



# CSO Program Reassessment Report #2

City of Newport CSO LTCP Implementation  
Project #10-039

Prepared for  
City of Newport, RI  
Department of Utilities

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## Acronyms and Abbreviations

ACS	U.S. Census American Community Survey
ADDF	average dry day flow
ADS	ADS Environmental Services
AWWA	American Water Works Association
BMP	best management practices
BOD	biochemical oxygen demand
CAFR	Comprehensive Annual Financial Report
CAP	Corrective Action Plan
CCTV	closed-circuit television
CD	Consent Decree
CH2M	CH2M HILL, Inc.
CIP	Capital Improvement Plan
City	City of Newport, Rhode Island
COA	Clean Ocean Access
CPH	cost per household
CPI	consumer price index
CSO	combined sewer overflow
CWA	Clean Water Act
DBO	design build operate
DO	dissolved oxygen
DPS	City of Newport Department of Public Services
EPA	United States Environmental Protection Agency
FCA	Financial Capability Analysis
FCI	financial capability indicator
ft <sup>2</sup>	square foot
FTE	full-time employee
FY	fiscal year
GI	green infrastructure
GIS	geographic information system
GPD	gallons per day
I/I	infiltration and inflow
LID	low-impact development
LQPI	lowest quintile poverty indicator
LTCP	Long-Term Control Plan
LWFM	Long Wharf Force Main
LWPS	Long Wharf Pump Station
Kgal	kilogallons
MG	million gallons
mg/L	milligrams per liter

MGD	million gallons per day
MHI	median household income
mL	milliliter
MLLW	mean low low water
MPN	most probable number
NACWA	National Association of Clean Water Agencies
NASC	Narragansett Avenue Storage Conduit
Navy	United States Navy
O&M	operations and maintenance
PE	professional engineer
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RDII	rainfall-derived infiltration and inflow
RI	residential indicator
RIDEM	Rhode Island Department of Environmental Management
RIDOH	Rhode Island Department of Health
RIPDES	Rhode Island Pollutant Discharge Elimination System
ROI	return on investment
S&P	Standard and Poor's
SCADA	supervisory control and data acquisition
SMP	System Master Plan
SRF	State Revolving Fund
SSES	sewer system evaluation survey
SSO	sanitary sewer overflow
TBD	to be determined
TKN	total Kjeldahl nitrogen
TM	technical memorandum
TMDL	total maximum daily load
TSS	total suspended solids
U.S.	United States
UV	ultraviolet
WEF	Water Environment Federation
WPC	water pollution control
WPCP	water pollution control plant
WWT	wastewater treatment
WWTP	wastewater treatment plan

## 1. Introduction

As specified in the Modified Consent Decree (CD) paragraph 67, the City of Newport Rhode Island (City) shall complete the implementation of the System Master Plan (SMP) by June 30, 2033. The SMP recommended this 20-year period to be completed in four phases, with a total of three periodic program reassessments.

The City submitted the Combined Sewer Overflow (CSO) Program Reassessment Report # 1 to EPA and RIDEM on March 19, 2020 (CH2M, 2020). The City is now ten years through the 20-year implementation schedule, and in accordance with item # 67.a.iii of the Modified CD, the City has completed the CSO Program Reassessment Report #2.

The purpose of this assessment is to evaluate the effectiveness of projects completed to-date, summarize the City's progress towards meeting its regulatory requirements, and reevaluate the City's financial capability. The assessments will also evaluate previously established targets and provide recommendations if these targets are not being met.

To address the objectives of the item # 67.a., this CSO Program Reassessment Report contains five sections as summarized below.

**Section 2 - CSO Program Background:** The purpose of this section is to provide an overview of the wastewater collection system, the aboveground and underground assets and areas served. This section also documents the history of the City's efforts to reduce the frequency and volume of CSO events since the 1970s. In addition, Section 2 provides an outline of the SMP and the work completed by the City towards meeting the recommendation made within.

**Section 3 – Green Infrastructure and BMP Implementation:** The purpose of this section is to document compliance with item 67.a.i of the Modified CD. This section provides a synopsis of the City's efforts to reduce wet weather flow to the combined sewer through implementation of green infrastructure (GI) and other best management practices (BMP). It includes details on the types of projects that have evaluated or implemented GI, the types of GI practices implemented and other non-structural BMPs.

**Section 4 - Inflow Removal Program Reassessment:** The purpose of this section is to document compliance with items 67.a.iii and 67.a.vi of the Modified CD. This section provides a reassessment of the City's inflow removal efforts and progress toward meeting established goals of the CD as part of the City's CSO Long-Term Control Plan (LTCP). Specifically, the section evaluates progress towards achieving inflow removal estimates, CSO discharge volume reductions and CSO activation frequency for specific design precipitation events and typical annual precipitation amounts. Section 4 also evaluates progress towards achieving water quality benefits associated with the implementation of the SMP.

**Section 5 - Updated Financial Capability and Affordability Analysis:** This section is an update to the financial capability and affordability analysis described in the SMP. The intent of the update is to determine the financial and affordability impacts of recent capital improvement projects and other changes in financial conditions on the City and rate payers that effect its implementation of the projects described in the SMP.

**Section 6 - Summary of Reassessment Findings and Recommendations:** This section provides a summary of the reassessment findings, gaps, and recommendations for the City toward meeting established goals of the CD as part of the CSO LTCP. The summary includes recommendations the City shall take to meet the projections in the SMP and Quantification of Early SMP Improvements memorandum.

## **2. CSO Program Background**

### **2.1 System Overview**

The City's wastewater collection system consists of approximately 97 miles of gravity sewers and force mains delivering wastewater to the City's Water Pollution Control Plant (WPCP). The City also receives wastewater flow through two force mains from the Town of Middletown and through three force mains from Naval Station Newport. An additional nine miles of privately owned and operated force mains are connected to the City's collection system, primarily located throughout the Newport Neck area. The system's aboveground assets include the WPCP, 15 pump stations, and two CSO treatment facilities. There is also one belowground combined sewage storage conduit, the Narragansett Avenue Storage Conduit (NASC).

The City's collection system consists of gravity sewers and force mains ranging in diameter from 2-inches to 84-inches. The system currently exhibits characteristics of both separated and combined sewers. A combined sewer system collects flows of both sanitary sewage and stormwater during wet weather events. During dry weather, all wastewater passes through the WPCP and receives secondary treatment and disinfection prior to being discharged into the Newport Harbor. During wet weather events, flows can exceed system capacity and trigger a CSO event. A CSO is the diversion of flow through one of the CSO outfalls into the harbor.

The City has two permitted CSO outfalls. The two CSO treatment facilities owned and operated by the City are the Washington Street CSO Treatment Facility and the Wellington Avenue CSO Treatment Facility. The purpose of these facilities is to provide partial treatment and disinfection prior to discharge into the harbor.

A map of the City's sanitary sewer collection system is provided on Figure 2-1.



Figure 2-1. City of Newport Sanitary Sewer System Overview

## 2.2 Program History

The City has been working towards reducing the frequency and volume of CSO events since the 1970's. Prior to the 1970's, much of the City's sanitary sewer system was designed and operated as a combined system. In the past 55 years, the City has constructed several projects to reduce the number of CSO events including stormwater connection separations, infiltration and inflow (I/I) removal efforts, rehabilitation of existing infrastructure, and several system improvement and capacity increase projects. The most recent project includes upgrades at the Long Wharf Pump Station (LWPS), which will increase the peak capacity to 27 million gallons per day (MGD). This project is currently under construction and estimated to be completed in November 2025.

The City has been coordinating with Rhode Island Department of Environmental Management (RIDEM) to develop a plan to control the City's CSOs since 1997, entering into a consent agreement (RIA-292) in November 1999. The City and RIDEM planned an initial approach for the CSO Control Program, and in 2004, brought in engineering services to assist with development of the LTCP.

Early phases of the program (2004-2009) primarily consisted of data collection and field investigations such as flow metering, inspections, house-to-house surveys, closed-circuit television (CCTV), smoke testing, and dye testing. These data were collected as part of a sewer system evaluation survey. The Wellington Avenue CSO Treatment Facility was initially addressed as it was prioritized due to the Environmental Protection Agency (EPA) designation of King Park Beach as a Flagship Beach. The results of the initial work are described in the Phase 1, Part 2 CSO Control Plan, Wellington Avenue CSO Facility report (AECOM, 2007).

The initial data collected were used to develop a calibrated hydraulic model of the City's collection system and to identify long-term sewer system improvements to comply with RIDEM and EPA CSO policies. The results of this effort are documented in the Phase 2 CSO Control Plan Wellington Avenue CSO Facility Report (AECOM, 2009).

In March 2009, EPA notified the City of its intent to intervene in the consent agreement negotiations between the City and RIDEM. Following this, the City negotiated a CSO Corrective Action Plan (CAP) with EPA and RIDEM. The CAP led to a CD agreement between EPA, RIDEM, Environment Rhode Island, and the City (Civil Action No. 08 - 265S), effective as of October 18, 2011. The CD outlines the required deliverables and schedule of activities for the City to meet its regulatory requirements. A modification to this CD was signed by all parties in December 2015.

In 2010, the City began implementing activities from the draft CAP. This included performing extraneous flow investigations in the Wellington Avenue and Washington Street sewersheds. The purpose of the investigations was to identify sources of rainfall-derived infiltration and inflow (RDII). The results of these extraneous flow investigations are documented in the Washington Street Outfall Extraneous Flow Investigations Report (CH2M, 2011a) and the Wellington Avenue Outfall Additional Extraneous Flow Investigations Report (CH2M, 2011b), submitted by the City in July 2011 and September 2011, respectively. These reports provide summaries of identified public and private sources of RDII as well as recommendations and schedules for corrective actions.

### 2.2.1 System Master Plan

In November 2012, the City submitted a Collection System Capacity Assessment and System Master Plan (CH2M, 2012) to EPA and RIDEM for review and approval. The System Master Plan (SMP) was developed by analyzing data collected up to that point, while also considering key input from stakeholders.

The City facilitated 12 CSO Stakeholder Workgroup meetings during development of the SMP. The stakeholder workgroup consisted of more than 30 members from affiliations including City Council, EPA, RIDEM, Newport County Chamber of Commerce, Roger Williams University, residents, wholesale customers, and several other commissions and committees. Initial meetings provided an overview of the City's collection system and the history and goals of the CSO program. The initial meetings also served to develop an understanding of affordability requirements and the alternatives evaluation process. Later meetings identified stakeholder priorities, discussed control options, and ultimately led to the selection of the preferred SMP control alternative.

The final SMP provided a system-wide approach to reduce future CSO events with projected costs, schedules, affordability analysis, and long-term targets. CSO control projects considered in the SMP included, but were not limited to:

- Treatment plant improvements and capacity upgrades
- New and/or upgraded conveyance facilities
- Improvements to CSO treatment facilities
- In-line and/or offline storage
- Inflow reduction from public and private sources and green technologies

Various control alternatives were evaluated in the SMP. The preferred alternative, Scenario C1A, was chosen because it maximized the use of existing facilities while minimizing operation and maintenance (O&M) costs and best achieving the priorities of stakeholders. The phased-implementation approach also allowed for an affordable and achievable result in a reasonable timeframe.

### **2.2.2 Wellington Avenue and Washington Street Sewer System Evaluation Survey**

In 2014, the City prepared the Wellington Avenue and Washington Street Sewer System Evaluation Survey Report (CH2M, 2014). This report presented findings and recommendations based on the ongoing extraneous flow investigations performed as part of the CSO LTCP. The report identified additional sources of RDII discovered since the submission of the extraneous flow investigation reports in 2011, as well as a comprehensive plan and prioritized approach for remediating the extraneous sources of inflow.

## **2.3 System Master Plan Implementation Activities**

During the first phase of the program, the City made substantial progress toward reducing the volume and frequency of CSO events through completion of the recommended improvement projects. A description of the program activities completed to-date is provided in the following sections.

### **2.3.1 Inflow Reduction Efforts**

A main component of the SMP is to achieve a 50 percent reduction in rainfall-derived inflow to the combined/sanitary sewer system. The majority of the inflow removal is achieved through the disconnection of catch basins, downspouts, and other private area drains. Inflow sources are those that are tied directly to the system and provide rapid flow in response to rain events. Infiltration sources are caused by defects or cracks in pipes and other assets, allowing stormwater and groundwater to enter the system as it moves through the soil. Infiltration sources provide slower, elongated flows in response to rain events. These sources can often be discovered through inspections of system infrastructure.

### 2.3.1.1 Field Investigations

To identify sources of stormwater entering the sanitary sewer system, the City conducted several field investigations including, but not limited to:

- Building inspections (including dye tests)
- Smoke testing
- Manhole and catch basin inspections
- Visual pipe inspections
- CCTV inspections

#### Building Inspection Program

The goal of the building inspection program is to identify locations of I/I on private properties through sources such as sump pumps, floor drains, roof drains, driveway drains, or broken service laterals. The investigations include techniques such as door-to-door surveys, dye-testing, and smoke testing to determine if there is a defect.

If a source of I/I is discovered, the property owner is contacted by the City to correct the defect by redirecting the flow to either the ground or stormwater drainage system. Figure 2-2 shows the present status of building inspections near Touro Park.

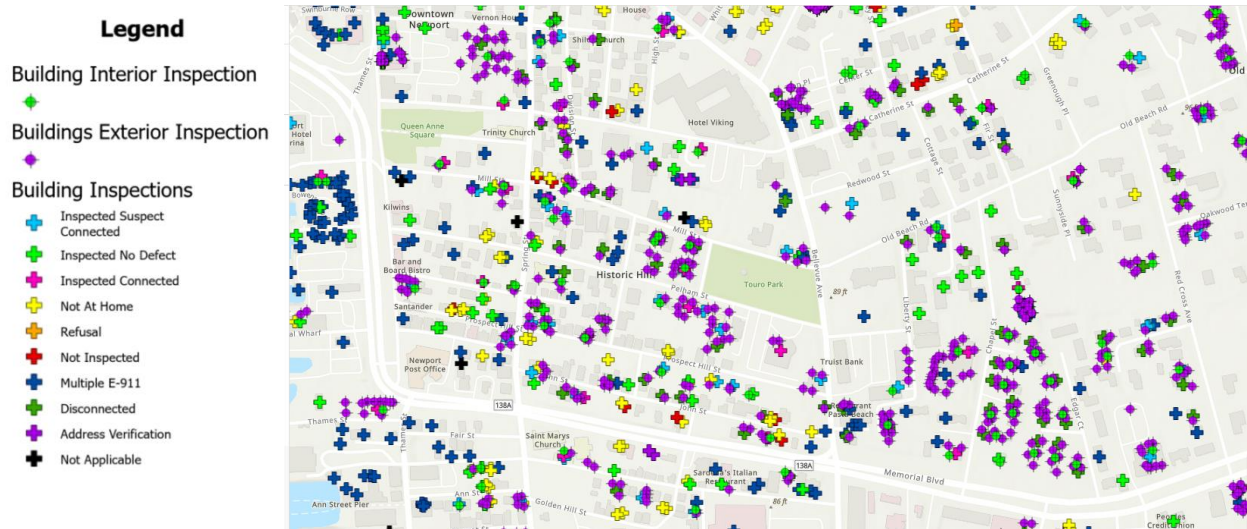


Figure 2-2. City of Newport Building Inspection Program Webmap

#### Removal of Downspouts

The beginning of the inspection program primarily focused on downspout disconnections. Upon discovery of a downspout connection to the sanitary sewer system, the property owner has 45 days to disconnect. Once disconnected, the property owner schedules an inspection with the City. The inspection is conducted to verify the downspout has been properly disconnected.

### 2.3.1.2 Catch Basin Disconnections

Since 2008, the City has completed several capital projects that disconnected 83 City-owned catch basins from the sanitary sewer collection system. The disconnection of these catch basins is estimated to have removed approximately 240,000 gallons of stormwater per inch of rain from entering the sanitary sewer system.

### 2.3.1.3 Green Infrastructure

Green infrastructure (GI) can also effectively reduce I/I, as this technology provides the benefits of naturally attenuating and treating stormwater before releasing it back into the ground or stormwater drainage system. The City has implemented several GI projects since the start of the CSO program. These projects are discussed in detail in Section 3 of this report.

### 2.3.1.4 Improvements to Storm Drains

The City has also conducted projects involving stormwater drainage system improvements. The improved storm drains more effectively capture stormwater during wet weather and redirect the flow away from the combined/sanitary sewer collection system.

## 2.3.2 Baseline Projects

### 2.3.2.1 Interceptor Rehabilitation

The City has completed rehabilitation projects on two of its primary interceptors; one on Wellington Avenue and the other on Thames Street. Both interceptors are critical links conveying sewer flows to central collection and pumping locations.

- **Wellington Avenue Interceptor:** The Phase 2 CSO Control Plan Wellington Avenue CSO Facility report (AECOM, 2009) identified the Wellington Avenue interceptor as in need of improvement. In 2011, the City completed a rehabilitation project which included replacement of over 2,800 linear feet of sewer interceptor on Wellington Avenue between Halidon Avenue and Marchant Street.
- **Thames Street Interceptor:** The rehabilitation project at Thames Street included the rehabilitation of aged infrastructure and removal of obstructing utilities. The repairs included installing a structural pipe liner, minor leak repairs, joint sealing, and root removal. The project provided increased conveyance capacity of wet weather flows from the Wellington Avenue CSO sewershed to the LWPS and Washington Street CSO Treatment Facility.

### 2.3.2.2 Baseline Pump Station Improvements

- **Beach Pump Station:** In 2011, the Beach Pump Station and surrounding gravity sewers were found to be in poor condition and identified as a major source of groundwater infiltration. The improvement project involved the construction of a new pump station, rehabilitation of the gravity sewer line, and the installation of a new force main.
- **Ruggles Pump Station:** The City also completed improvements at the Ruggles Pump Station in 2017 in accordance with the SMP. This involved the installation of a new force main; improvements to the pump station mechanical, electrical, and controls system; and rehabilitation of the wet well and valve pit.

### **2.3.2.3 Sanitary Sewer Improvements**

As part of the CSO LTCP, the City identified over three miles of sanitary sewer mains requiring rehabilitation. Specific areas were prioritized for repair based on conditions discovered during CCTV inspections. Over the past 15 years, the City has rehabilitated portions of its sanitary collection system. This includes the replacement of over 16,900 feet of sanitary sewer and the replacement of associated manholes and service laterals. The rehabilitation efforts have also included the lining of several force mains and gravity pipes throughout the City.

The City continues to develop a systematic approach for prioritizing improvements to its aging sanitary sewer collection system. As the CSO program continues, the City intends to proceed with rehabilitation activities and further establish its asset management program.

### **2.3.3 Conveyance Improvement Projects**

#### **2.3.3.1 Wellington Pump Station and Long Wharf Pump Station Weir Improvements**

This project involved the permanent abandonment of Overflow Structure No. 1 and increasing the height of six existing weirs. The six weirs chosen for this project were identified to have the most significant hydraulic impact by regulating flow in the sanitary sewer collection system. The weir adjustments also provided a cost-effective method for reducing CSO discharges. The location of each of the six adjusted weirs is as follows:

1. Long Wharf at America's Cup Avenue
2. Washington Square at Duke Street
3. Touro Street at Thames Street
4. Thames Street just south of Touro Street
5. Wellington Avenue at Thames Street
6. America's Cup Avenue just south of Long Wharf

#### **2.3.3.2 Optimization of Long Wharf Pump Station Wet Weather Controls**

Prior to completion of the WPCP improvement project, discharges from LWPS were throttled to maintain peak wet weather flows within its 19.7 MGD permit limits. After the WPCP improvement project was completed, the wet weather pump controls of LWPS were modified to maximize flows routed to the WPCP and to utilize the plant's increased capacity. All three of the pumps at the LWPS are now used during wet weather events. Evaluations performed for the SMP indicated that running the third pump during wet weather would increase peak flows to 24 MGD.

The control algorithms for Narragansett relief sewer storage conduit were also modified to better manage system capacity and wet weather operations. The control gate at the storage conduit is automatically closed via supervisory control and data acquisition (SCADA) when the LWPS wet well reaches a set point of 9 feet. By closing the gate, the conduit can hold up to 500,000 gallons of flow upstream of LWPS. The stored volume is slowly released when downstream capacity becomes available based on the LWPS wet well returning to lower levels.

Subsequent to the implementation of these modified operating procedures, observed flows at the LWPS with three pumps running have been in the range of 19 to 20 MGD. The gap between the peak flows expected in the SMP and recent observations affect the system's ability to fully utilize the plant's increased wet weather capacity. Hydraulic investigations performed by the City in 2020 determined that the reduction in flows was partially attributed to grit and grease accumulation in the force main. The City subsequently completed cleaning of the Long Wharf force main (LWFM) in 2023. The City is also currently implementing improvements at the LWPS to increase pumping capacity and improve conveyance, which is discussed further in Section 2.3.3.4.

### **2.3.3.3 Wellington Pump Station Capacity and Force Main Upgrade**

A component of this project involved increasing the sanitary pumping capacity of the Wellington Avenue Pump Station to 5.5 MGD by replacing the three existing dry pit pumps with four dry pit submersible pumps (one on standby). The project also involved increasing the size of the force main to 10 inches from the facility to the Thames Street interceptor. This capacity increase was fundamental in reducing the number of CSO events at the Wellington Avenue CSO Treatment Facility. Construction of the upgrades was completed in early 2017. Since December 2015, the Wellington Avenue CSO Treatment Facility has only experienced one CSO event which occurred on September 2, 2021.

### **2.3.3.4 Long Wharf Pump Station Improvements (Previously Catchment 10 Reroute Project)**

Originally the SMP included a Catchment 10 Reroute Project (also referred to as the North End Reroute Project), which included construction of a new pump station to convey flow from the North End of the City (Catchment 10) to the WPCP. The intent of the project defined in the SMP was to redirect flow (from Catchment 10) to a new 3.5 MGD pump station which would pump directly into the LWFM and the WPCP. The project would reduce the amount of flow passing through the LWPS and Washington Street CSO Facility.

During conceptual design for this project, preliminary modeling determined it would not provide the CSO reductions projected by the SMP C1A alternative. Significant challenges with siting and construction were also identified during conceptual design, including conflicts with the planned bridge ramp relocation for The Rhode Island Department of Transportation (RIDOT) Pell Bridge Improvements Project. As a result, the City worked with EPA and RIDEM to modify the CD to allow time to identify an alternative project that would achieve the CSO reduction goals projected by the SMP.

An alternative recommended plan was submitted to EPA and RIDEM in a Technical Memorandum in February 2021. The alternative plan included improvements to increase pumping capacity at the LWPS and improve flow conveyance through the LWFM. This was to be achieved through cleaning the LWFM, design and construction of improvements to the LWFM, and design and construction of improvements to the LWPS.

Cleaning of the LWFM was completed in 2023. This included cleaning of the full 30-36-inch polyvinyl chloride (PVC) pipeline, approximately 10,000 feet, through conventional pipe pigging. Following completion of cleaning activities pressure testing and flow metering showed significantly improved hydraulic conditions, with an estimated 30% increase in the roughness coefficient (C-Factor) of the force main.

The last step of the alternative plan included design and construction of improvements to the LWPS. The Long Wharf Pump Station Improvements Project is currently under construction and includes replacement of the LWFM 24-inch venturi flow meter with a 24-inch magnetic flow meter, replacement of the existing

wastewater pumps, replacement of the electrical system, as well as enhancements to the HVAC system, replacement of the odor control system, and increased flood resiliency of the facility. Construction of the LWPS Improvements Project is anticipated to be completed in November 2025 and is expected to increase the peak capacity of the pump station from 20 to 27 MGD.

## 2.3.4 Treatment Projects

### 2.3.4.1 CSO Treatment Facility Improvements

- **Wellington Avenue CSO Treatment Facility:** Improvements to the Wellington CSO Treatment Facility were completed in 2017. In an effort to eliminate CSO discharges at the facility, this project involved increasing the capacity of the Wellington Pump Station and force main, as discussed previously. Treatment improvements included the addition of a chlorination system to provide disinfection. The project also included several asset management related improvements for flood protection measures; instrumentation and controls; heating, ventilation, and air conditioning (HVAC); electrical; and lighting systems.
- **Washington Street CSO Treatment Facility:** All CSO discharges from the Washington Street Treatment Facility were previously treated with chlorination. In 2016, the City completed treatment improvements to the facility which included the addition of a dechlorination system. The dechlorination system serves to remove residual chlorine from the disinfected wastewater prior to discharge into the harbor.

### 2.3.4.2 WPCP Wet Weather Capacity Upgrade

A major component of the SMP is to increase the wet weather capacity at the WPCP to reduce CSO discharges. On June 28, 2019, the City completed construction of the WPCP Wet Weather Capacity Upgrade project. The project involved increasing the effective wet weather treatment capacity of the plant from 19.7 to 30 MGD. To accommodate the additional flow, the project included upgrades to the headworks, primary clarifiers, secondary clarifiers, disinfection, and solids handling.

A list of upgrades to the major process components is as follows:

- New headworks, including new fine screens and vortex grit removal
- Chemically - enhanced primary treatment (CEPT)
- Increased aeration tank volume
- Two - train contact stabilization
- New high - efficiency turbo blower to improve energy efficiency
- Deeper secondary clarifiers to provide more reliable sludge blanket control
- New ultraviolet (UV) disinfection system
- Improved solids management to minimize odors and reduce disposal costs
- Biofilters for more reliable odor control

## 2.3.5 Summary of Recent Projects

In the past 15 years, the City has completed over 40 capital improvement projects related to the LTCP in an effort to reduce the frequency and volume of CSO events. A summary of projects completed or in progress that align with the CSO Program is provided in Table 2-1.

## CSO Program Reassessment Report #2

All capital improvement projects recommended in the SMP have been completed except for the Long Wharf Pump Station Improvements Project (previously referred to as the North End Reroute), which is currently in construction and estimated to be completed in November 2025.

**Table 2-1. Newport CSO Program List of Projects Completed or In Progress**

<b>Project Type</b>	<b>Contract</b>	<b>Description</b>	<b>Status</b>	<b>Date Completed</b>
Catch Basin Disconnections	2008-001	Catch Basin Separation Improvements	Complete	2008
	2010-027	Catch Basin Separation - Area 6 (Webster, West, Spring, Pelham, Thames, Tuoro, Friendship, Willow, Bellevue and Morton Park)	Complete	2010
	2011-015	New Catch Basins and Sewer Lines on Sherman St	Complete	2011
	2014-045	Catch Basin Separation and Drainage Improvements	Complete	2015
	2015-011	Replacement and Installation of Catch Basins in the City	Complete	2015
	2016-114	Meeting Street/River Lane Catch Basin Improvements	Complete	2016
	2016-117	Catch Basin Improvements	Complete	2016
	2017-041	Catch Basin Separations in the City	Complete	2017
Improvements to Storm Drains	2011-015	Water, Sewer & Drainage Improvements - Sherman St *(Note: contract is also listed above in Catch Basin Disconnections Projects)	Complete	2011
	2018-006	Marsh Street Storm Drain Improvements	Complete	2018
	2019-005	Storer Park Tide Gate – Bridge Street Site Plan	Complete	2019
Baseline Projects	2011-001	Wellington Avenue Sanitary Sewer Interceptor Rehabilitation	Complete	2011
	2011-011	Thames St. Sanitary Sewer Interceptor Rehabilitation	Complete	2011
	2012-054; 2014-006	Beach Pump Station and Force Main Improvements	Complete	2014
	2017-016	Ruggles Pump Station Improvements	Complete	2017
Conveyance Improvement Projects	2014-017	Wellington Pump Station and Long Wharf Pump Station Weir Improvements	Complete	2014
	N/A	Optimization of Long Wharf Pump Station Wet Weather Controls	Complete	2018
	2016-002	Wellington Pump Station Capacity and Force Main Upgrade	Complete	2017
	2022-035	Long Wharf Pump Station Improvements	Ongoing	Est. 2025
Treatment Projects	2016-002	Wellington CSO Treatment Disinfection *(Note: contract is also listed above in Conveyance Improvement Projects)	Complete	2017
	2016-003	Washington CSO Treatment Dechlorination	Complete	2016
	2015-023	WPCP Wet Weather Capacity Increase	Complete	2019
Green Infrastructure	N/A	Almy Pond Management Plan Green Infrastructure Projects	Complete	2017
	2018-021	Hillside Ave Green Infrastructure	Complete	2018
Other Sanitary Sewer Improvements	2009-011	Wellington Service Area Manhole Rehabilitation Project	Complete	2009
	N/A	Long Wharf Force Main Repair	Complete	2010
	2010-007	Railroad Interceptor Sewer Improvement Project	Complete	2010
	2010-013	Phase 2 CSO Control Plan - High Priority Sewer Pipe Replacement	Complete	2011
	2012-035	Sanitary Sewer Improvements - Carroll Ave, Old Fort Rd, Ruggles Ave	Complete	2014

Project Type	Contract	Description	Status	Date Completed
	2012-043	Sanitary Sewer System Manhole Rehabilitation Project	Complete	2012
	2013-043	Sanitary Sewer Improvements - Ayrault St, Broadway Water & Sewer Improvements	Complete	2014
	2015-994	Sanitary Sewer Improvements - Warner Place	Complete	2015
	2016-001	Goat Island Force Main Rehabilitation	Complete	2016
	2016-006	Sanitary Sewer Improvements - Friendship Street	Complete	2016
	2017-019	Sanitary Sewer Improvements - Bedlow Ave, Curry Ave, and Smith Ave	Complete	2018
	2018-0611	Gooseberry Beach FM	Complete	2018
	2019-01.24	Washington St CSO Force Main Repair	Complete	2019
	2019-0401	Carroll Ave Sewer Relocation	Complete	2019
	2020-001	Poplar/Farewell Sewer Main Improvement	Complete	2020
	2021-044	Long Wharf Force Main Cleaning	Complete	2023
	2022-026	Engineering Services for the Wastewater Rehabilitation Pilot Program	Complete	2023
	2022-039	Water Distribution System Improvements Project <sup>1</sup>	Complete	2023
	N/A	Emergency Replacement Halsey Street 8" Sewer – Waste Management Connection	Complete	2023
	N/A	Emergency Replacement of 8" Sewer Main in Ledyard Street	Complete	2023
	2024-015	Sewer Rehabilitation Within Various Sub-Basins	Ongoing	N/A

<sup>1</sup>Includes associated sanitary and storm drainage improvements on Spring Street from Narragansett Avenue to Perry Street

## 2.4 SMP Implementation Schedule

The City has completed 102 CD requirements on schedule to-date, including:

- 15 technical evaluations/reports
- 11 equipment purchases/upgrades
- 9 annual compliance reports
- 13 annual CMOM reports
- 16 quarterly compliance reports
- 9 geographic information system (citywide GIS) map submissions
- 11 completed construction projects
- 18 miscellaneous requirements

The LTCP CSO control plan is currently on track with the implementation schedule provided in the SMP, with the exception of the LWPS Improvements Project (previously Catchment 10 Reroute) which was approved for a schedule extension. The updated schedule is provided in Figure 2-3.

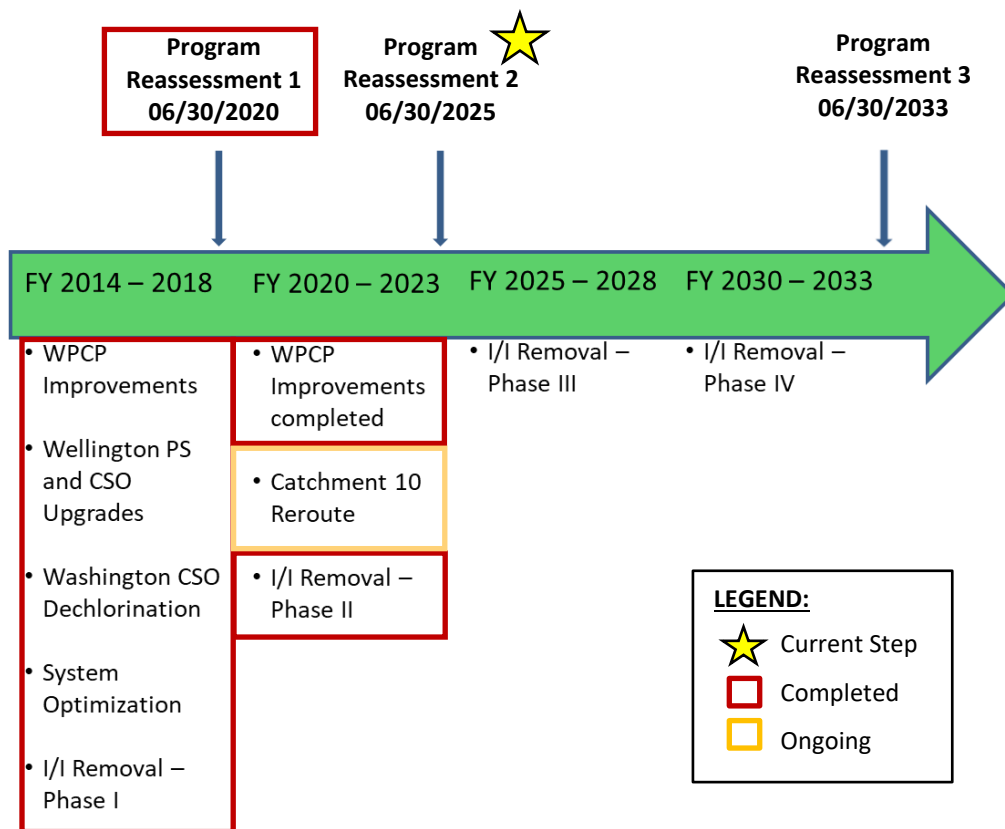


Figure 2-3. Progress Toward System Master Plan Implementation Schedule

The schedule includes a total of three periodic program reassessments. The purpose of these reassessments is to evaluate the effectiveness of projects completed to-date, summarize the City’s progress towards meeting its regulatory requirements, and reevaluate the City’s financial capability. The reassessments will also evaluate previously established targets and provide recommendations if these targets are not being met.

The City is now 11 years through this 20-year implementation schedule and has completed the first and second reassessment periods. This report summarizes the results of the second program reassessment, evaluating progress through 2024.

### 3. Green Infrastructure and BMP Implementation

This section provides a historical synopsis of the City's efforts to reduce wet weather flow to the combined sewer through implementation of GI and other best management practices (BMPs) and includes details related to the types of projects that have evaluated or implemented GI, the types of GI practices that have been implemented in the City, and other non-structural BMPs the City has implemented. Progress towards pollutant loads and receiving water quality are addressed in Section 4.5.

#### 3.1 Consent Decree Requirements

Paragraph 67 of the modified CD provides requirements related to this report. Item 67.a.i of the modified CD provides specific requirements related to the evaluation of GI and other BMPs; this language is as follows (emphasis added):

- *The City shall evaluate implementation of green infrastructure and other BMPs, consistent with the General Stormwater Permit, to address pollutant loads and flow-related impacts from stormwater during its design and implementation **of stormwater separation projects that result in new stormwater outfall(s) and/or new stormwater inlet structure(s)** and include such evaluations in its CSO Program reassessments. Such evaluations will identify the feasibility and cost effectiveness of alternatives to reduce the impact of stormwater from new stormwater outfalls or inlet structures on receiving waters, including measures to reduce stormwater flow and stormwater contamination.*

#### 3.2 Consent Decree Compliance

Item 67a.i of the modified CD specifically requires evaluation of implementing GI and other BMPs for "stormwater separation projects that result in new stormwater outfall(s) and/or new stormwater inlet structure(s)."

During the 1970s, the City focused their efforts on separating the stormwater drainage system from the sanitary sewer collection system. This work consisted primarily of disconnecting stormwater inlet structures (or catch basins) from the existing sanitary sewer system and tying these structures into a new stormwater drainage system. Since the sewer separation and disconnection efforts occurred in the 1970s, the City is not subject to the CD's requirements for evaluation of GI and other BMPs.

Since 2011, the City of Newport has invested heavily in eliminating CSOs by upgrading and optimizing pump station operations, increasing weir heights at critical infrastructure locations, repairing and improving the sanitary sewer and stormwater drainage systems, disconnecting catch basins from the sanitary sewer and reconnecting them to the stormwater drainage system, identifying and conducting residential downspout disconnections, and increasing the capacity of the WPCP. Because of the City's efforts to eliminate CSOs before the effective date of the CD, of the 432 catch basins inspected in 2011, only 63 were found to be connected to the sanitary sewer (of the 63 total catch basins, 57 catch basins were identified as City-owned). Presently only 12 City-owned catch basins and 3 privately-owned catch basins remain connected to the sanitary sewer system. The City has continued to evaluate opportunities, methods, and cost-benefit for removing the remaining catch basins. A project including disconnection of 4 of the 12 remaining City-owned catch basins is currently in final design.

As part of the City's ongoing effort to improve the water quality of its receiving water bodies, the City continues to evaluate and implement GI and other non-structural BMPs to address pollutant loads and flow-related impacts from stormwater discharges as part of City studies and projects.

The following sections provide a synopsis of projects and/or studies completed since the effective date of the CD (October 18, 2011) that have evaluated and/or implemented GI. These projects include an evaluation of the feasibility and cost effectiveness of GI as part of the study or design.

### 3.3 Green Infrastructure Implementation in Newport

A summary of the projects completed by the City's Department of Public Services (DPS) since the effective date of the CD is provided in Table 3-1. The sections that follow provide a summary of each of the projects with specifics on the GI evaluated or installed as part of the project.

**Table 3-1. Green Infrastructure Project Summary**

Project Name	Project Type	Project End Date	GI Evaluated	GI Installed	Non-structural BMPs Implemented	GI Practices
Hillside Avenue Green Infrastructure Project	Implementation	2018	Yes	Yes	No	Bioretention; permeable pavement; tree box filter
Drainage Investigation and Flooding Analysis Wellington Avenue and Bridge Street	Study	2017	Yes	No	Yes	N/A
Almy Pond Management Plan Green Infrastructure Projects	Implementation	2017	Yes	Yes	Yes	Hydrodynamic separator; media filtration units; tree box filters; filter strips; deep sump catch basins
Whitwell Avenue Drainage Investigation and Flooding Analysis	Study	2017	Yes	No	Yes	N/A
Cliff Walk Restroom Project	Implementation	2014	Yes	Yes	No	Sand filter
Broadway Streetscapes Project	Implementation	2016	Yes	Yes	No	Pervious pavers; bio-infiltration swales
Bellevue and Ledge Catch Basin Separation	Implementation	Ongoing- In Final Design	Yes	Yes <sup>1</sup>	No	Bioretention; infiltration facilities
Prescott Hall Drainage Study	Study	Ongoing- In Prelim. Design	Yes	TBD	TBD	TBD

<sup>1</sup>Project not yet complete; but GI is included in final design

N/A = not applicable

TBD = To Be Determined

### **3.3.1 Hillside Avenue Green Infrastructure Project**

In 2015, as part of the federal Clean Water Act Section 319 Funds Grant Award program, the City received a grant of \$279,863 for a GI pilot project to design and construct stormwater BMPs in the City-owned roadway and right-of-way along Hillside Avenue. The Hillside Green Infrastructure Project was installed in an 18-acre watershed. The GI installations provide direct water quality treatment to approximately 1 acre of mostly impervious area. Estimated nitrogen, phosphorous, and sediment removal efficiencies for the project are as follows:

- Nitrogen Reduction: 18.7 pounds per year
- Phosphorous Reduction: 2.8 pounds per year
- Sediment Reduction: 0.5 ton per year

The project was completed in the summer of 2018. A public-education sign (plaque) was installed on Hillside Avenue as part of this project, with graphics and descriptions of the water quality benefits provided by the GI practices implemented with this project.

#### **3.3.1.1 Feasibility Evaluation**

In response to flooding from three rainfall events during the summer of 2010, a study of the storm drain system was led by the City which resulted in the Drainage Investigation and Flooding Analysis for Malbone Road (Revised June 18, 2013). The analysis assessed the storm drain system in the flooded area and its contributing watershed and developed several mitigation alternatives to alleviate the flooding, including increasing storm drain pipe sizes and installation of detention ponds at Miantonomi Memorial Park.

The City decided to instead evaluate GI options to alleviate flooding, which resulted in the Hillside Avenue Green Infrastructure project.

#### **3.3.1.2 Green Infrastructure Implemented**

The project included installation of bioretention gardens in the sidewalk esplanade; installation of permeable block pavers in the parking stalls adjacent to Miantonomi Memorial Park; and installation of a tree box filter and underdrains. The project also included improvements to sections of storm drain, manholes, and catch basins in the southbound lane of Hillside Avenue. The proposed design is summarized below and shown in Figure 3-1.

- Area of bioretention basins: 339 square feet (Figure 3-2)
- Area of permeable block paver parking stalls: 7,890 square feet
- 1 tree box filter

#### **3.3.1.3 Green Infrastructure Costs**

Bids for the Hillside Avenue Green Infrastructure Project were opened on Wednesday, November 15, 2018. Bids were received from four contractors. Bid amounts ranged from \$497,085 to \$729,599. The project was awarded to the low bidder, D'Allessandro Corporation, in the amount of \$453,085 (bid amount less \$44,000 for police details to be paid directly by the City's Department of Utilities). D'Allessandro mobilized for construction on April 4, 2018 and the project was certified by the Engineer of Record as completed on 10/19/2018.

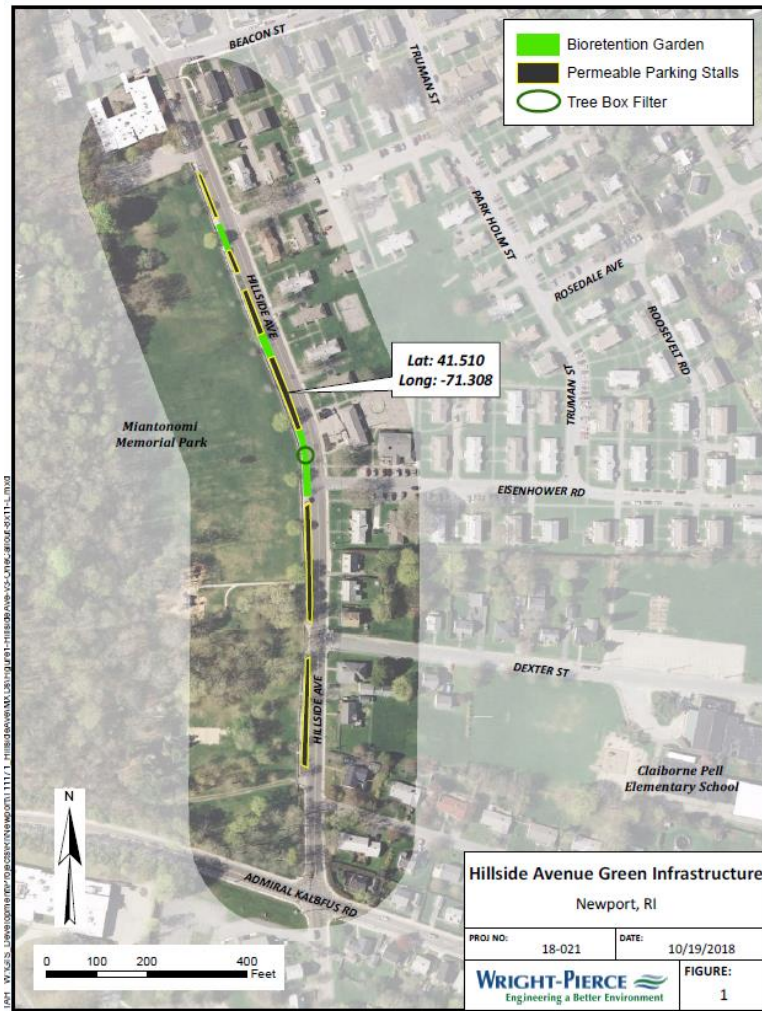


Figure 3-1. Hillside Avenue Green Infrastructure Project Plan



Figure 3-2. Hillside Avenue Installed Bioretention Area

### 3.3.2 Drainage Investigation and Flood Analysis, Wellington Avenue and Bridge Street

This project evaluated flooding and potential solutions for neighborhoods along Wellington Avenue and Bridge Street that are subject to “sunshine flooding” or flooding caused solely by tidal fluctuation. Flooding is exacerbated when precipitation events coincide with a high tide. GI was considered in the Drainage Investigation and Flooding Analysis Wellington Avenue and Bridge Street (Project No. 15-037) report (CH2M, 2017) commissioned by the City to address the flooding issues.

Ultimately, the City elected to pursue a grey infrastructure recommendation made in the 2017 report, the installation of a tide gate valve on the Bridge Street storm drain project. GI was recommended as one of the long-term controls to eliminate the remaining wet-weather flooding and may be implemented at a later date if flooding persists.

#### 3.3.2.1 Feasibility Evaluation

GI was one of seven potential conveyance and control alternatives considered for this project. An engineering screening analysis was performed using the City’s calibrated hydrologic and hydraulic model of the stormwater drainage system to evaluate the effectiveness of each alternative for an event in July 2015. The results of this screening analysis for the GI alternative at high-tide conditions are presented for Bridge Street and Wellington Avenue in Figure 3-3 and Figure 3-4, respectively.

