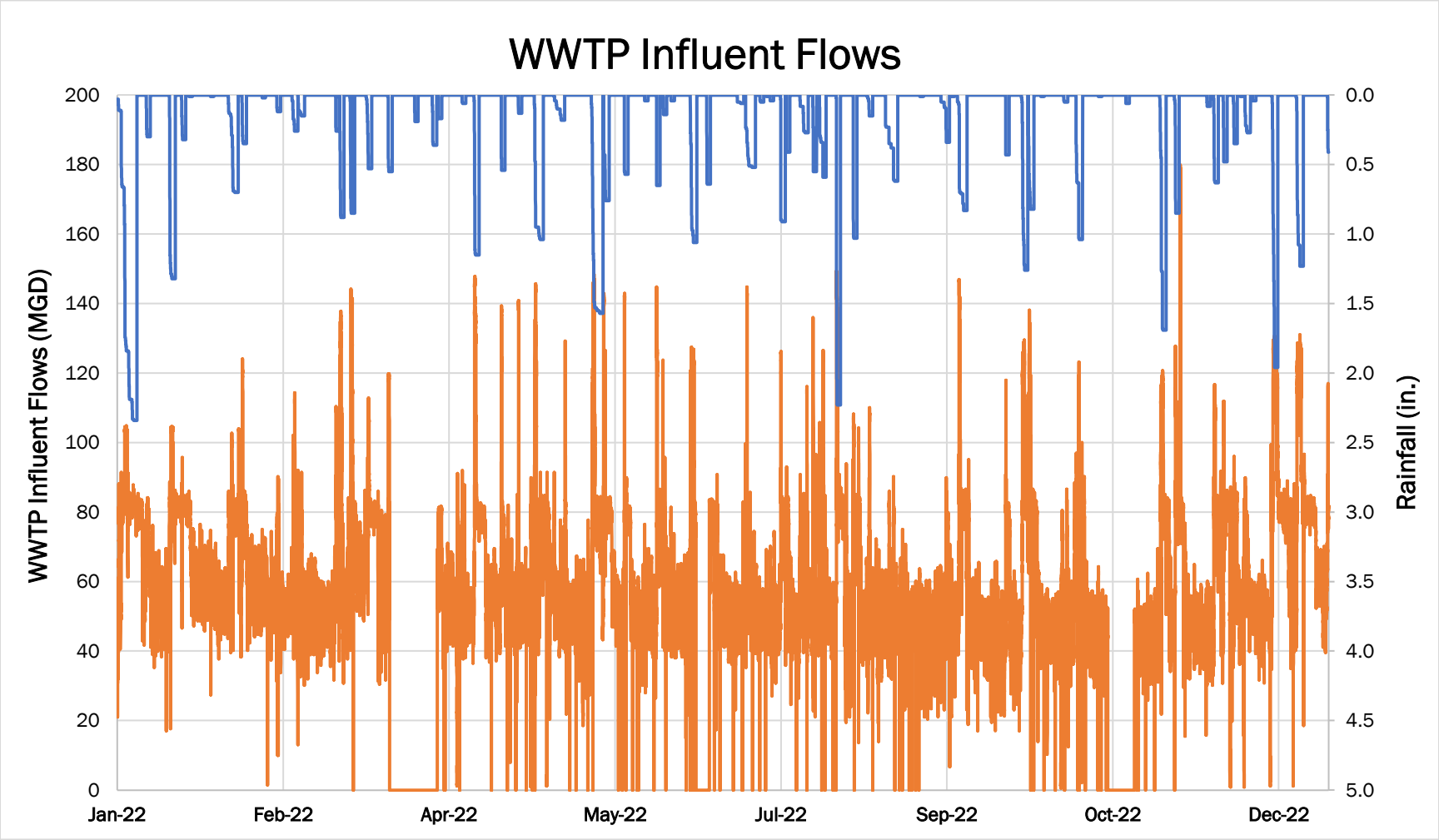

Figure 3-5: WWTP Influent Flows

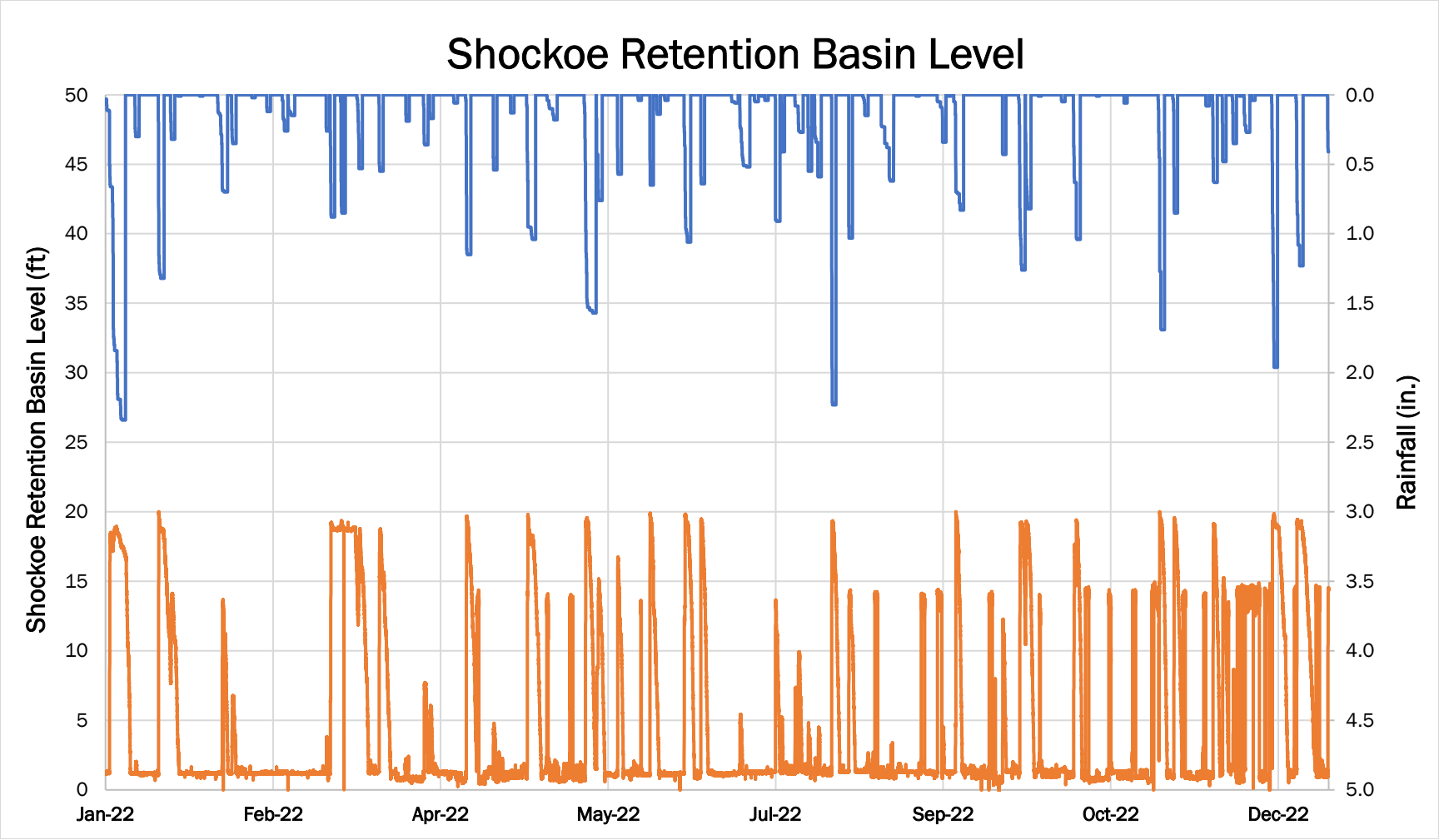

Figure 3-6: Shockoe Retention Basin Levels

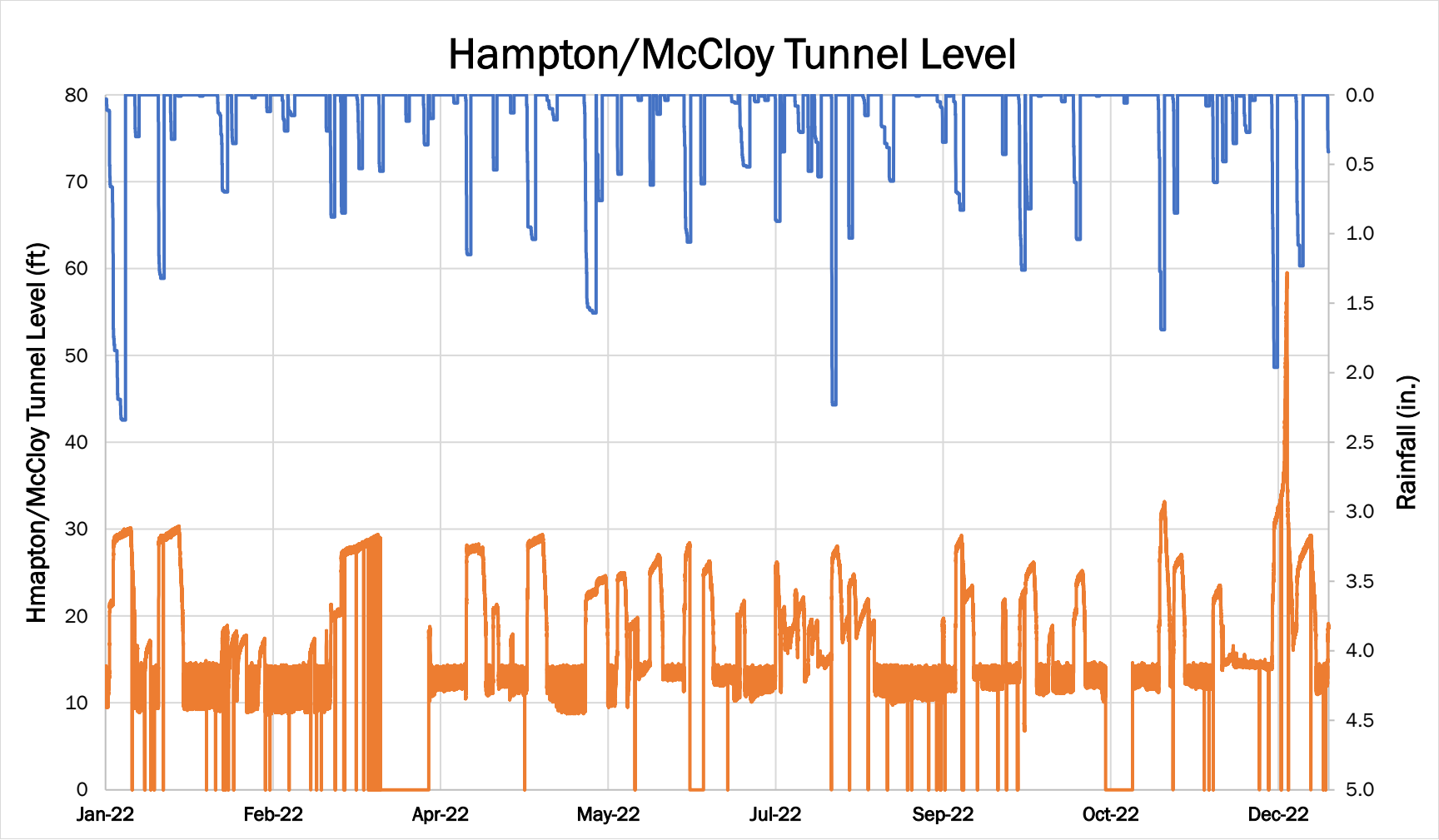

Figure 3-7: Hampton/McCloy Tunnel Levels

3.5 Eliminate Dry Weather Overflows (DWOs) (NMC 5)

3.5.1 Inspection and Maintenance of Diversion Facilities

The City regularly inspects and maintains CSS diversion facilities to prevent dry weather overflows, see Section 3.1.1. If a dry weather discharges occurs, the City maintains an "on call" team of maintenance personnel to respond to blockages or other occurrences that could result in dry weather discharges.

3.5.2 Monitoring of Pumping Stations for DWOs

The City inspects and maintains the pump stations on a daily basis to prevent dry weather overflows, see Section 3.1.1. If a dry weather discharges occurs, the City maintains an "on call" team of maintenance personnel to respond to blockages or other occurrences that could result in dry weather discharges.

3.5.3 Operation of the Shockoe Retention Basin

The Shockoe retention basin is continuously staffed. The basin is utilized to store combined sewage during wet weather conditions and is drained as soon as possible after overflow conditions have concluded. The 2022 operating levels of the Shockoe Retention Basin are shown in Section 3.4.1.

3.5.4 Reports of DWOs

All dry weather overflows are reported in accordance with the VPDES permit. Table 3-7 below summarizes each dry weather overflow event that occurred during the reporting period.

Table 3-7. Dry Weather Overflow Reports

Date of Incident	Location of Incident	Volume Discharged (gallons)	Event Description
5/27/2022	1702 Pump House Drive	43,200	An existing 30" main was found to be leaking adjacent to pump house.
10/27/2022	Ford Ave and Raven St.	1,000	12" Line blocked by leaves & sticks

3.6 Control Solid and Floatable Materials in the CSS (NMC 6)

3.6.1 Cleaning and Maintenance related to Control of Solid and Floatable Materials

The City implements many programs and strategies to capture and remove solid and floatable material from CSS areas. Table 3-8 below summarizes the city-wide programs conducted during the reporting period.

Table 3-8. Solid and Floatable Material Capture Programs

Program	Quantity
Loose-Leaf Collection	8,820 tons removed
Litter Basket Collection	287 tons removed

Catch Basin Cleaning	2,896 basins cleaned
Street Sweeping	3,139 tons removed

Additional strategies the City implements to control solid and floatable material in CSS areas include:

- The Shockoe retention facilities provide continuous mechanical screening for over two-thirds of the CSS. Screening operations at the facilities are increased during leaf season.
    - The Shockoe Diversion Structure Trash Rake Replacement project (construction starting in Summer 2023) will replace the screening system at the Shockoe West Diversion Structure to increase the volume of the screenings removed from the facility.