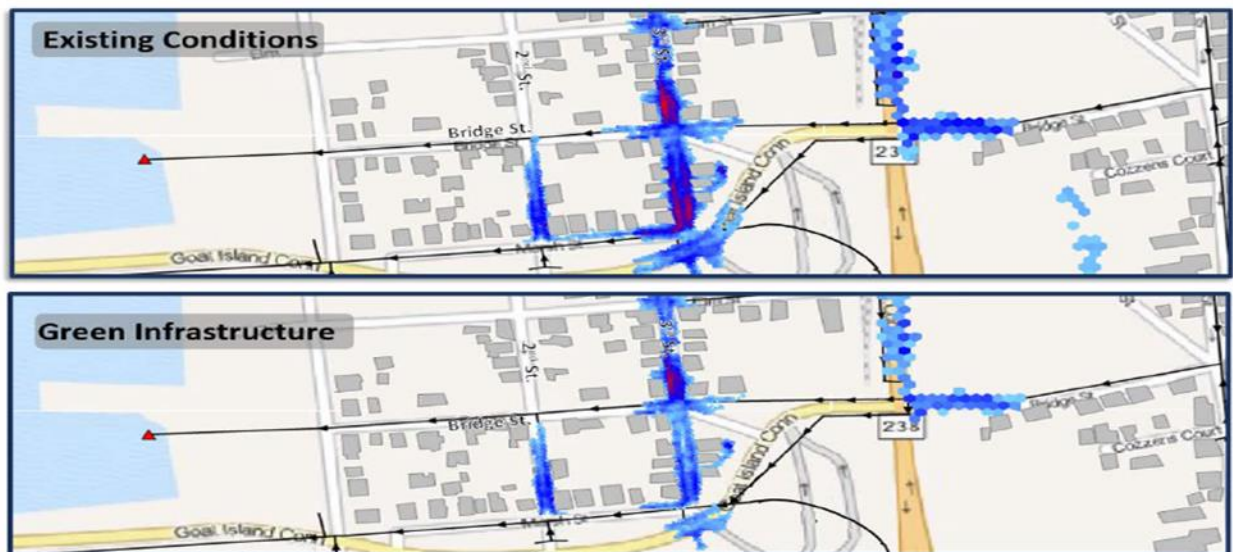


Figure 3-3. Bridge Street Green Infrastructure – Rain at High Tide

Comparison between existing conditions and GI alternative for the July 1, 2015 rain event of 1.2 inches at high tide of 4.3 feet (MLLW)

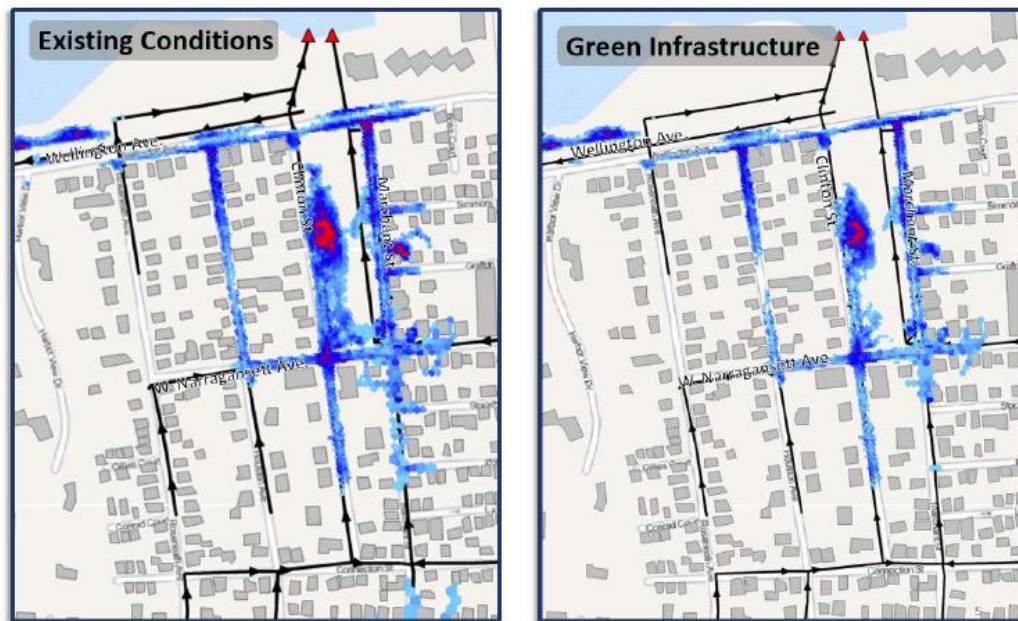


Figure 3-4. Wellington Avenue Green Infrastructure – Rain at High Tide

Comparison between existing conditions and GI alternative for the July 1, 2015 rain event of 1.2 inches at high tide of 4.3 ft (MLLW)

The GI alternative was calculated to improve drainage but would not be able to eliminate flooding. With GI infiltrating rainfall into the subsurface, there was also concern that the added infiltration would worsen basement flooding.

### 3.3.2.2 Green Infrastructure Proposed

This project evaluated the use of several types of GI including permeable pavement, bioretention cells, rain gardens, green roofs, and rain barrels. The GI features proposed are shown in Figure 3-5.

#### Wellington Ave. – Green Infrastructure

- **Modeled Assumptions**
  - » Capture 15% of runoff primarily through infiltration
  - » Only applied in areas at low risk for basement flooding
- **Available Options**
  - » Permeable Pavement
  - » Bio-Retention Cells
  - » Rain Garden
  - » Green Roof
  - » Rain Barrels





Figure 3-5. Wellington Avenue Green Infrastructure Considered

The recommended GI alternative included a mix of bioretention cells and permeable pavement along Wellington Avenue and Bridge Street. This alternative is summarized below:

- Wellington Avenue
  - Approximately 54,000 square feet of bio-retention
  - Approximately 73,000 square feet of permeable pavement
- Bridge Street
  - Approximately 30,000 square feet of bio-retention
  - Approximately 21,000 square feet of permeable pavement

### **3.3.2.3 Green Infrastructure Costs**

Preliminary cost estimates were calculated for the recommended GI alternative. Total capital cost includes design, construction, and engineering services during construction. Potential additional costs include permitting and easement acquisition. The preliminary cost estimates for this project were developed in 2017 and may range -25 to +50 percent from actual costs at that time. The cost estimates developed are summarized below:

- Wellington Avenue
  - Capital Cost: \$6.5 million
  - Annual O&M Cost: \$65,000 per year
- Bridge Street
  - Capital Cost: \$2.9 million
  - Annual O&M Cost: \$29,500 per year

GI costs used to estimate alternatives are from contractor bid tab information for similar type of construction, based on a per-square-foot unit rate. Contingency, escalation, design services, and engineering services during construction were added to the square-foot unit costs.

No construction costs are available since the proposed GI alternative was not determined to be the most cost-effective option during the preliminary design stage.

### **3.3.3 Almy Pond Management Plan Green Infrastructure Projects**

Almy Pond is a eutrophic freshwater body located at the southern tip of the City, north of Bailey's Beach. The pond has a surface area of 49.8 acres and an average depth of 3.9 feet and was identified in September 2007 by RIDEM as impaired by pollutants in accordance with Section 303(d) of the federal Clean Water Act. The total maximum daily load (TMDL) notice prepared by RIDEM reported this pond as having phosphorous related impairments.

The City developed a four-tiered TMDL management plan to reduce phosphorus loading to Almy Pond. The management plan consists of a public outreach and education program (Tier 1), implementation of watershed-wide non-structural BMPs (Tier 2), planning and implementation of watershed-wide structural BMPs and low-impact development (LID) practices (Tier 3), and developing and implementing internal pond sediment management strategies (Tier 4).

Five different types of GI practices were implemented in the Almy Pond watershed for a total of 14 controls installed. Construction of the project was completed in October 2017. Overall, reported phosphorus concentrations in stormwater appear to be lower in the 2018 sampling event when compared to the 2013 and 2016 sampling events, which can be attributed to both the GI implementation and public education conducted in the watershed.

### 3.3.3.1 Feasibility Evaluation

Between March and September 2013, assessments were conducted to determine sources of phosphorous in Almy Pond. Assessments included the following:

- Shoreline survey of stormwater outfalls
- Stormwater sampling and analysis
- Pond surface water and sediment sampling
- Watershed mapping and characterization

Based on the results from these assessments, a pilot study area in the northern sub-watershed was defined (Figure 3-6). GI practices for the pilot area were selected because of their small footprints, ease of maintenance, and ability to remove phosphorus effectively.

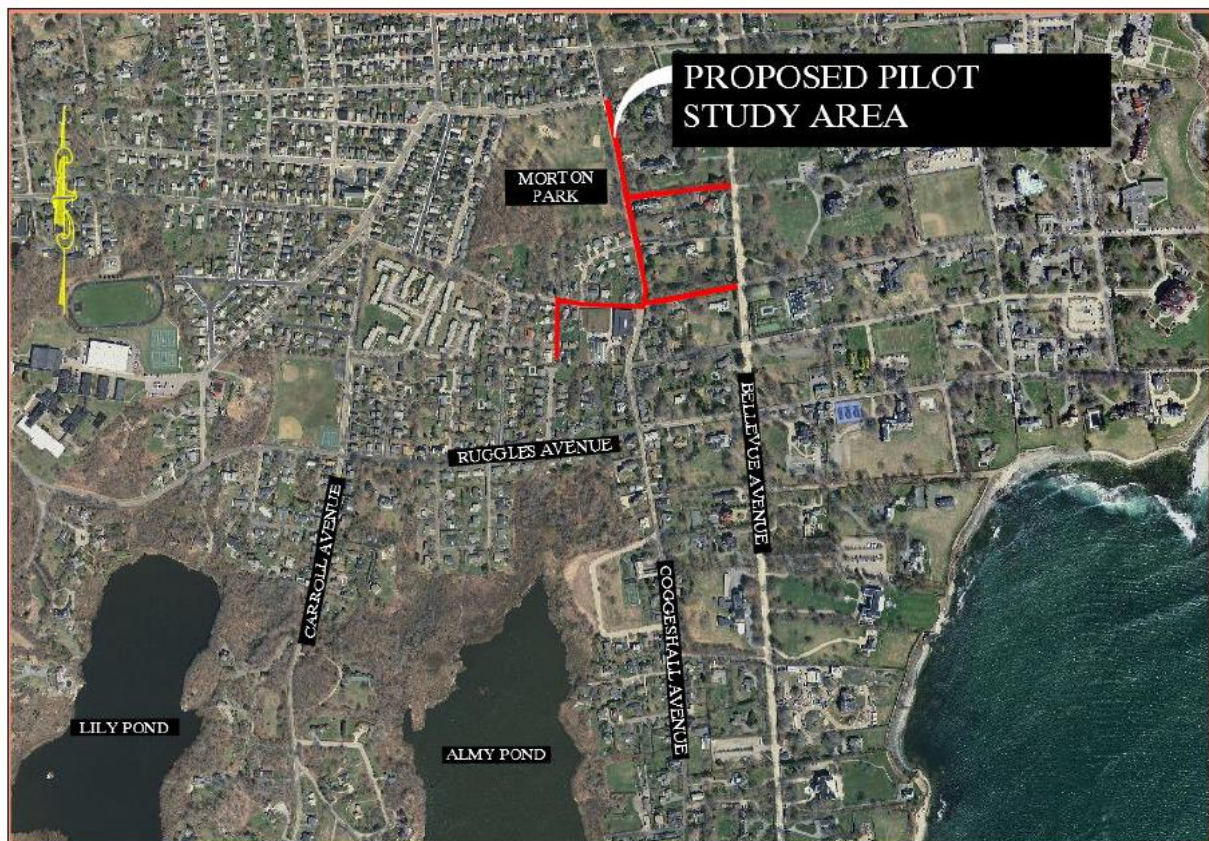


Figure 3-6. Almy Pond Pilot Study Area

### **3.3.3.2 Green Infrastructure Implemented**

The four-tiered TMDL management plan included initiatives related to GI and BMPs throughout the first three tiers of the program. Activities completed during these tiers of the management plan are summarized as follows:

#### **Tier 1 – Public Outreach and Education Program**

- Public meetings
- Household stormwater management
- School programs/classroom education
- City website development

#### **Tier 2 – Non-structural BMPs**

- Dog waste stations
- Catch basin cleaning
- Street sweeping

#### **Tier 3 – GI Practices Installed**

- Media filtration system (perk filter) installed at the end of Andrews Street (September 28, 2017)
- Hydrodynamic separator installed on Andrews Street (September 28, 2017)
- Tree box filter (Figure 3-7) installed on Hazard Avenue (July 26, 2017)
- Two vegetative filter strips installed on Andrews Street (June 13 and 19, 2017)
- Nine deep sump catch basin retrofits installed along Coggeshall Avenue, Hazard Avenue, Gordon Street, Vanderbilt Avenue, and Andrew Street (June 21 through July 28, 2017)

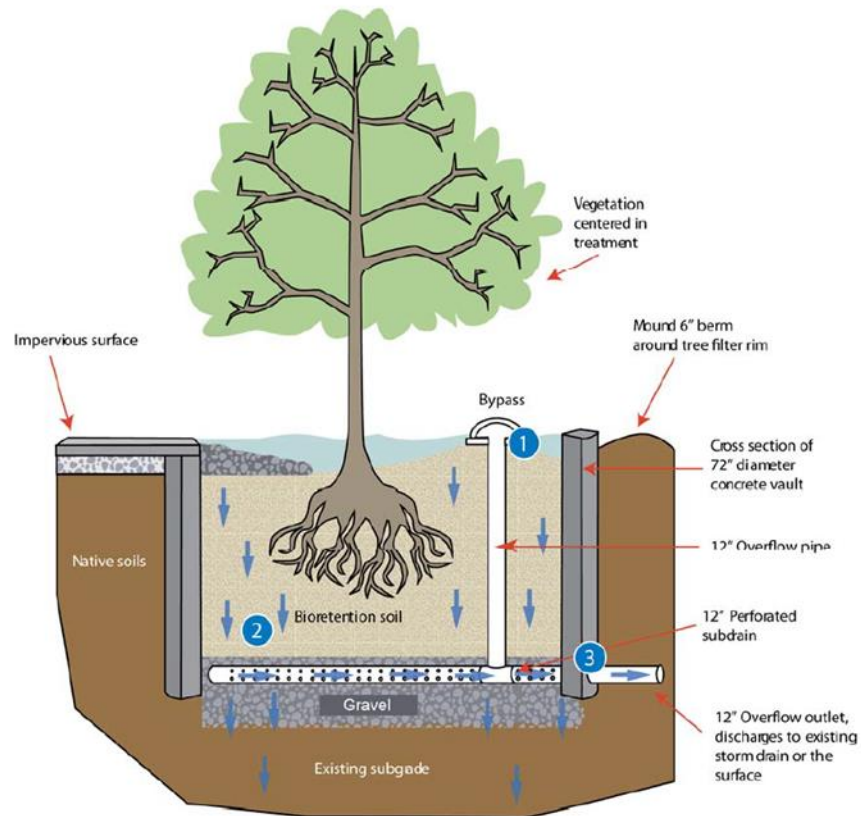


Figure 3-7. Tree Filter (RIDEM, 2010)

### 3.3.3.3 Green Infrastructure Costs

The City received a \$250,000 Narragansett Bay Watershed Restoration Fund Grant from the RIDEM for pilot testing GI in the Almy Pond watershed. The City also provided \$250,000 in matching contributions to the project.

### 3.3.4 Whitwell Avenue Drainage Investigation and Flooding Analysis

This project evaluated flooding and potential solutions for the 262-acre Whitwell drainage catchment and the Whitwell neighborhood, which experiences significant street and private-property flooding during high-intensity rain events. GI was considered as one of the potential solutions for this project. However, poor draining soils in the watershed made GI infeasible, and other alternatives were considered and developed further.

The results of the analysis are presented in the Whitwell Avenue Area Drainage Investigation and Flooding Analysis report (Fuss & O'Neill, 2017). Based on the results of this analysis, a subsurface storage system was proposed to reduce flooding in the Whitwell neighborhood. Although the GI alternative was determined to be infeasible early in the analysis, non-structural BMPs were recommended in addition to the chosen alternative to further reduce flooding.

### 3.3.4.1 Feasibility Evaluation

GI was considered as a potential alternative for this project, including features such as bioretention basins, infiltration trenches, permeable pavement, and dry swales. Physical limitations in the watershed, including high groundwater and poor hydraulic capacity of underlying soils, prevented GI from being an effective alternative. These conditions restricted infiltration of a substantial volume of runoff, meaning that a significant amount of land would be needed for GI features to make an impact on flooding. The watershed consisted of primarily impervious cover and privately-owned land, which did not provide enough available land for GI to be effective.

As a result of the analysis, the GI alternative was ruled out early on. The subsurface storage system alternative was recommended as it was determined to be the only alternative that would achieve the City's goals for reducing flooding and not negatively impacting downstream flooding.

### 3.3.4.2 Green Infrastructure Implemented

Although the GI structural improvements alternative was determined infeasible for this project, non-structural improvements were recommended to further reduce flooding in the watershed. Non-structural BMPs that were recommended in addition to the subsurface storage system alternative included the following:

- Reduce infill development impacts within the watershed
- Disconnect residential roof downspouts
- Promote installation of residential rain gardens
- Rain barrel workshop and giveaway programs

The City is also incorporating ordinance changes for non-structural BMPs as part of a recently awarded Southeastern New England Program (SNEP) grant. The Whitwell area is planned to be the pilot for this ordinance change related to non-structural BMPs.

### 3.3.4.3 Green Infrastructure Costs

The GI alternative for this project was determined to be infeasible prior to cost estimates being completed.

### 3.3.5 Other Green Infrastructure Projects

Other City departments are also implementing GI throughout the City. The following are two examples of these projects.

- *Cliff Walk Restroom Project* – In 2014, the City Council awarded a \$418,500 contract to East Coast Landscaping and Construction Inc. of Portsmouth, Rhode Island to construct a sidewalk, extend water and sewer utilities, and install a low-impact stormwater treatment sand filter at the Forty Steps restroom location.
- *Broadway Streetscapes Project* – This project was developed and completed as a partnership between the City and the Rhode Island Department of Transportation (RIDOT), which funded the \$5.8 million construction cost through federal sources, including Safe Routes to School, in addition to the Rhode Island Municipal Road and Bridge Revolving Fund. The project was designed using Complete Streets principles. Streetscape improvements included roadway repairs and repaving as well as modifications to sidewalks, crosswalks, bump outs, lighting, parking, bike lanes, curb cuts, street furnishings, narrowed travel lanes, stormwater improvements, green space/vegetation, and overall improvements

that provide a more dedicated land area for pedestrians. GI was incorporated into this project and includes pervious pavers in the newly created angled parking coves, roadside bio-infiltration swales, and additional landscaping and green space.

### 3.3.6 Ongoing Projects Evaluating Green Infrastructure

- ***Bellevue and Ledge Catch Basin Separation Project*** – The purpose of this project is to disconnect four of the remaining City-owned catch basins that are connected to the sanitary sewer system. As part of the project, stormwater runoff entering three catch basins on Bellevue Ave and one catch basin on Ledge Road will be redirected to a new separated storm drain. The new separated storm drain will discharge to green infrastructure, including two new subsurface infiltration facilities and one new bioretention cell. The project also includes improved energy dissipation at the existing stormwater outfall at Rejects Beach and public outreach/education through installation of new signage at the proposed bioretention cell. This project is currently in design, being led by Jacobs as part of the City's CSO Program Implementation. In 2024, the City was awarded a grant by RIDEM to support final design and construction for this project. This project is discussed further in Section 4.2.2.
- ***Prescott Hall Drainage Study (Also referred to as Elizabeth Brook Resiliency Project)*** – The City has been working with Jacobs on this project since 2014. The goal of the project is to mitigate flooding and enhance urban revitalization in the City's North End. Building on previous studies, the project includes development of a vision for daylighting portions of Elizabeth Brook, integrating stormwater improvements with the North End Urban Plan, and creating green spaces for community use. The overall project aims to improve stormwater management, community resilience, and ecological health in the Elizabeth Brook Watershed. Design for this project is still ongoing; however, is expected to include a combination of green, gray and blue infrastructure to mitigate persistent flooding issues.

## 3.4 Non-Structural BMPs Implemented

### 3.4.1 Street Sweeping

Roads in the City constitute 396 acres or 21 percent of the City's total impervious area (1,852 acres). This impervious surface is typically directly connected to the City's stormwater drainage system. Roadways contribute relatively high concentrations of a wide variety of stormwater pollutants, including sediment, nutrients, metals, and volatile organic compounds, among other constituents. Street sweeping helps to remove sediment and debris from paved surfaces, reducing potential pollutant transport to waterbodies. Street and parking lot sweeping may also reduce the need for maintenance of pretreatment devices, such as catch basins and forebays, that precede dedicated treatment systems. DPS runs the Street Sweeping program. In addition to City streets, DPS sweeps business areas and public parking lots. The Street Sweeping program has two components.

- The City is committed to sweeping every street twice per year. This program runs from March until November, weather permitting.
- Nighttime street sweeping occurs all year and focuses on the main roads, commercial roads, and arterials.

The City owns two street sweepers. These mechanical sweepers are used for the City's residential streets and business areas. The Almy Pond Watershed Management Area is swept three times per year.

In 2024, the total quantity of sand and debris collected by sweeping streets was 135 tons.

### 3.4.2 Catch Basin Cleaning

In general, the City inspects their catch basins once per year; those in low-lying areas are inspected more frequently (e.g., before and after major storms). All catch basins and manhole inspections are initially completed in conjunction with the application of the West Nile Virus larvicide. Any evidence of flow, odor, discoloration, or debris are further investigated by members of the collection system staff and overseen by management staff of the City's Division of Water Pollution Control (WPC). Each catch basin and manhole is identified and tracked by a numbering system in the City's GIS tracking system. Those in need of cleaning are recorded into the GIS database and scheduled to be cleaned. Reports are stored in the WPC GIS database.

Catch basin inspections are completed using tablets and importing data to the City's Computerized Maintenance Management System (CMMS), Cityworks. Cityworks is software developed by Trimble that seamlessly integrates with ArcGIS online web maps and the City's GIS database. The data collected in the Cityworks inspection form (Figure 3-8) was customized to meet the City's requirements.

The screenshot shows the Cityworks interface for an inspection form. At the top, there's a navigation bar with 'Cityworks' logo and menu items like 'Inbox', 'New SR', 'New WO', 'New Insp', and 'Designer'. Below that is a toolbar with icons for 'Inspection', 'Email', 'Print', 'Save', 'Close', and a trash icon. The main form area is titled 'Inspection' and has a 'Details' tab. It contains several input fields: 'Id: 22530', 'Location:', 'Status: Open', 'Resolution:', 'Insp. Date:', and 'Inspected By:'. There are three expandable sections: 'Observations' with 'Needs Cleaning?', 'Needs Repair?', and 'Needs Investigation?' (each with a dropdown and edit icon), and 'Depth of Debris?'. The 'GIS Updates' section includes 'Access Type?', 'Inlet Type?', 'Depth of Basin?' (with an 'Answer' input field), and 'Depth of Sump?' (with an 'Answer' input field). A 'Reset' button is below this section. The 'Comments' section has three text areas for 'Observation:', 'Repairs:', and 'Recommendation:'. At the bottom, it shows 'Cond. Score: 0'.

Figure 3-8. Example Catch Basin Inspection Form in Cityworks

The City is divided into 36 grids on their GIS system map; at least one grid is cleaned each month, with all grids scheduled to be cleaned at least once every 3 years. The City's MS4 Annual Report (2024) reported a total of 247 catch basins were cleaned in 2024, resulting in 135 tons of material removed from the stormwater drainage system.

### **3.5 Green Infrastructure and BMP Maintenance**

The WPC owns and operates six structural BMPs. GIS mapping is updated as needed, and additional structural BMPs will be added as they are placed into service. Additionally, one structural BMP was installed and operated by the Newport Housing Authority.

The following maintenance activities were conducted on the City-owned BMPs in 2024.

- The Malbone cobblestone stormwater channel is inspected for obstructions and cleaned of growth and debris on a quarterly basis. This open channel takes storm flow from the Hillside Avenue area in the northern part of the City and connects into the State of Rhode Island's stormwater swale system, which eventually discharges into the Newport Harbor. The Department of Utilities has been working with RIDOT to stress the importance of cleaning and maintaining the State's swales/drainage channels and culverts to help improve water quality and flooding issues. RIDOT has cleaned many of the swales/drainage channels as part of the recent Pell Bridge Improvements Project.
- Each catch basin is individually inspected during the application of the West Nile Virus larvicide. Catch basins in need of cleaning are noted in the GIS database and scheduled to be cleaned in the City's CMMS, Cityworks. Additionally, as part of the WPC's continuous O&M activities, WPC staff regularly inspects, cleans, and/or repairs catch basins throughout the City as needed. WPC inspection reports are saved to the City's GIS database. Catch basins in critical low-lying areas are also checked more frequently (i.e., before and after all significant storm events).
- The City of Newport WPC inspected and cleaned the Vortex unit and Perk Filter vault at the end of Andrew Street in 2024. Routine inspections and preventive maintenance were performed by WPC staff in 2024.
- The City of Newport WPC added public education graphics to their work truck with information regarding keeping catch basins clear to help prevent flooding and pollution "Keep Grates Clear." Said truck was operating during 2024. WPC also installed storm drain public education markings on catch basin inlets to inform residents that these catch basins are connected to our local waterways "No Dumping Drains to Bay".

### **3.6 Privately-Owned BMP Requirements**

To identify proposed stormwater structural BMPs discharging to the City's stormwater drainage system and with a goal of ensuring long-term performance of these BMPs, a Citywide Development Plan Review (DPR) process, managed by Department of Planning, allows the Department of Utilities to review proposed projects with drainage, sewer, and water improvements.

#### **3.6.1 Requirement for Plan Reviews**

The WPC, with assistance from the Building Inspections office, reviews 100 percent of proposed post-construction BMPs for the control of stormwater runoff from new development and redevelopment projects. These are projects greater than 1 acre that result in discharges to the City's stormwater drainage system, which incorporates consideration of potential water quality impacts. Reviews are conducted by professional staff with backgrounds in all aspects of civil and environmental engineering, including soil science, erosion control measures, BMPs, LIDs, construction site management, and enforcement of controls and protection of the environment and its resources.

### **3.6.2 Operation & Maintenance Requirements**

For projects that use privately-owned stormwater BMPs, the applicant must follow the development plan review process for operation and maintenance of the BMP. As part of this process, an approved O&M manual must be recorded for the subject parcel in the Land Evidence Records office at City Hall.

The City also requires the development and execution of BMP O&M Agreements. These agreements must include the following:

- Party responsible for the long-term O&M of permanent stormwater management BMPs
- A description of the permanent stormwater BMPs that will be operated and maintained
- The location of the permanent stormwater BMPs that will be operated and maintained
- A timeframe for routine and emergency inspections and maintenance of all permanent stormwater management BMPs
- A requirement that all inspections and maintenance activities are documented
- Annual submission of inspection/maintenance certification/documentation to the City
- Stormwater management easement for inspection and maintenance access or the preservation of stormwater runoff conveyance, infiltration, and detention areas and other stormwater controls and BMPs by persons other than the property owner
- Steps available for addressing a failure to maintain the stormwater controls and BMPs

## **3.7 Public Education**

Public education also plays a large role in water quality improvement through behavioral changes from residents and business owners in the City. The following is a summary of the City's efforts in public education.

### **3.7.1 Public Education and Presentation Materials**

The Department of Utilities maintains educational information concerning storm drainage on the City's website, including applicable reports, links to informational websites, and calendars of upcoming meetings and activities. An EPA brochure entitled "Make your home the Solution to Stormwater Pollution" is available and distributed to residents (Figure 3-9). Topics include vehicle and garage practices, lawn and garden usage, home repair and improvements, pet care, swimming pool maintenance, and septic system use and maintenance.



Figure 3-9. EPA's Homeowner's Guide to Healthy Habits for Clean Water

The City has contracted for ongoing development of printed material for distribution to residents, businesses, commercial landscapers, and schools that identifies the impact phosphorus has on the environment and the Almy Pond Watershed specifically, along with development of graphic, tabular, and illustrative material for the City's website. The City's Clean City program is administered by DPS, in coordination with Rhode Island Resource Recovery Corp.'s Eco-Depot program and provides information on household hazardous waste disposal and recycling.

As part of the Whitwell Avenue Drainage Investigation and Flooding Analysis study, the City held three public meetings in 2016 to obtain public input on stormwater management and to provide information on stormwater management and its relationship to periodic, tidally influenced flooding in the Whitwell Avenue Watershed area. In addition to the public meetings, a website portal was provided to obtain public input and distribute information resulting from the study. A report was finalized in January 2017 and is currently available to the public via the City's website.

Since 2018, to further increase public awareness of stormwater drainage infrastructure, WPC created immediately appealing and noticeable standard storm drain and catch basin covers with markings stating, "No Dumping Drains To Bay."

In October 2018, WPC, with assistance from the City's Communications Officer, developed and rolled out an "Adopt-A-Catch-Basin" public education and participation program. The overall message was that the clearing of catch basin grates will help reduce pollutants flowing into Newport Harbor. Free-flowing catch basins not only help prevent ponding of rain water on City streets, but they also help minimize the amount of pollutants entering local waterways such as Newport Harbor. The City's website provides an interactive map displaying all the catch basins in the City and their adoption status. Citizens can volunteer to adopt a

catch basin directly on the website. Since the website went live in November 2023, 2 catch basins have been adopted by the public.

As part of the Prescott Hall Drainage Study, the City held three public meetings in 2022 to obtain public input on stormwater management and proposed flood mitigation measures proposed for the Elizabeth Brook Watershed area. In addition to the public meetings, a website portal was provided to obtain public input and distribute information resulting from the study. A report was finalized in December 2022 and is currently available to the public via the City's website.

### **3.7.2 Municipal Trainings and Continuing Education**

The City WPC Engineer completed Certified Stormwater Inspector training. Management and staff have participated in multiple training classes throughout their careers. New professional development classes are encouraged by management and attended each year.

WPC management staff provided training to crew members on proper catch basin and storm manhole inspection techniques. Crews were given guidance on what to look for in terms of contamination in stormwater flow and structural integrity. Also communicated was the importance of providing correct information about the stormwater system. Crew members were educated on the importance of cleaning the catch basins and tide gates, which can benefit the stormwater system throughout the City. Crews then enter field data in the GIS System for continuous reports and quality assurance/quality control (QA/QC) reviews.

## **3.8 Policies Related to GI and BMP Implementation**

The City has adopted a proactive approach toward the evaluation and implementation of GI and other BMPs. The City meets the requirements of the Rhode Island Pollutant Discharge Elimination System (RIPDES) General Stormwater Permit and has implemented City ordinances and policies for GI and BMP implementation that are consistent with Section IV (Stormwater Management Program Plan Requirements) of the General Stormwater Permit, which states in part:

Item IV.B.5.a: An ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects, that includes non-structural and structural BMPs, as well as their installation and O&M, and sanctions to ensure compliance, to the extent allowable under State and local law.

Chapter 13.09 of the City's Code of Ordinances (Illicit Discharge and Connection – Stormwater) requires prevention, control, and reduction of stormwater pollutants:

Ch. 13.09.100: In an attempt to prevent, control, and reduce stormwater pollutants any person engaged in activities or operations, or owning facilities or property which will or may result in pollutants entering stormwater, the storm sewer system or waters of the state shall implement best management practices to the extent they are technologically achievable to prevent and reduce such pollutants. The owner or operator of a commercial or industrial establishment shall provide reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses. Facilities to prevent accidental discharge of prohibited materials or other wastes shall be provided and maintained at the owner or operator's expense.

The City also enforces post-construction stormwater management requirements for construction projects through their soil erosion and sediment control requirements. Chapter 15.26 of the City's Code of

Ordinances (Soil Erosion and Sediment Control) includes standards for the Soil Erosion and Sediment Control Plan, which requires a narrative that includes supporting documentation describing the proposed activity and soil erosion and control measures and stormwater management measures to be installed. The narrative and plan must document the decision process for the development of a post-construction stormwater management program. This chapter also includes post-construction runoff rate reduction:

15.26.060: Post development runoff rates should not exceed predevelopment rates, consistent with other stormwater requirements which may be in effect. Any increase in storm runoff shall be retained and recharged as close as feasible to its place of origin by means of detention ponds or basins, seepage areas, subsurface drains, porous paving, or similar technique.

The City's MS4 Permit Annual Report (2024) also references the City's zoning ordinance requirement that all new projects are to prepare stormwater management plans under the direction of a professional engineer that shall, at a minimum, conform to the current edition of RIDEM's "Rhode Island Stormwater Design & Installation Standards Manual". The ordinance requires that the design engineer on all new projects attempt to reduce flow volume and rate from existing site conditions for the project, with a City goal of 50 percent reduction. Water quality improvement is also required.

The City's Comprehensive Land Use Plan (2017) further defines the City's stormwater management goals and policies toward the evaluation and implementation of GI:

- Policy WA 9.2 states that, "The City will strive to implement innovative measures, such as Green Infrastructure, to manage stormwater." Section 12.3, Implementation Actions states the following goals and actions:
  - Goal WA-9.D: Continue to include LID and other GI in City street design and improvement projects.
  - Goal WA-9.E: Evaluate all City facilities to identify opportunities to implement LID and GI and include key initiatives in the City CIP.

### **3.9 Summary of Findings**

Although evaluation and implementation of GI and other BMPs for "stormwater separation projects" (as defined by Item 67.a.i of the modified CD) are not possible because the City's system is already separated, the City's standard practices, ordinances, and land use policies and goals show that the evaluation and implementation of GI and other BMPs has continued to take place.

As demonstrated in several feasibility evaluations from past projects summarized in this section, GI is often not a viable standalone solution for addressing flooding. Common limitations include a lower cost-benefit ratio compared to other alternatives, physical constraints within the watershed, such as high groundwater levels and poor soil hydraulic capacity, and the inability of GI measures to fully eliminate flooding risks.

Recognizing these limitations, the City plans to continue promoting GI for privately-owned stormwater BMPs and will evaluate and implement GI for smaller-scale public projects when cost-effective. For larger-scale efforts, the City's approach has shifted toward integrated Blue-Green Infrastructure strategies, as exemplified by the ongoing Elizabeth Brook Resiliency Project highlighted in this section. These strategies are designed to deliver multiple co-benefits beyond flood mitigation, including the creation of recreational spaces, reduction of urban heat island effects, and enhancement of local biodiversity. By leveraging these additional benefits, the City aims to achieve a higher return on investment (ROI) while advancing more resilient, sustainable, and livable urban environments.

## **4. Inflow Removal Program Reassessment**

This section provides a reassessment of the City's inflow removal efforts and associated progress toward meeting established goals of the CD as part of the City's CSO LTCP.

### **4.1 Consent Decree Requirements**

Paragraph 67 of the modified CD provides requirements related to this report. Item 67.a.iii. and item 67.a.vi. of the modified CD provides specific requirements related to the evaluation inflow removal and water quality benefits; this language is as follows:

- “the progress that has been made toward achieving the inflow removal estimates, CSO discharge volume reductions, and CSO discharge events projected for the specific design precipitation events and the typical annual precipitation record as presented in the November 26, 2013, memo from CH2M HILL to the City” (Modified CD item 67.a.iii.)
- “progress towards achieving the water quality benefits associated with implementation of the Master Plan, including (as may be necessary after consultation with EPA and RIDEM and review of Harbor monitoring data) stormwater monitoring to determine the water quality benefits and impacts of the inflow removal efforts, and including assessment of other actions the City has taken or will undertake to address water quality impacts associated with any elements of the Master Plan” (Modified CD item 67.a.vi.)

### **4.2 Progress Toward Achieving Inflow Removal Estimates**

In accordance with the terms of the CD, the City submitted a Collection System Capacity Assessment and SMP on November 30, 2012 that proposed disconnecting or removing private and public inflow sources to achieve a 50 percent reduction in rainfall-derived inflow upon full implementation of the SMP (by June 30, 2033).

The City elected to target the inflow portion of RDII because inflow can most cost-effectively be removed through the disconnection of catch basins and downspouts. Although other private sources of inflow were identified in the Washington Street Outfall Extraneous Flow Investigations Report, as illustrated in Figure 4-1 (CH2M, 2011), removal of these sources was not targeted during this phase of the program.

Infiltration sources are typically cracks or defects in the pipes or other assets where stormwater or groundwater can enter into the system and are harder to detect and fix. Infiltration sources are often identified through system infrastructure inspections, such as CCTV, pipe, manhole, or catch basin inspections. Removal of infiltration is generally more expensive than removal of inflow and was not initially targeted during beginning phases of the program; however, the City has made considerable progress towards reduction of infiltration through rehabilitation of pipes and manholes based on findings from CCTV inspections and other visual inspections. This is discussed further below.

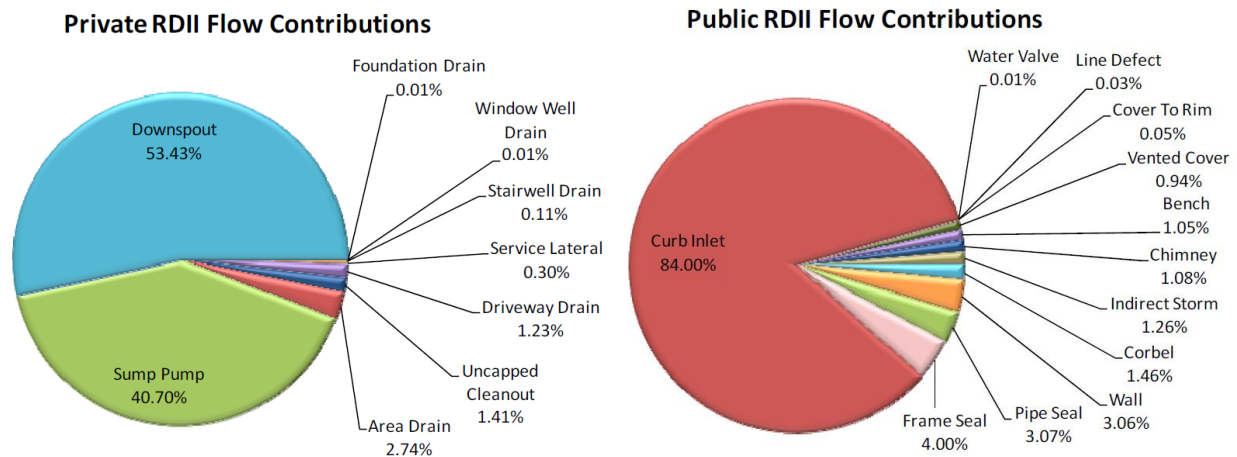


Figure 4-1. Washington Street CSO Sewershed RDII Source Summary

Targets for inflow removal activities were established for FY2019 and FY2033 in the Quantification of Early SMP Improvements Technical Memorandum (CH2M, 2013) and the Wellington Avenue and Washington Street Sewer System Evaluation Survey Report (CH2M, 2014). The following sections provide an overview of the inflow removal efforts completed and evaluate the progress made toward achieving established targets.

#### 4.2.1 Building Inspections and Downspout Disconnections

The City started a building inspection program in 2006 to identify sources of inflow on private properties. The inspections used techniques such as door-to-door surveys, dye testing, and smoke testing to identify defects in systems on private properties that contribute inflow to the City's sanitary sewer system. Typical sources of inflow found through these investigations include downspouts, sump pumps, floor drains, driveway drains, and broken service laterals.

When a connected downspout is identified, the property owner receives a letter from the City requesting that the defect be corrected by redirecting the source of inflow to either the ground or the stormwater system. Since the start of the building inspection program in 2006, the City has attempted over 11,500 building inspections and sent over 16,300 letters to private property owners requesting private system corrections (e.g., downspout disconnections).

For identification of inflow sources, the goal was to complete all remaining initial building inspections by the end of the first reassessment period. As noted in Reassessment Report #1 (CH2M, 2020), this target was not initially met. At the end of the first reassessment period, there were 1,216 buildings in the City remaining that had yet to be inspected. This target was achieved in November 2023 during the current reassessment period in which inspections were attempted at all remaining properties.

As shown in Figure 4-1, investigations of the City's infrastructure documented in the Wellington Avenue and Washington Street Sewer System Evaluation Survey Report (CH2M, 2014) found that a primary source of inflow on private properties is through downspouts that are tied directly to the sanitary sewer system. For this reason, removal of downspouts was the initial focus of the City's private inflow program and building inspections were focused on identifying downspouts directly connected to the sanitary sewer system. Once a downspout sanitary sewer connection is discovered, the City notifies the property owner and requests the downspout be disconnected within 45 days. The City then conducts a follow-up inspection to confirm that the disconnection has been completed.

## CSO Program Reassessment Report #2

At the end of the first reassessment period, 2,016 downspouts were identified as connected to the sanitary sewer system (CH2M, 2020). Building inspections performed over the current reassessment period identified an additional 392 downspouts as connected or suspected to be connected to the sanitary sewer system.

At the end of the first reassessment period, 1,908 downspouts were confirmed disconnected from the sanitary sewer system (CH2M, 2020). Over the current reassessment period, an additional 370 downspouts were confirmed disconnected, bringing the total since SMP implementation to 2,278 downspouts; this is estimated to have removed approximately 603,670 square feet of impervious area from the sanitary sewer system.<sup>1</sup>

Table 4-1 provides details related to completed downspout disconnections by sewershed catchment area. As noted in Table 4-1, program targets for downspout disconnections were initially identified for catchments 1, 3, and 6 in the Wellington Sewershed. While the Wellington Sewershed was initially prioritized, the Wellington CSO Facility has only experienced one CSO event since December 2015; therefore, priorities shifted to disconnections in the Washington Sewershed.

**Table 4-1. Summary of Private Inflow Removal Progress – Comparison to Established Targets**

Catchment	Sewershed	# Downspouts Disconnected		Impervious Area Removed (ft <sup>2</sup> ) <sup>b</sup>	
		Target by FY2033 <sup>a</sup>	Actual by FY2024 <sup>c</sup>	Target by FY2033	Actual by FY2024
1	Wellington	844	349	223,593	92,485
2	Wellington	-	23	-	6,095
3	Wellington	966	348	256,656	92,220
4	Wellington	-	195	-	51,675
6	Wellington	1,850	340	490,294	90,100
7	Wellington	-	28	-	7,420
8	Washington	-	3	-	795
9	Washington	-	10	-	2,650
10	Washington	-	141	-	37,365
11	Washington	-	624	-	165,360
12	Washington	-	149	-	39,485
13	Washington	-	68	-	18,020
<b>Total</b>		<b>3,662</b>	<b>2,278</b>	<b>970,543</b>	<b>603,670</b>

<sup>a</sup> The downspout disconnection program was initially focused in the Wellington Sewershed; no targets were identified for the Washington Sewershed. Downspout disconnections are a voluntary action for Newport property owners; therefore, the target number of downspouts disconnected through FY2033 was an estimate that represented the goal of the City's CSO LTCP.

<sup>b</sup> The estimated impervious area removed includes impervious area associated with downspouts disconnected at private buildings. The estimate does not include any inflow that was removed through the disconnection of other types of private inflow sources, such as sump pumps or area drains. It was assumed that each downspout disconnected removed approximately 265 ft<sup>2</sup> of impervious area.

<sup>c</sup> For disconnected properties where exact number of previously connected downspouts is unknown, an average of 4 disconnected downspouts per property was assumed.

Source for targets: Quantification of Early SMP Improvements Technical Memorandum (CH2M, 2013)

<sup>1</sup> Quantity is based on an estimate of 265 square feet of impervious area removed per downspout disconnected (CH2M, 2012).

A comparison of the first-time building inspection and downspout disconnection estimated targets to the actual quantities for the reassessment period is provided in Table 4-2. In the previous reassessment, the City did not initially meet the target of 4,642 first time building inspections to be completed by FY2019. This target was completed over the current reassessment period, with all buildings in the City now having at least one attempted inspection. The quantities presented in Table 4-2 include first time building inspections only and since FY2014 only, for comparison to initial SMP targets; the actual total number of building inspections attempted by the City since 2006 is over 11,500.

**Table 4-2. Inflow Removal Progress – Comparison to Established Targets Since SMP Implementation**

Activity <sup>a</sup>	Target FY2014 – FY2019	Target by FY2033	Actual FY2014 – FY2019	Actual FY2020 – FY2024	Remaining for FY2033
Building Inspections <sup>b</sup>	4,642	-	3,426	1,575	-
Downspout Disconnections	1,894	3,662	1,908	2,278	1,384 <sup>c</sup>

<sup>a</sup> The Wellington Sewershed was prioritized for inflow identification and removal, followed by the Washington Sewershed.

<sup>b</sup> Building inspection targets and counts presented include first-time inspections only and since FY2014 only, for comparison to initial SMP targets.

<sup>c</sup> More downspouts could be determined to be connected as part of the remaining building inspections required to be conducted by FY2033.

Source for targets: *Wellington Avenue and Washington Street Sewer System Evaluation Survey Report* (CH2M, 2014)

As shown in the table above, the City has completed 62% of the downspout disconnection targets set for year 2033, with a total of 1,384 downspouts remaining. All buildings in the City have now had at least one attempted inspection, meeting the original SMP inspection goal.

While the City has made significant progress towards building inspections and downspout disconnections since the start of SMP implementation, the continued benefit of this program is limited by several factors:

- Although the City issues letters to property owners when downspout connections are identified, there is currently no legal mechanism to enforce corrective actions or issue penalties for non-compliance. The voluntary nature of the program limits its effectiveness, particularly for properties that have already received notices but have not taken corrective action. These remaining cases are likely to be more difficult to resolve.
- Although inspections have been attempted at all properties, many could not be completed due to residents not being home. This challenge is compounded by the high number of seasonal residents in Newport, resulting in a significant portion of attempted inspections remaining incomplete.
- In many areas, disconnected downspouts lack a suitable alternative outlet, leading to runoff discharging onto impervious surfaces such as sidewalks. This creates hazardous conditions, especially during winter months when ice can form.

Given these limitations, continued investment in building inspections and downspout disconnections may yield diminishing returns. As a result, the City plans to pause this program during the next reassessment period and will reevaluate its continuation during Program Reassessment #3 in 2030. This decision reflects a strategic shift in priorities, with funding redirected toward program areas that offer greater cost-benefit, particularly those focused on improving water quality, as discussed later in this section.