- The Hampton/McCloy tunnel provides continuous mechanical screening. All flow captured in the tunnel is screened prior to transfer to the WWTP, which consist of 1,012 acres of the CSS. The tunnel is equipped with solid and floatable capture chambers.
- The Northside, Southside James River Park, Gillies Creek, and Hilton Street CSO conveyance facilities have flotation or stilling chambers and/or static screens along with baffles to capture solid and floatable material. The material captured is transferred to the intercepting sewers for removal at the WWTP.

3.7 Public Education and Outreach (MCM 1, NMC 7 and NMC 8)

3.7.1 List of High-Priority Stormwater Issues and Strategies

The City identified three high-priority stormwater issues to be addressed in their public education and outreach program.

3.7.1.1 High Priority Issue #1: Pet Waste

- Rationale for Selection: Minimize the degree of pet waste runoff to reduce the bacteria loads entering local waterways
- Identification of Public Audience: Pet Owners
- Strategies
    - Traditional written materials: Fact Sheets; flyers; handouts
    - Alternative materials: Pet waste stations; pet waste baggies and holders
    - Signage: Yard Signs
    - Media materials: Radio ads; social media posts
    - Speaking engagements: Presentations to varied community groups

The specific events/media utilized to address public education on Pet Waste are summarized below in Table 3-9.

Table 3-9. Strategies to Communicate High Priority Issue #1 – Pet Waste

Date	Event/Media	Audience Reached
2/23/22	Healthy Home, Healthy James: River Hero Homes Webinar with James River Association	Virtual

1/27/22 – 10/26/22	Distributed Pet Waste Bags at Parks	30,400
3/4/22 – 8/8/22	Distributed Pet Waste Bags to Private Citizens	1,811
3/4/22	Pet Waste Information Keychains to Private Citizens	3,304
3/4/22	Pet Waste Handouts to Private Citizens	17
03/10/22 - 08/31/22	Distributed 40 Pet Waste Yard Signs to Private Citizens and Parks	
11/12/22	The Hill Association of RVA Community Newsletter	

3.7.1.2 High Priority Issue #2: General Stormwater Awareness

- Rationale for Selection: Educate residents on stormwater and its impact on the environment to improve the quality and minimize the quantity of urban runoff from residential areas
- Identification of Public Audience: Richmond citizens and school-age students
- Strategies
    - Traditional written materials: Newsletters
    - Signage: Signage posted at Richmond Public Library branches

The specific events/media utilized to address public education on General Stormwater Awareness are summarized below in Table 3-10.

Table 3-10. Strategies to Communicate High Priority Issue #2 – General Stormwater Awareness

Date	Event/Media	Audience Reached
1/20/22	VA AWWA Webinar	Virtual
2/23/22	Healthy Home, Healthy James: River Hero Homes Webinar with James River Association	Virtual
3/4/22 – 4/13/22	Distributed DPU Packable Tote Bags	23
3/4/22 – 8/1/22	Distributed Water Bottles	500
3/9/22	East End Green Infrastructure Collaborative Meeting	Virtual
3/23/22	NACWA Tellevate Your Story Lunch & Learn Webinar	Virtual
4/13/22 – 5/23/22	Distributed Backpacks	50
4/13/22 – 5/5/22	Distributed Ceramic Mugs	21
4/21/22	Virginia Water Environment Association's Annual Stormwater Seminar: Stormwater's Role in Environmental Justice "Looking at Combined Sewer Systems Through the Lens of Environmental Justice – How Do We Fix This?"	Virtual
4/23/22 – 5/23/22	Distributed Flashlight Pens	71
4/23/22 – 10/4/22	Distributed Brown Paper Bags	107
4/23/22 – 10/4/22	Distributed Stickers	878
5/23/22 – 10/4/22	Distributed Cleaner Water Faster Notebooks	136
6/21/22	Distributed Rain Barrels	31
8/1/22	Distributed RVAH2O Pouches	61
6/23/22	5th District Council Meeting	
10/28/22	Life-Ready Expo	

Table 3-10. Strategies to Communicate High Priority Issue #2 – General Stormwater Awareness		
Date	Event/Media	Audience Reached
2022	Social Media: Twitter	526,569
2022	Social Media: Facebook	1,008
2022	Social Media: Instagram	1,841
2022	RVAH2O Website Views	8,523

3.7.1.3 High Priority Issue #3: Litter Awareness

- Rationale for Selection: Minimize the degree of litter entering the storm sewer system and local waterways to achieve higher water quality
- Identification of Public Audience: Pedestrians
- Strategies
    - Alternative materials: Stickers
    - Media materials: Radio ads; social media posts
    - Speaking engagements: Presentations to varied community groups

The specific events/media utilized to address public education on Litter Awareness are summarized below in Table 3-11.

Table 3-11. Strategies to Communicate High Priority Issue #3 – Litter Awareness		
Date	Event/Media	Audience Reached
2/23/22	Healthy Home, Healthy James: River Hero Homes Webinar with James River Association	Virtual
3/23/22	NACWA Tellevate Your Story Lunch & Learn Webinar	Virtual
4/23/22	Ancarrow's Landing Clean-Up with the Virginia Water Environment Association	22
4/24/22	Keep Virginia Cozy's Earth Day Clean-Up	125
5/10/22	Second Baptist Church Meeting	30

3.7.2 Proper Disposal of Substances - Public Education Programs and Facility Tours

The educational programs and tours conducted and/or hosted by the City during the reporting period to educated on the proper disposal of substances are summarized in Table 3-12 below.

Table 3-12. Public Education Programs and Facility Tours		
Date	Program/Tour	Audience Reached
2/23/22	Healthy Home, Healthy James: River Hero Homes Webinar with James River Association	Virtual
4/23/22	Ancarrow's Landing Clean-Up with the Virginia Water Environment Association	22
4/24/22	Keep Virginia Cozy's Earth Day Clean-Up	125
5/5/22	Combined Sewer System Public Stakeholder Group Meeting	

Table 3-12. Public Education Programs and Facility Tours		
Date	Program/Tour	Audience Reached
6/23/22	5th District Council Meeting	
7/28/22	Combined Sewer System Public Stakeholder Group Meeting	
9/8/22	Combined Sewer System Stakeholder Group Tour of the Wastewater Treatment Plant and Shockoe Retention Basin	
9/28/22	VWEA Wastewater Treatment Plant Tour	
10/26/22	Wastewater Treatment Plant Tour with Reynolds Environmental Studies Class	

3.7.3 Pretreatment Awareness Programs

The pretreatment awareness programs that were implemented to encourage industrial waste reduction through recycling and improved housekeeping are summarized in Table 3-13 below.