During the next phase of I/I removal, investigations will shift focus from the private inflow sources targeted in the early phases of the program to identifying and addressing infiltration sources. This effort will be supported by the expansion of the City's CCTV inspection program, which is discussed in more detail later in this report.

## 4.2.2 Catch Basin Disconnections

Catch basin disconnections are a critical component of the City's inflow removal program due to the large volume of inflow a single, connected catch basin can contribute to the sanitary sewer system. For identification of inflow sources, the goal was to complete inspections of the remaining City-owned catch basins by the end of the first reevaluation period.

Table 4-3 presents a comparison of the estimated targets for catch basin inspections and the actual number of catch basins inspected over the reassessment period.

At the start of SMP implementation, 75 City-owned catch basins were estimated to require inspections (CH2M, 2014). In 2014 the City inspected all remaining catch basins requiring inspections. The City continues to inspect their catch basins once per year on average.

Field investigations in 2011 identified that of the 2,300 catch basins in the City, more than 63 (City-owned and privately owned) were confirmed or suspected to be connected to the sanitary sewer system. A target was established to disconnect all remaining City-owned catch basins by the end of first reassessment period. A comparison of the catch basin disconnection estimated targets to the actual quantities for the reassessment period is also provided in Table 4-3.

At the beginning of SMP implementation, 57 City-owned catch basins were identified as remaining connected to the sanitary sewer system. Over the current reassessment period, one additional catch basin was identified as being connected to the sanitary sewer system in 2022, bringing the total to 58. Through FY2024, the City has disconnected a total of 46 City-owned catch basins; 12 City-owned catch basins are known to remain connected to the sanitary sewer system. It should be noted that this only includes the catch basins removed since the initial targets were established (i.e., at the beginning of SMP implementation in 2014). This is to provide a comparison of progress towards initial program targets, as shown in Table 4-3. Including all work since 2008, the City has now disconnected a total of 83 City-owned catch basins from the sanitary sewer system. This is estimated to have removed approximately 240,000 gallons of stormwater per inch of rain.<sup>2</sup>

**Table 4-3. Inflow Removal Progress, Catch Basin Disconnections – Comparison to Established Targets Since SMP Implementation**

Activity	Target by FY2014	Actual by FY2014	Gap for Reassessment Period #2
Catch Basin Inspections (City-owned)	75	79	0
Activity	Target by FY2019	Actual FY2014 - FY2024	Gap for Reassessment Period #2
Catch Basin Disconnections (City-owned)	57	46	12 <sup>a</sup>

Source for targets: Wellington Avenue and Washington Street Sewer System Evaluation Survey Report (CH2M, 2014)

<sup>a</sup>Includes 1 additional City-owned catch basin that was found in 2022.

The established catch basin disconnection target for the first reassessment period included disconnecting the remaining 57 City-owned catch basins that were directly connected to the sanitary sewer system. Catch basins thought to be the easiest to disconnect (35 catch basins) were prioritized while continuing to

<sup>2</sup> Quantity is based on an estimate of 4,900 square feet of effective impervious area contributing to each catch basin (CH2M, 2012)

make progress toward disconnecting the remaining 22 catch basins, which were expected to be more complicated and significantly more costly to design and construct the disconnection. The timing and number of the target disconnections represented in Table 4-3 were estimates. When establishing the target for the reassessment period, it was understood that the schedule would depend upon the budgets allotted each year in the City's Capital Improvement Plan (CIP) versus the disconnection costs.

During the current reassessment period, the City also initiated design for separation of 4 of the remaining City-owned catch basins on Bellevue Avenue and Ledge Road (catch basins CB-194-161, CB-194-200, CB-194-154, and CB-194-155). As noted in Section 3.3.6, the project includes disconnecting these catch basins from the sanitary sewer and redirecting towards new green infrastructure, including one bioretention area and two infiltration facilities. The detailed design for this work is currently ongoing and being led by Jacobs. In 2024, the City submitted this project for the 2024 Bay and Watershed Restoration Fund (BWRP) grant issued by RIDEM. The City's application for the \$400,000 grant was approved in August 2024. This grant will be used towards a portion of the costs for final design, permitting, and construction of the project.

Figure 4-2 shows the locations of the remaining 12 City-owned catch basins and 3 privately owned catch basins that are known or suspected to be connected to the sanitary sewer system. The City did not meet the established SMP target of disconnecting all remaining City-owned catch basins connected to the sanitary sewer system; however, design is already underway for disconnection of 4 of the remaining basins. Upon completion of this project, the City will have disconnected 99.7% of catch basins from the sanitary sewer system (8 City-owned and 3 private catch basins remaining, out of the 3,305 total active catch basins currently in the City's collection system).

The City will continue to evaluate the feasibility, costs, and benefits of disconnecting the remaining City-owned catch basins during the next reassessment period; however full disconnection is unlikely to occur in the near-term. Many of the remaining basins are challenging and costly to remove due to the lack of nearby storm drains. Their disconnection will continue to be evaluated as opportunities arise through other planned infrastructure projects, such as street paving or utility upgrades. Additionally, the City has noted that maintaining a small number of catch basins connected to the sanitary sewer system provides O&M benefits, as these connections help flush the system and support overall performance.

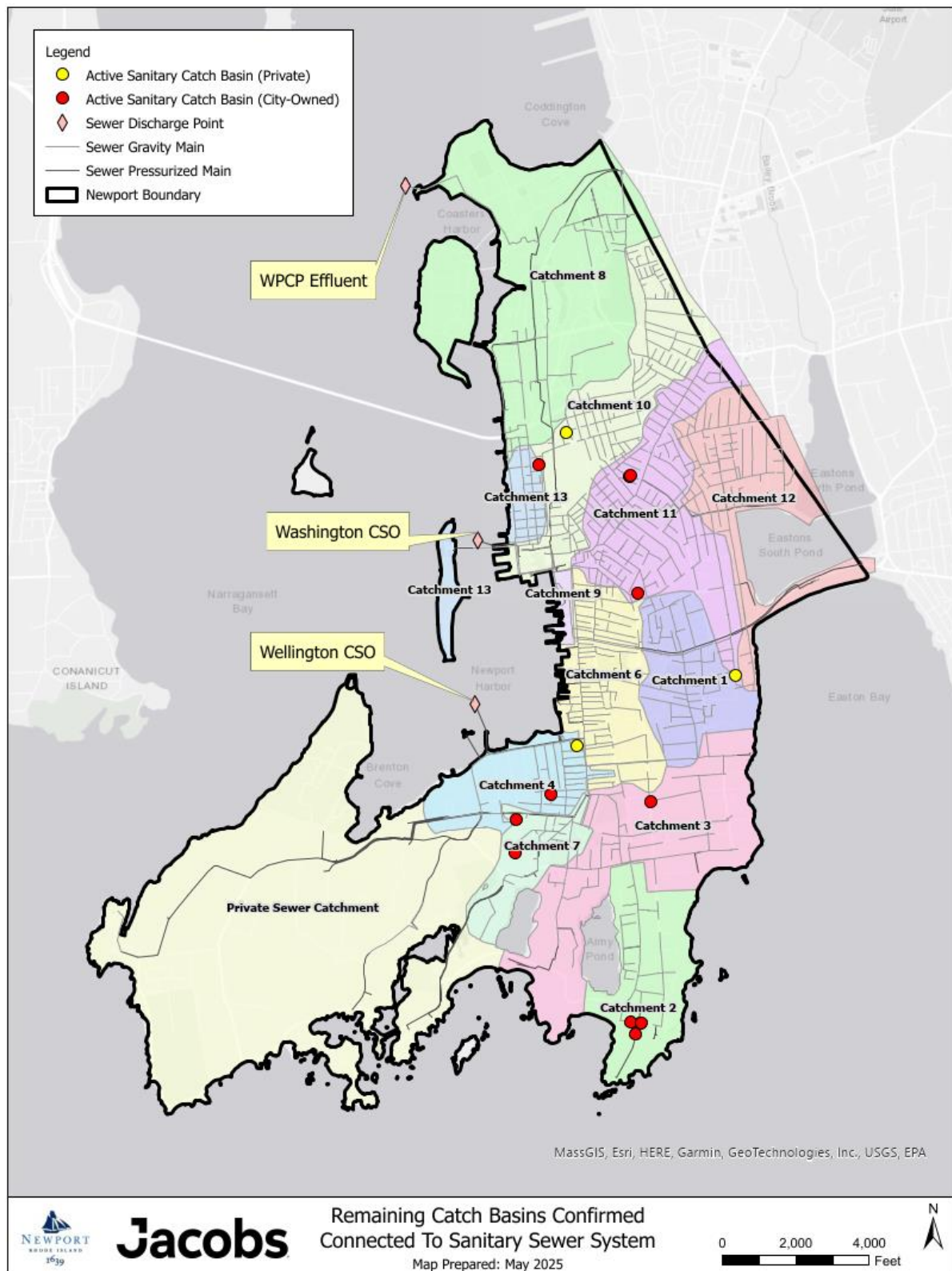


Figure 4-2. Remaining Catch Basins Known or Suspected to be Connected to Sanitary Sewer System

### 4.2.3 Other Rainfall-Derived Inflow and Infiltration Removal Efforts

Between 2009 and 2011, the City performed CCTV inspections on nearly 270,000 linear feet of pipe to help identify maintenance and rehabilitation needs and/or sources of infiltration into the sanitary sewer system. Provided below is a summary of improvement projects completed during the program that affect RDII.

- Catch Basin Separation and Drainage System Improvements, Contract No. 2014-045
- Catch Basin Separation and Drainage System Improvements, Contract No. 2017-041
- Friendship Street Sanitary Sewer Improvements, Contract No. 2016-006
- Marsh Street Storm Drain and Tide Gate Improvements, Contract No. 2018-006
- Sanitary Sewer Improvements – Bedlow Ave, Curry Ave, and Smith Ave, Contract No. 2017-019
- Goat Island Force Main Rehabilitation, Contract 2016-001
- Sanitary Sewer Improvements - Carroll Ave, Old Fort Rd, Ruggles Ave, Contract 2012-035
- Long Wharf Force Main Cleaning, Contract 2021-044

In 2021, the City purchased a CCTV truck and camera and has continued utilizing this equipment to conduct inspections through FY2024. The inspections are stored, with videos and associated GIS asset identification, in Cityworks. Having equipment in-house allows the City to inspect their sewers on a more consistent basis. The data collected is used to prioritize sewers for rehabilitation and repair. Since 2021, the City has completed CCTV investigations on over 140,000 linear feet of gravity sewers.

While the City has made significant effort towards inspecting its linear assets through CCTV over the years, a substantial portion of the system still lacks inspection data. This data is essential for assessing the condition of aging pipes, identifying sources of infiltration, and prioritizing repairs. As part of the next reassessment period, the City plans to expand its CCTV inspection program to target areas with missing or outdated condition data. Currently, approximately 68,000 linear feet (26%) of sanitary gravity mains and 249,000 linear feet (99%) of storm drains have no inspection records. The goal of the expanded program will be to continue evaluating aging infrastructure, close data gaps, and prioritize repairs to reduce infiltration and enhance overall system performance. The program will explore the feasibility of inspecting the entire system over a defined period (e.g., 5, 10, or 20 years) depending on what proves to be most cost-effective and practical. The program will be a tiered approach and may also use methods such as acoustic testing or pole camera to narrow down the percentage of pipes needing full CCTV inspections.

In 2024, the City contracted with Duke's Root Control, Inc. (Duke's) to evaluate I/I through Duke's Microdetection. This study was performed to determine areas of greatest and least concern to maximize cost effectiveness. iTrackers, ultrasonic microdetection meters, were utilized to measure water level changes every 15 minutes. The data collected during dry and wet weather flow was compared to identify sources of inflow and infiltration or structural defects in the study area. Each area upstream of an iTracker received a priority rating ranging from good to severe. The study was conducted in three different areas over different time periods. For the first area, the dry weather period was May 16 to May 19, 2023. The wet weather period was May 20 to May 23, 2023 with one day of heavy rain and 3 following days for infiltration. For the second area, the dry weather period was April 24 to April 27, 2024 and the wet weather period was March 23 to March 26, 2024. For the third area, the dry weather period was April 22 to April 25, 2024 and the wet weather period was March 23 to March 26, 2024. Microdetection metering studies are designed to determine specific collection system lines that respond significantly to rain events, evident in increased water levels and flows. Results are characterized in units of Gallons per Day per inch-

mile of pipe to determine the priority rating. The priority rating results were determined as severity ratings of good, fair, moderate, and severe. Recommended next steps included smoke testing or CCTV for areas designated as a moderate or severe rating. Manhole inspections were also conducted using a digital camera to analyze the manhole connected pipes. Repair recommendations were made based on the structural or other manhole defects. More specific results of the study can be found in the Duke's Project Findings Reports prepared for the City in 2023 and 2024.

#### **4.2.4 Quantification of Rainfall-Derived Inflow Removal Achieved**

A sewer flow monitoring program was implemented in Spring/Summer 2024 to quantify inflow reduction and to collect data to recalibrate the system's hydraulic model. Flow meters were installed by ADS Environmental Services (ADS) at 10 locations throughout the City, collecting flow data from May 1, 2024 through August 22, 2024.

Similar monitoring programs were conducted in 2010 - 2011, collecting flow data from April 15, 2010 through April 15, 2011 at over 40 monitoring locations as well as in 2019 collecting flow data from February 20<sup>th</sup> through June 16<sup>th</sup> at 11 monitoring locations. In the 2024 program, monitoring locations were chosen that were also used in the 2010-2011 and 2019 programs to provide comparable data to evaluate changes in flow over time. Monitoring locations were also selected based on the amount of inflow removal work performed in the catchment area since 2010, prioritizing areas with greater inflow removal activities. A detailed description of the 2024 monitoring program is contained in **Appendix A**, Newport RDII Analysis 2024 vs. 2010 & 2019 (ADS, 2024).

A map displaying the monitoring locations for the 2024 program is provided in Figure 4-3. The figure also provides the planning-level, percent inflow reduction estimates by catchment included in the Wellington Avenue and Washington Street Sewer System Evaluation Survey Report. Those catchments with the largest amount of potential removable impervious area (i.e., the highest potential inflow volume) are prioritized with higher estimated percent inflow reduction.

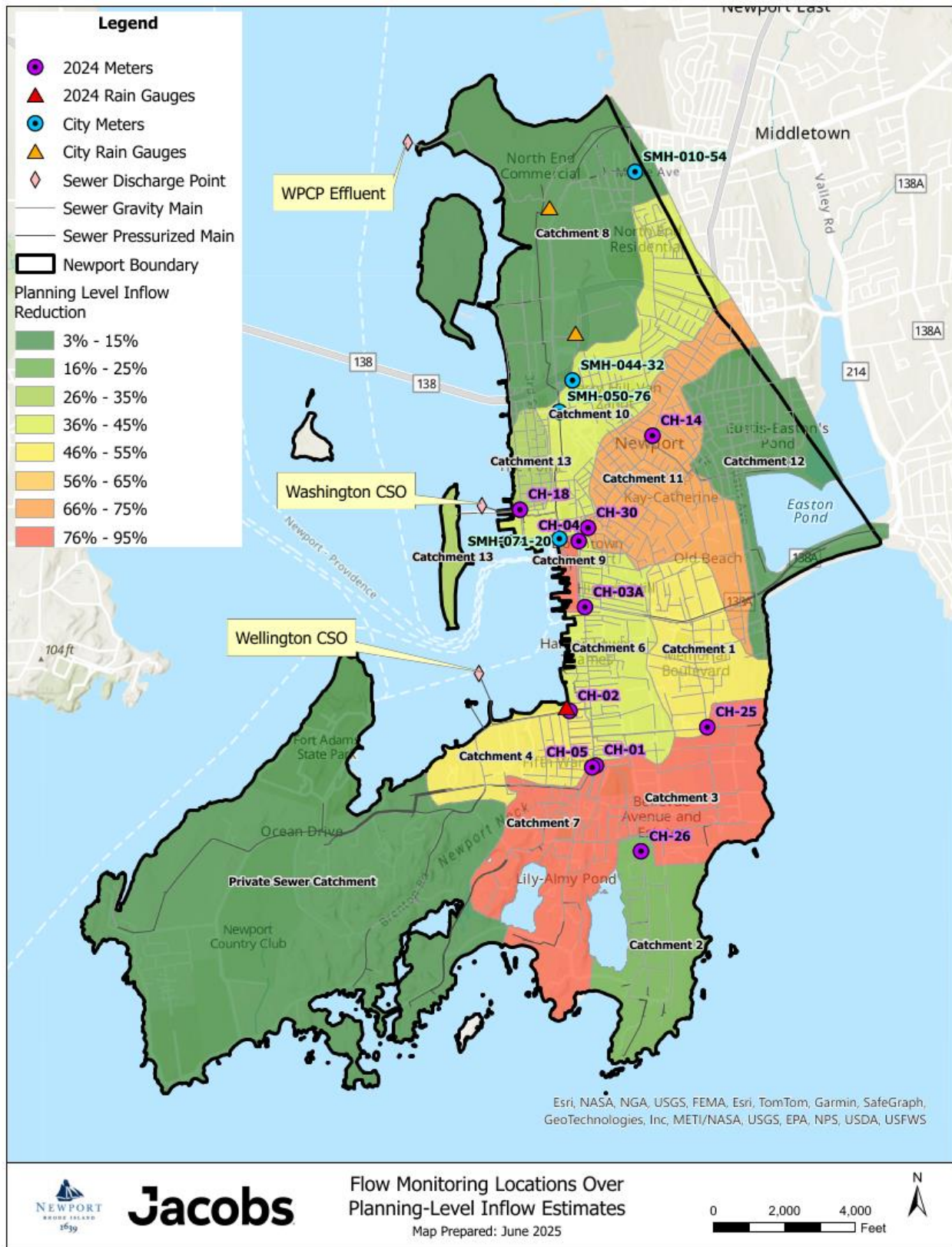


Figure 4-3. 2024 Monitoring Locations over Catchment Planning-Level Inflow Removal Estimates

Results and observations from the flow monitoring data were calculated by ADS using their Sliicer software. Sliicer considers average dry day flow (ADDF) and its components and wastewater production (WWP), while focusing on base infiltration (BI) during dry weather and RDII during wet weather. The analysis conducted a comparison of measured flows during each monitoring year to:

1. Compare the ADDF values to determine if the rehabilitation work resulted in a reduction of BI  
Compare the relationship between rainfall and the resulting RDII total volume to determine if the post-rehabilitation period results in less inflow volume
2. Compare peak RDII rates to determine if the post-rehabilitation demonstrated lower peak flow rates

#### **4.2.4.1 Base Infiltration**

BI is the component of ADDF consisting of groundwater, potable water leaks, springs, and tidal intrusion. For most sites, the highest BI values were in 2019; however, this was also determined to be the wettest hydrologic period of each of the four years. In general, the BI values were relative to the amount of rainfall.

Infiltration related to tidal fluctuations typically occurs directly to sewers and manholes near the harbor. As identified during recent building inspections, basement sump pumps are an additional source of tidal infiltration.

Tidal intrusion into sewers can be identified by cyclic increases in measured flow patterns that appear to be synchronized with tidal cycles. Data from 2010, 2011, 2019 and 2024 at monitoring locations CH-02 and CH-18 suggest that tidal intrusion may still be occurring, but the magnitude is less than it was in prior years. The trench water elevation at CH-18 also showed changes with the tide throughout the study, which indicates a direct connection between the sewer trench and sea water. The improvement in tidal intrusion can be attributed to the work completed on the system between 2010 and 2024, including:

- Wellington Avenue Sanitary Sewer Interceptor Rehabilitation project, constructed in 2011 and included the installation of new sewer manholes and 1,280 feet of new 12-inch ductile iron and 24-inch PVC pipe.
- Marsh Street Storm Drain Improvements project, constructed in 2018 and included installation of a new tide gate at Marsh Street and Washington Street
- Installation of a 48-inch tide gate on the Bridge Street Storm Drain in 2019
- Installation of a 66-inch tide gate on the Wellington Avenue Storm Drain in 2024

#### **4.2.4.2 Rainfall-Derived Inflow and Infiltration**

RDII is calculated by subtracting ADDF from the total measured flow during storm events. Table 4-4 displays the net RDII volumes for each of the 10 monitoring locations in each of the four periods that were monitored. Since the May 15, 2024 storm was such an outlier, the net RDII volumes were also calculated with this storm omitted. For comparison purposes, the 2024 (Sans May 15<sup>th</sup>) data will be used. Figure 4-4 shows the percent of RDII volume reduction for each catchment.

Calculated RDII volumes in 2024 are lower than in 2019 for all monitoring locations where data for both years are available. Majority of the meter locations show greater than 50 percent reduction in RDII when compared to the 2010-2011 values. This suggests that the improvements to the system implemented through the current reassessment period, namely downspout disconnections, catch basin disconnections, and sewer rehabilitation efforts to reduce infiltration, have been very effective in reducing RDII.

**Table 4-4. Projected RDII Volumes for a 1-year, 24-hour Design Storm of 2.85 Inches**

Meter	Catchment	Sewershed	RDII Volume – Projected (MG)					
			2010	2011	2019	2024 <sup>a</sup>	% Reduction 2010-2011 to 2019 <sup>b</sup>	% Reduction 2010-2011 to 2024 <sup>b</sup>
CH-01	3	Wellington	0.46	1.68	1.07	0.86	36%	49%
CH-02	4	Wellington	0.97	2.67	1.21	0.74	55%	72%
CH-04	6	Wellington	0.72	N/A	1.31	0.49	(+45%)	32%
CH-05	7	Wellington	0.44	N/A	0.49	0.27	(+10%)	39%
CH-14	11	Washington	0.43	0.54	0.34	0.21	37%	61%
CH-15	10	Washington	N/A	1.85	0.80	N/A	57%	57% <sup>c</sup>
CH-18	13	Washington	0.23	0.52	0.24	0.12	54%	77%
CH-25	1	Wellington	1.60	2.73	1.30	0.77	52%	72%
CH-26	2	Wellington	0.41	1.00	0.40	0.22	60%	78%
CH-30	11	Washington	2.35	4.85	1.97	1.74	59%	64%

MG = million gallons

Source: CH2M Hill, 2020; ADS, 2024

<sup>a</sup>2024 values exclude the storm on May 15, 2024, which was identified as an outlier for the study period (ADS, 2024)

<sup>b</sup>2010 RDII value used when 2011 value not available

<sup>c</sup>2019 RDII value used when 2024 value not available

The 2024 monitoring data indicates that the City has made significant progress during the current reassessment period at reducing rainfall derived inflow and infiltration to the sewer system. Seven of the ten areas analyzed have already met and exceeded the CD requirement to reduce inflow by 50 percent. However, there are still several portions of the City where 50 percent reduction in inflow has not been achieved or where monitoring data has not yet been collected to support an inflow reduction comparison.

In addition to inflow generated within the City of Newport, the collection system also receives significant wet weather flows from the United States Navy and the Town of Middletown. During wet weather, inflow from their major pump stations can approach three to five times their average dry weather flow. Although efforts taken by these entities support the goals of the CSO program, the level of effort and schedule for inflow removal implemented by the Navy and by the Town of Middletown are not controlled by the City of Newport.

Going forward, the City plans to continue efforts to reduce I/I to the sewer system so that a 50 percent reduction is achieved within the City of Newport. Monitoring data collected during 2024 will be used to target areas that have high inflow volumes and areas where a larger percent removal may be attainable.

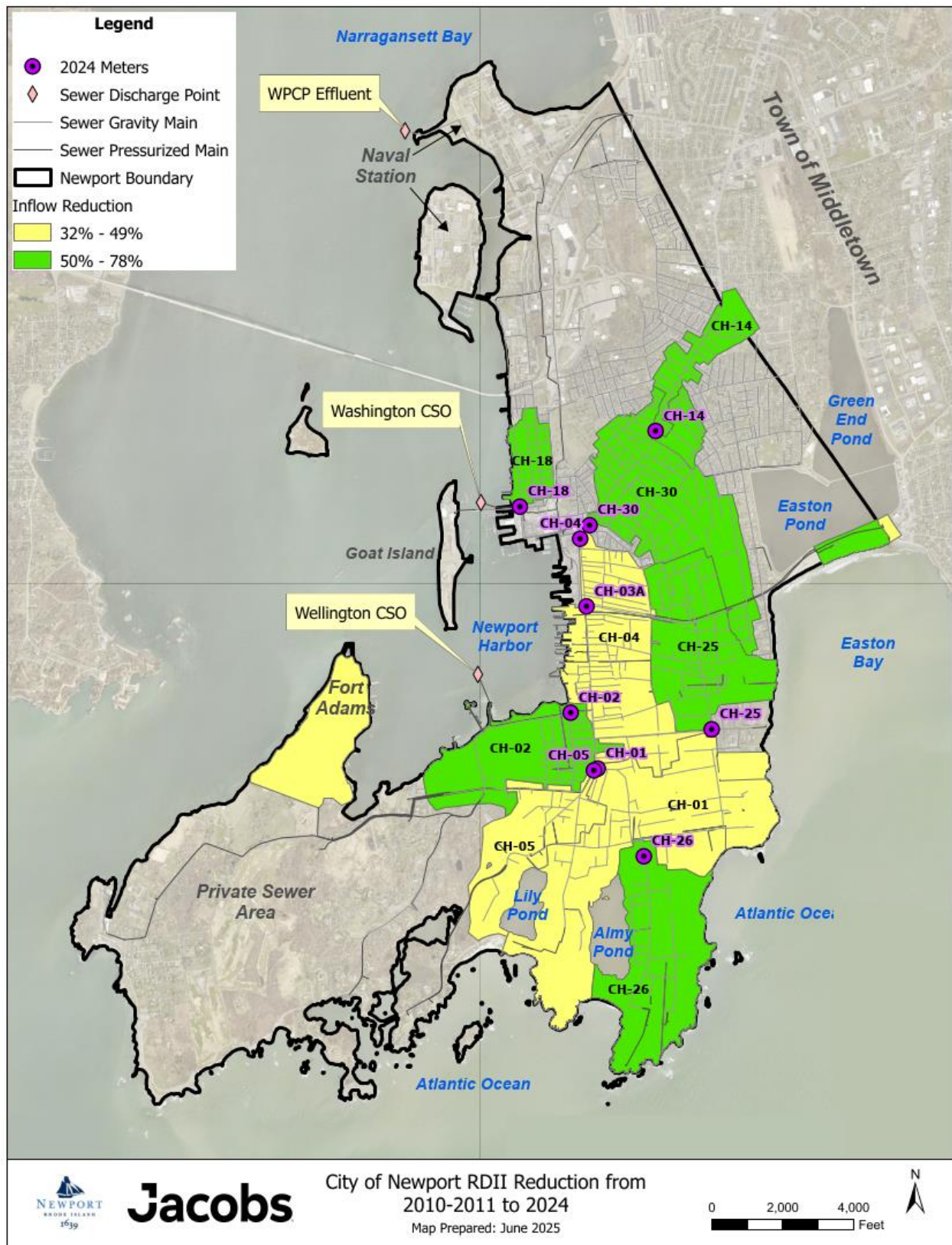


Figure 4-4. RDII Reduction from 2010-2011 to 2024

### 4.3 Progress Toward Achieving CSO Discharge Reductions

The primary objective of the implementation measures outlined in the SMP is to eliminate discharges from the City's two CSO treatment facilities. This section discusses the City's progress toward meeting this goal by evaluating the change in CSO discharges over time and specifically, progress in the past 5 years since the first reassessment period. Progress is evaluated by considering impacts on both CSO discharge volume and frequency.

#### 4.3.1 CSO Discharge Volumes

Discharge volumes from the Wellington Avenue CSO Treatment Facility and Washington Street CSO Treatment Facility are provided in Table 4-5. Total CSO discharge volume for each facility and total rainfall for each year from 2001 through 2024 are shown. Data from Table 4-5 is shown graphically for the Wellington Avenue CSO Treatment Facility and Washington Street CSO Treatment Facility in Figure 4-5 and Figure 4-6, respectively.

Table 4-5. Newport Annual CSO Discharge Volumes Since 2001

Year	Wellington Avenue CSO Discharge Volume (gallons)	Washington Street CSO Discharge Volume (gallons)	Total Rainfall (inches)
2001	59,448,200	42,185,600	43.9
2002	18,654,000	24,300,000	50.0
2003	36,666,000	20,900,000	53.1
2004	13,406,000	14,500,000	50.5
2005	24,152,689	38,472,206	55.6
2006	26,551,419	51,141,367	58.6
2007	13,295,853	13,639,293	41.9
2008	15,030,992	23,187,696	53.8
2009	15,074,870	35,408,803	61.9
2010	31,041,449	92,437,806	52.8
2011	8,096,801	72,720,000	57.7
2012	2,792,384	13,449,600	43.9
2013	9,622,914	31,370,800	45.5
2014	6,076,529	39,405,549	44.3
2015	408,100	15,903,000	41.9
2016	0	0	37.8
2017	0	9,740,000	44.3
2018	0	65,726,016	58.9
2019	0	7,041,016	48.1
2020	0	3,909,008	32.3
2021	1,250,000	8,594,992	39.1
2022	0	1,714,000	39.1
2023	0	2,799,084	41.4
2024	0	23,650,000	44.3

Rainfall data source: Newport WPCP, supplemented by NOAA, 2025

The Wellington Avenue CSO Treatment Facility has only experienced one CSO event since December 2015, which occurred during Hurricane Ida on September 2, 2021. The reduced CSO discharge volumes at Wellington can likely be attributed to the inflow removal efforts and capital improvement projects completed by the City, specifically, the Wellington Pump Station and Long Wharf Pump Station Weir

Improvement project completed in 2014. The Wellington Pump Station Capacity and Force Main Upgrade project was also completed in 2017, further reducing the likelihood of CSO events at this facility.

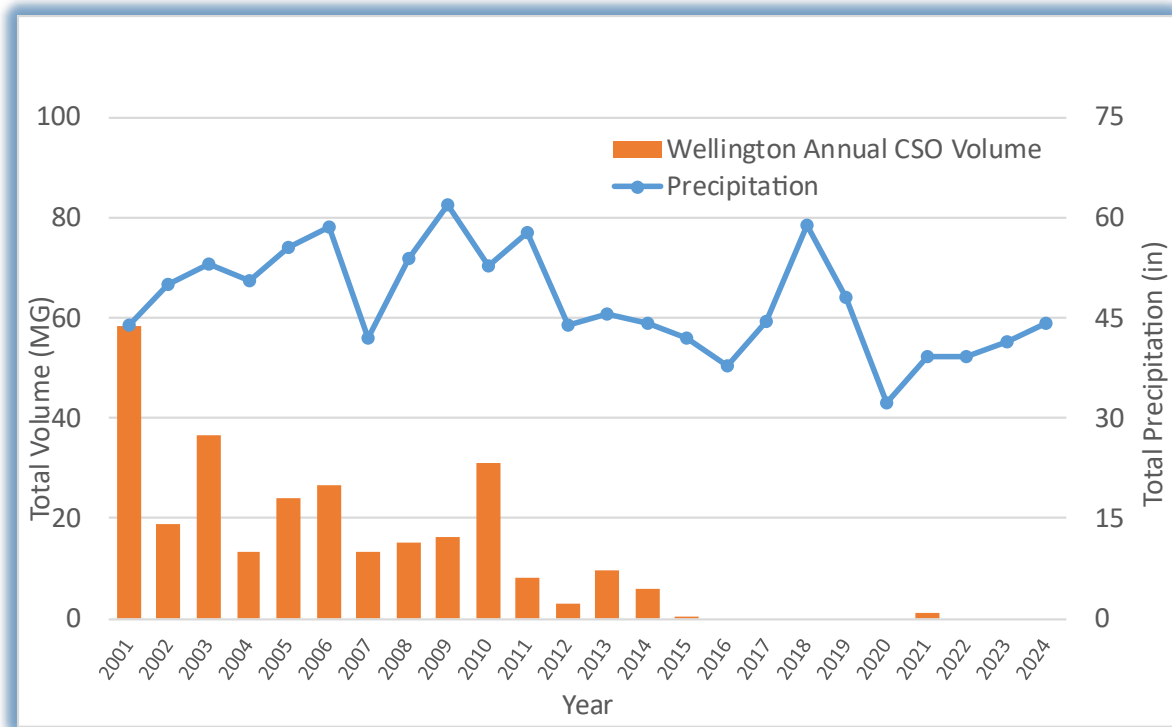


Figure 4-5. Wellington Avenue CSO Treatment Facility Annual CSO Discharge Volumes Since 2001

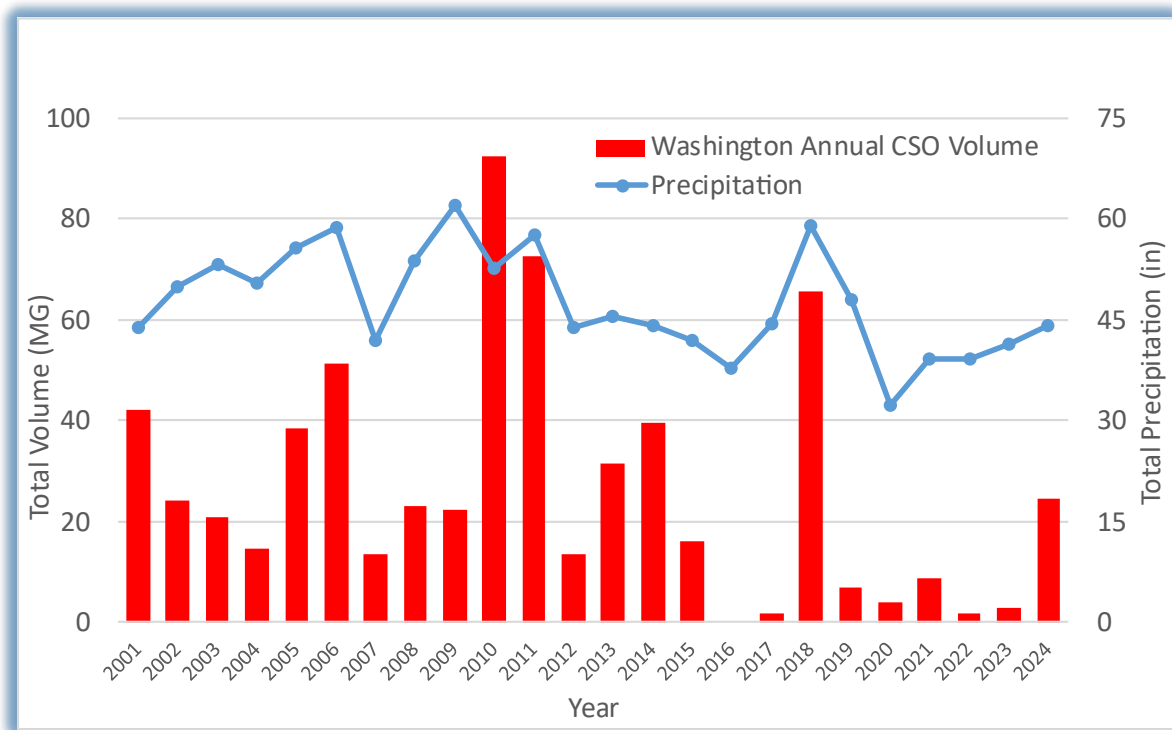


Figure 4-6. Washington Street CSO Treatment Facility Annual CSO Discharge Volumes Since 2001

While the CSO discharge volumes at the Washington Street CSO Treatment Facility have generally declined since the start of SMP implementation in 2014, a spike was seen in 2018. There were two large storm events in 2018 that generated roughly 60 percent of the annual CSO volume that occurred that year. The return period of the 3.26-inch storm event on January 12, 2018 is between a 2-year and a 5-year event, while the return period of the 3.19-inch storm on March 2, 2018 is just under a 2-year event. These were the largest rainfall events since 2014. In addition, the WPCP Wet Weather Capacity Upgrade project was under construction in 2018, which may have impacted system performance.

There was another minor spike in CSO discharge volumes at the Washington Street CSO Facility in 2024, which can likely be attributed to the increased rainfall observed during this year compared to previous years. Three of the six CSO events that occurred at the Washington CSO Facility in 2024 occurred during storms with rainfalls exceeding the 1-year, six-hour design storm (depth = 1.95 inches), the largest of which being the May 16, 2024 event with a total rainfall of 4.46 inches.

The trends for CSO discharge volumes at the Washington Street CSO Treatment Facility were also affected by completion of the capacity improvements at the Wellington Avenue pump station. These improvements convey additional wet weather flows downstream to the Washington Street CSO Treatment Facility. This makes it more challenging for the Washington Street facility to accommodate all flows during wet weather events. It should also be noted that the large events of 2018 occurred prior to completion of upgrades to the City's Wastewater Treatment Plant.

The CSO volume (combined volume for both facilities) per inch of rainfall for each year since 2001 is presented in Figure 4-7. As shown in the graph and the associated trendline, the estimated annual CSO volume per inch of rainfall has decreased by 92% over the duration of the program. As indicated in the graph, the collection system can handle larger rain events as a result of the system improvements and capacity upgrades.

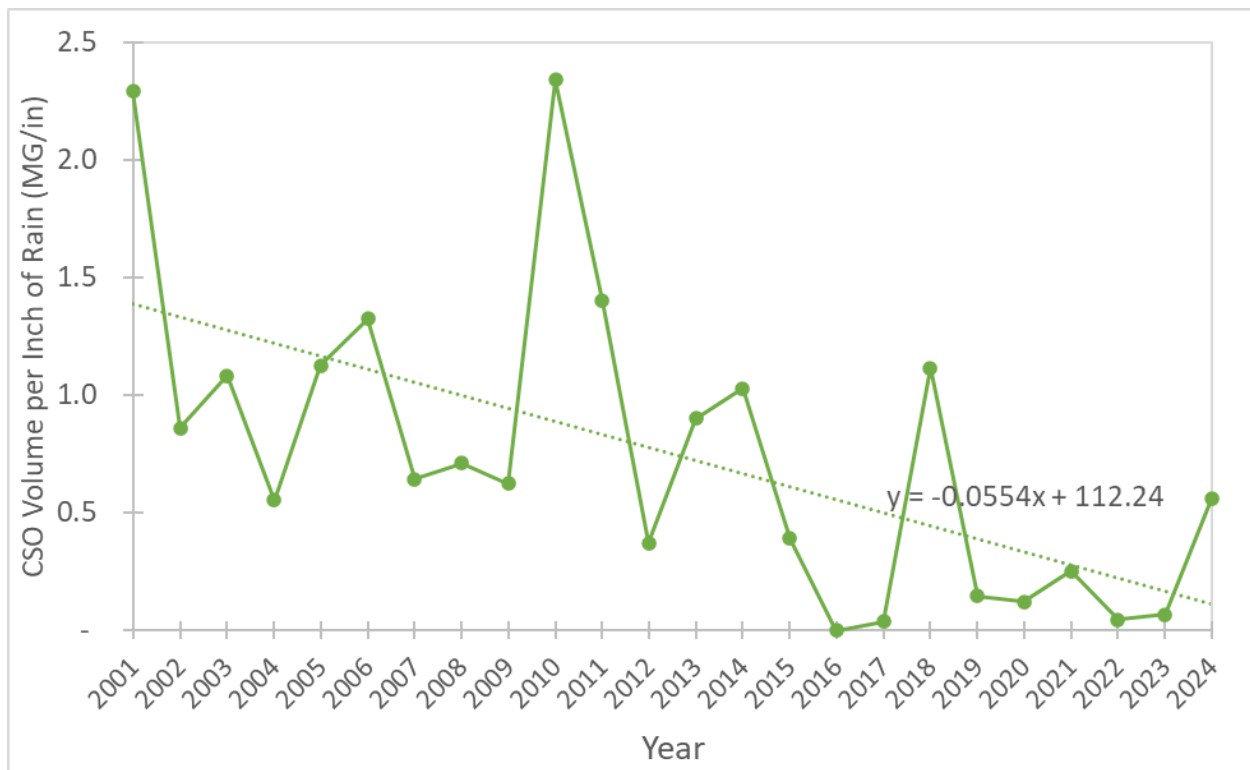


Figure 4-7. Annual CSO Volume per Inch of Rain (Both Facilities)

### 4.3.2 CSO Discharge Frequency

Discharge frequency from the Wellington Avenue CSO Treatment Facility and Washington Street CSO Treatment Facility is provided in Table 4-6. The total number of CSO events for each facility and total rainfall per year from 2001 through 2024 are shown. This data is plotted graphically in Figure 4-8.

As shown in Figure 4-8, the frequency of CSO events has steadily declined since the City began implementation activities from the CSO CAP in 2010. In the past 10 years, since the start of SMP implementation, the annual number of CSO events has dropped even further, with CSOs at the Wellington Avenue facility nearly eliminated entirely since 2015. The near elimination of CSO events at the Wellington Avenue facility can be attributed to the Wellington Avenue Pump Station Capacity and Force Main Upgrade project. The project increased the pumping capacity to 5.5 MGD and the size of the force main to 10-inches. The upgrades were completed in December of 2016 (ahead of schedule) coinciding with the first year of five continuous years of an absence of CSO activations at the Wellington Avenue CSO Treatment Facility.

**Table 4-6. Newport Annual CSO Discharge Events Since 2001**

Year	Wellington Avenue CSO Discharge Events	Washington Street CSO Discharge Events	Total Rainfall (inches)
2001	25	6	43.9
2002	20	11	50.0
2003	26	11	53.1
2004	13	7	50.5
2005	16	17	55.6
2006	16	12	58.6
2007	12	10	41.9
2008	16	8	53.8
2009	26	24	61.9
2010	17	9	52.8
2011	20	16	57.7
2012	6	5	43.9
2013	10	10	45.5
2014	6	6	44.3
2015	2	3	41.9
2016	0	0	37.8
2017	0	5	44.3
2018	0	10	58.8
2019	0	5	48.1
2020	0	2	32.3
2021	1	1	39.1
2022	0	1	39.1
2023	0	2	41.4
2024	0	6	44.3

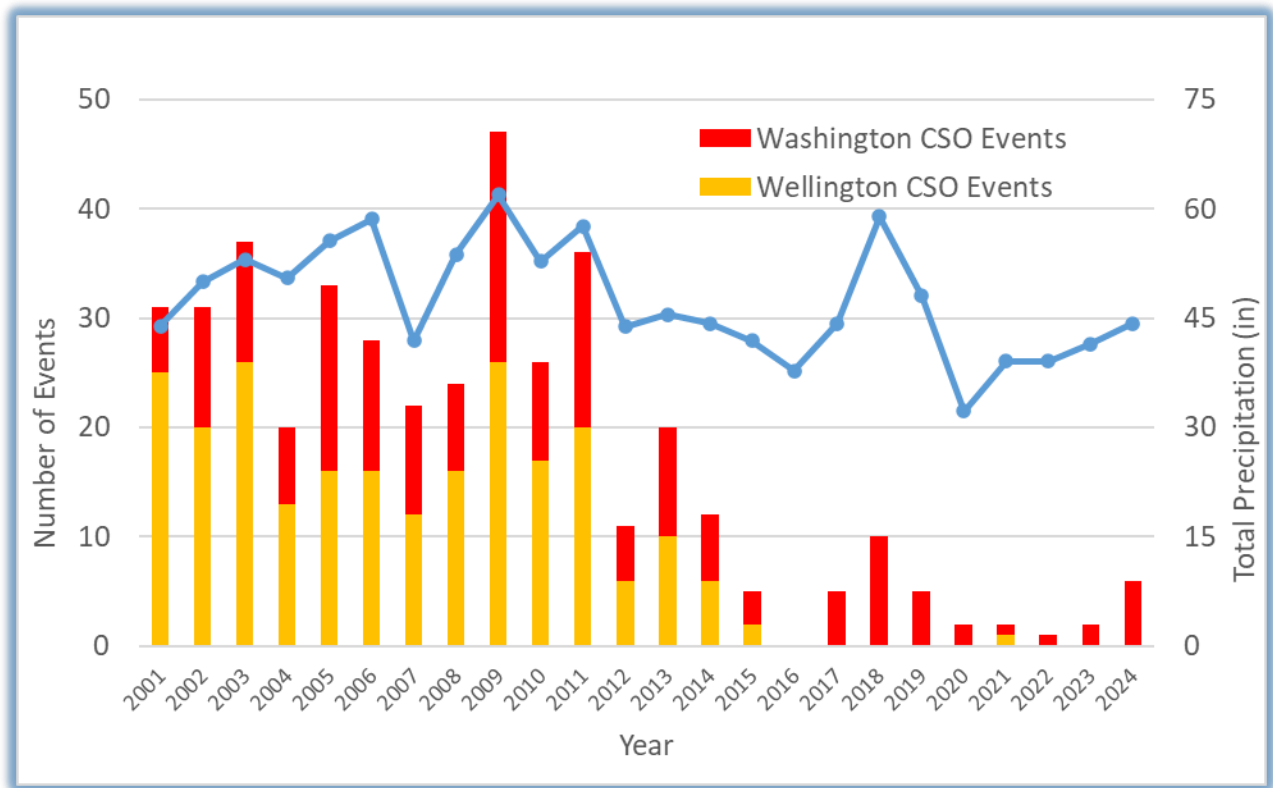


Figure 4-8. Newport Annual CSO Discharge Events Since 2001

#### 4.4 Progress Toward Achieving Model Projected Design Storm and Typical Year CSO Discharge Estimates

To support the reevaluation of interim goals related to design events and the typical year, the hydraulic model of the City’s collection system was updated to reflect construction projects completed subsequent to the development of the SMP. The hydrologic components of the model were also updated to address the inflow removal activities completed by the City during this same time period. Data collected during the 2024 flow monitoring program were used to identify changes in the system’s performance and to recalibrate the model to align with recently observed conditions.