Table 3-13. Awareness Programs to Encourage Waste Reduction		
Date	Event/Program	Audience Reached
1/8/22	Household Hazardous Waste Take-Back Event	
5/21/22	Household Hazardous Waste Take-Back Event	
8/29/22	Household Hazardous Waste Take-Back Event	

3.8 Public Involvement and Participation (MCM 2 and NMC 8)

3.8.1 Public Input on MS4 Program

Stormwater complaints received by the City, and complaints that were addressed and closed out through the duration of the reporting period are summarized in Table 3-14 below.

Table 3-14. Stormwater Complaints Summary (Cityworks)	
No. of New Complaints Received	1,598
No. of Complaints Closed	2,166

3.8.2 Published Information on a City-Controlled website pertaining to the CSO Control and MS4 Program

Published information on the CSO control and MS4 programs is located at the following City-controlled websites:
https://www.rva.gov/index.php/public-utilities/wastewater-utility

https://www.rva.gov/index.php/public-utilities/pretreatment

https://www.rva.gov/public-utilities/stormwater-management

https://www.rva.gov/public-utilities/stormwater-utility

https://www.rva.gov/public-utilities

3.8.3 Public Involvement Activities

The public involvement activities conducted and/or hosted by the City during the reporting period are summarized in Table 3-15 below.

Table 3-15. Public Involvement Activities

Date	Event	Attendees
1/8/22	Household Hazardous Waste Take-Back Event	
2/23/22	Healthy Home, Healthy James: River Hero Homes Webinar with James River Association	26
3/23/22	NACWA Tellevate Your Story Lunch & Learn Webinar	125
4/21/22	VWEA's Annual Stormwater Seminar	
4/23/22	Ancarrow's Landing Clean-Up with the Virginia Water Environment Association	22
4/24/22	Keep Virginia Cozy's Earth Day Clean-Up	125
5/21/22	Household Hazardous Waste Take-Back Event	
8/29/22	Household Hazardous Waste Take-Back Event	
9/8/22	Combined Sewer System Stakeholder Group Tour of the Wastewater Treatment Plant and Shockoe Retention Basin	
9/28/22	VWEA Wastewater Treatment Plant Tour	
10/26/22	Wastewater Treatment Plant Tour with Reynolds Environmental Studies Class	

3.8.4 Public Involvement Metric Evaluation

The metrics used to evaluate the effectiveness of the implemented public involvement activities are summarized in Table 3-16 below.

Table 3-16. Public Involvement Activities

Public Involvement Opportunity Outlined in Program Plan	Metric as Defined in Program Plan	Metric Measurements	Evaluation
Monitoring – Volunteer Monitoring	The number of participants per training event	No volunteer samples were conducted during the 2022 reporting year.	Volunteer sampling was suspended comply with COVID-19 protocols.
Restoration – Watershed Cleanup	The number of participants per event	4/23/22 Ancarrow's Landing Clean-Up with the VWEA – 22 volunteers 4/24/22 "Keep Virginia Cozy Earth Day Clean Up" - 125 volunteers	In 2022, the Department of Public Utilities partnered with the VWEA to clean up Ancarrow's Landing. The cleanup effort had the participation of 22 volunteers. 900 pounds of trash was collected.

Table 3-16. Public Involvement Activities			
Public Involvement Opportunity Outlined in Program Plan	Metric as Defined in Program Plan	Metric Measurements	Evaluation
Disposal or Collection Event – Household Hazardous Waste Collection Events	The number of barrels of hazardous waste collected per event	1/8/22 5/21/22 8/29/22	22 barrels of hazardous household material was collected over the three events. Keeping hazardous material from being improperly disposed of and out of the environment, our stormwater, our combined stormwater and sewer infrastructure, and out of waterways is beneficial to improving and protecting water quality.

3.8.5 Public Meetings Organized/Attended

During the reporting period, the City organized and participated in meetings with the community, regulatory agencies, stakeholders, and other MS4 permittees. These meetings are summarized in Table 3-17 below.

Table 3-17. Public Involvement Meetings	
Date	Meeting
1/20/22	VA AWWA Webinar
2/23/22	Healthy Home, Healthy James: River Hero Homes Webinar with James River Association
3/9/22	East End Green Infrastructure Collaborative Meeting
3/23/22	NACWA Tellevate Your Story Lunch & Learn Webinar
4/21/22	Virginia Water Environment Association's Annual Stormwater Seminar: Stormwater's Role in Environmental Justice "Looking at Combined Sewer Systems Through the Lens of Environmental Justice – How Do We Fix This?"
5/5/22	Combined Sewer System Public Stakeholder Group Meeting
6/23/22	5th District Council Meeting
7/28/22	Combined Sewer System Public Stakeholder Group Meeting

3.8.6 CSO Warning Signs

Eighteen (18) of the twenty-five (25) CSO outfalls were predicted to discharge, more than once per summer on average. Each of these outfalls are required to have a CSO warning sign per the VPDES permit. These signs have been installed and have been maintained by DPU throughout the reporting year.

3.8.7 Local Press Coverage of CSO Program

Local press coverage of the CSS is ongoing. The articles/sessions released during the reporting period are summarized in Table 3-18 below.