As summarized in Section 4.3, significant reductions in CSO events and volumes have occurred at both CSO treatment facilities. The recalibrated model simulates these improvements; however, as noted in the previous Reassessment Report (CH2M, 2020), there is a gap in performance at the LWPS. Models used for the SMP indicated that the LWPS would deliver a peak rate of 24 MGD during wet weather. The peak flows observed at the LWPS have recently ranged between 19 and 20 MGD. This gap is currently being addressed by the LWPS Improvements Project, which is currently under construction and is expected to be completed in November 2025. This project will increase the capacity of the LWPS from 20 to 27 MGD. This project is not reflected in the 2024 recalibrated model since it is not yet complete. The hydraulic model will be updated in 2025 to project how the system will respond after these improvements are complete.

For this report, the updated model was used to evaluate progress toward reducing CSOs for design storms and the typical year. Results from the model updated in 2024 were compared with the interim goals for the CSO program described in the Quantification of Early SMP Improvements Technical Memorandum

(CH2M, 2013). That memorandum summarized data for: the conditions that existed in 2012, the 2033 full implementation scenario C1A from the SMP and an interim condition for progress expected through 2019. Reductions in CSOs were calculated for the Wellington Avenue CSO Treatment Facility and the Washington Street CSO Treatment Facility. Simulations were performed for the 2-year, 5-year, and 10-year, 6-hour design storm events, and the typical year.

Progress toward reducing CSOs for the design events is shown in Table 4-7. Table 4-8 presents progress towards the volumes and frequency targets established for a typical year.

**Table 4-7. Model Projected CSO Discharge Volumes for Design Events – Comparison to Established Model Targets**

Modeled Scenario	CSO Discharge Volumes (MG)					
	2-year, 6-hour event		5-year, 6-hour event		10-year, 6-hour event	
	Wellington	Washington	Wellington	Washington	Wellington	Washington
2012 Existing Conditions Model	1.29	3.24	1.83	5.05	2.71	6.76
C1A	0	0	0	0	0	0.19
Target by FY2019	0	0.12	0	1.19	0.20	2.53
2019 Calibrated Model	0.35	1.44	0.54	2.95	1.09	4.42
2024 Calibrated Model	0.05	1.21	0.08	2.08	0.15	3.33

Source for existing conditions and targets: Collection System Capacity Assessment and System Master Plan (CH2M, 2012) and Quantification of Early SMP Improvements Technical Memorandum (CH2M, 2013)

**Table 4-8. Model Projected CSO Discharge Volumes and Frequency for the Typical Year – Comparison to Established Model Targets**

Modeled Scenario	Number of CSO Events		Total CSO Discharge Volume (MG)		Percent CSO Reduction (compared to Existing Conditions)	
	Wellington	Washington	Wellington	Washington	Wellington	Washington
2012 Existing Conditions Model	12	12	11.1	27.7	N/A	N/A
C1A	0	0	0	0	100%	100%
Target by FY2019	0	3	0	1.83	100%	93.4%
2019 Calibrated Model	1	5	0.4	4.9	97%	82%
2024 Calibrated Model	1	4	0.05	5.82	99.5%	79%

Source for existing conditions and targets: Collection System Capacity Assessment and System Master Plan (CH2M, 2012) and Quantification of Early SMP Improvements Technical Memorandum (CH2M, 2013)

The model-based exercise demonstrates the significant reductions in CSO discharges that has occurred since 2012. Although the City plans to use the hydraulic model to evaluate the system's performance and

future improvements, quantification of CSO reductions should consider limitations typical to the simulation of complex urban infrastructure and natural processes.

## 4.5 Progress Toward Achieving Water Quality Benefits

An evaluation of water quality in Newport Harbor was performed as part of the Newport CSO LTCP Implementation Project in 2012. The evaluation consisted of a review of available water quality data, CSO statistics, and rainfall to characterize the effects of CSOs on water quality in Newport Harbor, as well as to assess the potential benefits of implementing additional CSO controls in the City. The analysis evaluated water quality data from October 2008 through 2011. Findings from the 2012 study showed that bacteria (i.e., enterococci) exceedances were observed at the outfalls of the CSO treatment facilities for 8 of the 12 CSO events recorded over the analysis period (33 percent compliance); however, samples collected 6 hours later resulted in only 3 exceedances (75 percent compliance). This suggests that water quality exceedances due to CSOs were diluted by natural flushing that occurs through tidal cycles.

The study also noted bacteria exceedances at monitoring stations throughout the harbor during both dry weather and wet weather events when no CSO occurred. This suggests that CSOs are not the sole cause of poor water quality in the harbor. The study indicated that additional CSO controls and measures to reduce overflows into the harbor would improve water quality; however, since degraded water quality also results from other factors, such as stormwater runoff and dry weather point source pollution, it may not be cost effective to focus efforts solely on further CSO improvements while other potentially larger water quality degradation contributors persist. The complete report is provided in Appendix B of the SMP (CH2M, 2012).

This section of the report serves as an update to the 2012 water quality analysis based on monitoring data collected in Newport Harbor since the start of the CSO Program and evaluates progress toward achieving water quality benefits associated with implementation of the SMP.

### 4.5.1 Newport Harbor Water Quality Goals

The Newport Harbor water quality goals support the attainment of State of Rhode Island water quality standards and comply with EPA CSO policy. CSOs are not to degrade water quality such that they fail to meet water quality standards set by RIDEM. Newport Harbor water quality classifications are shown in Figure 4-9; SB designation applies to nearly all immediate Harbor locations. According to RIDEM, SB waters are “designated for primary and secondary contact recreational activities; shellfish harvesting for controlled relay and depuration; and fish and wildlife habitat. They shall be suitable for aquacultural uses (other than shellfish for direct human consumption), navigation, and industrial cooling. These waters shall have good aesthetic value.” Designated uses for Newport Harbor waters include primary and secondary contact recreation, fish consumption, fish and wildlife habitat, and shellfish controlled relay and depuration.

Based on the 2024 Rhode Island Impaired Waters Report (finalized in April 2024), the attainment status of the Newport Harbor waters is either “fully supporting,” “not assessed,” or “insufficient information” for all uses, with the exception of those areas immediately adjacent to the City (RIDEM, 2024), as depicted in Figure 4-9. The cause of the impairment for Area 1 is enterococcus. The cause of the impairment for Area 2 is related to a hazardous waste site, where remediation is underway.

The water quality standards that are protective of designated uses for Newport Harbor classifications are summarized in Table 4-9. Enterococci (or fecal coliform when adequate enterococci data are not available) is the pathogenic indicator used due to the recreational nature of the harbor and is the main parameter used in this water quality analysis to evaluate water quality exceedances.

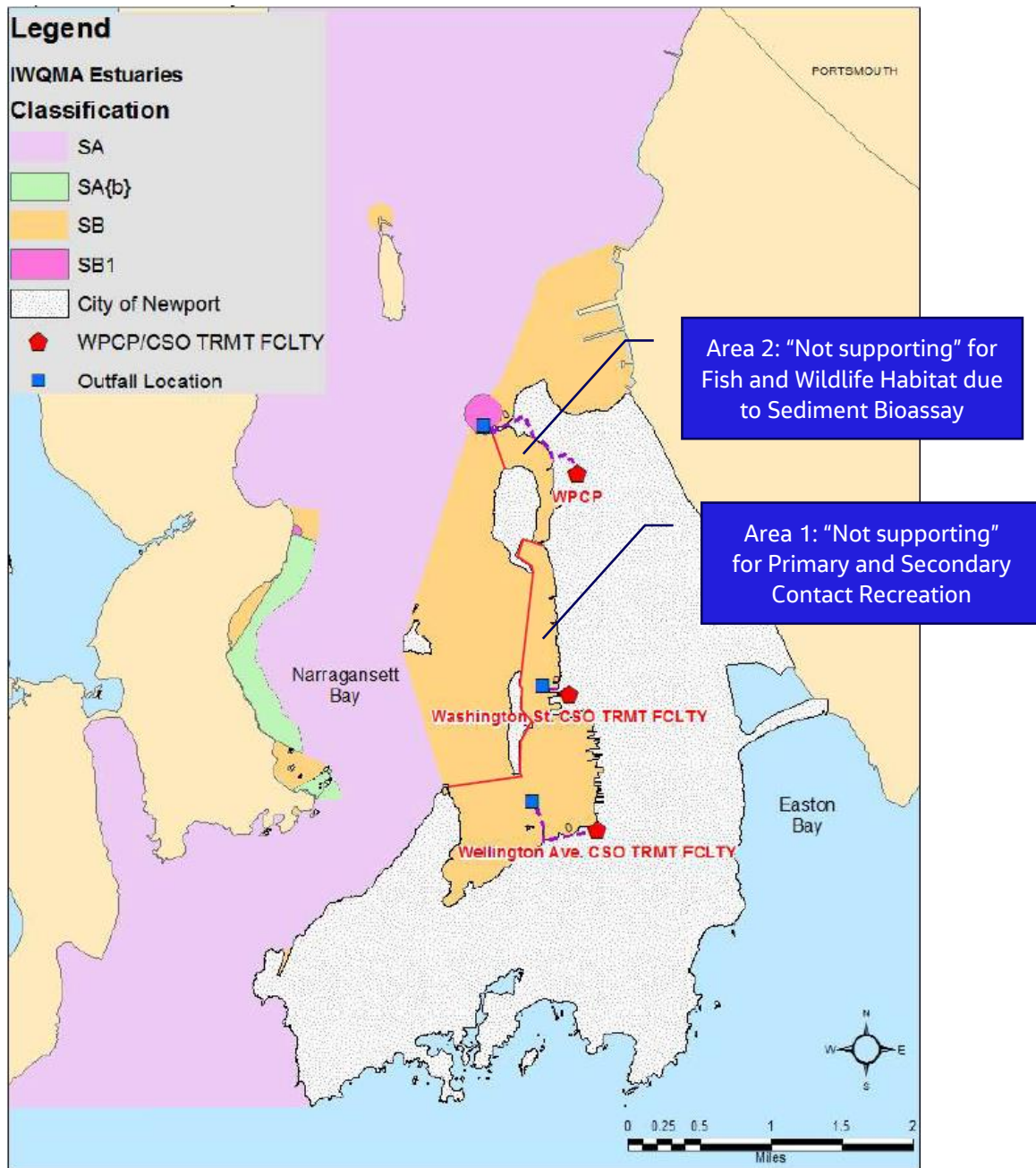


Figure 4-9. Newport Harbor Water Quality Classification

**Table 4-9. Seawater Class-Specific Water Quality Standards**

<b>Classification</b>	<b>Enterococci</b>	<b>Fecal Coliform (Shellfishing)</b>	<b>Fecal Coliform (Primary Contact Recreational)</b>	<b>DO</b>
SA	Geometric Mean Density: 35 colonies/100 mL	Geometric Mean: 14 MPN 10% of Samples: 31MPN	Geometric Mean: 50 MPN/100 mL	Varies from 2.9 to 4.8 mg/L daily based on Seasonal Pycno- cline
SB, SB1	Single Sample Maximum: 104 MPN/100 mL		10% of Samples: 400 MPN/100 mL	
SC	None in such concentrations that would impair any usages specifically assigned to this class			

Source: RIDEM 2025 Water Quality Regulations  
mL = milliliter(s)

### 4.5.2 Receiving Water Quality Characterization

As water quality is important to the vitality of the harbor, it is necessarily monitored by multiple agencies. The City has been conducting a Harbor Monitoring Program since 2008. Through this program, the City collects water quality samples weekly at ten monitoring locations in the harbor. Figure 4-10 shows the location of the sampling sites.

The City also collects water quality samples during CSO discharge events, as well as 6 hours after a CSO discharge event, at the two harbor monitoring locations nearest to the CSO treatment facility outfalls (Sites 6-24 and 6-27). Samples are collected at monitoring locations 6-24 and 6-27 for at least two CSO events per year.

The following parameters are analyzed for each sample collected: fecal coliform, enterococci, biochemical oxygen demand (BOD), total suspended solids (TSS), total Kjeldahl nitrogen (TKN), organic nitrogen, and ammonia. Of these indicators, enterococci is the primary factor used to characterize overall water quality health and dictate beach closures.

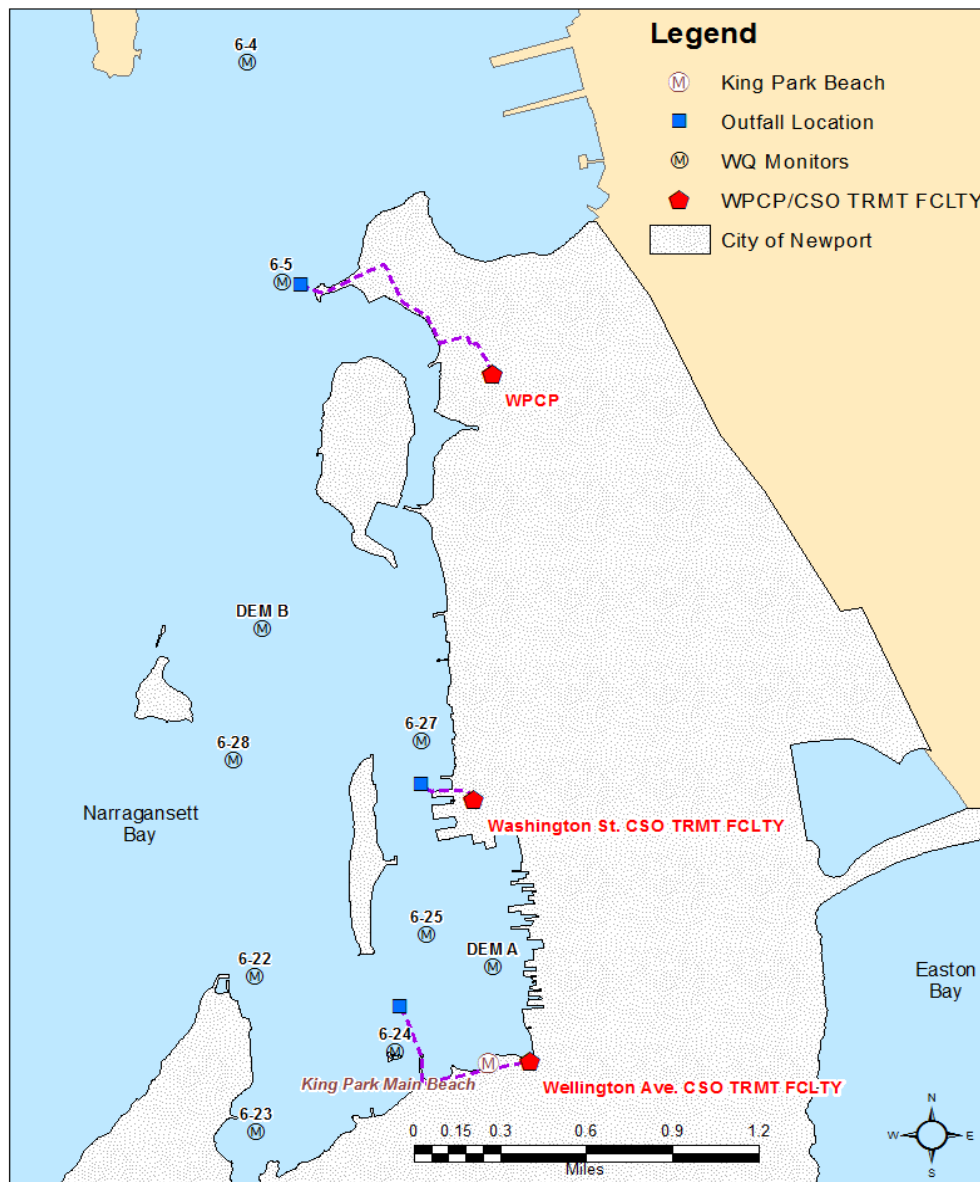


Figure 4-10. City of Newport Water Quality Sampling Locations

#### 4.5.2.1 Newport CSO Event Monitoring Water Quality Data

This section summarizes the monitoring data collected by the City during at least two CSO discharge events per year and 6 hours after these events, at the two harbor monitoring locations nearest to the CSO treatment facility outfalls (Sites 6-24 and 6-27).

Table 4-10 summarizes the combined enterococci exceedances recorded during CSO events at both CSO facility outfall monitoring locations combined (Sites 6-24 and 6-27) for 2012 through 2024. For the entire program since 2012, 18 enterococci exceedances were observed in the 23 wet weather CSO events sampled (22 percent compliant). However, the same measurements performed 6 hours later resulted in only three enterococci exceedances (87 percent compliant). For the current reassessment period since 2019, no exceedances were observed in the measurements performed 6 hours after a CSO (100%

compliance), indicating improvement over time. Note that not all CSOs were sampled; the City is required to sample CSOs twice per year.

Prior to 2016, all CSO discharges from the Washington Street CSO Treatment Facility were treated with chlorination. In 2016, the City completed treatment improvements to the facility which included the addition of a dechlorination system. The dechlorination system serves to remove residual chlorine from the disinfected wastewater prior to discharge into the harbor.

**Table 4-10. Newport CSO Event Monitoring Data – Enterococci Exceedances**

Year	Total # of CSO Events	Samples Collected During CSO Events	CSO Enterococci Exceedances	Samples Collected 6 Hours after CSO Events	Post-CSO Enterococci Exceedances	Months Sampled
2012	11	4	4	4	1	May, December
2013	20	4	4	4	2	November, December
2014	12	4	2	4	0	March, December
2015	5	2	2	2	0	December
2016	0	N/A	N/A	N/A	N/A	N/A
2017	5	2	2	2	0	March, April
2018	10	2	1	2	0	February, March
2019	5	1	1	1	0	December
2020	2	1	1	1	0	December
2021	2	0	N/A	0	N/A	N/A
2022	1	0	N/A	0	N/A	N/A
2023	2	1	0	1	0	January
2024	6	2	1	2	0	April, May
<b>Total</b>	<b>81</b>	<b>23</b>	<b>18</b>	<b>23</b>	<b>3</b>	<b>-</b>

Note: No CSOs occurred in 2016 and no CSO-related sampling event data was collected for 2021 and 2022 (2021 CSOs occurred during Hurricane Ida and the only CSO in 2022 occurred early in the year in February).

N/A = not applicable

#### 4.5.2.2 Newport Weekly Harbor Monitoring Program Water Quality Data

This section summarizes the data collected by the City on a weekly basis at the ten monitoring locations in the Newport Harbor as part of the Harbor Monitoring Program.

Using enterococci as the metric for measuring overall water quality, water quality standard exceedance graphs were developed for each of the ten monitoring locations for samples collected from 2012 through 2024. Figure 4-11 and Figure 4-12 show the water quality exceedance graphs for the two sampling locations closest to the CSO treatment facility outfalls (Site 6-24 for Wellington Avenue CSO Treatment Facility outfall and Site 6-27 for Washington Street CSO Treatment Facility outfall). The graphs for the remaining harbor sampling locations are included for reference in **Appendix B**.

Enterococci sample results and exceedance limits for geometric mean (35 MPN/100 mL sample volume) and single sample maximum (104 MPN/100 mL sample volume) are shown in the figures. The figures

also show CSO discharge volumes from each facility. The CSO volumes are recorded by the City along with the corresponding rainfall volume in the City's Discharge Monitoring Reports.

In Figures 4-11 and 4-12, the points above the blue dashed line represent exceedances of the single sample maximum enterococci value. Points highlighted by orange triangles represent exceedances associated with a CSO (i.e., exceedances associated with samples collected 0 to 2 days after a reported CSO event). Points highlighted by blue squares represent wet weather exceedances not associated with a CSO. Points highlighted by purple circles represent dry weather exceedances (i.e., exceedances associated with samples collected with no measurable rain recorded within 48 hours prior to sample collection).

These graphs indicate that water quality standard exceedances occur both as a result of CSOs and in the absence of CSOs, during normal wet weather events. Other harbor monitoring locations (i.e., 6-22 and DEM-A) also show dry weather exceedances. Figures 4-11 and 4-12 also show enterococci values well below exceedance limits (for single sample maximum and geometric mean) within days of small and large CSO events. As an example, on March 30, 2014 through April 2, 2014, there was a rain event greater than 4 inches that resulted in CSO discharges of 3.8 MG at Wellington and 27.6 MG at Washington. Sampling conducted on April 1, 2014 resulted in zero exceedances at all ten monitoring locations, with all enterococci recordings below 20 MPN.

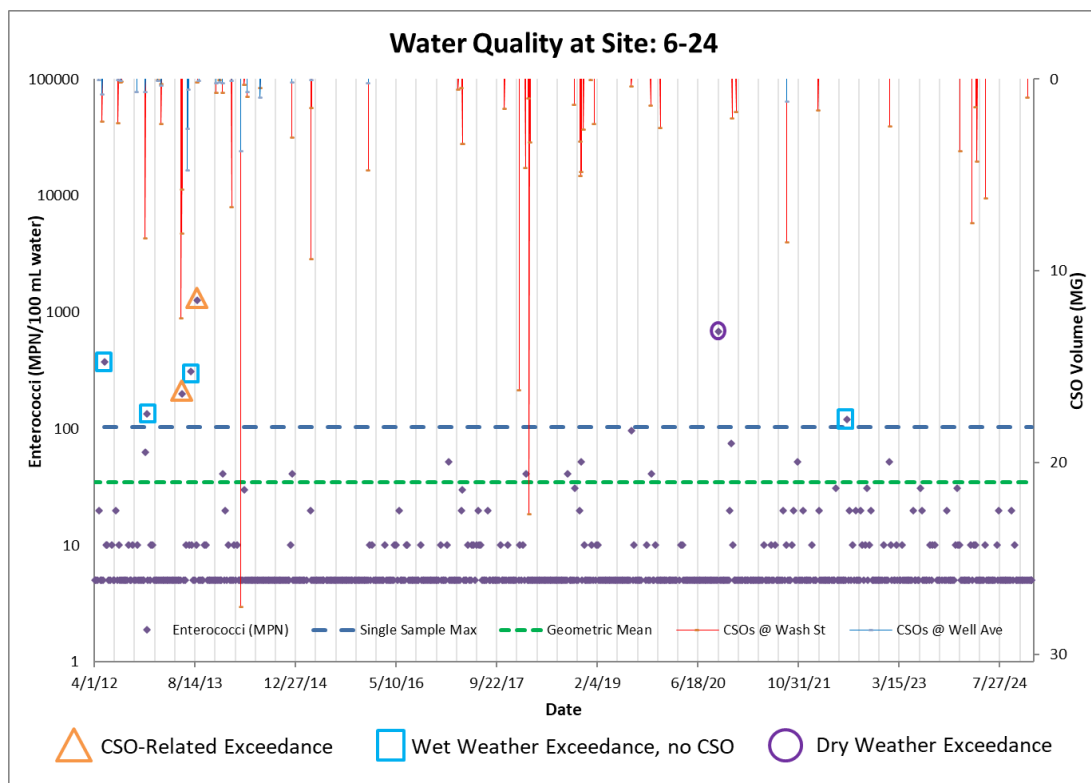
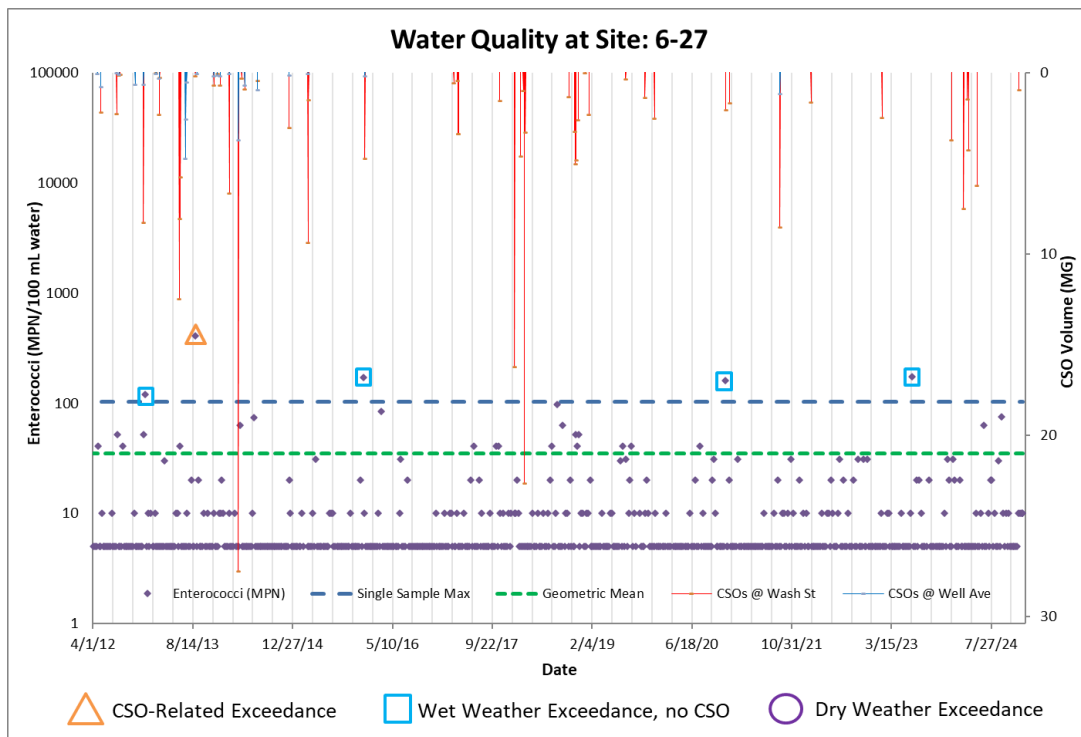


Figure 4-11. Weekly Harbor Monitoring Data – Enterococci Levels in Relation to CSOs at Site 6-24 (Near Wellington Ave. CSO Treatment Facility)



**Figure 4-12. Weekly Harbor Monitoring Data – Enterococci Levels in Relation to CSOs at Site 6-27 (Near Washington Ave. CSO Treatment Facility)**

As part of the data collected from the weekly sampling program, there have been no enterococci exceedances above the single sample maximum associated with a CSO event since August 27, 2013 at either of these two monitoring sites.

Table 4-11 shows a summary of annual enterococci exceedances in relation to rainfall and CSOs based on the City's weekly harbor monitoring data collected from 2012 through 2024. Out of the 63 total exceedances observed, 38 exceedances, or 60 percent of the exceedances, were observed in the absence of a CSO. For 7 of the 13 years monitored, more exceedances were observed during wet weather (but no CSO event) than the exceedances that occurred within 2 days of a CSO.

Several other water quality indicators are consistently measured throughout the harbor, including fecal coliform, BOD, TSS, and TKN. Table 4-12 tabulates the ranges and averages for these data based on 671 weekly samples from 2012 through 2024. While an abundance of data is available for these parameters, this study focuses on enterococci as the primary water quality metric.

**Table 4-11. Annual Enterococci Exceedance Summary for Harbor Waters with Background Weather Conditions**

Year	Total Samples Collected	Total Enterococci Exceedances <sup>a</sup>	Enterococci Exceedances Associated w/Rainfall (but No CSO Event)	Enterococci Exceedances Preceded by 24+ hours of Dry Weather	Enterococci Exceedances 0 to 2 days after a CSO Event
2012	520	10	5	2	3
2013	530	16	3	0	13
2014	520	2	1	0	1
2015	500 <sup>b</sup>	1	1	0	0
2016	520	1	1	0	0
2017	520	6	4	0	2
2018	510 <sup>b</sup>	4	1	0	3
2019	500	5	2	1	2
2020	520	6	3	3	0
2021	520	0	0	0	0
2022	510	1	1	0	0
2023	500	2	1	0	1
2024	540	9	8	1	0
<b>Total</b>	<b>6710</b>	<b>63</b>	<b>31</b>	<b>7</b>	<b>25</b>

<sup>a</sup> Total enterococci exceedances is the sum of all exceedances at the monitoring stations for the entire year. For example, in 2016 there was only one exceedance recorded at any of the monitoring stations (Site DEM-A).

<sup>b</sup> A small number of samples were not collected during periods when the harbor was iced over.

**Table 4-12. Ranges and Median Values for Various Water Quality Indicators across all Harbor Sites**

Parameter	Fecal Coliform (MPN)	BOD <sub>5</sub> (mg/L)	TSS (mg/L)	TKN (mg/L as N)
Max	1600	18	80	4.7
Min	1	4	2	0.1
Median	1	6	4	0.2

### 4.5.2.3 Newport MS4 Program Stormwater Outfall Sampling Data

Table 4-13 summarizes the number of bacteria exceedances relative to the total number of samples based on the City's MS4 stormwater outfall sampling data collected seasonally from 2012 to 2024. Overall, the percentage of exceedances has remained relatively high, averaging around 53% across all years. There is a general increase in the number of samples taken over time, particularly in the spring, reflecting increased monitoring efforts. Exceedance rates fluctuate year to year, with the lowest exceedances rate observed in 2013 (38%) and the highest exceedance rate observed in 2017 (73%). Fall seasons often show higher exceedance rates despite fewer samples, such as in 2019 and 2023, where all or nearly all fall samples exceeded limits.

**Table 4-13. MS4 Stormwater Outfall Sampling Data Summary**

Year	Season	Total No. of Samples	No. of Exceedances <sup>1</sup>	% Exceedances by Year
2012	Spring	2	1	50%
	Fall	2	1	
2013	Spring	3	1	50%
	Fall	1	1	
2014	Spring	7	2	38%
	Fall	1	1	
2015	Spring	3	1	40%
	Fall	2	1	
2016	Spring	6	2	44%
	Fall	3	2	
2017	Spring	8	6	73%
	Fall	7	5	
2018	Spring	12	7	58%
	Fall <sup>2</sup>	-	-	
2019	Spring	14	4	47%
	Fall	5	5	
2020	Spring	10	5	50%
	Fall	6	3	
2021	Spring	9	3	50%
	Fall	5	4	
2022	Spring	9	4	57%
	Fall	5	4	
2023	Spring	7	1	57%
	Fall	8	7	
2024	Spring	6	3	58%
	Fall	6	4	
<b>Total</b>		<b>147</b>	<b>78</b>	<b>53%</b>

<sup>1</sup> Exceedances include bacteria samples over 104 MPN.

<sup>2</sup> Data not available for Fall 2018.

The City's MS4 stormwater outfall sampling data has shown that bacteria exceedance rates have remained consistently high (averaging over 50%) since 2012. Similar to the harbor monitoring data presented in the previous section, the MS4 sampling data supports that CSOs are not the sole contributors to water quality issues in the harbor. The data indicates that stormwater runoff may be a significant and consistent source of bacterial contamination. As such, the City plans to incorporate an integrated adaptive management approach towards addressing water quality issues during the next phase of the CSO Program, which is discussed further in the section below.

### 4.5.3 Harbor Water Quality Summary

As noted in the 2012 study, water quality monitoring conducted during the current reassessment period continues to show that bacteria exceedances occur during a range of conditions including CSO events, wet weather without CSOs, and even dry weather. Of the 63 exceedances observed in this study, 60% occurred in the absence of a CSO, a trend consistent with the 2012 findings (where 42% of exceedances were unrelated to CSOs). These results reinforce that CSOs are not the sole source of water quality impairments. Other contributors include stormwater runoff (particularly fecal contamination from birds) and localized dry-weather sources such as illegal boat discharges.

Importantly, the data also shows that water quality at CSO outfall locations tends to recover quickly following discharge events. In this reassessment period since 2019, 100% of samples collected six hours after a CSO event met water quality standards, compared to 75% in the 2012 study and 83% in the previous 2019 reassessment. This steady improvement over time can likely be attributed to the City's continued progress towards its CSO LTCP implementation.

Further evidence of progress is seen in the declining number of CSO-related exceedances. Of the 25 exceedances recorded within two days of a CSO event, 24 occurred between 2012 and 2019. Only one such exceedance has been recorded in the past five years. In contrast, 94% of exceedances during this period occurred without a CSO, and 72% were associated with rainfall alone – highlighting stormwater as a persistent and significant contributor to bacterial contamination in Newport Harbor. This conclusion is supported by the City's MS4 stormwater outfall sampling data, which has shown consistently high bacteria exceedance rates averaging approximately 53% since 2012.

In response, the City is shifting its focus for the next reassessment period toward a more integrated water quality approach, with stormwater management as a central priority. The City has identified stormwater water quality improvements as a key priority for upcoming years, as indicated in the City's FY26-FY30 CIP which includes \$1.45 Million budgeted for MS4 Water Quality Improvements over the next 5 years (Newport, 2025).

As part of this next phase, the City plans to adopt an adaptive management approach towards water quality improvements, testing and evaluating a range of strategies to determine which provide the greatest benefit. This flexible, data-driven approach will allow the City to refine its efforts over time based on observed outcomes. Initial strategies are expected to include implementing blue-green infrastructure solutions (such as the Elizabeth Brook Resiliency Project), implementing treatment at problem stormwater outfalls, enhancing the City's MS4 program, and launching public education initiatives. These outreach efforts will aim to explain the limitations of fully eliminating CSOs, particularly in light of more frequent and intense storms, and raise awareness of other sources of water quality issues that occur during both wet and dry weather conditions.

## 5. Updated Financial Capability and Affordability Analysis

An updated Financial Capability Assessment (FCA) was completed for the City of Newport in 2023-2024. **Appendix C** includes a technical memorandum with additional detail regarding the FCA update. This section will summarize the key findings and results.

Driven by its commitments to improving water quality, the City of Newport has historically had one of the highest sewer use rates in Rhode Island. Based on the 2024 Sewer Rate Survey, summarized in Figure 5-1, for the State of Rhode Island (Narragansett Bay Commission, 2024) Newport was among those with the highest rates out of the 21 communities surveyed. Sewer charges in Newport are 29% greater than its neighboring community, Middletown, and 74% greater than the State average.

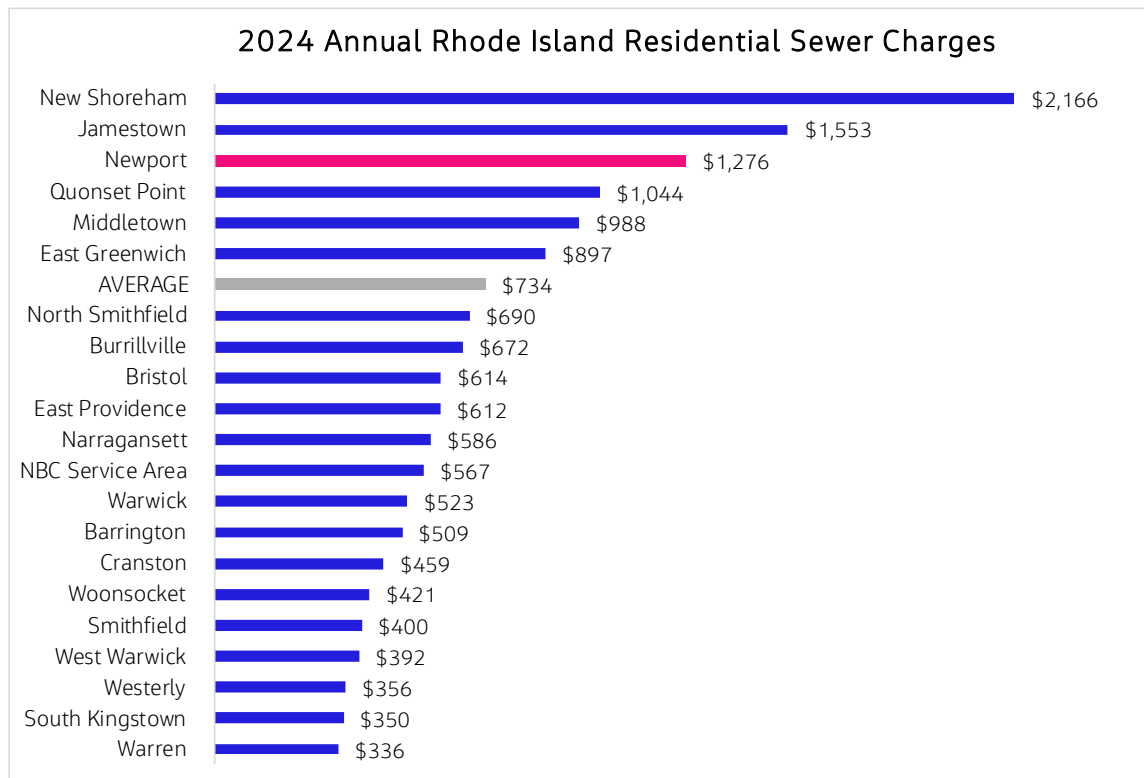


Figure 5-1. Summary of Rhode Island Sewer Charges

The intent of this FCA update is to address the impacts of recently completed projects and other changed financial conditions within the City that affect affordability. The update was completed in accordance with EPA's 2023 *Clean Water Act Financial Capability Assessment Guidance* (2023 FCA Guidance). Previous FCA updates for Newport were completed using EPA's 1997 *Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development* (1997 FCA Guidance). The update also addresses industry guidance developed by AWWA, WEF, and NACWA subsequent to the preparation of the 2019 analysis. This guidance includes consideration of measures in addition to MHI such as *poverty level* and *income distribution* to better quantify the effects of sewer rates on all customers.

## 5.1 Approach to Financial Capability Analysis

In February 2023 EPA finalized and published its new guidance for Financial Capability Assessment (FCA) related to implementation of long-term control plans pursuant to the Clean Water Act (CWA). The new guidance provides localities two alternatives:

- “Alternative 1 considers metrics that measure the financial impact of the current and proposed CWA controls on residential users, the financial capability of the community, and the lowest quintile income and poverty prevalence within the community's service area.”
- “Alternative 2 utilizes dynamic financial and rate models that evaluate the impacts of debt service on customer bills.”

Consistent with EPA previous guidance, additional information can be provided in the FCA for consideration when negotiating schedule, including the following:

- Costs for wastewater, stormwater, and drinking water infrastructure investment
- Other demographic and economic data

The previous FCAs prepared by Jacobs for the City of Newport have included a combination of Alternatives 1 and 2. The updates for 2023 addresses EPA's 2023 FCA guidance, including consideration of the affordability of wastewater services that encompasses a number of elements that include the ability of a community to finance required facilities and the ability of individual customers to pay their bills for service. In addition, for combined sewer overflow and sanitary sewer overflow programs, there is a regulatory element to the consideration of affordability. The negotiation of programs and schedules between local utilities and the federal and state regulatory agencies are often closely tied to Federal guidance documents that define a framework for assessing the capability of communities to undertake the identified programs.

Both Alternative 1 and Alternative 2 from EPA's 2023 FCA Guidance were evaluated as part of the latest FCA update for Newport. Additional detail on the guidance, approach, and data used for both alternatives is summarized further in **Appendix C**.

## 5.2 Residential Indicator

The Residential Indicator (RI) is based on the estimated cost per household (CPH) as a percent of Median Household Income (MHI). The RI is part of EPA's 1997 FCA Guidance and is used in determining the overall FCA Matrix score. Table 5-1 provides the information used to determine the CPH. Total costs are allocated to residential customers based on the relationship between residential and total flows. The residential share of costs is divided by the number of households in the service area to determine the CPH. The CPH is then compared to the MHI to determine CPH as a percent of MHI, which is used as part of the RI portion of the FCA matrix. Table 5-2 provides the information used to determine the RI. For this update, the CPH includes the estimate costs for the water utility system as provided for in the EPA's 2023 FCA Guidance. This is also consistent with other EPA policy memorandum. The guidance also allows the addition of stormwater costs, but these are assumed to be part of the wastewater costs.

**Table 5-1. Cost per Household for Water and Wastewater Treatment (CSO/LTCP)**

Line	Cost Item	Wastewater	Water	Total
<b>Current Costs</b>				
100	Annual O&M Expenses (net depreciation)	\$12,788,972	\$10,270,200	\$23,059,172
101	Annual Debt Service (Principal and Interest)	\$6,628,541	\$7,274,243	\$13,902,784
102	Subtotal Current Costs	<b>\$19,417,513</b>	<b>\$17,544,443</b>	<b>\$36,961,956</b>
<b>Projected Costs</b>				
103	Estimated Annual O&M Expenses (net depreciation)	N/A	N/A	N/A
104	Annual Debt Service (Principal and Interest)	\$5,712,929	\$9,153,000	\$12,541,000
105	Subtotal Projected Costs	<b>\$5,712,929</b>	<b>\$9,153,000</b>	<b>\$12,541,000</b>
106	<b>Total Current and Projected Costs</b>	<b>\$28,570,513</b>	<b>\$30,085,443</b>	<b>\$58,655,956</b>
	Residential Flow (MGD)	5.80	5.80	5.80
	Total Flow (MGD)	7.43	7.43	7.43
	Residential Percentage	78%	78%	78%
107	<b>Residential Share Costs</b>	\$22,285,000	\$23,466,646	\$45,751,646
108	<b>Total Number of Households in Service Area</b>	17,447	17,447	17,447
109	<b>Cost Per Household (annual)</b>	\$1,277	\$1,345	\$2,622

WWT = wastewater treatment

Households in Service Area = 10,177 City of Newport + 7,270 Middletown

**Table 5-2. Residential Indicator for the 2023 Financial Capability Assessment**

Line	Item	Wastewater	Water	Combined
201	Median Household Income (MHI) (2021 Dollars)	\$81,725	\$81,725	\$81,725
202	MHI Adjustment Factor	1.069	1.069	1.069
203	Adjusted MHI (2023 Dollars)	\$87,000	\$87,000	\$87,000
204	Annual CPH (2023 Dollars)	\$1,277	\$1,345	\$2,622
205	Residential Indicator (Percent)	1.47%	1.55%	3.01%
	Affordability Threshold	2%	2%	4%

## 5.2.1 Financial Capability Indicators

The Financial Capability Indicators (FCI) are used to identify a system's financial capability to implement CSO / LTCP programs by evaluating the debt, socioeconomic, and financial conditions. The FCI score is used in both the traditional FCA Matrix (from the 1997 FCA Guidance) and the new Extended FCA Matrix (from the 2023 FCA Guidance). As shown in Table 5-3, the average score for the six financial indicators is 2.3 for the 2023 FCA. Based on the scoring ranges identified in the Guidance, this is deemed to be a mid-range score. The City's score was strong for the 2019 FCA. There are two indicators, unemployment and tax revenue collections, that changed compared to the 2019 FCA that result in a lower FCI score.

**Table 5-3. FCI – Overall Financial Capability Indicator Score**

<b>Item</b>	<b>2019 FCA</b>	<b>2023 FCA</b>
Bond Rating	Strong (3)	Strong (3)
Net Debt as a Percentage of FMV	Strong (3)	Strong (3)
Unemployment Rate	Strong (3)	Weak (1)
Median Household Income	Mid-range (2)	Mid-range (2)
Property Tax Revenues as a Percent of FMV	Strong (3)	Strong (3)
Property Tax Rate Collection	Strong (3)	Mid-range (2)
<b>Overall score (average)</b>	<b>Strong (2.8)</b>	<b>Mid-range (2.3)</b>

### 5.3 Lowest Quintile Poverty Indicator

EPA's 2023 FCA Guidance provides an additional metric to measure and evaluate affordability. The framework for the Lowest Quintile Poverty Indicator (LQPI) includes six indicators. The indicators identify low-income households and the prevalence of poverty within the service area. Table 5-4 summarizes the LQPI scores for the six indicators and for the City of Newport there is medium impact for the LQPI. This score is further evaluated in the next section as part of the new Expanded FCA Matrix identified in EPA's 2023 FCA Guidance.

**Table 5-4. LQPI Score**

<b>LQPI</b>	<b>Score</b>
1: Upper Limit of Lowest Quintile Income	2
2: Percentage of Population with Income Below 200% of Federal Poverty Level	2
3: Percentage of Households Receiving Food Stamps/SNAP Benefits	2
4: Percentage of Vacant Housing Units	2
5: Trend in Household Growth	2
6: Unemployment Rate Population 16 and Over in Civilian Labor Force	2
<b>LQPI Score</b>	<b>Medium Impact (2)</b>

### 5.4 FCA Matrix Results

There are two FCA Matrixes summarized for the analysis presented herein, including the following:

- Traditional FCA Matrix, based on EPA's 1997 FCA Guidance
- Expanded FCA Matrix, based on EPA's 2023 FCA Guidance

#### 5.4.1 Traditional FCA Matrix

The traditional FCA Matrix is based on EPA's 1997 FCA Guidance and includes six indicators that are used to develop an overall financial capability indicator score and is compared to the residential indicator. Based on the findings from the 2019 Financial Capability Assessment, the FCI was 2.8 and the RI was 2.18, as summarized on the matrix presented in Table 5-5, and this correlated to a medium burden. There is no change in the burden when comparing the 2019 FCA and the 2023 FCA.

Table 5-5. Newport, RI 2019 Financial Capability Assessment Matrix

Permittee's Financial Capability Indicators Score	Residential Indicator (Cost Per Household as a Percent of Median Household Income)		
	Low (Below 1 %)	Medium (Between 1% and 2%)	High (Above 2.0%)
Weak( Below 1.5)	Medium Burden	High Burden	High Burden
Mid- Range (Between 1.5 and 2.5)	Low Burden	Medium Burden	High Burden
High (Above 2.5)	Low Burden	Low Burden	Medium Burden

Based on the findings from the 2023 Financial Capability Assessment, the FCI was 2.3 and the RI was 1.47% and based on the FCA matrix, this correlates to medium burden, as presented in Table 5-6. The change in the RI is attributed to increase in MHI and cost per household. Since the MHI represents a limited view of household income, for the households that have income below the median level, the RI would shift to from medium to high burden.

Table 5-6. Newport, RI 2023 Financial Capability Assessment Matrix

Permittee's Financial Capability Indicators Score	Residential Indicator (Cost Per Household as a Percent of Median Household Income)		
	Low (Below 1 %)	Medium (Between 1% and 2%)	High (Above 2.0%)
Weak( Below 1.5)	Medium Burden	High Burden	High Burden
Mid- Range (Between 1.5 and 2.5)	Low Burden	Medium Burden	High Burden
High (Above 2.5)	Low Burden	Low Burden	Medium Burden

### 5.4.2 Expanded FCA Matrix

The new Expanded FCA Matrix compares the result of the traditional FCA matrix against the new Lowest Quintile Poverty Indicator (LQPI) matrix, as presented Table 5-7, and this correlates to a medium burden. The Expanded FCA Matrix indicates a medium impact. The details and results for the new Expanded FCA Matrix and the analysis for 2023 FCA are further detailed in **Appendix C**.