Table 3-18. Local Press Coverage		
Date	Source	Link
01.18.2022	ABC8	https://www.wric.com/news/politics/capitol-connection/when-will-richmond-stop-dumping-raw-sewage-into-the-james-river/?ipid=promo-link-block2
01.18.2022	Richmond Times-Dispatch	https://richmond.com/news/state-and-regional/govt-and-politics/senate-panel-votes-to-speed-deadline-for-richmond-to-fix-1-3-billion-sewer-problem/article_5b347821-16c0-5ae0-8b5a-c34f5e719ceb.html
01.28.2022	ABC8	https://www.wric.com/news/local-news/richmond-short-1-billion-in-fight-against-flooding/
02.03.2022	Richmond Free Press	https://richmondfreepress.com/news/2022/feb/03/without-federal-state-dollars-city-residents-may-p/
02.08.2022	Richmond Times-Dispatch	https://richmond.com/news/state-and-regional/govt-and-politics/senate-panel-speeds-deadline-on-richmond-sewer-project-but-with-off-ramp-based-on-funding/article_854ee14f-023c-5ea0-8695-ac9886db8957.html
02.14.2022	Virginia Mercury	https://www.virginiamercury.com/2022/02/14/senator-pushes-to-speed-up-richmond-combined-sewer-fix/
02.15.2022	The Legacy Newspaper	https://www.legacynewspaper.com/senator-pushes-to-speed-up-richmond-combined-sewer-fix/
03.02.2022	Virginia Mercury	https://www.virginiamercury.com/2022/03/02/push-to-accelerate-richmond-combined-sewer-fix-halted-in-house/
03.03.2022	Richmond Times-Dispatch	https://richmond.com/news/state-and-regional/govt-and-politics/as-budget-talks-begin-attempt-to-speed-richmond-deadline-on-sewer-project-flushed/article_ec2846bc-3171-5e71-a31c-41d8a64c3e07.html
03.03.2022	RVAHUB	https://rvahub.com/2022/03/03/push-to-accelerate-richmond-combined-sewer-fix-halted-in-house/
03.14.2022	E&E News	https://www.eenews.net/articles/how-andrew-wheelers-va-nomination-came-undone/
03.18.2022	ALXnow	https://www.alxnow.com/2022/03/18/senator-kaine-and-congressman-beyer-tour-riverrenew-tunnel-project-in-alexandria/
04.05.2022	NBC12	https://www.nbc12.com/2022/04/05/richmonds-push-deal-with-costly-storm-water-runoff-issues/
04.23.2022	The Republican Standard	https://therepublicanstandard.com/featured/youngkin-breaks-new-ground-planting-earth-day-trees/ericburk/2022/04/
05.18.2022	ABC8	https://www.wric.com/community/positively-richmond/tiny-kitten-saved-from-richmond-bridge-storm-drain/
06.10.2022	Axios	https://www.axios.com/local/richmond/2022/06/10/richmond-1-billion-sewer-overflow-problem
07.14.2022	VPM	https://vpm.org/news/articles/34016/local-libraries-lead-the-way-in-creating-green-infrastructure
08.08.2022	UVA Today	https://news.virginia.edu/content/swim-team-captains-summer-work-goes-down-drain
08.10.2022	Richmond Times-Dispatch	https://richmond.com/entertainment/richmond-hops-on-the-little-miss-trend/article_c2c51df3-2b82-5183-8052-2c42afa963b0.html
08.12.2022	ABC8	https://www.wric.com/news/local-news/richmond/how-richmond-tracks-sewage-and-bacteria-levels-in-the-james-river/
09.15.2022	Southern Maryland Chronicle	https://southernmarylandchronicle.com/2022/09/15/water-quality-throughout-the-chesapeake-bay-watershed-shows-mixed-results/
09.30.2022	VPM	https://www.vpm.org/news/2022-09-30/environmentalists-call-for-more-green-infrastructure-ahead-of-hurricane-ian

Table 3-18. Local Press Coverage		
Date	Source	Link
10.03.2022	NBC12	https://www.nbc12.com/2022/10/03/richmond-city-council-takes-legislative-priorities-state-lawmakers-ahead-2023-general-assembly-session/
10.05.2022	Water Environment Federation	https://www.wef.org/resources/pressroom/press-releases2/wef-press-releases/thirteen-communities-recognized-for-excellence-in-stormwater-management/
10.15.2022	Richmond Times-Dispatch	https://richmond.com/news/state-and-regional/advocates-celebrate-50th-anniversary-of-clean-water-act-note-continued-improvements-needed-in-virginia/article_3185b3fd-0400-5146-9c1a-1d0304fc0eb5.html
10.17.2022	The News and Advance	https://newsadvance.com/news/state-and-regional/advocates-celebrate-50th-anniversary-of-clean-water-act-note-continued-improvements-needed-in-virginia/article_33bec150-69ff-5097-8154-7c8ee52412db.html
12.01.2022	CBS6	https://www.wtvr.com/news/local-news/congressman-donald-mceachin-obit-environmental-justice-champion
12.14.2022	The Straight Flush Podcast	https://www.buzzsprout.com/1817695/11853158-ep-21-virginia-s-cso-communities-series-history-of-regulations-in-virginia
12.15.2022	AP News	https://apnews.com/article/politics-business-richmond-virginia-state-government-bb247895307f23bfb5eaa00dd15fa267
12.19.2022	Shore Daily News	https://shoredailynews.com/headlines/youngkin-proposes-more-individual-and-corporate-tax-cuts/
12.28.2022	Richmond Times-Dispatch	https://richmond.com/news/local/richmond-on-track-with-combined-sewer-overflow-cleanup/article_907b7f78-714c-5a5e-ba20-218b7f2c46bc.html

3.8.8 Awards

The City received the following awards in 2022 for their work to improve water quality and their communication efforts:

- "2022 National Municipal Stormwater and Green Infrastructure Phase II MS4 Award from the Water Environment Federation, Innovation, RVAH2O's Stormwater Utility"

3.9 Illicit Discharge Detection and Elimination (MCM 3)

3.9.1 MS4 Map and Information Confirmation Statement

The MS4 map and information table are up to date as of December 31st of the reporting period, and is presented in Appendix B.