Table 5-7. 2023 New Expanded Financial Capability Assessment Matrix

Financial Capability Assessment (FCA) Score (RI x FCI)	Lowest Quintile Poverty Indicator Score		
	Low Impact (Above 2.5)	Medium Impact (1.5 to 2.5)	High Impact (Below 1.5)
Low Burden (Impact)	Low Impact	Low Impact	Medium Impact
Medium Burden (Impact)	Low Impact	Medium Impact	High Impact
High Burden (Impact)	Medium Impact	High Impact	High Impact

## 5.5 Additional Local Considerations/Factors

The analyses called for in the 2023 FCA Guidance do not address all considerations related to the affordability of wastewater charges. There are a number of additional considerations that can affect the community's ability to implement and support large capital programs in tight required timeframes. Below is a recap of some of the considerations also relevant to determining whether Newport's typical residential customers can afford to pay an additional \$165 for wastewater services above their current annual charges:

- Water system costs
- Snapshot Analysis (i.e., based on 2022 American Community Survey data from US Census)
- Income Profile Beyond MHI (i.e., based on 2017 American Community Survey data from US Census)
- Local Priorities/Considerations

### 5.5.1.1 Water System Costs

The City of Newport has undertaken a major capital program related to its drinking water system. In particular, the City is undertaking a significant capital investment as part of its lead service line replacement. The RI analysis previously presented includes water operating and capital costs to determine the cost per household for the water system and the combine water and wastewater systems. These costs are also evaluated as part of financial Pro forma and cash flow analysis summarized further in **Appendix C**.

### 5.5.1.2 Snapshot Analysis

The City has seen some of its financial indicators (unemployment rate, household income, etc.) fluctuate up and down during the past 5-10 years based on local, national, and global economic factors. Over the course of a 20- or 30-year repayment period, there is a reasonable prospect that the City's financial situation could change from the snapshot at a single point in time that results from following the methodology identified in the 2023 FCA Guidance. It may therefore commit the City's wastewater system customers to a capital program that could push the City's customers to experience a financial burden. This is especially true for households earning less than the MHI and which are at or below federal poverty levels. To help provide insights beyond the snapshot in time, **Appendix C** provides a financial cash flow analysis that attempts to evaluate key affordability metrics for a 10-year study period.

### 5.5.1.3 Income Profile Beyond MHI

Income Profile Beyond MHI is addressed in the new LQPI that evaluates the lowest quintile income as one of six indicators related to poverty. Also, the distribution of income is also evaluated as part of financial Pro forma and cash flow analysis presented **Appendix C**. Based on output from EPA's tool EJScreen, Figure 5-2 depicts the low income percentile compared to the State. For the EJScreen socioeconomic indicators related to low income, the City of Newport (service area) is 29% low income. By way of comparison, the state is 26% and the nation 40%. Figure 5-3 depicts the demographic index percentile compared to the State. For the EJScreen socioeconomic indicators related to demographic index, the City of Newport (service area) is 26% low income. By way of comparison, the state is 35% and the nation 45%.

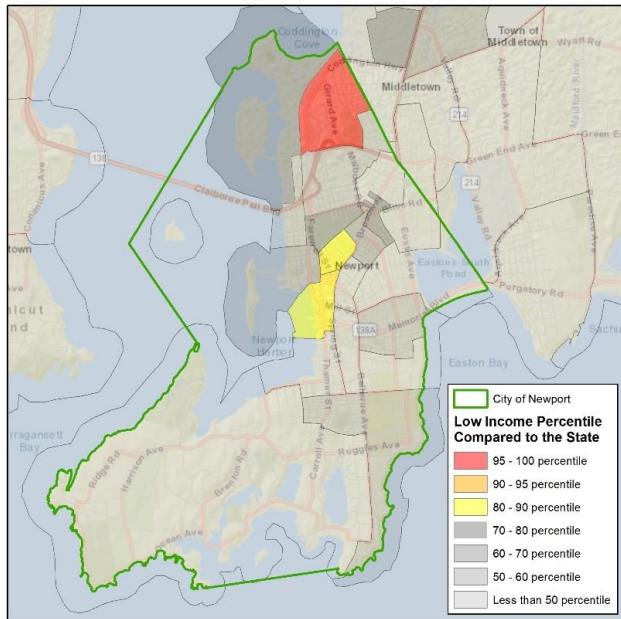


Figure 5-2. Low Income Percentile Compared to the State

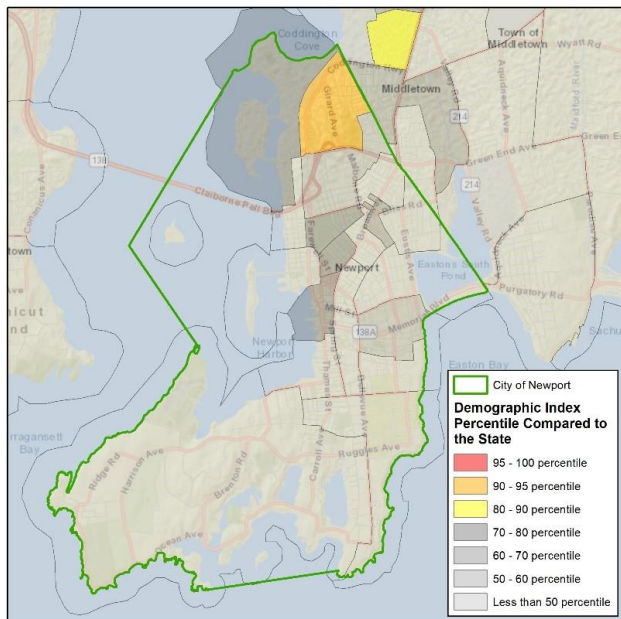


Figure 5-3. Demographic Index Percentile Compared to the State

### 5.5.1.4 Local Priorities/Considerations

Many communities face a variety of public improvement needs, such as the need to replace aging roads, bridges, and public buildings at the same time that investment in wastewater systems is required. Based on the full range of community needs, the stakeholders and leaders of a community may simply disagree that they can afford the level of investment in wastewater systems implied by the static, point-in-time analyses defined in EPA's FCA Guidance.

The City is currently performing a Water and Wastewater System Rate Study, led by Raftelis in partnership with Jacobs, which began in late 2024. The rate study will identify water and wastewater rates that balance the equity of consumers, the utility's financial viability, and the long-term sustainability of water and WPC systems. The study will also evaluate the feasibility of a stormwater fee to equitably recover the costs of providing stormwater services in the City.

## 5.6 FCA Update Conclusions

The key findings for the 2023-2024 FCA update are summarized below. Additional detail regarding these findings is included in **Appendix C**.

- There is no change in the burden when comparing the 2019 FCA and the 2023 FCA. The traditional FCA matrix correlates to a medium burden.
- The LQPI score is 2 and represents a medium impact with regards to the severity and prevalence of poverty.
- The new Lowest Quintile Poverty Indicator (LQPI) matrix correlates to a medium burden. When considering income levels, poverty, and the City's financial condition, there would be a medium burden associated with water and wastewater utility operating and capital costs.
- The water and wastewater CPH as % of MHI is below 4% combined affordability threshold. The CPH for households with income at or near the poverty level (i.e., LQI), is above the 4% combined affordability threshold.
- WPC generates approximately \$20 million in sewer user fee revenues, spends \$10.3 million in operating expenses (net of depreciation), and makes approximately \$6.5 million in annual debt service payments. The debt service coverage ratio (DSCR) is 1.61x as of June 30, 2022.
- At the time of the FCA update, no sewer rate increases were planned for upcoming years. This resulted in the DSCR dropping below the target ratio of 1.25x in 2025. However, this should be confirmed and compared against the required coverage ratio identified in Revenue Bond indenture document.
- At current rates, the typical residential water and sewer annual bill is \$1,718 and represents 2.23% of MHI and 6.1% of the LQI. This is compared to a combined affordability threshold of 4% for water and sewer.
- If rates increase 3% per year, the typical residential bill increases approximately \$30 per year and would present additional burden on certain households.

## 6. Summary of Reassessment Findings and Planned Actions

This section provides a summary of the reassessment findings, gaps and planned actions.

### 6.1 Consent Decree Requirements

Paragraph 67 of the modified CD provides requirements related to this report. Item 67.a.vi. of the modified CD provides specific requirements related to the evaluation of recommended actions the City should take to address gaps identified during the reassessment; this language is as follows:

- “If any of the reassessments indicate that the City has been unable to achieve the inflow removal estimates, CSO discharge volume reductions, and/or the CSO discharge event projections from either the November 26, 2013, memo or the Master Plan, then the reassessment shall include actions the City shall undertake to meet the projections in accordance with the Master Plan.” (Modified CD item 67.a.vi.)

### 6.2 CSO Program Background

This section provides a summary of the City’s overall CSO program efforts and associated progress toward meeting established goals of the CD for SMP implementation and capital improvements.

- **SMP Implementation:** Over the past 15 years, the City has completed more than 40 capital improvement projects related to the LTCP in an effort to reduce the frequency and volume of CSO events. All capital improvement projects recommended in the SMP have been completed, except for the Long Wharf Pump Station Improvements Project, which is currently under construction.
  - Gap: No gap. The Long Wharf Pump Station Improvements project is currently under construction; the project scope and schedule have been approved as a modification to the CD.
  - Planned Actions: The City will complete construction of the LWPS Improvements Project, which is expected to be completed in November 2025.
- **Capital Improvements – Optimization of Long Wharf Pump Station:** Wet weather operation of LWPS was upgraded to optimize flows to the WPCP and better manage the upstream capacity of the collection system. During wet weather events, all three pumps are used to manage system capacities.
  - Gap: The LWPS has not provided the 24 MGD peak flow rate as was expected in the SMP. Its performance has been observed to be limited to a peak flow rate of 19 to 20 MGD.
  - Planned Actions: The City is addressing this gap through the LWPS Improvements Project. This project will increase the total peak capacity of the pump station from 20 to 27 MGD and is expected to be completed in November 2025.

### 6.3 Green Infrastructure and BMP Implementation

This section provides a summary of the City’s efforts and associated progress toward reducing wet weather flow to the combined sewer through implementation of GI and other BMPs.

- **Green Infrastructure and BMPs:** As part of the City’s ongoing effort to improve the water quality of its receiving water bodies, the City continues to evaluate and implement GI and other non-structural BMPs to address pollutant loads and flow-related impacts from stormwater discharges as part of City studies and projects. The City’s sewer separation and disconnection efforts occurred in the 1970s (prior to the date of the CD). More recent projects completed by the City are not subject to the CD’s requirements

for evaluation of GI and other BMPs, because they did not include new stormwater outfalls or new stormwater inlet structures.

- Gap: No gap.
- Planned Actions: Continue implementation of GI and other BMPs in accordance with the City's RIPDES General Stormwater Permit and the City's adopted standard practices, ordinances, and land use plan policies. Larger-scale efforts will incorporate integrated blue-green infrastructure strategies that offer co-benefits in addition to flood mitigation, such as recreation, urban cooling, and biodiversity enhancement. By embedding these co-benefits into infrastructure planning, the City aims to maximize long-term value and foster a more adaptive, climate-resilient community.

## 6.4 Inflow Removal Program Reassessment

This section provides a summary of the City's inflow removal efforts and associated progress toward meeting established goals of the CD for inflow removal, CSO discharge reduction, projected design storm and typical year CSO discharge/event reduction, and water quality benefits.

### 6.4.1 Progress Toward Achieving Inflow Removal Estimates

- **Building Inspections**: The City completed all first-time building inspections over the current reassessment period, including 5,001 first time inspections since the start of SMP implementation. The target established for the previous reassessment period was 4,642.
  - Gap: No gap; While the City did not meet the initial target during the first reassessment period, all buildings have now had at least one attempted inspection.
  - Planned Actions: Although all properties have been visited, many inspections remain incomplete due to access issues, particularly among seasonal residences. Given the limited additional benefit and increasing difficulty of completing remaining inspections, the City plans to pause the building inspection program during the next reassessment period and instead prioritize efforts towards higher-impact water quality initiatives. Continuation of the building inspection program will be reevaluated during Program Reassessment #3 in 2030.
- **Downspout Disconnections**: The City confirmed the disconnection of 2,278 downspouts since the start of SMP implementation. The target established for the end of the program is 3,662.
  - Gap: The City is 62 percent complete with the overall target for downspout disconnections.
  - Planned Actions: While significant progress has been made, the voluntary nature of the program and lack of enforcement mechanisms have limited its effectiveness, particularly for properties that have received notices but not taken corrective action. Additionally, in some areas, disconnected downspouts introduce safety concerns with the discharge being redirected to impervious sidewalks creating icy conditions in winter weather. As a result of these limitations, the City plans to pause the downspout disconnection program during the next reassessment period and instead prioritize efforts towards higher-impact water quality initiatives. Continuation of the downspout disconnection program will be reevaluated during Program Reassessment #3 in 2030.
- **Catch Basin Inspections**: The City inspected 79 catch basins known or suspected to be connected to the sanitary sewer system over the first year of the previous reassessment period, exceeding the initial target of 75 catch basins requiring inspection.

- **Gap:** No gap; the City exceeded the target for catch basin inspections during the previous reassessment period and continues to inspect catch basins on a regular basis as part of their MS4 permit regulatory requirements.
- **Planned Actions:** The City will perform additional inspections as needed to confirm mitigation measures.
- **Catch Basin Disconnections:** The City has disconnected 83 City-owned catch basins since 2008, of which 46 were disconnected since the start of SMP implementation. The target established for the previous reassessment period was to disconnect all remaining City-owned catch basins that were connected to the sanitary sewer (57 catch basins identified initially, plus 1 additional catch basin that was found in 2022).
  - **Gap:** 12 City-owned catch basins are known to remain connected to the City's sanitary sewer system.
  - **Planned Actions:** The City is actively working on design for disconnecting 4 of the remaining City-owned catch basins that are connected to the sanitary sewer system. The City will continue to evaluate feasibility, costs, and benefits of removing the 8 remaining catch basins; however full disconnection is unlikely to occur in the near-term. Many of the remaining basins are challenging and costly to remove due to the lack of nearby storm drains. Their disconnection will continue to be evaluated as opportunities arise through other planned infrastructure projects, such as street paving or utility upgrades. The City prefers to maintain a small number of catch basins connected to the sanitary sewer system due to the O&M benefits, as these connections help flush the system and support overall performance.
- **Rainfall-Derived Inflow Removal Achieved:** Observed rainfall-derived inflow volumes in 2024 are lower than in 2010-2011 for all meters where a comparison was possible. The 2024 RDII values indicate greater than 50 percent reduction in RDII for seven of the ten areas monitored. The other three areas monitored all indicate greater than 30 percent reduction. There was no inflow reduction target established for the current reassessment period; however, the established target for the program is to reduce inflow by 50 percent.
  - **Gap:** No gap; the City has made significant progress over the reassessment period at reducing rainfall derived inflow to the sanitary sewer system.
  - **Planned Actions:** Use 2024 monitoring data and results of the inflow assessment to focus efforts for continued I/I removal. The City plans to use the monitoring data to target areas that have not yet achieved a 50 percent reduction or target areas with higher RDII volumes, where a larger percentage of RDII removal may be more attainable, so that an overall 50 percent inflow reduction across the City is achieved. These areas will be prioritized for upcoming RDII investigations, including the enhanced CCTV program that is planned for the next phase of I/I removal.

## 6.4.2 Progress Toward Achieving CSO Discharge Reductions

- **Wellington Avenue CSO Treatment Facility:** The Wellington Avenue CSO Treatment Facility has only experienced one CSO event since December 2015, which occurred during Hurricane Ida on September 2, 2021. There was no CSO discharge volume or frequency target established for the reassessment period.
  - **Gap:** No gap.
  - **Planned Actions:** Continue CSO LTCP implementation to improve system capacity and further reduce inflow to the City's sanitary sewer system. Planned actions over the next reassessment period include completion of the LWPS Improvements Project and continued inflow reduction

efforts through catch basin disconnections and private inflow removal. Inflow reduction efforts completed within the watersheds of contributing communities (Town of Middletown and United States Navy), while not controlled by the City of Newport, are also anticipated to influence further reductions in CSOs.

- **Washington Street CSO Treatment Facility:** While the CSO discharge volumes at the Washington Street CSO Treatment Facility generally declined since the start of SMP implementation in 2014, a spike was observed in 2018, with ten CSO discharge events. The spike was likely due to the amount of rainfall recorded at the plant (58.8 inches; the highest annual rainfall recorded at the plant in 10 years). The plant capacity upgrades were also under construction in 2018, which may have impacted system performance. There was another spike in CSOs at Washington in 2024, with six total events. This can likely be attributed to the increased rainfall observed during this year compared to previous years. Three of the six CSO events that occurred at the Washington CSO Facility in 2024 occurred during storms with rainfalls exceeding the 1-year, six-hour design storm (depth = 1.95 inches), the largest of which being the May 16, 2024 event with a total rainfall of 4.46 inches. There was no CSO discharge volume or frequency target established for the reassessment period.
  - Gap: No gap.
  - Planned Actions: Continue CSO LTCP implementation to improve system capacity and further reduce inflow to the City's sanitary sewer system. Planned actions over the next reassessment period include completion of the LWPS Improvements Project and continued inflow reduction efforts through catch basin disconnections and private inflow removal. Inflow reduction efforts completed within the watersheds of contributing communities (Town of Middletown and United States Navy), while not controlled by the City of Newport, are also anticipated to influence further reductions in CSOs.

### 6.4.3 Progress Toward Achieving Model Projected Design Storm and Typical Year CSO Discharge Estimates

The hydraulic model of the City's collection system was updated with completed construction projects, inflow removal activities, and data from recent field tests. The recalibrated model simulates reductions in CSO events. The updated model was used to simulate the 2-year, 5-year, and 10-year 6-hour design storm events.

The hydraulic model of the City continues to be refined as the projects progress, so there are inherent limitations in using the model to predict volume and frequency of CSO discharge events. Model predictions are more suited for evaluation of projected benefits of additional controls (e.g., pump station upgrades), providing a direct comparison between model results with and without implementation of the proposed control.

- **Design Storm CSO Discharge Volume Estimates:** The results of the design storm analysis show the City has significantly reduced CSO discharge volumes.
  - Gap: The City has made significant progress toward reducing model projected design storm CSO discharge volumes as compared to the 2012 existing conditions modeled values. The 2024 recalibrated model also shows reductions for all design storm events compared to the 2019 model. See Table 4-7 for CSO discharge volumes for each design storm for each CSO treatment facility.
  - Planned Actions: The City will continue CSO LTCP implementation to reduce inflow to the City's sanitary sewer system, which will result in additional reduction in projected design storm CSO discharge volumes.

- **Typical Year CSO Frequency and Discharge Volume Estimates:** For the Wellington Avenue CSO Treatment Facility, the typical year model shows one CSO event of 0.05 MG. For the Washington Street CSO Treatment Facility, the typical year model shows four CSO events with a total CSO discharge volume of 5.82 MG.
  - **Gap:** The model indicates significant progress toward reducing CSO discharge volumes and frequencies as compared to the 2012 existing conditions. For the typical year, the 2024 calibrated model shows that for Wellington the FY2019 targets have nearly been met and for Washington the target has not yet been met. This is assumed to be attributed to the fact that recent observed flows at LWPS suggest that the 24 MGD pump capacity used in the SMP was overestimated. The observed pump capacity is 20 MGD.
  - **Planned Actions:** To address this gap at LWPS, the City is implementing upgrades to the LWPS that will increase the station's peak capacity from 20 to 27 MGD. This project is expected to be completed by November 2025.

#### 6.4.4 Progress Toward Achieving Water Quality Benefits

Enterococci was the pathogenic indicator used to assess water quality due to the recreational nature of the harbor; enterococci exceedance were evaluated as single sample maximum of 104 MPN per 100 milliliters. Using enterococci as the metric for measuring overall water quality, water quality standard exceedance graphs were developed for each of the ten harbor monitoring locations. There were no water quality targets specifically established for the reassessment period; the overall goal of the CSO LTCP is to support the attainment of State of Rhode Island water quality standards in Newport Harbor.

- **Newport Harbor Water Quality Benefits:** The results continue to show that water quality standard exceedances occur both as a result of CSOs and in the absence of CSOs, during normal wet weather events; some harbor monitoring locations also show dry weather exceedances. Enterococci values well below exceedance limits are observed within days of small and large CSO events. In general, the enterococci exceedances caused by CSO events have decreased over the SMP period, corresponding with the decrease in frequency of CSO events. Over the past 5 years, only 1 of the 18 exceedances were attributed to CSO events. For the remaining exceedances in the absence of a CSO event, 13 of the exceedances were associated with wet weather events and the remaining 4 were dry weather exceedances.
  - **Gap:** The results of the water quality monitoring conducted during the reassessment period show bacteria water quality exceedances are observed both when CSOs occur and in the absence of CSOs, during both wet and dry weather. CSO-related exceedances have continued to decrease over time.
  - **Planned Actions:** CSOs are not the sole cause of poor water quality in the harbor. Stormwater runoff carrying fecal matter from birds, as well as local point source contamination occurring during dry weather (such as boats dumping their waste directly into the harbor) are other contributors to bacteria exceedances in Newport Harbor. In response, the City is shifting to an adaptive water quality approach that will test and evaluate a range of strategies, including blue-green infrastructure, targeted treatment at high-priority stormwater outfalls, enhancements to the City's MS4 program, continued implementation of the LTCP, and public outreach. Stormwater will be a central focus for the next reassessment period; The City has allocated \$1.45 Million for MS4 water quality improvements in the latest CIP through FY2030.
- **CSO Facility Outfall Water Quality Benefits:** The combined enterococci exceedances during CSO events over the reassessment period at both CSO facility outfall monitoring locations (Sites 6-24 and 6-27) was recorded. The results indicate 3 enterococci exceedances were observed in the 5 CSO events

sampled (40 percent compliant). However, the same measurements performed 6 hours later resulted in no enterococci exceedances (100 percent compliant).

- Gap: No enterococci exceedances were observed in the harbor 6 hours after CSO events. However, exceedances were observed for some of the samples taken during CSO events.
- Planned Action: It was shown that water quality exceedances at CSO outfall locations as a result of CSOs are diluted to acceptable levels in a matter of hours after the CSO discharge stops. The recovery time appears to be improving; water quality data collected 6 hours after an event in this analysis show 100 percent compliance, while water quality data collected 6 hours after an event in the previous reassessment report showed 83 percent compliance and the 2012 study showed 75 percent compliance. The data suggest that as CSO discharge events have decreased, so have CSO-related enterococci exceedances. Recognizing that the majority of recent exceedances are not CSO-related, the City plans to integrate a broader water quality approach to investigate non-CSO sources of contamination that occur during both wet weather and dry weather.

## 6.5 Updated Financial Capability and Affordability Analysis

This section provides a summary of the City's updated financial capability and affordability analysis. It addresses the impacts of recent capital improvement projects and other changes in financial conditions since the last analysis was completed in 2019.

- Gap: The City is among those with the highest wastewater rates in Rhode Island as cited in the Narragansett Bay Commission's 2024 rate survey. The FCA for the City was updated in 2023 in accordance with EPA's 2023 FCA Guidance. The results for both the traditional FCA matrix and the expanded FCA matrix indicate a "medium burden," similar to the 2019 FCA results. There are some additional considerations and limitations that are not accounted for in the approach outlined in the EPA Guidance, as described in Section 5.5.1.4. This includes recent significant capital investments for the City's water system, potential fluctuations in financial indicators for the City that are not accounted for in a single snapshot in time analysis, income profile beyond MHI, and additional local considerations and priorities. These considerations are also relevant to determining whether Newport's typical residential customers can afford to pay an additional \$165 for wastewater services above their current annual charges. This is a very high burden on customers that have the lowest household incomes. Projected increases in sewer rates will stretch the City's sewer charges beyond those of neighboring communities and inflict additional financial burden on its customers.
- Planned Action: The City plans to carefully control capital investments to sustain funding for maintaining the City's aged assets and emergency repairs. The City is currently performing a Water and Wastewater System Rate Study, led by Raftelis in partnership with Jacobs, which began in late 2024. The rate study will identify water and wastewater rates that balance the equity of consumers, the utility's financial viability, and the long-term sustainability of water and WPC systems. The study will also evaluate the feasibility of a stormwater fee to equitably recover the costs of providing stormwater services in the City.

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## CSO Program Reassessment Report #2

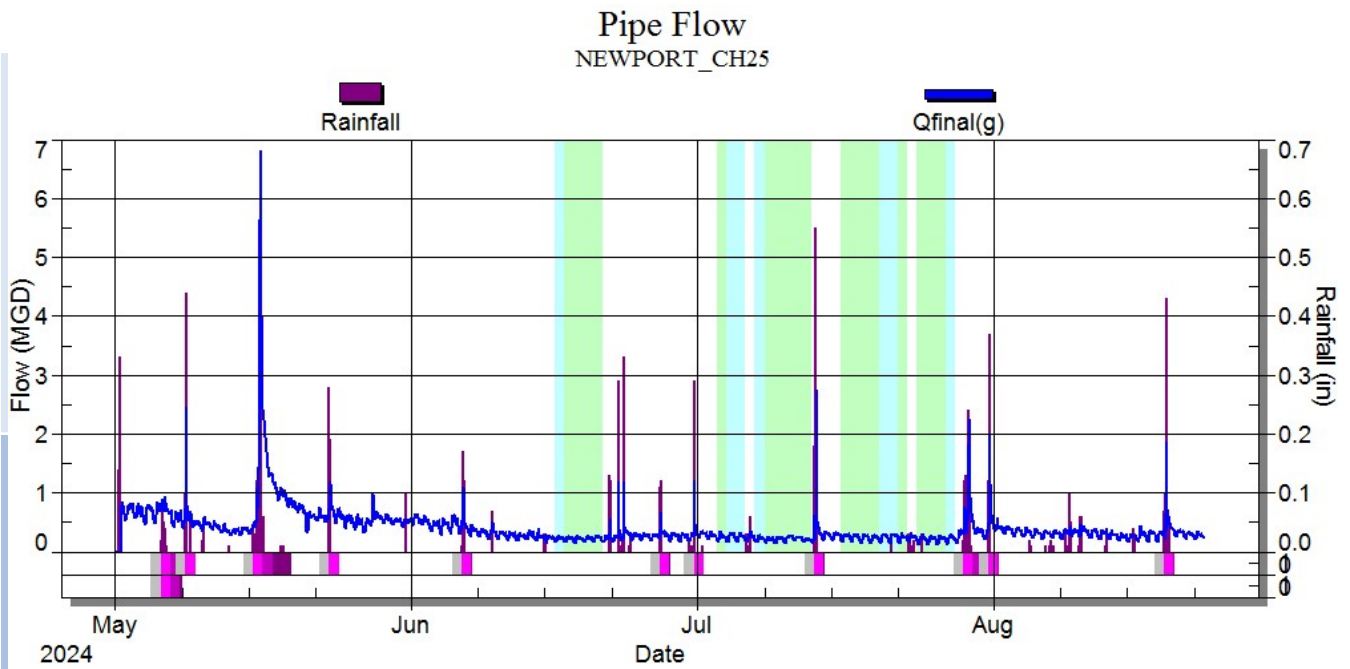
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## **Appendix A. Newport RDII Analysis 2024 vs. 2010 & 2019**

# Newport RDII Analysis 2024 vs. 2010 & 2019

26 December 2024



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## 1.0 Definition of Terms

Gross flows – Flow measured by a meter

Net flows – Gross flow measured by a meter minus Gross flow(s) from any upstream meter(s).

Wet period – Time of year when groundwater is high due to winter/spring precipitation.

Dry Day – Day not influenced by prior rainfall. To qualify as a Dry Day, cumulative rainfall must be less than 0.10" for the prior one day, 0.40" for the prior three days, and 1.00" for the prior five days. Any qualifying day with an unrepresentative pattern is removed from the dry day selection.

Average Dry Day Flow (ADDF) – The average daily total of several qualified Dry Days.

Base Infiltration (BI) – Component of ADDF comprised of groundwater, potable water leaks, springs and tidal intrusion. BI is relatively steady over days and weeks.

Waste Water (WW) – Component of ADDF comprised of sanitary flow from buildings and industrial discharge. [WW = ADDF – BI]

Inflow – Fast response flow component of RDII; typical sources include leaky manhole covers, catch basins, yard drains and downspouts.

Infiltration – Slow response flow component of RDII; typically include below ground sources such as leaky pipes, service laterals, footing drains and manholes

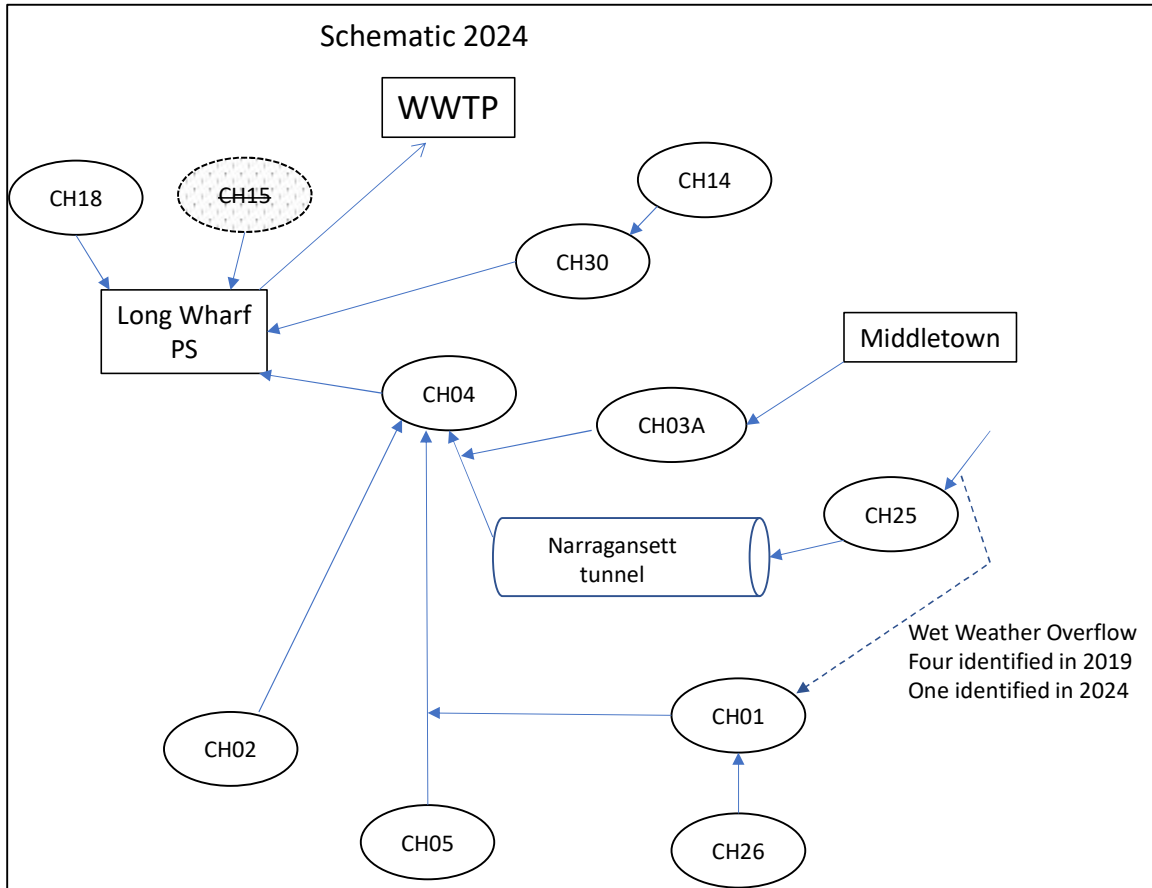
Rainfall Dependent Inflow and Infiltration (RDII) – Extraneous flow that enters a collection system following a precipitation event. It includes Inflow and Infiltration. Base Infiltration is removed from the calculation of RDII.

## 2.0 Overview

This report discusses the third metering project for Newport. The first period was a one-year flow metering period in 2010-2011 and the second period was a four-month metering period in 2019. This third period was from 1 May to 22 August 2024. The objective of the work is to determine if wet weather flows have been reduced by removal of direct inflow sources during the prior years. Flow data were collected at 43 sites in the 2010-2011 period, 11 sites in 2019 and 10 sites in 2024.

Figure 1 is a schematic layout of the metering network in the 2019 and 2024 metering periods. During the 2024 metering period, meter CH15 had been replaced by the City-owned meter FarewellSt, but that meter was not in operation during this study period. Tables in this report that compare data for all three metering periods will contain no data for CH15 in 2024. The single rain gauge used in this metering period was located at the Wellington Ave. pump station.

**FIGURE 1. Meter Schematic for 2024 metering. Meter CH15 was not installed during this metering period.**



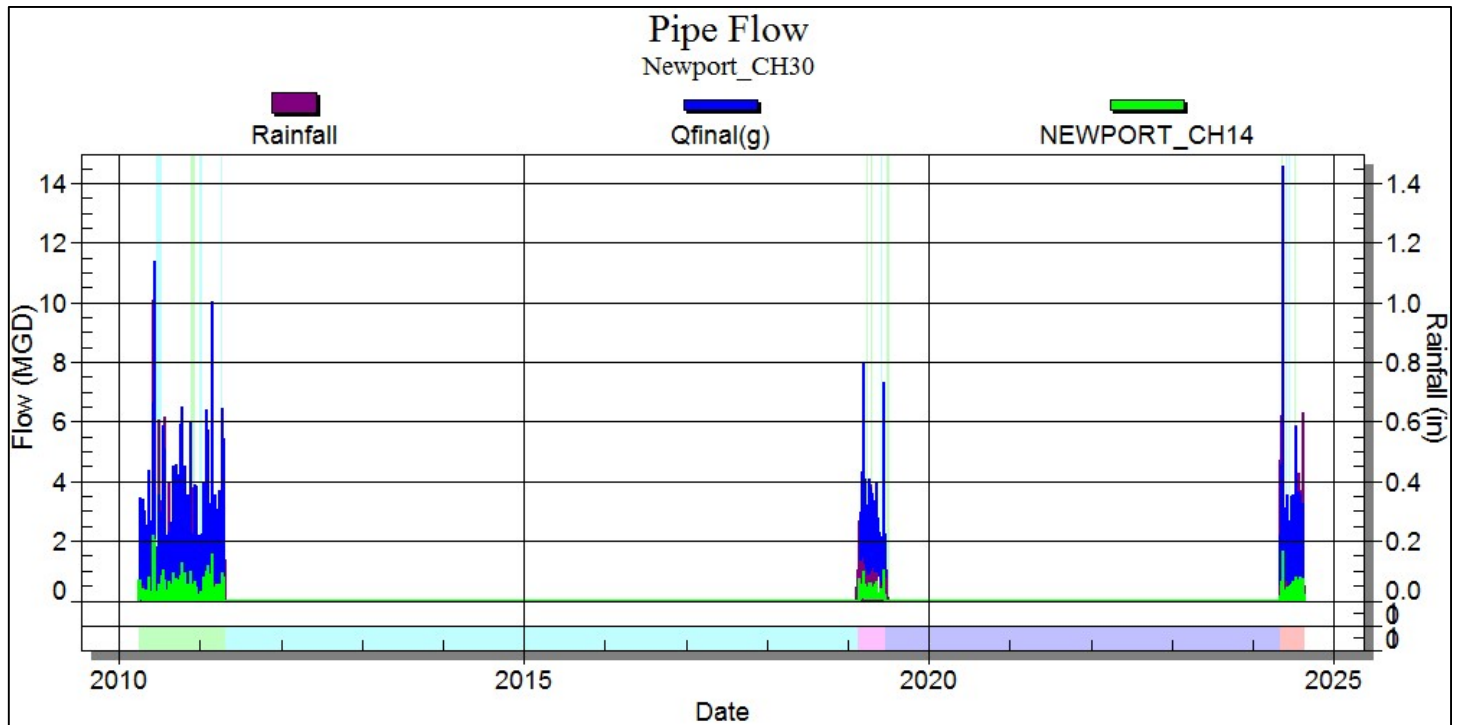
The strategy in this report is to compare the 2024 results to the prior metering periods by reproducing key tables and graphics from the 2019 report and appending tables and adding graphics from the 2024 analysis. The 2019 report included the results from the 2010\_2011 metering period. Some of the explanatory discussion in the 2019 report is omitted here so it may be helpful for the reader to have the 2019 report available for reference. Appendix A to this report is an Excel spreadsheet that includes the supporting data for this report.

### 3.0 Results

#### 3.1 – Comparison of Three Metering Periods

A fundamental requirement of a pre- and post-rehabilitation analysis is to conduct the analysis in the same hydrological season(s) so that there is an apples-to-apples comparison of how the system responds to rainfall. The 2010-2011 metering period began and ended during the months of April and included both wet and dry periods. The traditional ‘wet period’ is during the winter and spring when vegetation is dormant allowing for higher ground water tables and greater soil moisture. This phenomenon (variation between years) is common to collection systems and is the result of what is typically referred to as a ‘wet year’ and a ‘dry year’. The 2019 metering period began in February and contains both a wet and dry period. The 2024 metering period began in May and the entire period is considered a dry period. To simplify the analysis, this report avoids wet and dry periods and will look at data grouped into calendar years. Figure 2 is a hydrograph of all data for CH30.

Figure 2 Hydrograph of 2010-2011 metering period, the 2019 metering period and 2024 metering period.



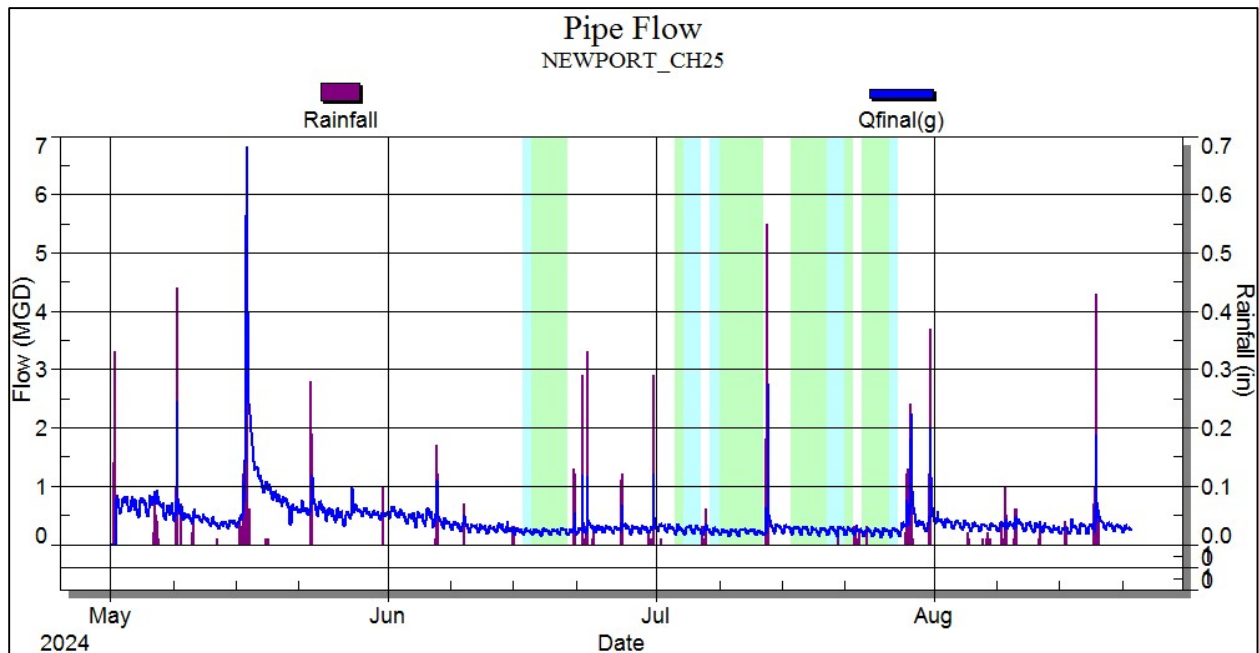
### 3.2 – Average Dry Day Flow (ADDF)

The first step in conducting an RDII analysis is to determine Average Dry Day Flow (ADDF) at each metering location, and this information is used in two ways. The first is that the ADDF is subtracted from the flow measured during a storm, and the difference is RDII. The second is that the shape of the ADDF hydrograph is used to estimate what portion of the ADDF is wastewater production (WWP) and what portion is base infiltration (BI).

Dry-day flows are obtained by identifying days that are not influenced by previous rainfall and have a regular diurnal (daily) pattern. Weekday and weekend diurnal patterns are typically different and are averaged separately. Selected dry days are averaged to generate separate weekday and weekend diurnal patterns. This analysis will focus on weekday patterns, which are usually more consistent and provide more data points for averaging.

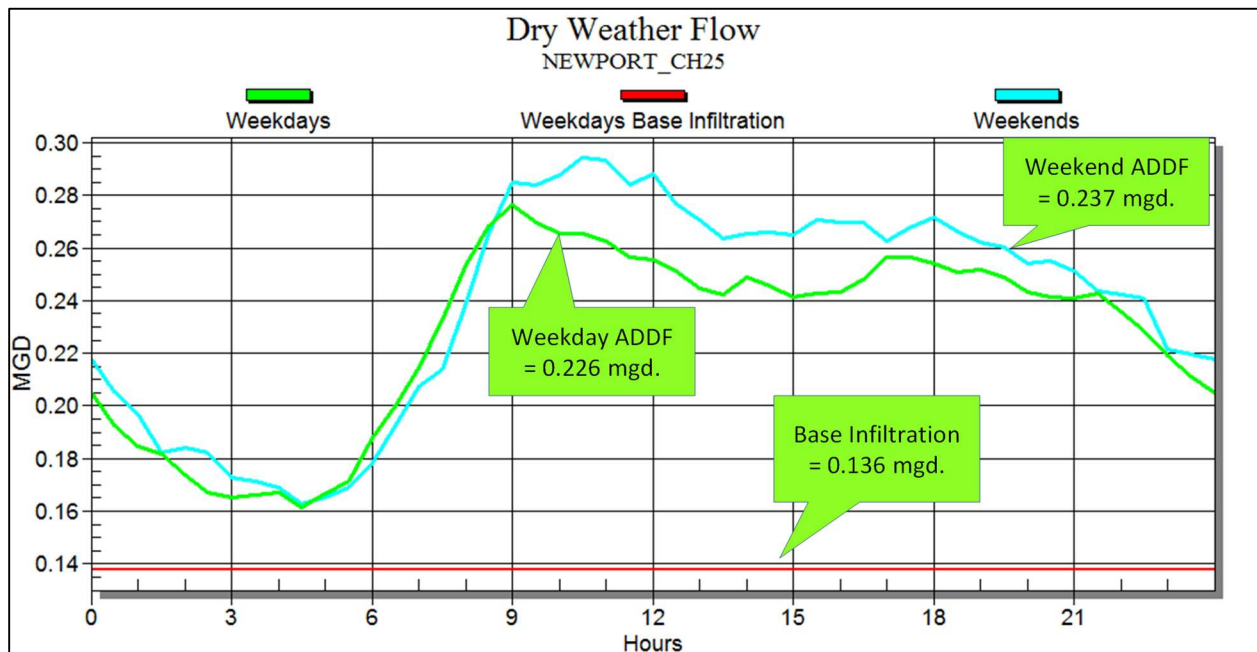
Figure 3 shows selected dry days for CH25 for the 2024 as shaded vertical bands. The 18 selected weekdays are green, and the 7 selected weekends are blue. The objective is to select dry days that are not affected by rainfall and are in a period of stable and repeatable patterns.

Figure 3 Selection of Dry Days for CH25. Green days are weekdays and blue days are weekends.



For each meter and measurement period, the ADDF is decomposed into the two components of wastewater production (WWP) and base infiltration (BI), as shown in Figure 4 for CH25. In this case the weekday and weekend ADDF values for 2024 are 0.226 mgd and 0.136 mgd, respectively. The estimated base infiltration (BI) is based on the shape of the weekday ADDF hydrograph and is shown as the red horizontal line at 0.136 mgd. The WWP (0.09 mgd) is the difference between ADDF and BI. The percent of base infiltration at this site is  $0.136 \text{ mgd} / 0.226 \text{ mgd}$  or 60% base infiltration. The method for estimating base infiltration is the Stevens-Schutzbach Method, which is discussed in Section 3.3.

Figure 4 Method for determining weekday and weekend ADDF values and Base Infiltration.



The method for estimating Base Infiltration, discussed in Section 3.3, depends upon the diurnal flow pattern at each meter or upon the diurnal pattern of the net flow between meters. Meter CH04 has five (5) upstream meters, each with different travel time to CH04. After subtraction of the 5 upstream flow data, the net diurnal hydrograph is irregular, and the base infiltration method often produces a zero value.

Table 1 is the Table 2 from the 2019 report, but has ADDF values from 2024 appended. The table compares the Gross and Net ADDF Values including the components of Wastewater Production (WWP) and Base Infiltration (BI) for each site. The Net values in the lower portion of the table will be the same as the Gross values if there are no upstream meters. The method for estimating of the components WWP and BI are described in the following section and they are based on the shape and magnitude of the dry day flow pattern.