3.9.2 Outfall Screening Summary

The total number of outfalls screened during the reporting period as part of the dry weather screening program is summarized in Table 3-19 below. The 2022 reporting period outfall inventory records are provided in Appendix C.

Table 3-19. Outfall Screening Summary		
Creek	No. of Outfalls	IDDE Potential
Dancing Creek	24	24 Unlikely
Rock Falls Creek	40	39 Unlikely 1 Potential

Table 3-19. Outfall Screening Summary		
Creek	No. of Outfalls	IDDE Potential
Broad Rock Creek	17	17 Unlikely
Along Creek	45	45 Unlikely

3.9.3 MS4 Illicit Discharges

The City investigated 29 illicit discharges during the reporting period. A summary of the illicit discharges to the MS4 is included in Appendix D.

3.10 Construction Site Stormwater Runoff Control (MCM 4)

3.10.1 Summary of Inspections

The inspections conducted at construction sites during the reporting period are summarized in Table 3-20 below.

Table 3-20. Summary of Construction Site Stormwater Inspections		
Total Conducted	Enforcement Actions	
	Type	Total
2,119	Notice to Comply	72
	Stop Work Order	5
	Notice of Violation	0

3.11 Post-Construction Stormwater Management for New Development and Development on Prior Developed Lands (MCM 5)

3.11.1 Summary of Inspections of Stormwater Management Facilities

The inspections conducted on privately owned and permittee owned stormwater facilities during the reporting period are summarized in Table 3-21 below.

Table 3-21. Summary of Stormwater Management Facility Inspections		
Stormwater Management Facility	Total Inspections Conducted	Enforcement Actions
Privately-Owned	51	No enforcement actions taken
Public/Permittee-Owned	118	No enforcement actions taken

3.11.2 Summary of Maintenance Activities

The City did not perform any significant maintenance activities on stormwater management facilities throughout the 2022 reporting year. The City performs regular inspections and maintenance

activities on City owned and operated stormwater management facilities that includes grass cutting, trash collection, and debris removal.

3.11.3 Submission Confirmation Statements

The Water Resources Division staff of DPU has submitted stormwater management facility information through the Virginia Construction Stormwater General Permit database, and have reported BMPs through the DEQ Warehouse.

3.12 Pollution Prevention and Good Housekeeping for Facilities Owned and Operated by the Permittee within the MS4 Service Area (MCM 6 and NCM 7)

3.12.1 Summary of New or Modified Operational Procedures

In the 2022 reporting year the following operational procedures have been modified or implemented:

- Expansion of the Illicit Discharge Detection and Elimination Program with the standardization of forms, and increased numbers of inspections and follow-up inspections

3.12.2 Summary of New or Modified SWPPPs

No updates were made to the existing SWPPP's during the 2022 reporting year. Training is performed based on the operations outlined in the SWPPP's.

3.12.3 Summary of New Turf and Landscape Nutrient Management Plans

No new Turf and Landscape Plans have been implemented within the City.

3.12.4 Summary of Training Events

The City has conducted a training program for stormwater awareness for new city employees. The program provides education on spill prevention, vehicle maintenance, bulk material storage, road and parking lot maintenance and facility maintenance. A total of three training sessions were provided throughout the 2022 reporting period to three (3) new employees.

3.12.5 Operation and Maintenance of Septage Receiving Station

In the 2022 reporting year, the City received 1,900 hauled waste discharges for a total of 2.7 million gallons. The Septage Receiving Station is inspected daily and is maintained at regular intervals.

3.12.6 Enforcement of Ordinances that prohibit substances from entering the Collection System

In the 2022 reporting year, the City performed the following activities:

- Collected samples at 192 facilities through the Strong Waste Surcharge Program
    - Issued three (3) Notices of Violations to Significant Industrial Users
- Performed 35 inspections at Significant Industrial Users Facilities

Section 4

Chesapeake Bay TMDL Action Plan Status Report

4.1.1 Implemented BMPs

The BMPs that have been implemented by the City to achieve compliance with Chesapeake Bay TMDL Action Plan are summarized in Table 4-1. The City has not acquired any credits during the 2022 reporting year.

Table 4-1. Summary of Implemented BMPs

BMPs	Completion Date	Pollutant Removal (lbs/year)		
		Total Nitrogen	Total Phosphorus	Total Suspended Solids
Maury Stream Restoration	2016	894.0	176.0	58,720.0
Green Alleys	2016	5.7	1.5	702.0
BMPs	2017	80.2	17.4	5,088.1
Cherokee Lake and Croatan Road	2018	872.4	198.2	16,679.8
Forest Hill	2018	1,354	298.8	25,154.9
Little Westham Creek	2019	3,180.0	1,224.0	422,000.0
Pocosham Creek	2019	4,696.0	1,061.0	354,013.0

4.1.2 Chesapeake Bay TMDL Action Plan Compliance Progress

The City's progress towards meeting the required pollutant load reductions are summarized in Table 4-2.