**Table 1 ADDF, Wastewater Production and Base Infiltration for four periods.**

ADDF 2010 Wet Period (mgd)				ADDF 2011 Wet Period (mgd)				ADDF 2019 Wet Period (mgd)				ADDF 2024 (mgd)			
Meter	Gross ADDF	Gross WWP	Gross BI	Meter	Gross ADDF	Gross WWP	Gross BI	Meter	Gross ADDF	Gross WWP	Gross BI	Meter	GrossAvg	GrossWW	GrossBI
CH01	0.319	0.108	0.211	CH01	0.430	0.143	0.287	CH01	0.537	0.150	0.387	CH01	0.426	0.16	0.266
CH02	0.220	0.081	0.140	CH02	0.380	0.113	0.267	CH02	0.368	0.097	0.271	CH02	0.275	0.1	0.175
CH03	1.873	1.176	0.697	CH03	2.157	1.093	1.064	CH03A	1.798	1.005	0.793	CH03A	2.045	1.245	0.8
CH04	2.936	1.715	1.230	CH04	0.000	0.000	0.000	CH04	3.511	1.759	1.849	CH04	3.086	1.663	1.506
CH05	0.063	0.029	0.033	CH05	0.000	0.000	0.000	CH05	0.077	0.030	0.048	CH05	0.045	0.026	0.019
CH14	0.116	0.082	0.035	CH14	0.095	0.065	0.031	CH14	0.166	0.094	0.072	CH14	0.105	0.066	0.04
CH15	0.640	0.282	0.357	CH15	0.619	0.270	0.349	CH15	0.626	0.200	0.426				
CH18	0.162	0.043	0.119	CH18	0.116	0.039	0.077	CH18	0.200	0.033	0.168	CH18	0.067	0.041	0.026
CH25	0.261	0.111	0.149	CH25	0.413	0.142	0.271	CH25	0.450	0.103	0.347	CH25	0.226	0.089	0.136
CH26	0.089	0.030	0.058	CH26	0.137	0.026	0.111	CH26	0.098	0.024	0.074	CH26	0.089	0.036	0.053
CH30	0.943	0.626	0.317	CH30	0.977	0.492	0.485	CH30	1.320	0.790	0.570	CH30	1.089	0.648	0.441
Meter	Net ADDF	Net WWP	Net BI	Meter	Net ADDF	Net WWP	Net BI	Meter	Net ADDF	Net WWP	Net BI	Meter	NetAvg	NetWW	NetBI
CH01	0.230	0.078	0.152	CH01	0.293	0.117	0.176	CH01	0.439	0.125	0.313	CH01	0.337	0.125	0.213
CH02	0.220	0.081	0.140	CH02	0.380	0.113	0.267	CH02	0.368	0.097	0.271	CH02	0.275	0.1	0.175
CH03	1.873	1.176	0.697	CH03	2.157	1.093	1.064	CH03A	1.798	1.005	0.793	CH03A	2.045	1.245	0.8
CH04	0.210	0.210	0.000	CH04	0.000	0.000	0.000	CH04	0.215	0.215	0.000	CH04	0.104	0.104	0
CH05	0.063	0.029	0.033	CH05	0.000	0.000	0.000	CH05	0.077	0.030	0.048	CH05	0.045	0.026	0.019
CH14	0.116	0.082	0.035	CH14	0.095	0.065	0.031	CH14	0.166	0.094	0.072	CH14	0.105	0.066	0.04
CH15	0.640	0.282	0.357	CH15	0.619	0.270	0.349	CH15	0.628	0.200	0.426				
CH18	0.162	0.043	0.119	CH18	0.116	0.039	0.077	CH18	0.200	0.033	0.168	CH18	0.067	0.041	0.026
CH25	0.261	0.111	0.149	CH25	0.413	0.142	0.271	CH25	0.450	0.103	0.347	CH25	0.226	0.089	0.136
CH26	0.089	0.030	0.058	CH26	0.137	0.026	0.111	CH26	0.098	0.024	0.074	CH26	0.089	0.036	0.053
CH30	0.827	0.544	0.282	CH30	0.882	0.428	0.454	CH30	1.154	0.655	0.498	CH30	0.984	0.582	0.402

### 3.3 – Estimating Base Infiltration

Base Infiltration (BI) is considered a component of I/I that is related to ground water and includes leaking water lines, leaking plumbing fixtures, springs, tides and other similar sources. It may be a seasonal phenomenon, as rainfall affects ground water levels, but base infiltration generally remains relatively steady over weeks and months. The most rigorous method for determining the quantity of base infiltration originating in a basin is to determine the quantity of potable water flowing into each building within the basin and subtract it from the measured sewer flow coming out of the basin. This is an expensive and sometimes difficult exercise and usually is not done for a short-term flow metering study.

For this analysis an empirical method for estimating base infiltration was used. The method is borrowed from the potable water industry, which has estimated that the rate of residential water usage during the overnight hours is approximately 12% of the daily average use. This empirical method provides an estimate of the average wastewater production (WWP) in a Basin based on the average flow ( $Q_{avg-D}$ ) and minimum flow ( $Q_{min-D}$ ) of the average dry day hydrograph.

Subtracting WWP from  $Q_{avg-D}$  provides an estimate of base infiltration (BI). The equations to estimate WWP and BI are listed in Equations BI 1 and BI 2.

#### Equation BI 1

$$WWP = \frac{(Q_{avg-D} - Q_{min-D})}{X}$$

Where; X = .88 (from potable water use records)

#### Equation BI 2

$$Q_{BI} = Q_{avg-D} - WWP$$

In concept, this method generates an estimate of WWP based on the difference between average flow and minimum flow. As base infiltration varies over the year the difference between average and minimum flow (and WWP) is expected to remain constant. This method

of estimating is reliable for residential neighborhoods with sewer basin sizes on the order of 20,000 LF.

A refinement to this empirical method, the Stevens/Schutzbach equation, uses a curve fitting technique to increase the reliability of the BI estimation at meters with higher flows. As sewer sheds become larger with longer travel times, the normal dry day hydrograph flattens, which in turn affect the minimum to average relationships. Equation BI 3 is the Stevens/Schutzbach equation that was used to estimate base infiltration in all Basins.  $Q_{avg-D}$  is the average flow and  $Q_{min-D}$  is the minimum flow of the dry day hydrograph.

**Equation BI 3**

*Stevens/Schutzbach Equation*

$$Q_{BI} = \frac{0.4 * Q_{min-D}}{1 - 0.60 \left( \frac{Q_{min-D}}{Q_{avg-D}} \right)^{0.70}}$$

Equation BI 3 is also dependent on average and minimum flows that occur in traditional residential flow patterns. Reliability decreases in non-residential basins and in basins where the flow meter measures flow from cycling pump stations. Although there are several limitations, this method is considered the best for estimating BI in residential areas using only flow data. In commercial or industrial areas, this method can produce unreliable results.

### **3.4 - Rainfall Summary**

Table 2 is from the 2019 report with 2024 rainfall data appended. Just one rain gauge was deployed in 2024. The left side lists rainfall depth for each event and the right side lists the maximum return frequency. Storms greater than 1.5 inches are highlighted in orange; and return frequencies greater than 1-year are highlighted in yellow. The largest storm by far was the 3.83 inch storm on 15 May 2024 and it has a tendency to skew the Q vs. i projections.

Table 2 Rainfall totals for 56 storms and the corresponding maximum return frequency.

Storm	Rainfall Total - Inches			Maximum Return Frequency and Rainfall Depth		
	RG1	RG2	RG3	RG1	RG2	RG3
4/9/2010	0.75	0.83	0.75	1.2-mo;12-hr;0.7-in	1.3-mo;12-hr;0.8-in	1.2-mo;12-hr;0.7-in
4/16/2010	0.59	0.62	0.60	0.9-mo;12-hr;0.6-in	1.0-mo;12-hr;0.6-in	0.9-mo;6-hr;0.5-in
5/18/2010	1.47	1.33	1.56	2.6-mo;12-hr;1.4-in	2.0-mo;12-hr;1.2-in	3.0-mo;12-hr;1.5-in
6/5/2010	0.93	1.44	0.90	9.7-mo;1-hr;0.9-in	3.4-yr;1-hr;1.4-in	8.7-mo;1-hr;0.9-in
6/12/2010	2.15	2.36	1.84	3.5-yr;3-hr;2.1-in	4.2-yr;3-hr;2.3-in	2.0-yr;3-hr;1.8-in
6/28/2010	0.61	0.17	0.66	2.6-mo;1-hr;0.6-in	0.5-mo;1-hr;0.1-in	3.4-mo;1-hr;0.7-in
7/14/2010	0.33	0.72	0.39	1.2-mo;1-hr;0.3-in	4.5-mo;1-hr;0.7-in	1.4-mo;1-hr;0.4-in
7/19/2010	1.15	0.81	1.31	3.8-mo;3-hr;1.0-in	1.4-mo;3-hr;0.6-in	5.2-mo;1-hr;0.8-in
7/23/2010	1.02	0.90	0.92	2.2-mo;1-hr;0.6-in	1.9-mo;1-hr;0.5-in	1.6-mo;3-hr;0.6-in
7/24/2010	0.62	0.26	0.79	2.6-mo;1-hr;0.6-in	0.9-mo;1-hr;0.2-in	5.3-mo;1-hr;0.8-in
8/22/2010	0.97	1.06	1.06	1.3-mo;18-hr;1.0-in	1.4-mo;18-hr;1.0-in	1.4-mo;18-hr;1.1-in
9/3/2010	1.16	1.25	1.19	1.6-mo;18-hr;1.2-in	1.6-mo;24-hr;1.2-in	1.6-mo;18-hr;1.2-in
9/16/2010	1.13	1.09	1.27	1.8-mo;12-hr;1.1-in	1.4-mo;24-hr;1.1-in	2.1-mo;12-hr;1.3-in
10/1/2010	0.75	0.31	0.79	1.2-mo;12-hr;0.7-in	0.3-mo;48-hr;0.3-in	1.3-mo;12-hr;0.8-in
10/6/2010	1.47	1.35	1.46	3.1-mo;12-hr;1.5-in	3.5-mo;6-hr;1.3-in	3.0-mo;12-hr;1.5-in
10/14/2010	1.66	1.66	1.62	7.0-mo;6-hr;1.6-in	7.1-mo;6-hr;1.6-in	6.4-mo;6-hr;1.6-in
10/27/2010	0.71	0.63	0.82	1.6-mo;1-hr;0.4-in	1.2-mo;1-hr;0.3-in	1.8-mo;1-hr;0.5-in
11/4/2010	1.55	1.60	1.57	1.9-mo;18-hr;1.4-in	1.9-mo;18-hr;1.4-in	1.9-mo;18-hr;1.4-in
11/8/2010	0.84	0.90	0.92	1.0-mo;12-hr;0.6-in	1.1-mo;12-hr;0.7-in	1.2-mo;12-hr;0.8-in
11/16/2010	1.20	1.44	1.17	2.1-mo;6-hr;1.1-in	3.5-mo;6-hr;1.3-in	1.9-mo;6-hr;1.0-in
12/1/2010	0.64	0.64	0.70	1.5-mo;1-hr;0.4-in	1.3-mo;1-hr;0.4-in	1.7-mo;1-hr;0.5-in
12/12/2010	1.09	1.28	1.05	1.7-mo;6-hr;0.9-in	2.0-mo;6-hr;1.0-in	1.6-mo;6-hr;0.9-in
1/18/2011	1.06	1.14	1.11	1.6-mo;12-hr;1.0-in	1.7-mo;12-hr;1.0-in	1.7-mo;12-hr;1.0-in
2/2/2011	1.13	1.17	0.47	2.7-mo;3-hr;0.9-in	3.0-mo;3-hr;0.9-in	0.7-mo;12-hr;0.5-in
2/5/2011	1.08	0.81	0.35	1.7-mo;12-hr;1.1-in	1.3-mo;12-hr;0.8-in	0.6-mo;6-hr;0.3-in
3/16/2011	0.51	0.63	0.51	1.1-mo;3-hr;0.5-in	1.4-mo;3-hr;0.6-in	1.1-mo;3-hr;0.5-in
3/31/2011	1.41	1.37	1.40	1.9-mo;12-hr;1.2-in	1.9-mo;12-hr;1.2-in	1.9-mo;12-hr;1.2-in
4/12/2011	2.17	2.64	2.36	5.6-mo;12-hr;1.8-in	10.0-mo;12-hr;2.2-in	9.0-mo;12-hr;2.1-in
4/16/2011	0.88	0.98	0.92	1.6-mo;6-hr;0.8-in	1.7-mo;6-hr;0.9-in	1.7-mo;6-hr;0.9-in
2/21/2019		0.63			1.1-mo;6-hr;0.6-in	
2/24/2019		0.85			1.6-mo;3-hr;0.6-in	
3/3/2019	1.24	0.87		1.9-mo;12-hr;1.2-in	1.4-mo;6-hr;0.8-in	
3/10/2019	1.19	1.03		2.4-mo;6-hr;1.1-in	1.9-mo;6-hr;1.0-in	
3/21/2019	0.79	0.85		1.4-mo;2-hr;0.5-in	1.4-mo;3-hr;0.5-in	
4/3/2019	0.52	0.63		0.9-mo;6-hr;0.5-in	1.1-mo;6-hr;0.6-in	
4/8/2019	0.76	0.63		1.5-mo;3-hr;0.6-in	1.2-mo;3-hr;0.5-in	
4/13/2019	0.61	0.73		1.2-mo;2-hr;0.4-in	1.5-mo;2-hr;0.5-in	
4/15/2019	0.49	0.56		1.5-mo;15-min;0.2-in	1.6-mo;30-min;0.3-in	
4/20/2019	0.92	0.73		1.3-mo;12-hr;0.8-in	1.0-mo;12-hr;0.6-in	
4/26/2019	0.72	0.62		1.0-mo;30-min;0.2-in	1.0-mo;15-min;0.2-in	
5/3/2019	0.50	0.75		0.9-mo;30-min;0.2-in	2.4-mo;1-hr;0.6-in	
5/5/2019	0.63	0.61		0.8-mo;24-hr;0.6-in	0.8-mo;24-hr;0.6-in	
5/12/2019	1.15	0.95		1.7-mo;6-hr;0.9-in	1.5-mo;6-hr;0.8-in	
6/10/2019	1.37	1.41		1.9-mo;18-hr;1.4-in	1.9-mo;18-hr;1.4-in	
6/13/2019	1.52	1.26		6.2-mo;3-hr;1.2-in	4.3-mo;2-hr;0.9-in	
Storm	NEWPORTRG1			NEWPORTRG1		
5/5/2024	0.6			0.9-mo;12-hr;0.6-in		
5/8/2024	0.91			2.8-mo;15-min;0.3-in		
5/15/2024	3.83			4.2-yr;12-hr;3.3-in		
5/23/2024	0.72			1.7-mo;3-hr;0.7-in		
6/6/2024	0.79			1.7-mo;3-hr;0.7-in		
6/27/2024	0.54			1.2-mo;2-hr;0.4-in		
6/30/2024	0.54			3.0-mo;15-min;0.4-in		
7/13/2024	0.93			6.5-mo;15-min;0.5-in		
7/28/2024	2.34			7.4-mo;18-hr;2.3-in		
7/31/2024	0.88			2.6-mo;15-min;0.3-in		
8/18/2024	1.24			4.9-mo;15-min;0.4-in		

### 3.5 - RDII Volumes and Peak Flow Rates

The rainfall dependent infiltration and inflow (RDII) is calculated as shown in Figure 5, which is reproduced from the 2019 report. The ADDF hydrograph is subtracted from the measured flow during a storm and the RDII hydrograph is calculated. The Volume and Peak RDII values are recorded. The Total Volume and RDII Volume are totaled for the duration shown by the purple bars along the bottom of the hydrograph. A pre-compensation step is conducted for each storm in which any variation in ground water is removed before the RDII calculation is made. The ADDF total and the actual flow values are compared within gray bar (pre-compensation period) preceding the storm. If there is a difference, the ADDF pattern is shifted either up or down during the RDII period. This process assures that only the increase in flow due to rainfall is measured.

Figure 5 Example of a storm hydrograph with significant RDII components highlighted.

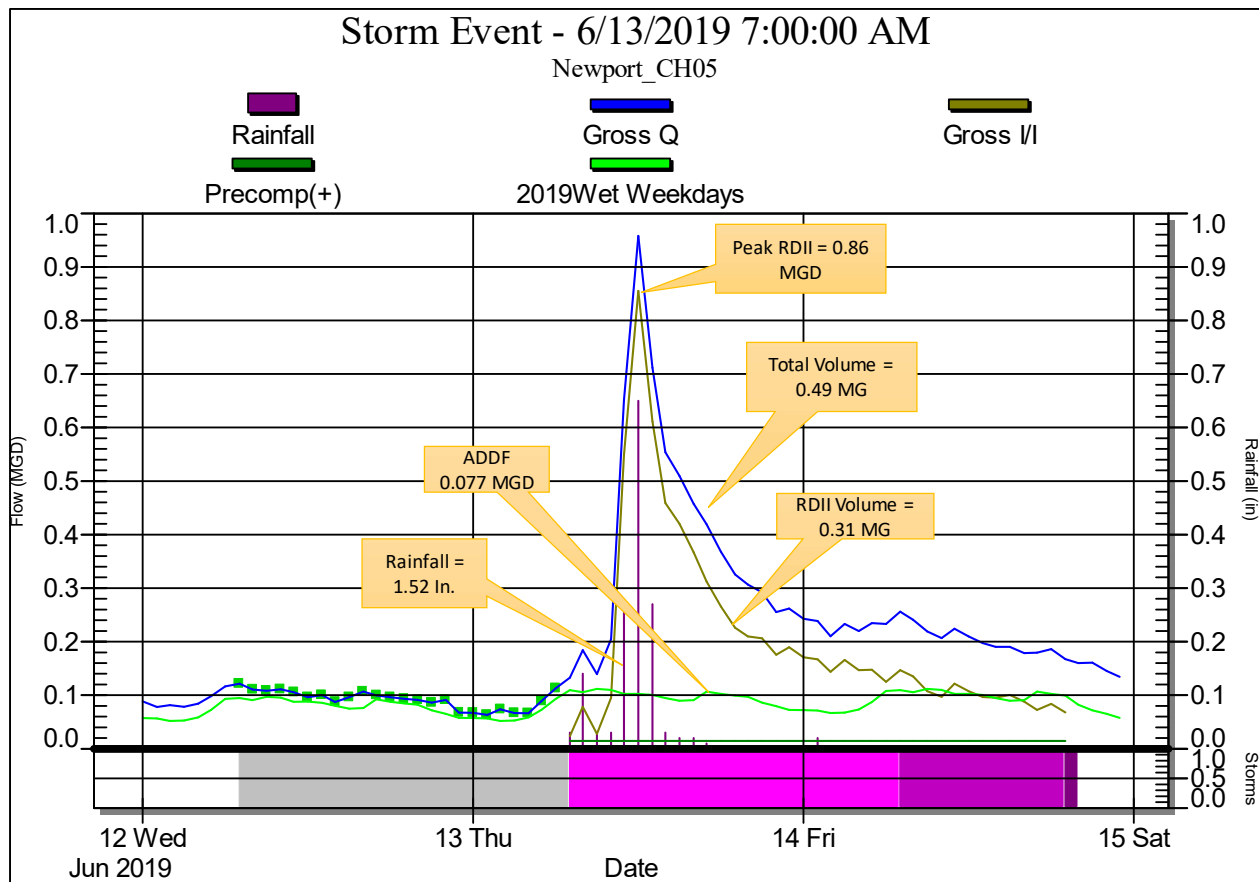


Figure 6 displays the calculated Gross **RDII volumes** for the three largest storms in each of the four calendar year periods. The 2010 storms are in the blue shades, the 2011 storms are in the green shades, the 2019 storms are in the red-yellow shades and the 2024 storms are in the violet shades. A total of 56 storms were analyzed during the full metering period, and the Gross and Net RDII volumes for these storms are listed in Appendix A. Meters CH02 and CH05 were not in operation during the 2011 wet period. There were no data from CH15 during the storms of 2010 and the meter was not installed in 2024. The large storm of 15 May 2024 clearly is an outlier.

Figure 6 Calculated RDII volume recorded for the 4 largest storms in each of the three wet periods.

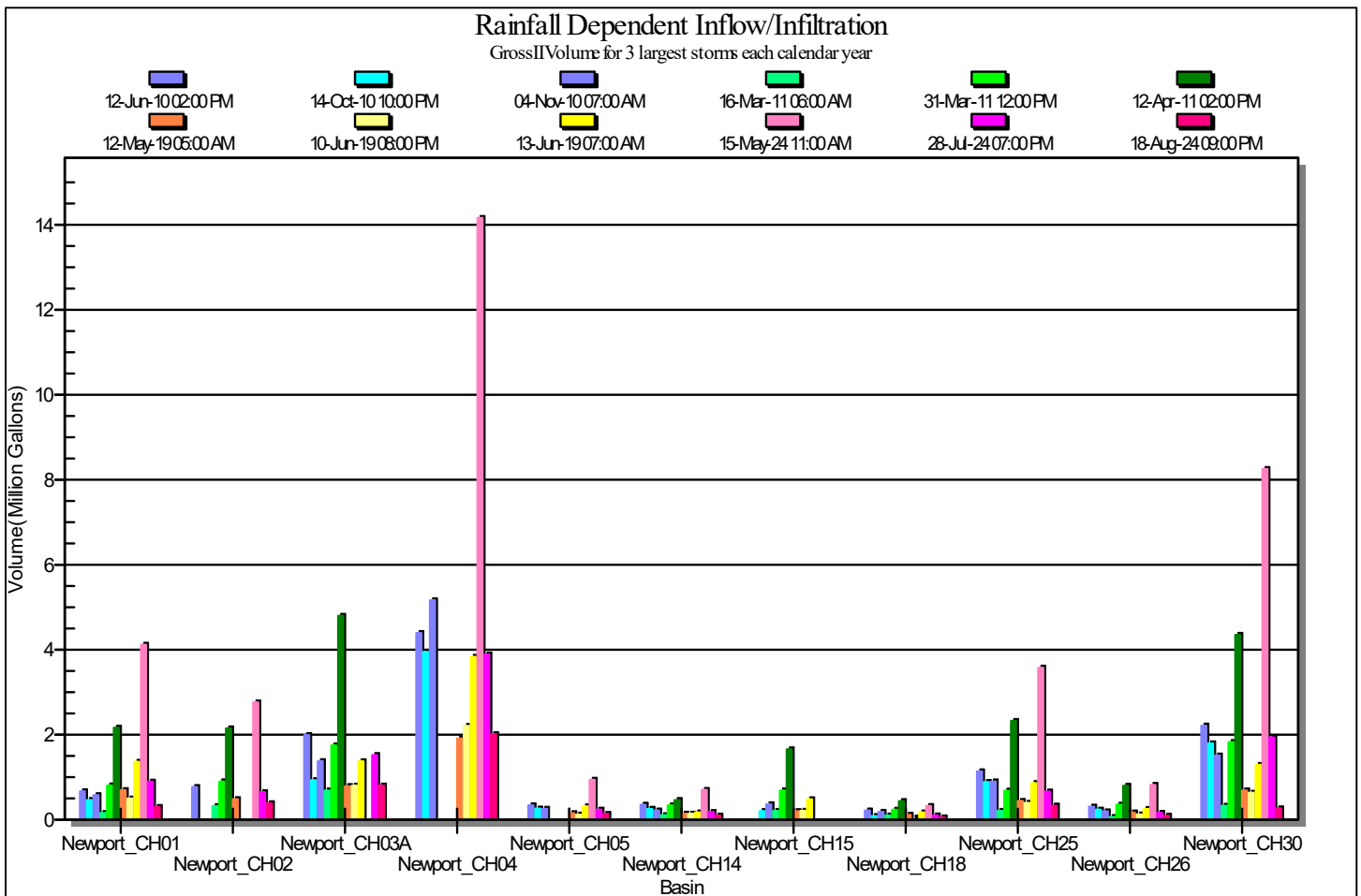


Figure 7 displays the calculated Gross **RDII peak flow rate** for the three largest storms in each of the four calendar year periods. The 2010 storms are in the blue shades, the 2011 storms are in the green shades, the 2019 storms are in the red-yellow shades and the 2024 storms are in the violet shades. It is not surprising that the greatest peak flows occurred on 15 May 2024. Meters CH04 and CH05 were not in operation during the 2011 wet period. There were no data from CH15 during the storms of 2010 and it was not installed in 2024.

Figure 7 Peak RDII values for the largest storms of 2010, 2011 and 2019.

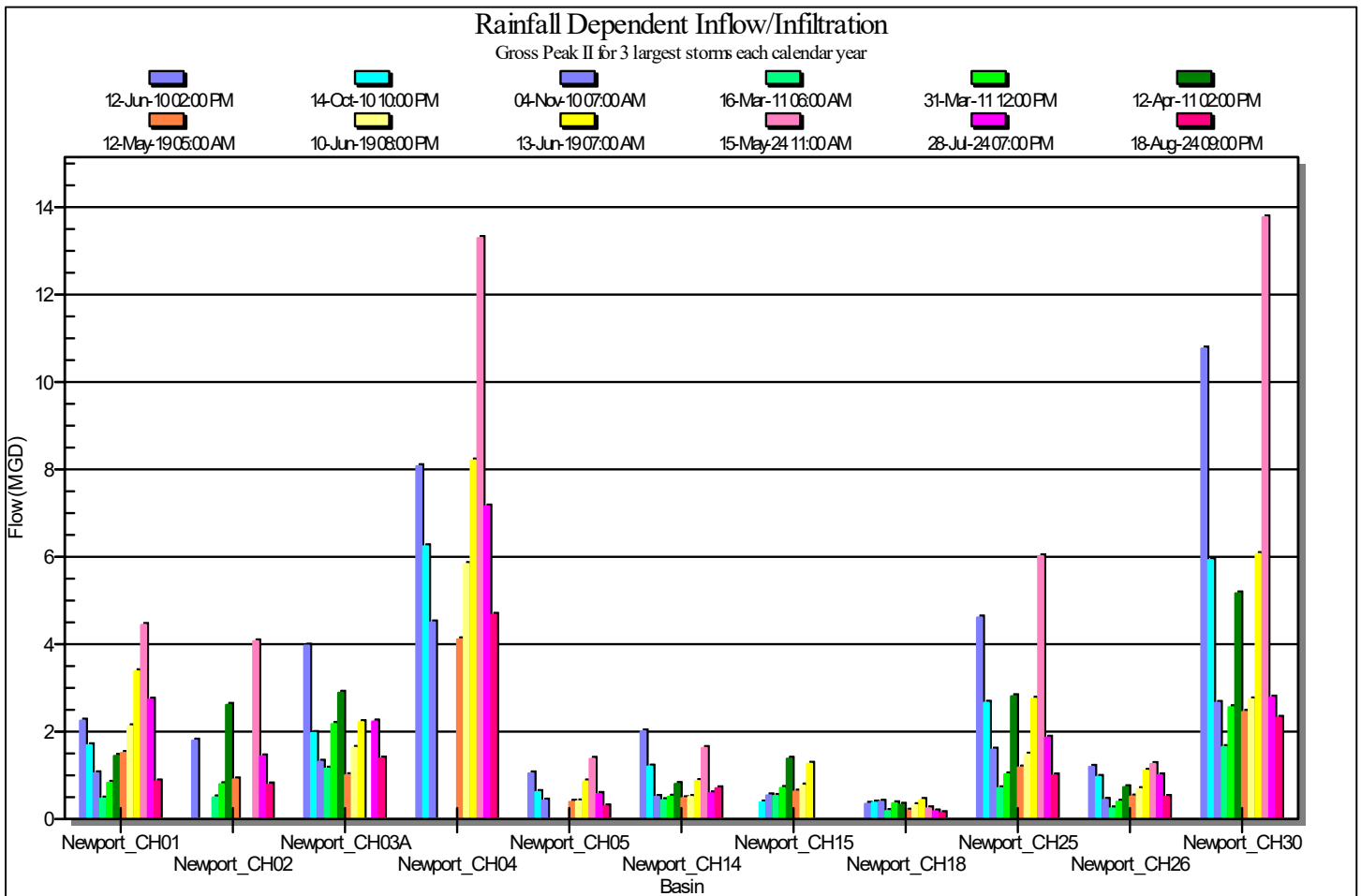






Table 3 lists the projected RDII volumes for the three prior periods along with the 2024 storms with and without the 15 May storm. There clearly has been demonstrable reduction in RDII system wide.

**Table 3 Projected RDII volumes from a 1-year, 24-hour storm of 2.84 inches.**

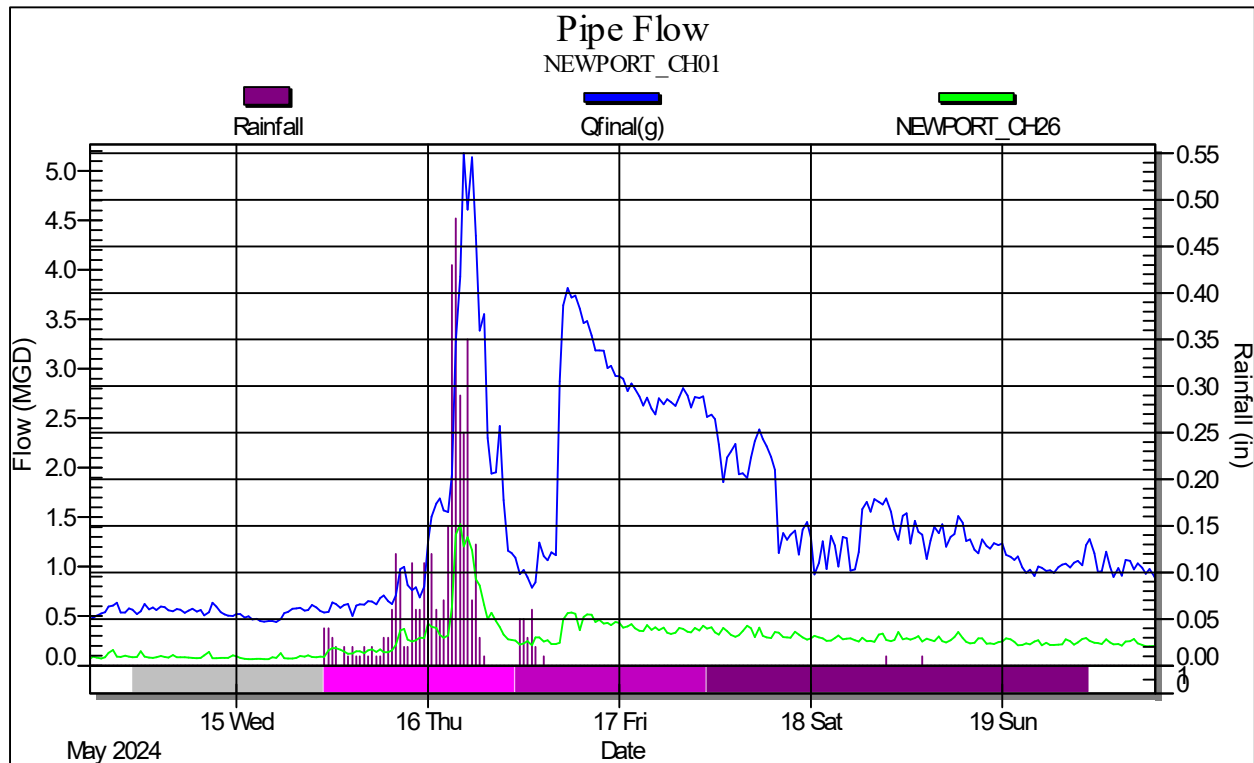
Meter	RDII Volume - Projected (MG)				
	2010 MG	2011 MG	2019 MG	2024 All Storms	2024 Sans 15 May
CH01	0.46	1.68	1.07	2.16	0.86
CH02	0.97	2.67	1.21	1.79	0.74
CH03A	2.42	5.92	2.10	1.79	1.79
CH04	0.72		1.31	0.76	0.49
CH05	0.44		0.49	0.61	0.27
CH14	0.43	0.54	0.34	0.47	0.21
CH15		1.85	0.80		
CH18	0.23	0.52	0.24	0.12	0.12
CH25	1.60	2.73	1.30	2.34	0.77
CH26	0.41	1.00	0.40	0.57	0.22
CH30	2.35	4.85	1.97	1.74	1.74

## 4.0 Observations

### 4.1 - Overflow from CH25 to CH01

There is an overflow at meter CH25 that will occur when the downstream Narragansett tunnel fills, backs up and surcharges. This phenomenon occurred 4 times during the 2019 metering period and just one time during the 15 May 2014 storm. In Figure 10 the overflow can be seen arriving at the downstream meter during the afternoon of 16 May and ending the evening of 17 May.

Figure 10 Hydrographs of downstream meter CH01 showing overflow event upstream of the Narragansett tunnel.



### 4.3 - Tidal intrusion in CH02 and CH18

The 2019 report identified tidal intrusion into sewers spotted by cyclic increases in measured flow patterns that appear to be synchronized with tidal cycles. The NOAA tidal data were not available online at this writing to verify tidal intrusion, but intrusion appears to be present in the same two meters - CH02 and CH18. The hydrographs highlighted in red in Figure 11 and Figure 12 reveal the double flow pulses each day offset by around an hour.

Figure 11 Tidal intrusion into CH02 is apparent.

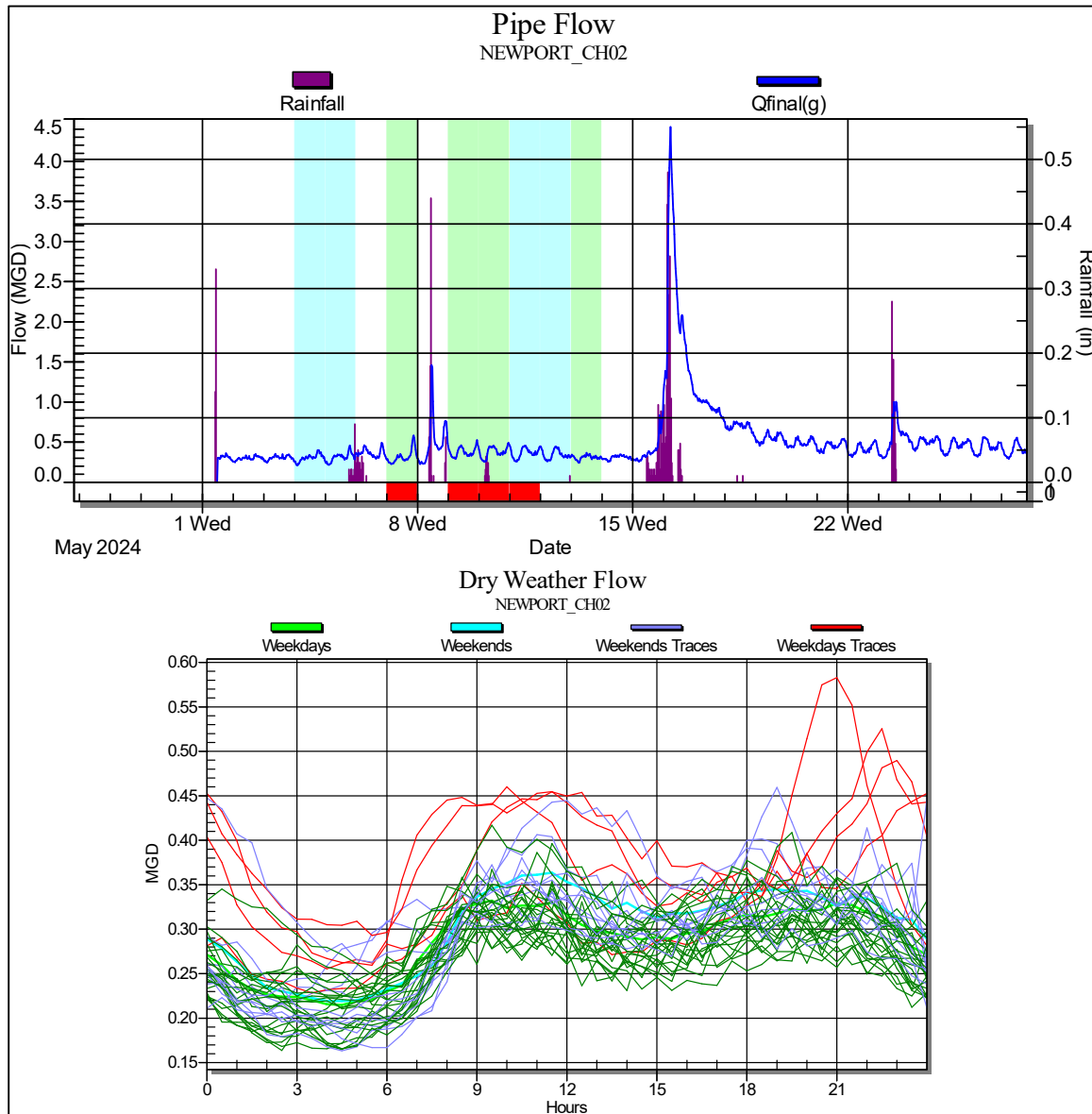
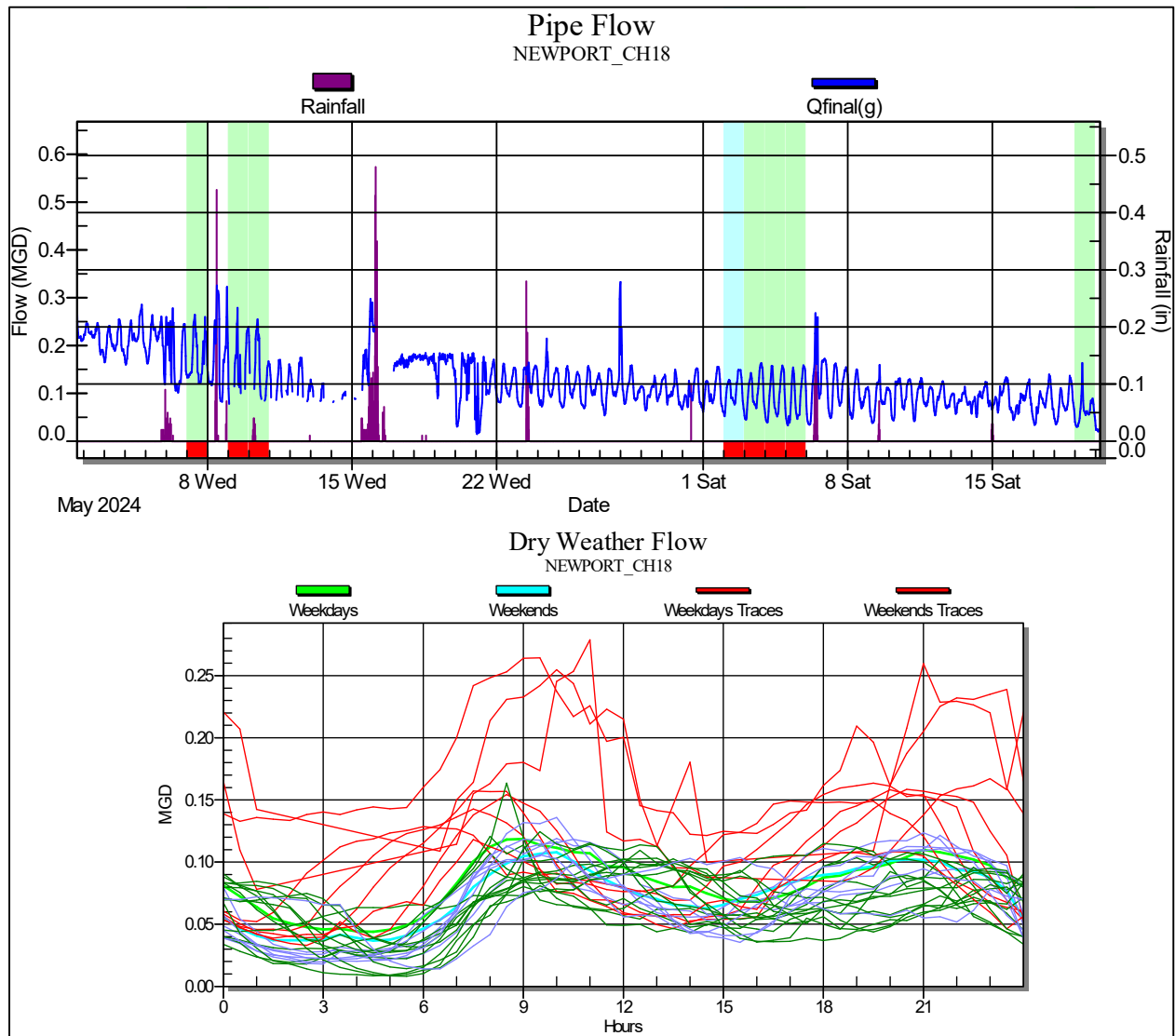


Figure 12 shows the red highlighted hydrographs consistent with tidal intrusion.

Figure 12 Hydrographs in red indicate tidal intrusion at CH18.

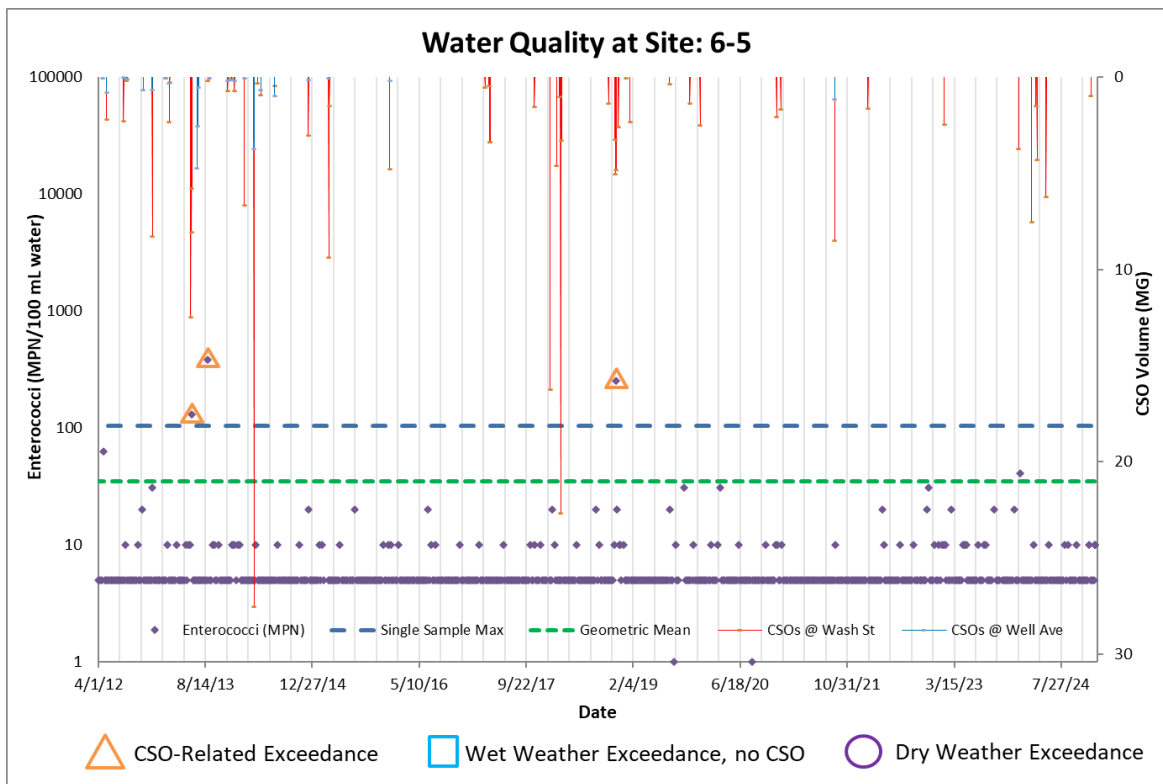
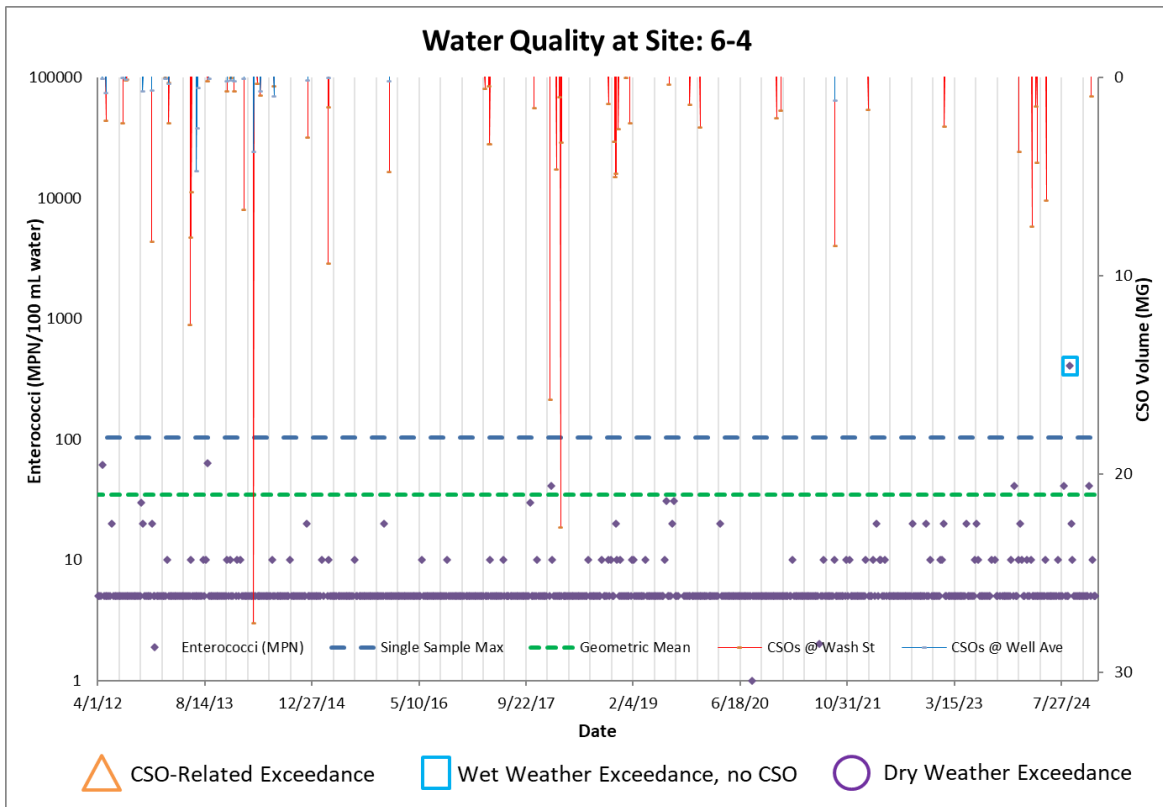


## 5.0 Conclusions

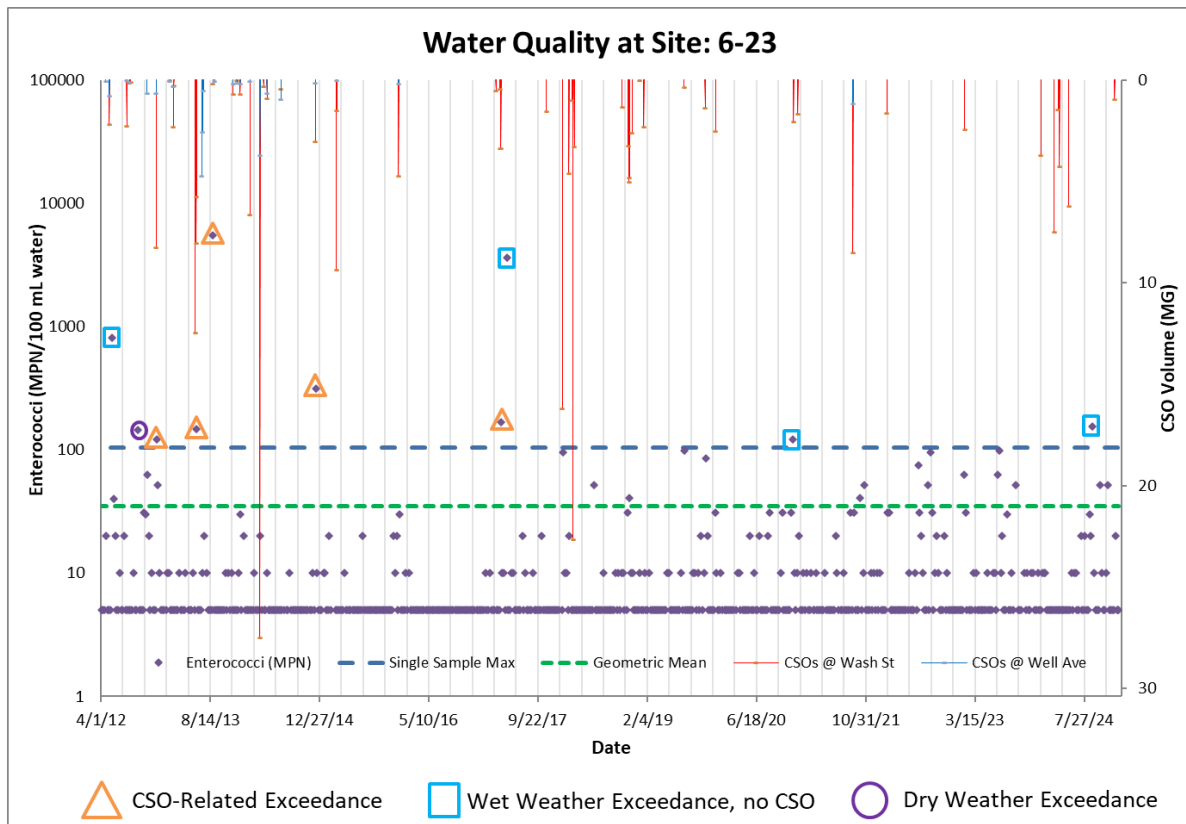
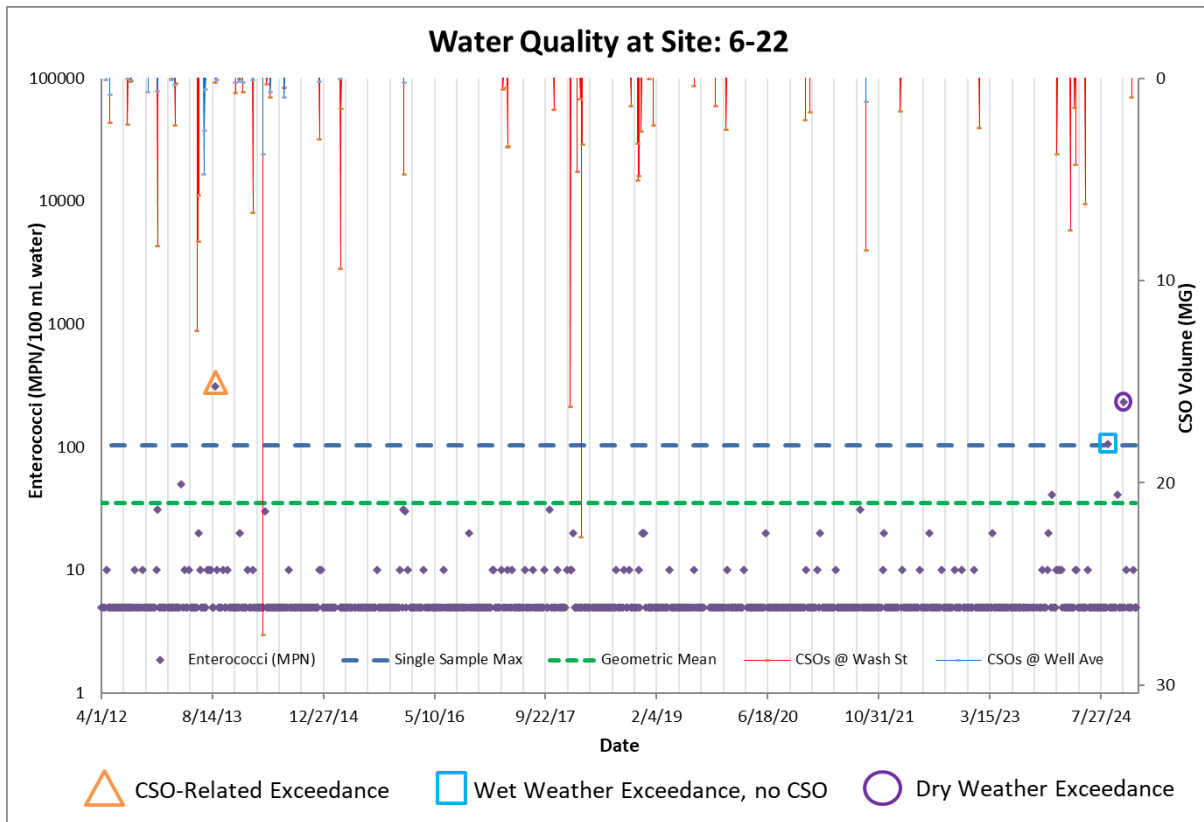
1. Subjectively, it is apparent from Figure 8 and Figure 9, along with Appendix B, that there has been a reduction of system wide RDII for the similar range of storms (Excluding the large 15 May outlier storm). This suggests **that improvements to the system were effective in reducing RDII**.
2. A general rule in data analysis says that data should not be excluded from a data set without clear and justifiable reason. Large storms can result in RDII volumes both higher and lower than expected levels. If the system has the capacity for RDII, larger storms generate more RDII because the ground is saturated and more the rainfall can enter the sewer. If the system does not have the capacity for RDII, no matter how large the storm is only a fixed amount of RDII can enter the system. An example is a system in low laying areas serviced by pump stations. In such a system the pumping capacity determines how much RDII enters the system. Extra rainfall enters the waterways instead of the sewers. In this case the large storm appeared only in the 'after' data set so we will never know how the system would have performed in the 'before' condition. We have conducted the analysis both with the large storm and without the large storm so the reader can make a judgement.
3. Objectively, the analytics resulting from the Q vs. i analyses (Table 4) quantifies the reduction by predicting how much RDII would be expected from a 1-year, 24-hour storm of 2.84 inches of rainfall. This suggests that there are **measurable reductions in RDII** due to the work accomplished in the intervening years.
4. In 2010 meters CH02 and CH18 both exhibited tidal intrusion into the sewers at high king tide and data from 2019 suggested that tidal intrusion was still be occurring, but at a magnitude less than it was in 2010. There appears to be tidal intrusion at the same two sites in 2024, but at a lower magnitude than in prior years.

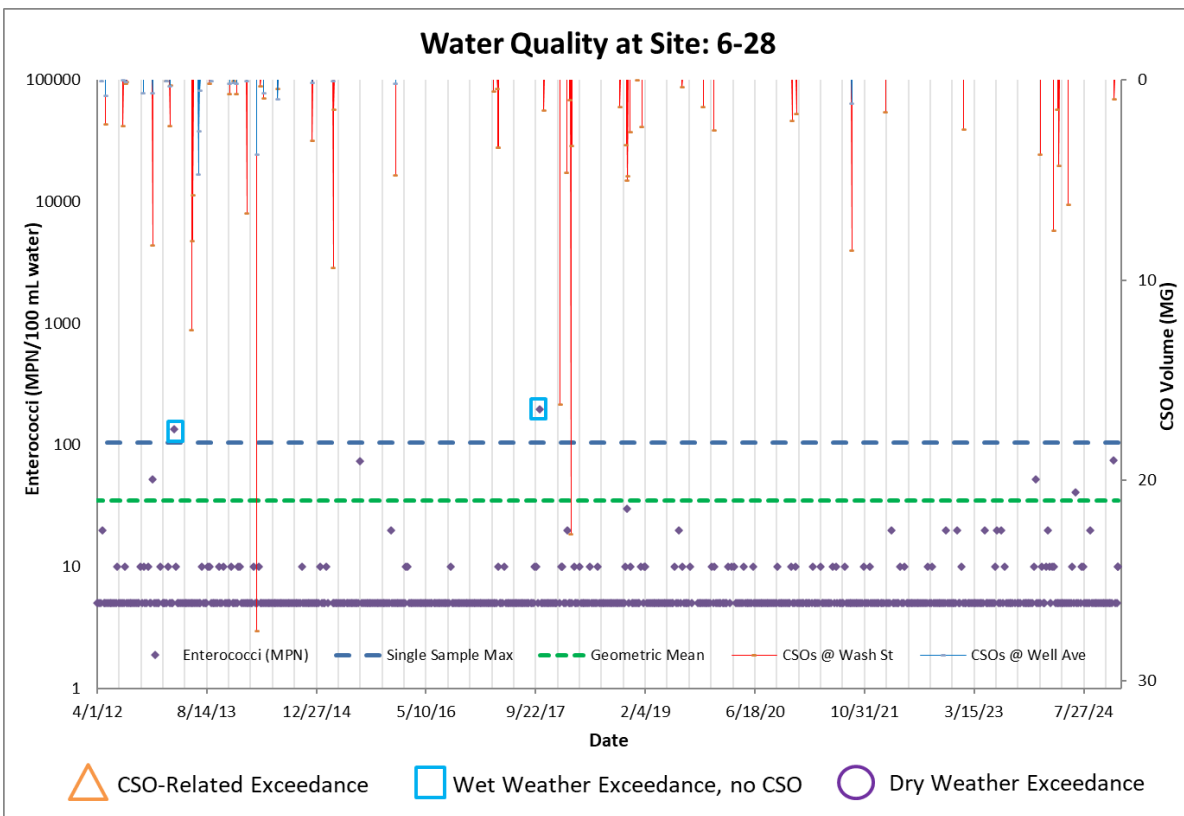
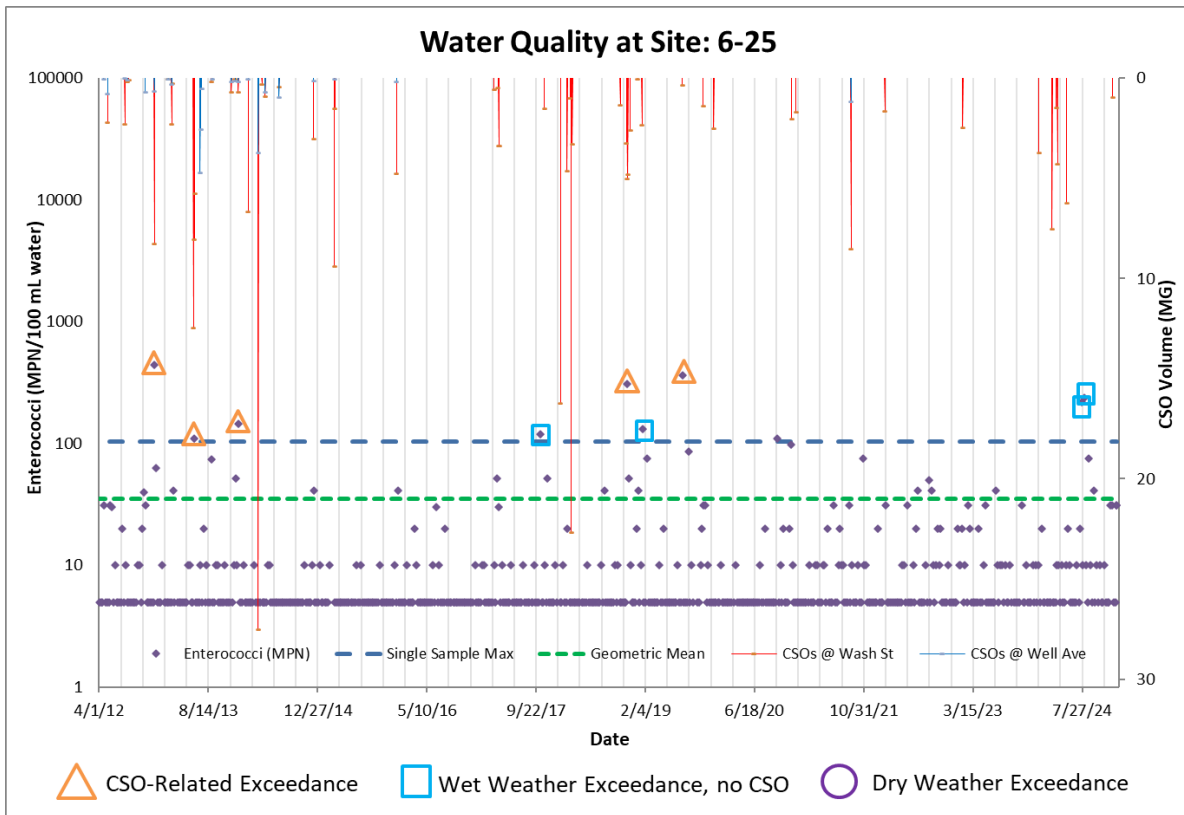
## **Appendix B. Enterococci Water Quality Plots at Additional Harbor Monitoring Sites**

CSO Program Reassessment Report #2

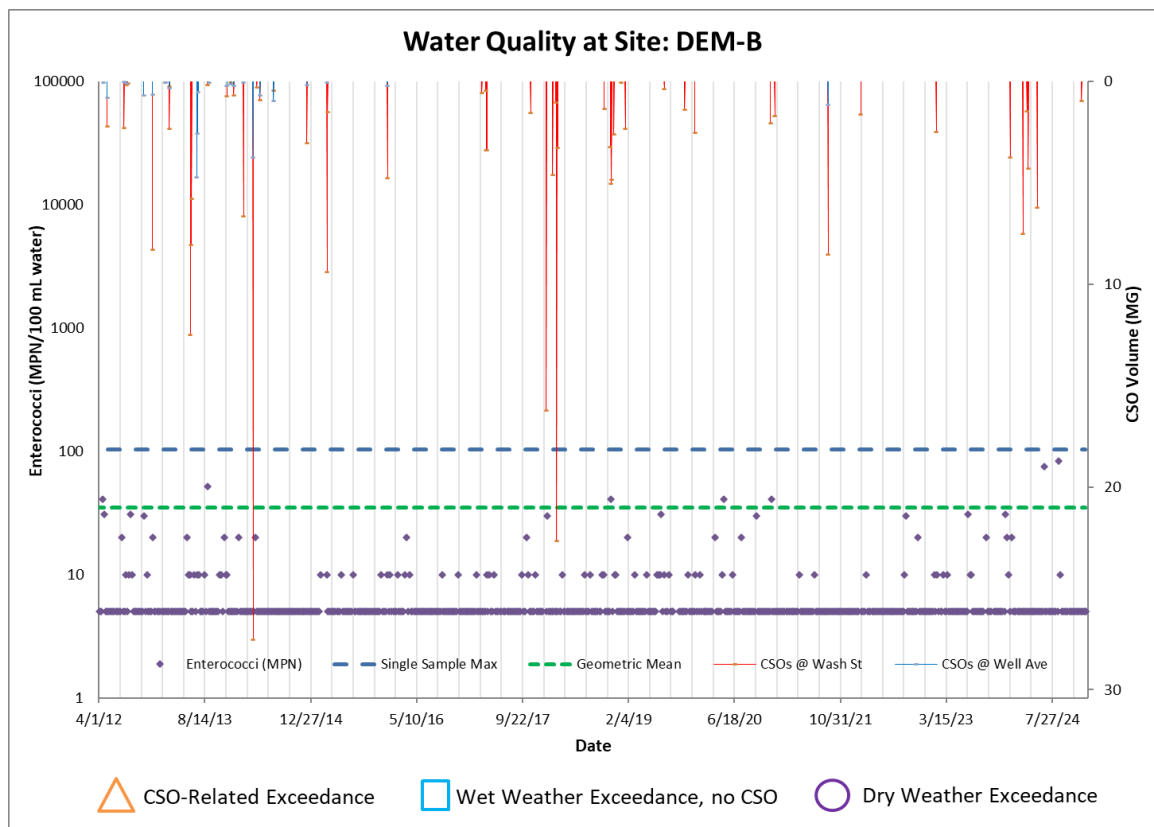
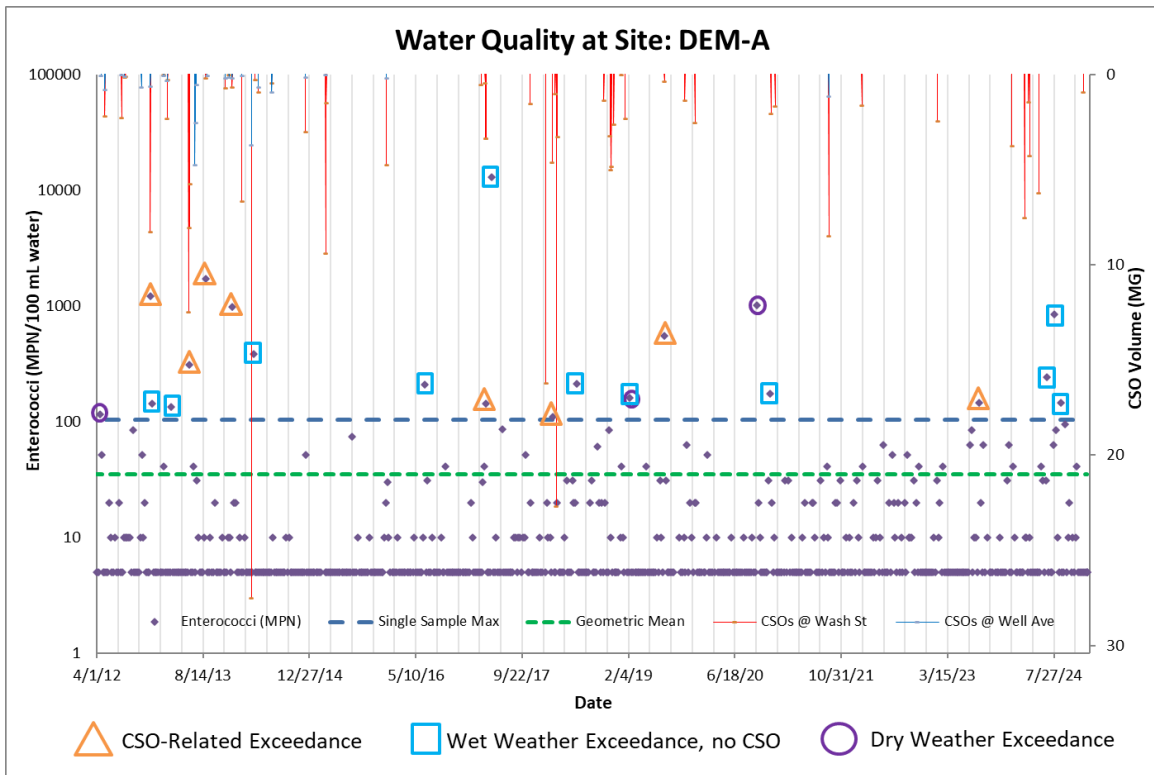


CSO Program Reassessment Report #2





CSO Program Reassessment Report #2



## **Appendix C. Financial Capability Assessment Update 2024**

## Financial Capability Assessment Update

<b>Date:</b>	June 5, 2024	120 St. James Avenue
<b>Project name:</b>	Newport CSO Program Management	5th Floor
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### 1. Financial Capability Assessment Update

The purpose of this Technical Memorandum (TM) is to provide an update to the financial capability assessment and affordability analysis for the City of Newport's Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) Project. The information provided in this TM will be incorporated into a Program Reassessment Report which is to be submitted to the United States Environmental Protection Agency (EPA) and the Rhode Island Department of Environmental Management (RIDEM) by June 30, 2025 per Consent Decree item 67.a.iii. This TM also documents the updates to the cash flow analysis developed for the City of Newport (the City) to evaluate the impacts based on sewer rates and affordability impacts associated with the Water Pollution Control (WPC) Division's ongoing wastewater and long-term control plan (LTCP) programs. The content of this TM follows:

- Introduction and Approach
- Key Financial Capability Assessment Results and Conclusion
- Financial Capability Assessment – Alternative 1
- Financial Capability Assessment – Alternative 2
- Summary

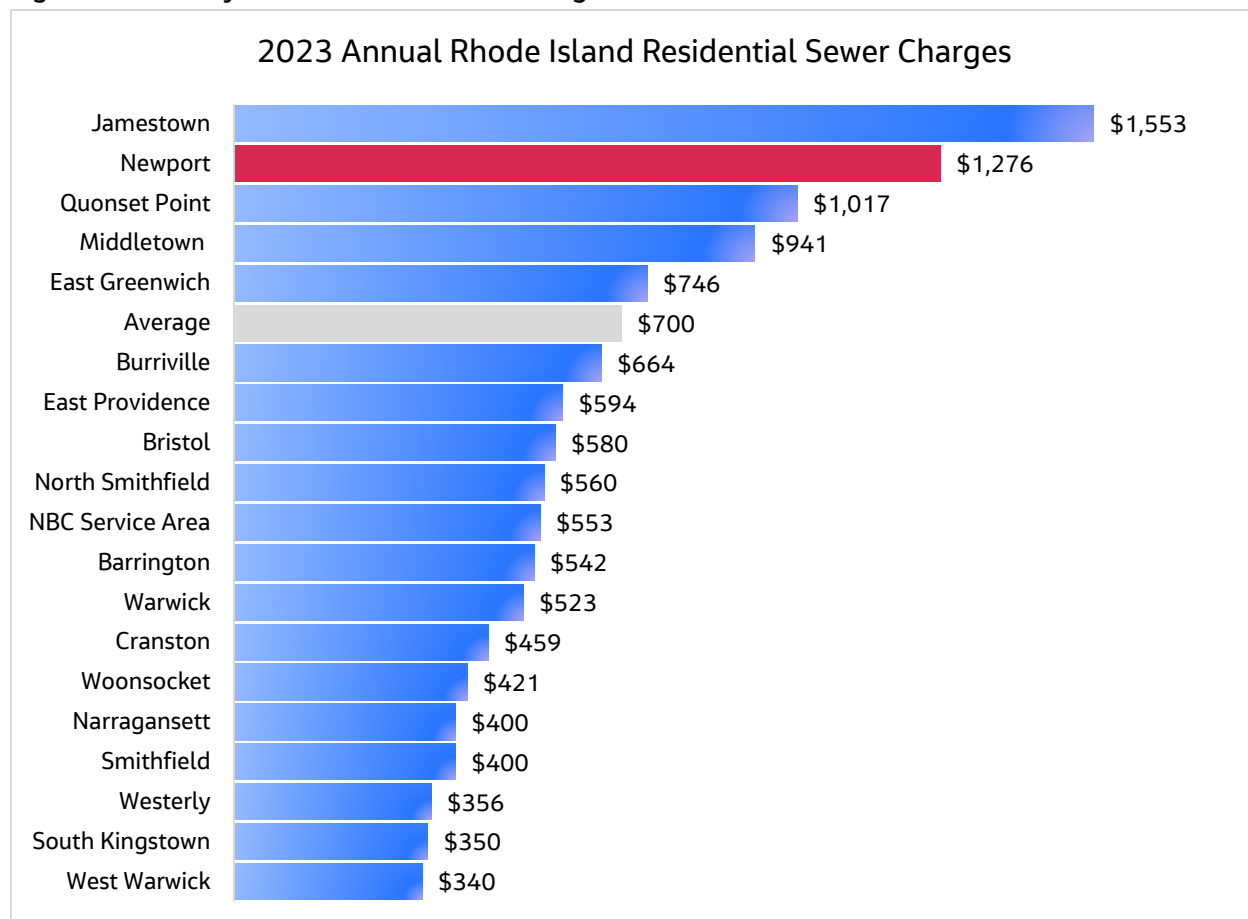
#### 1.1 Introduction

Historically, the City of Newport has made significant investments to improve its combined sewer conveyance, waste water treatments and storm drainage systems. Prior to the SMP this included construction of separate storm drains in the 1970s and treatment systems at its CSO outfalls in the 1970s and 1990s. Subsequent to submitting SMP in 2012 the City has implemented 32 additional improvement projects addressing:

- Upgrades for its wastewater and CSO treatment facilities
- Upgrades and rehabilitation of its pumping stations
- Rehabilitation of critical interceptors
- Replacement of aged pipes in its collection system
- Catch basin disconnections and inflow removal
- Storm drain system improvements
- Implementation of green infrastructure

Driven by its commitments to improving water quality, the City of Newport has historically had one of the highest sewer use rates in Rhode Island. Based on the 2023 Sewer Rate Survey, summarized in Figure 1, for the State of Rhode Island (Narragansett Bay Commission, 2023) Newport was among those with the highest rates out of the 20 communities surveyed. Sewer charges in Newport are 35% greater than its neighboring community, Middletown, and 82% greater than the State average.

**Figure 1. Summary of Rhode Island Sewer Charges**



The intent of this financial capability analysis update is to address the impacts of recently completed projects and other changed financial conditions within the City that effect affordability. This update also addresses industry guidance developed by AWWA, WEF, and NACWA subsequent to the preparation of the 2019 analysis. This guidance includes consideration of measures in addition to MHI such as *poverty level* and *income distribution* to better quantify the effects of sewer rates on all customers.

## 1.2 Approach to Financial Capability Analysis

In February 2023 EPA finalized and published its new guidance for Financial Capability Assessment (FCA) related to implementation of long-term control plans pursuant to the Clean Water Act (CWA). The new guidance provides localities two alternatives:

- “Alternative 1 considers metrics that measure the financial impact of the current and proposed CWA controls on residential users, the financial capability of the community, and the lowest quintile income and poverty prevalence within the community’s service area.”

- “Alternative 2 utilizes dynamic financial and rate models that evaluate the impacts of debt service on customer bills.”

Consistent with EPA previous guidance, additional information can be provided in the FCA for consideration when negotiating schedule, including the following:

- Costs for wastewater, stormwater, and drinking water infrastructure investment
- Other demographic and economic data

The previous FCAs prepared by Jacobs for the City of Newport have included a combination of Alternatives 1 and 2. The updates for 2023 addresses EPA's February 2023 FCA guidance, including consideration of the affordability of wastewater services that encompasses a number of elements that include the ability of a community to finance required facilities and the ability of individual customers to pay their bills for service. In addition, for combined sewer overflow and sanitary sewer overflow programs, there is a regulatory element to the consideration of affordability. The negotiation of programs and schedules between local utilities and the federal and state regulatory agencies are often closely tied to Federal guidance documents that define a framework for assessing the capability of communities to undertake the identified programs.

This section identifies the framework for affordability identified in the federal guidance documents, but also addresses local considerations related to affordability. The primary federal guidance document related to affordability for CSO/SSO programs is the February 1997 EPA document *Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development* (the Guidance). As detailed below, there are two primary elements in the analysis of financial capability:

- **Permittee Financial Indicator Score**, which assess whether the community's overall financial position is strong, mid-range, or weak, based on a number of components such as bond rating and unemployment rates.
- **Financial Capability Matrix**, which defines whether the burden imposed by wastewater programs is low, medium, or high, based on annual cost of sewer service for a household as a percent of the median household income (MHI) for the community.

As illustrated in Table 1, the Guidance identifies six components for the financial indicator score:

- Bond Rating
- Net Debt as Percent of Full Market Value
- Unemployment Rate
- Median Household Income
- Property Tax Revenues as a Percent of Full Market Value
- Property Tax Rate Collection

For each of these components, there is a possible score of 1 (weak), 2 (mid-range), or 3 (strong), depending on the community's performance. Table 1 summarizes the performance levels that constitute weak, mid-range, and strong performance for each of these indicators.

Table 1. EPA Framework for Financial Capability Indicators

Indicator	Strong	Mid-Range	Weak
Bond Rating	AAA-A (S&P) Aaa-A (Moody's)	BBB (S&P) Baa (Moody's)	BB-D (S&P) Ba-C (Moody's)
Overall Net Debt as a Percent of Full Market Property Value	Below 2%	2% - 5%	Above 5%
Unemployment Rate	More than 1 Percentage Point Below the National Average	+ Percentage Point of National Average	More than 1 Percentage Point Above the National Average
Median Household Income	More than 25% Above Adjusted National MHI	± 25% of Adjusted National MHI	More than 25% Below Adjusted National MHI
Property Tax Revenues as a Percent of Full Property Value	Below 2%	2% - 4%	Above 4%
Property Tax Collection Rate	Above 98%	94% - 98%	Below 94%
EPA Scoring	3	2	1

The scores for the individual indicators are averaged. The guidance identifies the following range of resulting average scores for all of the indicators:

- Weak (Below 1.5)
- Mid-range (Between 1.5 and 2.5)
- High (Above 2.5)

Table 2 illustrates the financial capability matrix. The Guidance identifies this matrix as the method for determining when wastewater charges are considered to impose an excessive burden on the community's rate payers. As illustrated in the figure, the two primary inputs to the matrix are the Financial Capability Indicators score, as defined above and the Residential Indicator score. The Residential Indicator score is the percent of annual income that a household with the community's median income is required to pay for wastewater program services. Wastewater services include the CSO/SSO program, but also include the ongoing costs for wastewater collection and treatment and administrative costs, such as management of the utility and costs associated with customer service and billing. So, for example, if a community's Financial Capability Indicator score is in the mid-range category, the financial burden is considered high when a typical residential household is required to pay more than 2% of the community's MHI for wastewater services (Residential Indicator is High).

**Table 2. EPA Framework for Financial Capability Matrix**

Permittee's Financial Capability Indicators Score	Residential Indicator (Cost Per Household as a Percent of Median Household Income)		
	Low (Below 1 %)	Medium (Between 1% and 2%)	High (Above 2.0%)
Weak( Below 1.5)	Medium Burden	High Burden	High Burden
Mid- Range (Between 1.5 and 2.5)	Low Burden	Medium Burden	High Burden
High (Above 2.5)	Low Burden	Low Burden	Medium Burden

The updated EPA guidance related to Alternative 1 approach added the Lowest Quintile Poverty Indicator (LQPI) and expanded the financial capability matrix to include the LQPI. The new LQPI consists of the following:

- Upper Limit of Lowest Quintile Income (US Census Topic B19080)
- Percentage of Population with Income Below 200% of Federal Poverty Level (US Census Topic S1701)
- Percentage of Households Receiving Food Stamps/SNAP Benefits (US Census Topic S2201)
- Percentage of Vacant Housing Units (US Census Topic B25002)
- Trend in Household Growth (US Census Topic B25004)
- Percentage of Unemployed Population 16 and Over in Civilian Labor Force<sup>14</sup> (US Census Topic DP03)

Census data were collected for each of the items listed above to determine the Lowest Quintile Poverty Indicator Score and is discussed later in Section 2.

Table 4 illustrates the expanded the financial capability matrix, which is a combination of financial capability matrix (RI x FCI) and the Lowest Quintile Poverty Indicator. The EPA's 2023 Guidance clarifies that if the expanded matrix score indicates a medium or high impact, this does not translate to stopping or avoiding the CIP projects. However, could be an opportunity to work with EPA to identify schedule relief. To the extent possible, additional planning and discussion with federal and state agencies could help identify grant and other assistance that had not been available previously. This might include changes in the affordability criteria used for RIDEM's SRF program to help the City apply for principal forgiveness loans (grants). The City may consider bolstering or enhancing assistance programs that are available to residents for energy programs.

**Table 3. EPA Framework for the Lowest Quintile Poverty Indicator**

Indicator	Strong (Score = 3)	Mid-Range (Score = 2)	Weak (Score = 1)
LQPI #1: Upper Limit of Lowest Quintile Income (B19080)	More than 25% above national LQI	±25% of national LQI	More than 25% below national LQI
LQPI #2: Percentage of Population with Income Below 200% of Federal Poverty Level (S1701)	More than 25% below national value	±25% of national value	More than 25% above national value
LQPI #3: Percentage of Households Receiving Food Stamps/SNAP Benefits (S2201)	More than 25% below national value	±25% of national value	More than 25% above national value
LQPI #4: Percentage of Vacant Housing Units (B25002)	More than 25% below national value	±25% of national value	More than 25% above national value
LQPI #5: Trend in Household Growth (B25002)	>1%	0%-1%	<0%
LQPI #6: Percentage of Unemployed Population 16 and Over in Civilian Labor Force (DP03)	More than 25% below national value	±25% of national value	More than 25% above national value

**Table 4. EPA Framework for Expanded Financial Capability Assessment Matrix**

Financial Capability Assessment (FCA) Score (RI x FCI)	Lowest Quintile Poverty Indicator Score		
	Low Impact	Medium Impact	High Impact
Low Burden (Impact)	Low Impact	Low Impact	Medium Impact
Medium Burden (Impact)	Low Impact	Medium Impact	High Impact
High Burden (Impact)	Medium Impact	High Impact	High Impact

The results of the financial capability assessments are often key considerations in the negotiation of CSO/SSO program requirements with federal and state regulators. With the addition of the LQPI and the expanded financial capability matrix, there may be an opportunity evaluate the CSO/SSO schedule, especially if federal and state regulators rely on the framework suggested in EPA’s February 2023 Guidance in their consideration of what constitutes an affordable program.

The previous FCA guidance did not include many of the elements of the PPI, and now that information is included and may help identify if the CSO/SSO program represents an excessive burden on its customers. For example, while the MHI has been part of the previous guidance, the February 2023 guidance now includes the upper limit of lowest quintile income category as part of the LQPI and the FCA analysis.

Also, the previous guidance excluded some items that could significantly affect a community’s overall financial position and ability to pay for large wastewater capital programs. For example, in assessing Net Debt as a % of Market Value, the Guidance specifically indicates that only general obligation debt is to be included. As a result, existing outstanding utility system debt that is revenue supported only, including both wastewater and drinking water debt, is excluded. In addition, any other revenue bonds that the communities may have issued to support other public service objectives could also significantly affect a community’s financial capability but are excluded from the calculations. In the case of Newport, there is

substantial debt associated with the City's drinking water system; the need for the community to repay that debt is a major burden on the City's residents and businesses, despite the fact that it is excluded from the Guidance's calculation of financial capability.

Also, some of the elements of the permittee's financial indicators are expressed only in relation to national averages (for example, unemployment rates). So, over time a community's financial capability could decline if unemployment rates increase, however this decline may be masked in the scoring if national unemployment rates increase along with the community's unemployment. A sudden change in markets and/or the economy could result in higher unemployment levels.

The calculation of financial capability and associated burden as defined in EPA's February 2023 Guidance is a single point in time analysis. A number of factors could cause changes in the assessment of financial capability over time, including, but not limited to:

- Reductions in resident/customer income
- Loss of property value
- Loss of revenue as a result of reductions in utility system usage over time through conservation, loss of population, reductions in business activity, or other factors
- Degradation of the community's financial position, such as a reduction in bond rating due to the magnitude of outstanding debt to support mandated programs, general declines in the bond market, or other factors

Many communities throughout the United States experienced some or all of these factors. Perhaps there is still the fallout of the collapse of the world financial markets that began in late 2008. Or more recently, the fallout of the COVID-19 pandemic. Over the course of a 20- or 30-year repayment period, the possibility of such negative factors affecting the affordability of mandated programs has a reasonable probability of occurring for many utility systems. Committing to a long-term capital program at the very edges of affordability based on a single point of time analysis based on today's financial conditions carries with it a reasonable prospect of requiring utility system customers to build systems that will impose a severe financial hardship at some time in the future.

The impact of utility system charges on a household that earns the median household income for the community may not be the best indicator of the affordability of a program on the community. For example: The income profile for communities varies, and there may be a significant number of households well below the median income level. In that case, there may be many households severely affected by paying for the wastewater program, even if the program appears to be affordable for a household with the MHI.

The program could impose significant financial burden on some commercial and industrial customers. Some industries and types of businesses face much more difficult challenges in remaining profitable in the current economic environment than others. Steep rate increases to pay for utility capital programs could mean the difference between being able to remain profitable or not; in some cases, it may affect a company's ability to stay in business.

Many communities face a variety of public improvement needs, such as the need to replace aging roads, bridges, and public buildings at the same time that investment in wastewater systems is required. Based on the full range of community needs, the stakeholders and leaders of a community may simply disagree that they can afford the level of investment in wastewater systems implied by the static, point-in-time analyses defined in the Guidance.

## 2. Key FCA Results and Conclusion

There are two FCA Matrixes summarized for the analysis presented herein, including the following:

- Traditional FCA Matrix, based on 1997 EPA Guidance
- Expanded FCA Matrix, based on 2023 EPA Guidance

### 2.1 Traditional FCA Matrix

The traditional FCA Matrix is based on the 1997 EPA Guidance and includes six indicators that are used to develop an overall financial capability indicator score and is compared to the residential indicator. Based on the findings from the 2019 Financial Capability Assessment, the FCI was 2.8 and the RI was 2.18, as summarized on the matrix presented in Table 5, and this correlates to a medium burden. there is no change in the burden when comparing the 2019 FCA and the 2023 FCA.

**Table 5. Newport, RI 2019 Financial Capability Assessment Matrix**

Permittee’s Financial Capability Indicators Score	Residential Indicator (Cost Per Household as a Percent of Median Household Income)		
	Low (Below 1 %)	Medium (Between 1% and 2%)	High (Above 2.0%)
Weak( Below 1.5)	Medium Burden	High Burden	High Burden
Mid- Range (Between 1.5 and 2.5)	Low Burden	Medium Burden	High Burden
High (Above 2.5)	Low Burden	Low Burden	Medium Burden

Based on the findings from the 2023 Financial Capability Assessment, the FCI was 2.3 and the RI was 1.47% and based on the FCA matrix this correlates to medium burden, as summarized on the matrix presented in Table 6. The change in the RI is attributed to increase in MHI and cost per household. Since the MHI represents a limited view of household income, for the households that have income below the median level, the RI would shift to from medium to high burden, refer to Sections 3.3.1 and 4.10. For the traditional FCA matrix,

**Table 6. Newport, RI 2023 Financial Capability Assessment Matrix**

Permittee’s Financial Capability Indicators Score	Residential Indicator (Cost Per Household as a Percent of Median Household Income)		
	Low (Below 1 %)	Medium (Between 1% and 2%)	High (Above 2.0%)
Weak( Below 1.5)	Medium Burden	High Burden	High Burden
Mid- Range (Between 1.5 and 2.5)	Low Burden	Medium Burden	High Burden
High (Above 2.5)	Low Burden	Low Burden	Medium Burden

## 2.2 Expanded FCA Matrix

The new Expanded FCA Matrix compares the result of the traditional FCA matrix against the new Lowest Quintile Poverty Indicator (LQPI) matrix, as presented Table 7, and this correlates to a medium burden. The Expanded FCA Matrix indicates a medium impact. The details and results for the new Expanded FCA Matrix and the analysis for 2023 FCA are presented in Sections 3 and 4 of this technical memorandum.

**Table 7. 2023 New Expanded Financial Capability Assessment Matrix**

Financial Capability Assessment (FCA) Score (RI x FCI)	Lowest Quintile Poverty Indicator Score		
	Low Impact (Above 2.5)	Medium Impact (1.5 to 2.5)	High Impact (Below 1.5)
Low Burden (Impact)	Low Impact	Low Impact	Medium Impact
Medium Burden (Impact)	Low Impact	Medium Impact	High Impact
High Burden (Impact)	Medium Impact	High Impact	High Impact

## 2.3 Conclusion

- There is no change in the burden when comparing the 2019 FCA and the 2023 FCA. The traditional FCA matrix correlates to a medium burden.
- The LQPI score is 2 and represents a medium impact with regards to the severity and prevalence of poverty.
- The new Lowest Quintile Poverty Indicator (LQPI) matrix correlates to a medium burden. When considering income levels, poverty, and the City’s financial condition, there would be a medium burden associated with water and wastewater utility operating and capital costs.
- The water and wastewater CPH as % of MHI is below 4% combined affordability threshold. The CPH for households with income at or near the poverty level (i.e., LQI), is above the 4% combined affordability threshold.
- WPC generates approximately \$20 million in sewer user fee revenues, spends \$10.3 million in operating expenses (net of depreciation), and makes approximately \$6.5 million in annual debt service payments. The debt service coverage ratio (DSCR) is 1.61x as of June 30, 2022.
- No sewer rate increases are planned for FY 2023 – FY 2025. This results in the DSCR dropping below the target ratio of 1.25x in 2025. However, this should be confirmed and compared against the required coverage ratio identified in Revenue Bond indenture document.
- At current rates, the typical residential water and sewer annual bill is \$1,718 and represents 2.23% of MHI and 6.1% of the LQI. This is compared to a combined affordability threshold of 4% for water and sewer.
- If rates increase 3% per year, the typical residential bill increases approximately \$30 per year and would present additional burden on certain households.

### **3. Financial Capability Assessment: Alternative 1**

This summarizes the results for City of Newport 2023 Financial Capability Assessment based on best available information. As previously described, Table 2 provides the Financial Capability Indicator (FCI) scoring framework. The following sections present the results for each of the six components of the Financial Capability Indicators. Sources of information used in developing this update included:

- Published information, such as U.S. Census Bureau and State and Federal agency websites.
- Information contained on the City of Newport's website, including the adopted budget for FY 2022-23, the City's Annual Comprehensive Financial Report (ACFR) for FY 2022, and other recent financial and other information related to the utility system and the City's overall financial indicators.

#### **3.1 Residential Indicator**

The Residential Indicator (RI) is based on the estimated cost per household (CPH) as a percent of MHI. The RI is part of EPA's 1997 FCA guidance and is used in determining the overall FCA Matrix score. Table 8 provides the information used to determine the CPH. Total costs are allocated to residential customers based on the relationship between residential and total flows. The residential share of costs is divided by the number of households in the service area to determine the CPH. The CPH is then compared to the MHI to determine CPH as a percent of MHI, which is used as part of the RI portion of the FCA matrix. Table 9 provides the information used to determine the RI. For this update, the CPH includes the estimate costs for the water utility system as provided for in the EPA's 2023 FCA Guidance. This is also consistent with other EPA policy memorandum. The guidance also allows the addition of stormwater costs, but these are assumed to be part of the wastewater costs.

**Table 8. Cost per Household for Water and Wastewater Treatment (CSO/LTCP)**

Line	Cost Item	Wastewater	Water	Total
<b>Current Costs</b>				
100	Annual O&M Expenses (net depreciation)	\$12,788,972	\$10,270,200	\$23,059,172
101	Annual Debt Service (Principal and Interest)	\$6,628,541	\$7,274,243	\$13,902,784
102	Subtotal Current Costs	<b>\$19,417,513</b>	<b>\$17,544,443</b>	<b>\$36,961,956</b>
<b>Projected Costs</b>				
103	Estimated Annual O&M Expenses (net depreciation)	N/A	N/A	N/A
104	Annual Debt Service (Principal and Interest)	\$5,712,929	\$9,153,000	\$12,541,000
105	Subtotal Projected Costs	<b>\$5,712,929</b>	<b>\$9,153,000</b>	<b>\$12,541,000</b>
106	<b>Total Current and Projected Costs</b>	<b>\$28,570,513</b>	<b>\$30,085,443</b>	<b>\$58,655,956</b>
	Residential Flow (MGD)	5.80	5.80	5.80
	Total Flow (MGD)	7.43	7.43	7.43
	Residential Percentage	78%	78%	78%
107	<b>Residential Share Costs</b>	\$22,285,000	\$23,466,646	\$45,751,646
108	<b>Total Number of Households in Service Area</b>	17,447	17,447	17,447
109	<b>Cost Per Household (annual)</b>	\$1,277	\$1,345	\$2,622

WWT = wastewater treatment

Households in Service Area = 10,177 City of Newport + 7,270 Middletown

**Table 9. Residential Indicator for the 2023 Financial Capability Assessment**

Line	Item	Wastewater	Water	Combined
201	Median Household Income (MHI) (2021 Dollars)	\$81,725	\$81,725	\$81,725
202	MHI Adjustment Factor	1.069	1.069	1.069
203	Adjusted MHI (2023 Dollars)	\$87,000	\$87,000	\$87,000
204	Annual CPH (2023 Dollars)	\$1,277	\$1,345	\$2,622
205	Residential Indicator (Percent)	1.47%	1.55%	3.01%
	Affordability Threshold	2%	2%	4%

## 3.2 Financial Capability Indicators

The Financial Capability Indicators are used to identify a system's financial capability to implement CSO / LTCP programs by evaluating the debt, socioeconomic, and financial conditions. The FCI score is used in both the FCA Matrix and the new Extended FCA Matrix. As shown in Table 10, the average score for the six financial indicators is 2.3 for the 2023 FCA. Based on the scoring ranges identified in the Guidance, this is deemed to be a mid-range score. The City's score was strong for the 2019 FCA. There are two indicators, unemployment and tax revenue collections, that changed compared to the 2019 FCA that result in a lower FCI score.