Table 4-2. City's Chesapeake Bay TMDL Action Plan Compliance Progress						
Goal	Pollutant (lbs/year)					
	Total Nitrogen		Total Phosphorus		Total Suspended Solids	
Removal to Date (End of 2022 Reporting Year)	11,082.2		2,976.8		882,357.8	
2018 Goal	633.7	1,749%	145.5	2,046%	64,646.4	1,365%
2023 Goal	4,852.7	228.4%	1,038.0	286.8%	456,385.5	193.3%
2028 Goal	12,085.0	91.7%	2,568.0	115.9%	1,134,901.2	77.7%

4.1.3 Future Planned BMPs

The BMPs that are scheduled to be constructed in the future are summarized in Table 4-3.

Table 4-3. Summary of Future Planned BMPs				
BMPs	Completion Date	Pollutant Removal (lbs/year)		
		Total Nitrogen	Total Phosphorus	Total Suspended Solids
Pinecamp Stream Restoration	2023	8,091.0	3,778.0	4,620,047.0

Section 5

Local TMDL Action Plan Status

The City has an approved James River Bacteria TMDL Action Plan dated 11/04/2010. The City has continued to implement the CSO program nine minimum control standards and the MS4 six minimum control standards to reduce the pollutants of concern.

In 2020, the Virginia General Assembly passed, and the Governor signed into law, the 2020 CSO Law, that requires the owner or operator of any CSS east of Charlottesville that discharges into the James River watershed to submit to DEQ an Interim and Final Plan to address the requirements of any consent special order issued by the Board.

The 2020 CSO Law identifies the following dates and tasks for the owner or operator:

	Purpose	Due Date	Initiate Construction and Related Activities	Complete Construction and Related Activities
Interim Plan	Identify improvements that can be initiated in the short-term	July 1, 2021	July 1, 2022	July 1, 2027
Final Plan	Re-evaluates the remaining Special Order projects and identifies system-wide improvements	July 1, 2024	July 1, 2025	July 1, 2035
TMDL Report	Identify improvements to meet the requirements of the "James River – Richmond Tributaries Bacteria TMDL"	July 1, 2030	NA	NA

The City completed the development of the Interim Plan in June 2021. The Interim Plan Projects are currently in various stages of design and procurement, as shown in Figure 5-1, and are estimated to reduce the annual combined sewage overflow volume by 182 MG.

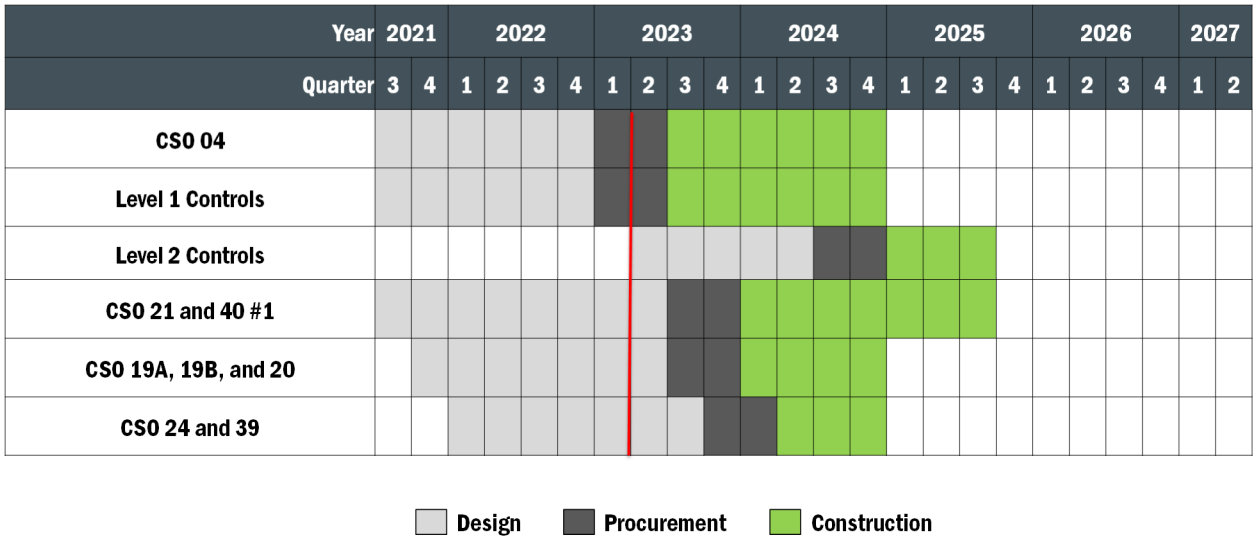

Figure 5-1: Interim Plan Project Status

The development of the Final CSO Plan is still underway, and is on track to be complete by the July 1, 2024 deadline.

Section 6

James River and Tributary Monitoring Report

Virginia Commonwealth University (VCU) conducts water quality monitoring in the James River and its tributaries on behalf of the City. The data collected by VCU is provided in Appendix E.

Appendix A: Richmond CSS Map

Appendix B: Richmond MS4 Map

Appendix C: Outfall Inventory Records

Appendix D: Illicit Discharge Records

Appendix E: James River and Tributary Monitoring Data