**Table 10. FCI – Overall Financial Capability Indicator Score**

Item	2019 FCA	2023 FCA
Bond Rating	Strong (3)	Strong (3)
Net Debt as a Percentage of FMV	Strong (3)	Strong (3)
Unemployment Rate	Strong (3)	Weak (1)
Median Household Income	Mid-range (2)	Mid-range (2)
Property Tax Revenues as a Percent of FMV	Strong (3)	Strong (3)
Property Tax Rate Collection	Strong (3)	Mid-range (2)
<b>Overall score (average)</b>	<b>Strong (2.8)</b>	<b>Mid-range (2.3)</b>

### 3.2.1 Bond Rating

The City's bond rating is rated as strong, based on an AA+ rating by Standard & Poor's. This rating is reflected in the City's FY 2022 CAFR. The City primarily uses State Revolving Fund (SRF) funding for WPC's capital financing, in particular SRF Revenue bonds and non-SRF revenue bonds all issued through the Rhode Island Infrastructure Bank (RIIB). For the previous two FCA's the City had similar score of 'strong'. Table 11 compares the bond rating indicator scores for the 2019 and 2023 FCAs.

**Table 11. FCI – Bond Rating**

Item	2019 FCA	2023 FCA
Most recent General obligation	S&P AA+	S&P AA+
Most recent Revenue (water/sewer) bond	na	na
Indicator Score	Strong (3)	Strong (3)

Notes:

2019 FCA data are based on the 2018 ACFR.

2023 FCA data are based on the 2022 ACFR.

### 3.2.2 Net Debt as Percent of Full Market Value

The City's net debt as percent of full market value indicator score is strong based on the definition for this indicator in the EPA guidance. The amount of net debt has increased compared to the 2019 FCA. The City's net general obligation debt is estimated at 1.5% and is very close to the 2% threshold for a strong rating. It is possible that the relationship between net debt and FMV could soon approach a mid-range score. Table 12 compares the net debt as a percent of FMV rating indicator scores for the 2019 and 2023 FCAs.

**Table 12. FCI - Net Debt as Percent of Full Market Value**

Item	2019 FCA	2023 FCA
Direct Net Debt (G.O. Bonds)	\$36,211,000	\$120,880,000
Overall Net Debt	\$36,211,000	\$120,880,000
Market Value of Property	\$6,943,351,014	\$7,979,198,776
Overall Net Debt as a Percentage of FMV	0.5%	1.5%
Indicator Score	Strong (3)	Strong (3)

## Notes:

There is no debt of overlapping entities.

2019 FCA data are based on the 2018 ACFR.

2023 FCA data are based on the 2022 ACFR.

### 3.2.3 Unemployment Rate

Based on the US Census American Community Survey data (2021 ACS 5-year estimates), the City's civilian unemployment rating is weak for the 2023 FCA, because the City's 9% unemployment rate is more than 1% lower than the national average of 6.3%. Compared to the 2019 FCA, the City's unemployment rate has increased, however this is a point estimate or snap shot in time and the unemployment rate will fluctuate over time. Over the past several years the COVID-19 pandemic mandates impacted many business and the high employment rate may reflect a slower than expected recovery. The data set available for the 2023 FCA was the US Census ACS 2021 5-year average. This data set may not be representative of normal conditions. Table 13 compares the unemployment indicator scores for the 2019 and 2023 FCAs.

**Table 13. FCI - Unemployment rate**

Item	2019 FCA	2023 FCA
Unemployment rate - City of Newport	4.50%	9.0%
Unemployment rate - National	6.6%	6.3%
Difference	-2.1%	2.7%
Indicator Score	Strong (3)	Weak (1)

## Notes:

2019 FCA unemployment data reflect 2017 ACS 5-year estimates.

2023 FCA unemployment data reflect 2021 ACS 5-year estimates.

### 3.2.4 Median Household Income

Based on the US Census American Community Survey data (2021 ACS 5-year Estimates) the City's rating for this indicator is mid-range, based on MHI of \$77,092, which is approximately 3% higher than the national average of \$74,755. Table 14 compares the MHI indicator scores for the 2019 and 2023 FCAs.

**Table 14. FCI - Median Household Income**

Item	2019 FCA	2023 FCA
MHI - City of Newport	\$65,365	\$77,092
MHI - National	\$57,652	\$74,755
Percent difference	13%	3%
Indicator Score	Mid-range (2)	Mid-range (2)

Notes:

2019 FCA MHI data reflect 2017 ACS 5-year estimates.

2023 FCA MHI data reflect 2021 ACS 5-year estimates.

### 3.2.5 Property Tax Revenues as a Percent of Full Market Value

The City's rating for this indicator is strong. The City's property tax revenues represent 1% of full property value, based on information provided in the FY 2022 Annual Comprehensive Financial Report (ACFR). This percentage is well below the 2% level that defines strong performance for this indicator. Table 15 compares the property tax revenues as a percent of FMPV indicator scores for the 2019 and 2023 FCAs.

**Table 15. FCI - Property Tax Revenues as a Percent of Full Market Value**

Item	2019 FCA	2023 FCA
Full Market Property Value (FMPV)	\$6,943,351,014	\$7,979,198,776
Property tax revenue	\$73,427,810	\$81,194,232
Property tax revenue as a percent of FMPV	1.1%	1.0%
Indicator Score	Strong (3)	Strong (3)

Notes:

2019 FCA data are based on the 2018 ACFR.

2023 FCA data are based on the 2022 ACFR.

### 3.2.6 Property Tax Rate Collection

The City's score for the property tax collection indicator score for the 2023 FCA is mid-range, based on a property tax collection rate of 96.57%, as documented in the City's FY 2022 ACFR. Historically, the City's collection has been high and the conditions resulting a lower than expected collection rate could be limited to recent economic conditions. Table 16 compares the property tax collection rate indicator scores for the 2019 and 2023 FCAs.

**Table 16. FCI - Property Tax Rate Collection**

Item	2019 FCA	2023 FCA
Property tax revenue collected	\$73,427,810	\$78,983,134
Property taxes levied	\$73,476,044	\$81,788,132
Property tax revenue collection rate	99.93%	96.57%
Indicator Score	Strong (3)	Mid-range (2)

Notes:

2019 FCA data are based on the 2018 ACFR.

2023 FCA data are based on the 2022 ACFR.

### 3.3 Lowest Quintile Poverty Indicator

EPA’s 2023 Guidance provides an additional metric to measure and evaluate affordability. Table 3 provides the framework for the Lowest Quintile Poverty Indicator (LQPI) that includes six indicators. The indicators identify low-income households and the prevalence of poverty within the service area. Table 17 summarizes the LQPI scores for the six indicators and for the City of Newport there is medium impact for the LQPI. This score is further evaluated in the next section as part of the new Expanded FCA Matrix identified in EPA’s 2023 Guidance.

**Table 17. LQPI Score**

LQPI	Score
1: Upper Limit of Lowest Quintile Income	2
2: Percentage of Population with Income Below 200% of Federal Poverty Level	2
3: Percentage of Households Receiving Food Stamps/SNAP Benefits	2
4: Percentage of Vacant Housing Units	2
5: Trend in Household Growth	2
6: Unemployment Rate Population 16 and Over in Civilian Labor Force	2
LQPI Score	Medium Impact (2)

The following sections provide the results for the six indicators that comprise the LQPI. For the LQPI analysis of each indicator, the service area is assumed to consist of the City of Newport and Town of Middletown and the weighted average is compared to the National value to determine the indicator score.

#### 3.3.1 Upper Limit of Lowest Quintile Income

The upper limit of lowest quintile income (LQI) is a statistic that helps identifies households with income at or near the poverty level. Data collected from the US Census based on the 2021 American Community Survey website shows for the City of Newport, the upper limit equates to 20% of households earning less than \$28,152 in 2021. The intent is to identify the portion of service area that would experience the most financial hardship as utility rates increase. Table 18 summarizes the data for the LQI indicator.

**Table 18. LQPI - Upper Limit of Lowest Quintile Income**

Jurisdiction	Upper Limit of Lowest Quintile Income	Total Households	Weighted Average
City of Newport, RI	\$28,152	10,177	\$16,421
Town of Middletown, RI	\$33,411	7,270	\$13,922
City of Newport Service Area	<b>\$30,343</b>	17,447	<b>\$30,343</b>
National	\$28,261		
City of Newport Service Area % National Value	7.37%		
Indicator Score	Mid-Range (2)		
Source: US Census, ACS, Table B19080, 2021 5-year average.			

### 3.3.2 Population with Income Below 200% of Federal Poverty Level

This indicator helps identify the population of the service that has income below the federal poverty level, and this metric the EPA chose is 200% of Federal Poverty Level (FPL). Poverty level is aligned with minimum level of resources needed meet basic needs and is adjusted to account for more unrelated people in the household. For this analysis, the poverty level is for all individuals and it is assumed that household size is not used. In general, the household size is a factor used with the poverty levels and are typically used to determine eligibility for assistance programs. The EPA uses the benchmark ranges to bracket the middle class characterize outliers. Table 19 summarizes the data for the poverty indicator.

**Table 19. LQPI - Percentage of Population with Income Below 200% of Federal Poverty Level**

Jurisdiction	Poverty Level	Households	Weighted Average
City of Newport, RI	25.86%	10,177	15.1%
Middletown Town	19.03%	7,270	7.9%
City of Newport Service Area	<b>23.0%</b>	17,447	<b>23.0%</b>
National	28.61%		
City of Newport Service Area % National Value	-19.56%		
Indicator Score	Mid-Range (2)		
Source: US Census, ACS, Table S1701, 2021 5-year average.			

### 3.3.3 Households Receiving Food Stamps or SNAP Benefits

Supplemental Nutrition Assistance Program (SNAP) is an assistance program to support low-income families and individuals. Programs are typically administered at the state level to determine eligibility. There are several conditions to determine eligibility, including gross income compared to percentage of the federal poverty level and household size. The Rhode Island Department of Human Services applies 185% of the FPL for households without an adult 60 or older, and 200% of the FPL for households with an adult 60 or older. Table 20 summarizes the percentage of households receiving SNAP benefits.

**Table 20. LQPI - Percentage of Households Receiving Food Stamps or SNAP Benefits**

Jurisdiction	Percentage of Households Receiving Food Stamps/SNAP Benefits	Households	Weighted Average
City of Newport, RI	13.20%	10,177	7.7%
Middletown Town	8.7%	7,270	3.6%
City of Newport Service Area	<b>11.3%</b>	17,447	<b>11.3%</b>
National	12.4%		
City of Newport Service Area as % National Value	-8.67%		
Indicator Score	Mid-Range (2)		
Source: US Census, ACS, Table S2201, 2021 5-year average.			

### 3.3.4 Vacant Housing Units

The LQPI includes a metric for vacant housing units. EPA's 2023 FCA Guidance does not provide any explanation as to its purpose. This metric could help the utility system understand the service area and explain the number households receiving service. If a large portion of housing units are vacant, then the utility system services are under used despite continued investment in the system. For purpose of determining the LQPI, vacant units categorizes as seasonal (vacation and recreational) are excluded to emphasis year round housing units. Table 21 summarizes the data for the vacant housing indicator.

**Table 21. LQPI - Percentage of Vacant Housing Units**

Jurisdiction	Percentage of Vacant Housing Units	Housing Units	Weighted Average
City of Newport, RI	11.59%	13,250	7.1%
Middletown Town	5.64%	8,344	2.2%
City of Newport Service Area	9.29%	21,594	<b>9.3%</b>
National	7.55%		
City of Newport Service Area as % National Value	23.10%		
Indicator Score	Mid-Range (2)		
Source: US Census, ACS, Table B25004, 2021 5-year average.			

### 3.3.5 Trend in Household Growth

The LQPI includes a metric for vacant housing units. EPA's 2023 FCA Guidance does not provide any explanation as to its purpose. The indicator is determine based on collecting This indicator is not compared to a national value. Table 22 summarizes the household growth indicator.

**Table 22. LQPI - Trend in Household Growth**

Jurisdiction	Trend in Household Growth	Households	Weighted Average
City of Newport, RI	-1.04%	10,177	-0.6%
Middletown Town	2.52%	7,270	1.1%
City of Newport Service Area	0.4%	17,447	0.4%
National	N/A		
City of Newport Service Area as % National Value	N/A		
Indicator Score	Mid-Range (2)		
Source: US Census, ACS, Table B25002, 2021 5-year average and 2015 5-year average.			

### 3.3.6 Unemployment Rate for Civilian Labor Force

The unemployment rate for the civilian labor force helps to identifying conditions in the service that may indicate a portion of the population may experience temporary financial hardship because of their unemployment status. Table 23 summarizes the unemployment rate indicator.

**Table 23. LQPI – Unemployed Rate for Population 16 and Over in Civilian Labor Force (DP03)**

Jurisdiction	Unemployed Rate	Households	Weighted Average
City of Newport, RI	9.0%	10,177	5.2%
Middletown Town	5.2%	7,270	2.2%
City of Newport Service Area	7.4%	17,447	7.4%
National	6.3%		
City of Newport Service Area as % National Value	17.72%		
Indicator Score	Mid-Range (2)		
Source: US Census, ACS, Table D03, 2021 5-year average			

## 3.4 Additional Local Considerations/Factors

As detailed in Section 3, the analyses called for in the Guidance do not address all considerations related to the affordability of wastewater charges. There are a number of additional considerations that can affect the community's ability to implement and support large capital programs in tight required timeframes. Below is a recap of some of the considerations also relevant to determining whether Newport's typical residential customers can afford to pay an additional \$165 for wastewater services above their current annual charges:

- Water system costs
- Snapshot Analysis (i.e., based on 2022 American Community Survey data from US Census)
- Income Profile Beyond MHI (i.e., based on 2017 American Community Survey data from US Census)
- Local Priorities/Considerations

### 3.4.1 Water System Costs

The City of Newport has undertaken a major capital program related to its drinking water system. In particular, the City is undertaking a significant capital investment as part of its lead service line replacement. The RI analysis previously presented includes water operating and capital costs to determine the cost per household for the water system and the combine water and wastewater systems. These costs are also evaluated as part of financial Pro forma and cash flow analysis presented in Section 4 - Financial Capability Assessment: Alternative 2.

### 3.4.2 Snapshot Analysis

The City has seen some of its financial indicators (unemployment rate, household income, etc.) fluctuate up and down during the past 5-10 years based on local, national, and global economic factors. Over the course of a 20- or 30-year repayment period, there is a reasonable prospect that the City's financial situation could change from the snapshot at a single point in time that results from following the

methodology identified in the Guidance. It may therefore commit the City's wastewater system customers to a capital program that could push the City's customers to experience a financial burden. This is especially true for households earning less than the MHI and which are at or below federal poverty levels. To help provide insights beyond the snapshot in time, Section 4 - Financial Capability Assessment: Alternative 2 of this TM provides a financial cash flow analysis that attempts to evaluate key affordability metrics for a 10-year study period.

### **3.4.3 Income Profile Beyond MHI**

Income Profile Beyond MHI is addressed in the new LQPI that evaluates the lowest quintile income as one of six indicators related to poverty. Also, the distribution of income is also evaluated as part of financial Pro forma and cash flow analysis presented in Section 4 - Financial Capability Assessment: Alternative 2. Based on output from EPA's tool EJScreen, Figure 2 depicts the low income percentile compared to the State. For the EJScreen socioeconomic indicators related to low income, the City of Newport (service area) is 29% low income. By way of comparison, the state is 26% and the nation 40%. Figure 3 depicts the demographic index percentile compared to the State. For the EJScreen socioeconomic indicators related to demographic index, the City of Newport (service area) is 26% low income. By way of comparison, the state is 35% and the nation 45%.

Figure 2. Low Income Percentile Compared to the State

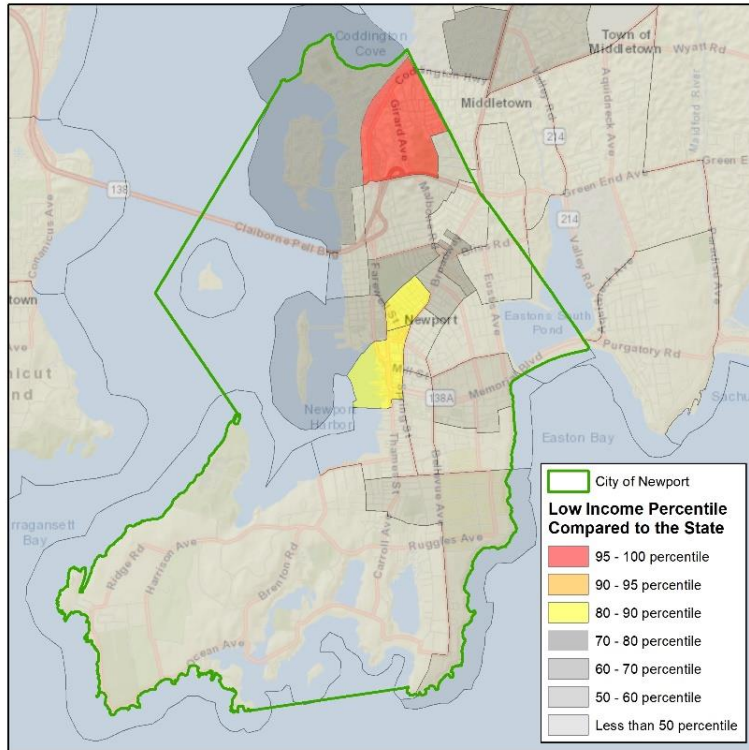
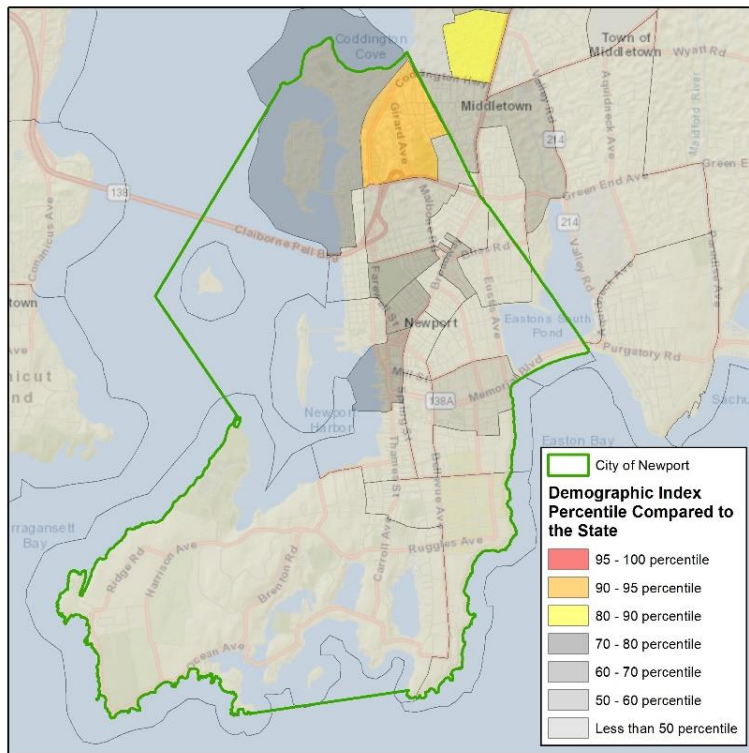


Figure 3. Demographic Index Percentile Compared to the State



### **3.4.4 Local Priorities/Considerations**

Many communities face a variety of public improvement needs, such as the need to replace aging roads, bridges, and public buildings at the same time that investment in wastewater systems is required. Based on the full range of community needs, the stakeholders and leaders of a community may simply disagree that they can afford the level of investment in wastewater systems implied by the static, point-in-time analyses defined in the Guidance.

## **4. Financial Capability Assessment: Alternative 2**

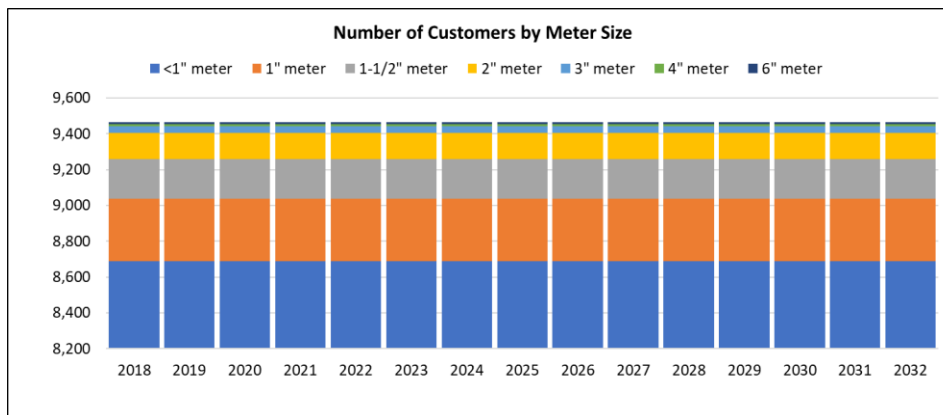
This section documents the updates to the cash flow analysis developed for the City of Newport (the City) to evaluate the impacts based on sewer rates and affordability impacts associated with the Water Pollution Control (WPC) Division's ongoing wastewater and long-term control plan (LTCP) programs.

### **4.1 Key Assumptions and Inputs**

- The CIP and financial data used in the analysis relies on the information provided in the City's Annual Comprehensive Financial Report (ACFR) and budget documents downloaded from the City's website. This includes debt service schedules, operating expenses, capital project costs, and revenues.
- The number of customers by meter size is based on a May 10, 2018 presentation entitled "Department of Utilities Water Pollution Control, Operating Expenses and Revenues for FY2019". It is assumed that the number of customers has not significantly changed.
- For the projection period FY 2026 to FY 2032, no grants or other outside funding is assumed. However, given the availability of federal stimulus funding, grant opportunities identified by the City can be updated as needed. For example, there may grant funding available for addressing lead service lines or additional principal forgiveness grants for SRF loans.
- To help fund the pump station upgrades, the City secured a \$12,000,000 SFR Loan / Revenue Bond (Series 2022). The annual debt service schedule provided in the FY 2024 and FY 2025 biennial budget has been incorporated as existing debt in the cash flow analysis. Based on review of the FY 2024 – FY 2028 CIP, no future / projected debt issuances are assumed. That is, other than the pump station upgrades funded by the Series 2022 Revenue Bond, projected capital costs are cash funded (i.e., existing cash reserves from sewer user fee or CSO fixed fee).
- For the projection period FY 2026 to FY 2032, there are no incremental operating and maintenance (O&M) costs associated with additional CSO programs or capital projects. It is not uncommon for there to be some incremental costs or savings associated with capital projects. However, based on review the budget documents, no incremental costs have been identified.
- O&M costs are escalated 3% per year. Projections starting with the period FY 2026 are based on FY 2025 proposed budget amounts.
- Capital costs provided in the FY 2024 – FY 2028 CIP are used "as-is" and are assumed to be expressed in nominal (not adjusted for inflation) dollars. Applying an inflation factor based on 3% annual inflation rate would have an impact on the results of the analysis presented herein.
- Data obtained from the US Census website is for the most recent year available for American Community Survey (i.e., 2021).
- Projections for household income assume a 1% per year increase.

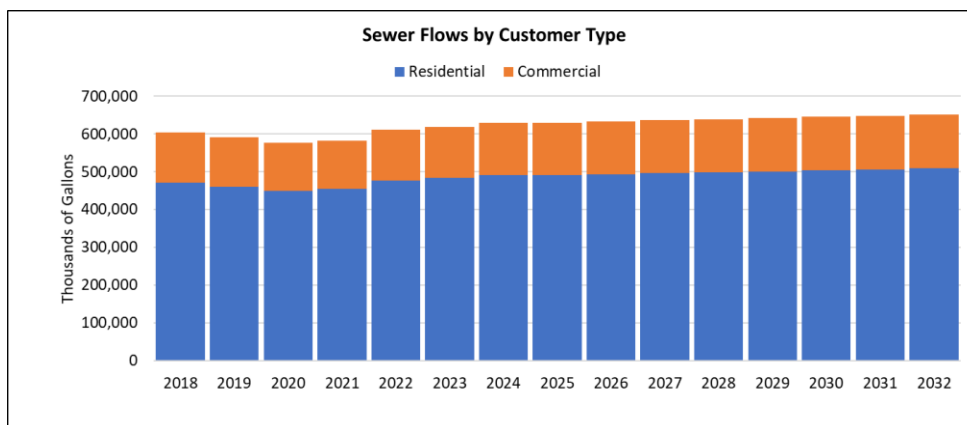
- Typical residential bill based on 5/8-inch meter and 4,000 gallons per month water consumption (131.5 gallons per day).
- Based on the FY 2024 and FY 2025 biennial budget, there are no sewer rate increases planned for FY 2023 – FY 2025.
- For the projection period FY 2026 to FY 2032, no growth in the number of accounts for residential and commercial. The latest estimate of number of accounts received from the City is from 2018 and more up-to-date information should be verified. While limited growth may have occurred, it is likely that it has been less 1%. Any increase in the number of accounts would result in an increase in CSO fixed fee revenue, as well as the user fee revenue associated with additional sewer flows. Figure 4 summarizes the number of accounts by meter size. This information is used to estimate the revenues from the annual CSO fixed fee.

**Figure 4. Number of WPC Accounts by Meter Size**



Based information collected for FY 2018, the sewer flows were estimated to be 603,877,000 gallons and assumed to 78% residential and 22% commercial. For period FY 2019 – FY 2022, sewer flows were estimated based reported user fee revenues (not including CSO fixed fee). For the proposed budget periods FY 2024 to FY 2025, sewer flows are assumed to be 630,000,000 gallons per year. For projections starting in FY 2026, a 0.5% growth rate is assumed. Figure 5 provides a graphical summary of the forecast sewer flows by account type. This information is used to estimate the revenues from the sewer charge.

**Figure 5. Projected Flows (thousands of gallons) by Account Type (Water Consumption)**



## 4.2 Cash Flow Analysis

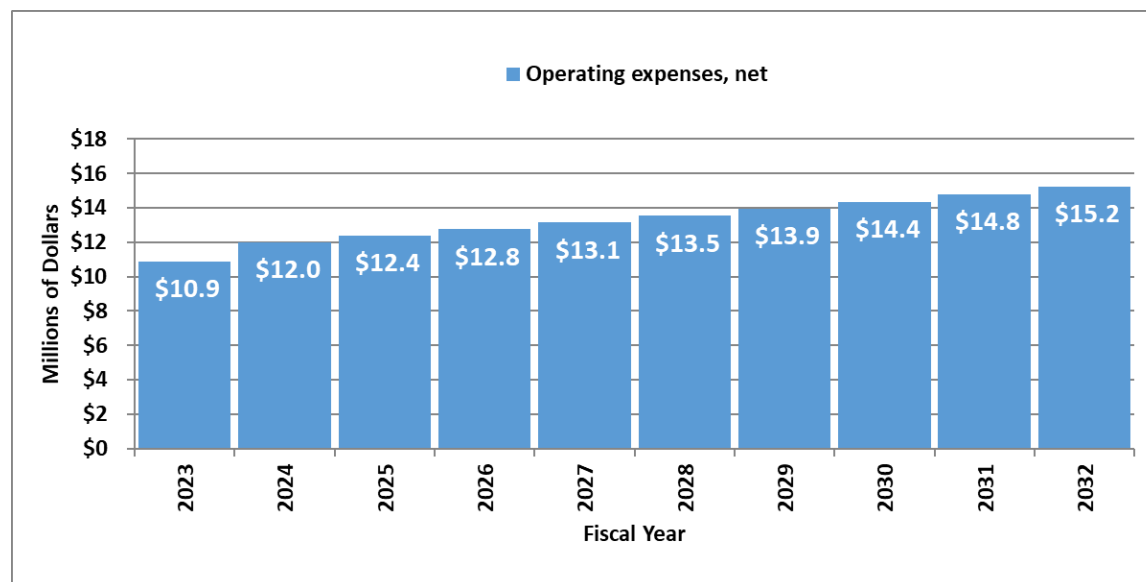
This section describes the financial (cash flow) analysis for two scenarios. Scenario 1 evaluates the base case conditions and reflects the information presented in the proposed budgets for FY 2024 and FY 2025. Scenario 2 evaluates conditions in which additional capital projects, such as asset management, are considered. In addition, Scenario 2 assumes that rates increase 3% per year starting in FY 2025, which is consistent with the 2019 analysis. The cash flow analyses documented herein follows a similar methodology that was used for the 2019 analysis. The updates for the 2023 cash flow analysis reflect the information provided in the City's Annual Comprehensive Financial Statements (ACFRs). In addition, the updates will help inform and support the evaluation of EPA's updated Financial Capability Assessment Guidance that was published in February 2023.

## 4.3 Operating and Maintenance Costs

For a historical perspective, Table 24 summarizes the WPC O&M expenditures for FY 2012 – FY 2018. The O&M expenditures do not include interest expense (part of debt service) or depreciation expense (non-cash expense). In FY 2017 there was an approximate \$2.5 million increase in O&M associated with the Wastewater Treatment Plant (WWTP) expansion and contract operations. In FY 2018 there was an approximate \$0.8 million increase in WPC salaries and benefits due to added full-time employees (FTE) when the collections systems operations joined the WPC.

WPC O&M expenditures for FY 2019 - FY2022 were obtained from the Annual Comprehensive Financial Reports. O&M expenditures for FY 2023 - FY2025 were obtain from the FY 2024 – FY 2025 Biennial Budget Report. Table 24 summarizes the WPC O&M expenditures for FY 2019 – FY 2025. As previously noted, projections for FY 2026 – FY 2032 assume 3% annual inflation rate. Figure 6 summarizes the projected O&M costs that are used as part of the cash flow analysis.

**Figure 6. Projected operating expenses (net of interest and depreciation expenses)**



#### **4.4 WPC Capital Projects**

Table 26 summarizes the FY2024 – FY2028 WPC CIP, which shows an average annual CIP of approximately \$3,750,000 and the funding source for each project is revenue from sewer rates. Table 26 also summarizes the FY 2023 CIP, which includes the \$12 Million project to upgrade the Long Wharf pump station. The issuance of a revenue bond for this project was authorized by City Ordinance 2022-08 and the debt service schedule is include the FY 2024 – FY 2025 proposed budget.

The WPC SMP projects anticipate additional LTCP/CSO that could include the following projects:

- Additional Inflow Removal (to achieve 50 percent inflow removal)
- Stormwater Conveyance Improvements
- Ongoing Asset Management
- Downspout Disconnections (customer funded)

For purpose of the cash flow analysis for Scenario 2, an additional \$12,000.000 in capital costs is assumed for these additional capital projects. This represents the cash funded amount that can accommodated with projected rate increases.

**Table 24. Annual WPC Operating and Maintenance Costs (2012 – 2018)**

Expense Item	2012 Actual	2013 Actual	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual
Salaries + Benefits	\$196,949	\$198,804	\$198,036	\$279,561	\$329,428	\$315,890	\$1,133,087
Materials and Supplies	12,649	-	-	-	-	6,960	104,310
Repair and Maintenance	-	-	-	79,221	178,900	-	203,364
Utilities	669,275	657,297	639,536	668,513	839,020	721,573	720,839
Administrative + Other	813,578	719,084	719,614	-	302,225	329,797	379,179
<b>Total Operating*</b>	<b>\$5,576,173</b>	<b>\$5,961,696</b>	<b>\$6,021,138</b>	<b>\$6,004,037</b>	<b>\$6,457,109</b>	<b>\$8,903,317</b>	<b>\$9,241,461</b>
Percent Change		7%	1%	3%	2%	38%	4%

\*does not include Interest Expense and Depreciation.

Source: WPC Budget, FY 2013 - FY 2019.

**Table 25. Annual WPC Operating and Maintenance Costs (2019 – 2025)**

Expense Item	2019 Actual	2020 Actual	2021 Actual	2022 Actual	2023 Budget Forecast	2024 Budget Proposed	2025 Budget Proposed
Salaries + Benefits	\$1,429,935	\$1,153,674	\$1,769,760	\$1,065,785	\$1,409,160	\$1,717,626	\$1,749,033
Materials and Supplies	80,030	96,430	77,670	67,960	120,383	172,950	172,950
Repair and Maintenance	190,159	108,470	109,594	274,025	194,999	275,000	275,000
Purchased Services	6,726,489	6,854,108	6,947,822	7,092,262	7,540,059	8,138,686	8,503,866
Utilities	831,192	844,534	773,725	925,482	793,152	837,500	837,500
Administrative + Other	351,422	512,952	507,482	844,686	832,648	851,990	851,990
<b>Total Operating*</b>	<b>\$9,609,227</b>	<b>\$9,570,168</b>	<b>\$10,186,053</b>	<b>\$10,270,200</b>	<b>\$10,890,401</b>	<b>\$11,993,752</b>	<b>\$12,390,339</b>
Percent Change		-0.4%	6%	1%	6%	10%	3%

\*does not include Interest Expense and Depreciation.

Source: WPC Budget, FY 2024 - FY 2025.

**Table 26. WPC CIP Budget for FY 2024–FY 2028**

Project	Funding Source	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Upgrades to Long Wharf Pump Station	Revenue Bond	\$12,000,000	\$ -	\$ -	\$ -	\$ -	\$ -
Sanitary Sewer Sys Improve 4&5-Design & Construction	Sewer Rates	1,300,000	900,000	750,000	1,000,000	825,000	1,050,000
Storm Drain Improvements	CSO Fixed Fee	1,080,000	500,000	750,000	750,000	1,000,000	500,000
Prog Man-Implement CSO System Master Plan (SMP)	CSO Fixed Fee	500,000	500,000	500,000	500,000	500,000	500,000
Sewer Inflow & Infiltration Removal	Sewer Rates	-	500,000	500,000	500,000	500,000	500,000
Flood Mitigation Measures	Sewer Rates	1,000,000	500,000	275,000	350,000	250,000	500,000
Equipment Replacement	Sewer Rates	200,000	550,000	250,000	300,000	300,000	300,000
WPC Trench Restoration	Sewer Rates	200,000	200,000	225,000	250,000	275,000	300,000
Catch Basin Separation	Sewer Rates	500,000	100,000	500,000	100,000	100,000	100,000
North End Sewer Reroute	CSO Fixed Fee	500,000	-	-	-	-	-
<b>Total CIP</b>		<b>\$17,280,000</b>	<b>\$3,750,000</b>	<b>\$3,750,000</b>	<b>\$3,750,000</b>	<b>\$3,750,000</b>	<b>\$3,750,000</b>

## 4.5 Existing Debt Service

Table 27 summarizes the existing WPC consolidated debt service for the SRF loans administered by the Rhode Island Infrastructure Bank. Based on information reported in the FY 2022 ACFR, there was \$54,190,231 in WPC debt outstanding as of June 30, 2022. The interest rate on the outstanding SRF loans ranges from 0.37 percent to 4.3 percent. The anticipated maturity is FY2036 for the existing debt obligations. Table 4 summarizes the outstanding debt obligations for WPC, and sequent to the balance sheet date, the City reported the Series 2022 (pump station upgrades) in the FY 2024 – FY 2025 proposed budget. Table 28 summarizes the annual debt service that is used in the cash flow analysis.

**Table 27. WPC Outstanding Debt as of June 30, 2022**

Project Description	Year Issued	Maturity Date	Issue Amount	Outstanding as of June 30, 2022
WWTP, pump stations, and sewer	2002	2023	\$13,000,000	866,194
Easton Pond; railroad interceptor; CSO	2009	2029	6,595,532	3,120,532
Thames Street and Wellington Avenue	2010	2030	9,327,000	4,934,000
Long Wharf force main repairs	2011	2031	3,095,505	1,814,505
Long Wharf force main repairs	2011	2026	10,345,000	4,240,000
Wellington CSO repairs	2015	2034	5,400,000	3,952,000
Sewer plant upgrades	2016	2035	9,142,000	7,057,000
Solar Energy Wastewater Plant	2016	2027	1,242,000	764,000
Sewer plant upgrades	2017	2036	<u>33,443,000</u>	<u>27,442,000</u>
Total			<u>\$91,590,037</u>	<u>\$54,190,231</u>

Does not include Series 2022 for the Long Wharf pump station upgrade project.

**Table 28. Existing WPC Consolidated Debt Service (2023–2032)**

Fiscal Year	Principal	Principal Forgiveness	Interest	Existing Debt Service	Source
2023	\$4,978,194	(\$93,744)	\$1,484,092	\$6,368,542	FY24 - FY25 Proposed Budget
2024	4,699,000	(96,284)	1,417,796	6,020,512	FY24 - FY25 Proposed Budget
2025	4,825,000	(98,929)	1,562,060	6,288,131	FY24 - FY25 Proposed Budget
2026	4,965,000	(101,725)	1,462,594	6,325,869	FY24 - FY25 Proposed Budget
2027	5,112,000	(104,624)	1,314,505	6,321,881	FY24 - FY25 Proposed Budget
2028	4,302,000	(107,780)	1,177,925	5,372,145	FY24 - FY25 Proposed Budget
2029	4,290,000	(111,085)	1,054,781	5,233,696	FY24 - FY25 Proposed Budget
2030	4,420,532	(114,679)	925,973	5,231,826	FY24 - FY25 Proposed Budget
2031	4,097,000	(49,583)	798,937	4,846,354	FY24 - FY25 Proposed Budget
2032	\$3,565,505	(\$50,938)	\$686,730	\$4,201,297	FY24 - FY25 Proposed Budget

Includes Series 2022 debt service for the Long Wharf pump station upgrade project.

## 4.6 Revenues

Table 29 summarizes actual revenues for FY 2022 and budgeted amounts for FY 2023 – FY 2025. Revenues from wholesale services are based on service agreements which typically specify terms and conditions for escalation of costs. Information on wholesale service agreements is not available; therefore, wholesale revenues are assumed constant.

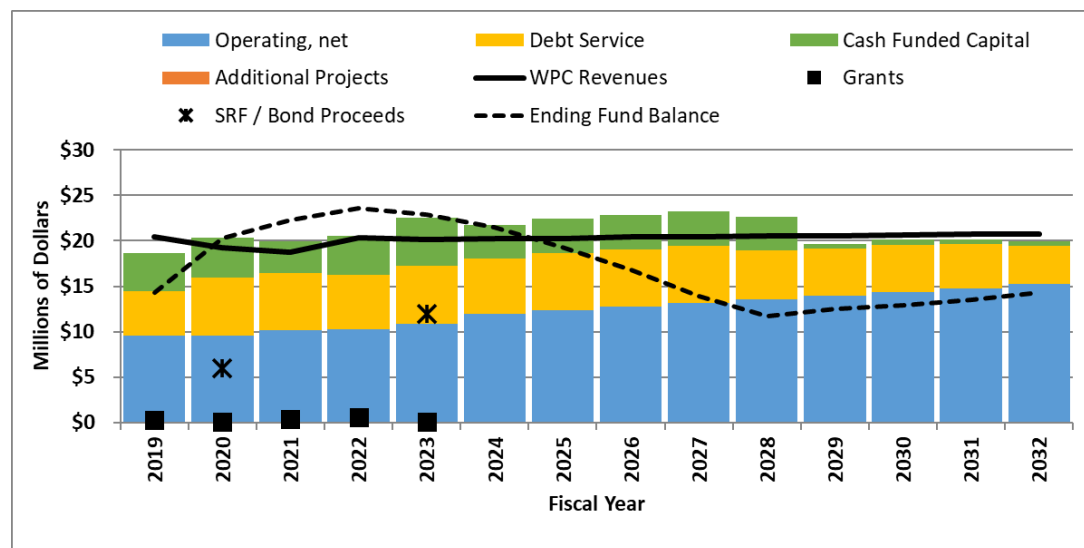
**Table 29. WPC Revenue (2022–2025)**

Revenue Item	FY 2022	FY 2023	FY 2024	FY 2025
Sewer User Charge	\$12,122,448	\$12,291,688	\$12,526,500	\$12,526,500
Middletown	2,954,566	2,926,933	2,926,897	2,926,897
CSO Fixed Fee	2,090,523	2,142,355	2,150,000	2,150,000
Sewer Treatment, U.S.N.	1,414,191	1,428,084	1,450,000	1,450,000
Other and Miscellaneous	683,711	708,226	556,000	556,000
Sewer Treatment, Water Utility	531,274	575,000	617,000	617,000
State and Federal Aid	561,208	87,000	-	-
Investment Income	<u>1,542</u>	<u>17,500</u>	<u>8,500</u>	<u>8,500</u>
<b>Total</b>	<b>\$20,359,463</b>	<b>\$20,176,786</b>	<b>\$20,234,897</b>	<b>\$20,234,897</b>

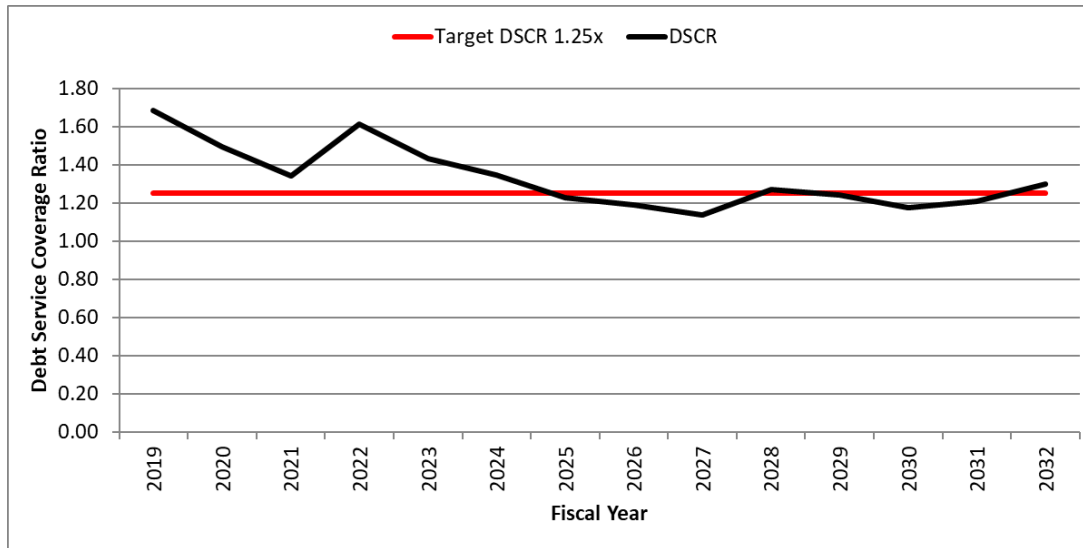
## 4.7 Cash Flow Scenario 1 (Base Case)

Figure 7 summarizes the cash flow results for Scenario 1, which represents the base case conditions for the estimated revenues and expenditures against timing of bond issues, grants, and ending balance. Based on the proposed budgets, no rate increases are assumed for FY 2023 – FY 2025. If rates are held constant, revenues remain flat and marginally cover operating and debt service expenses. For the period FY 2023 to FY 2028, existing cash reserves are used to cash fund a portion of the CIP. Based on the results for this scenario, Figure 8 shows that the debt service coverage ratio drops below the target ratio of 1.25x in FY 2025.

**Figure 7. Scenario 1 (Base Case) WPC Revenues and Expenditures**



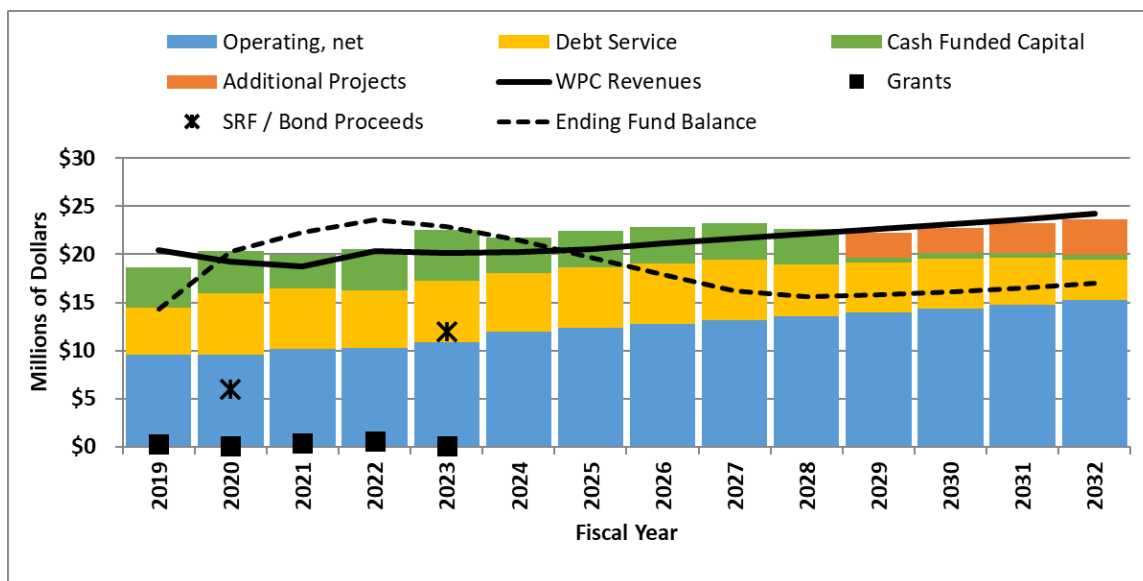
**Figure 8. Scenario 1 (Base Case) Debt Service Coverage Ratio**

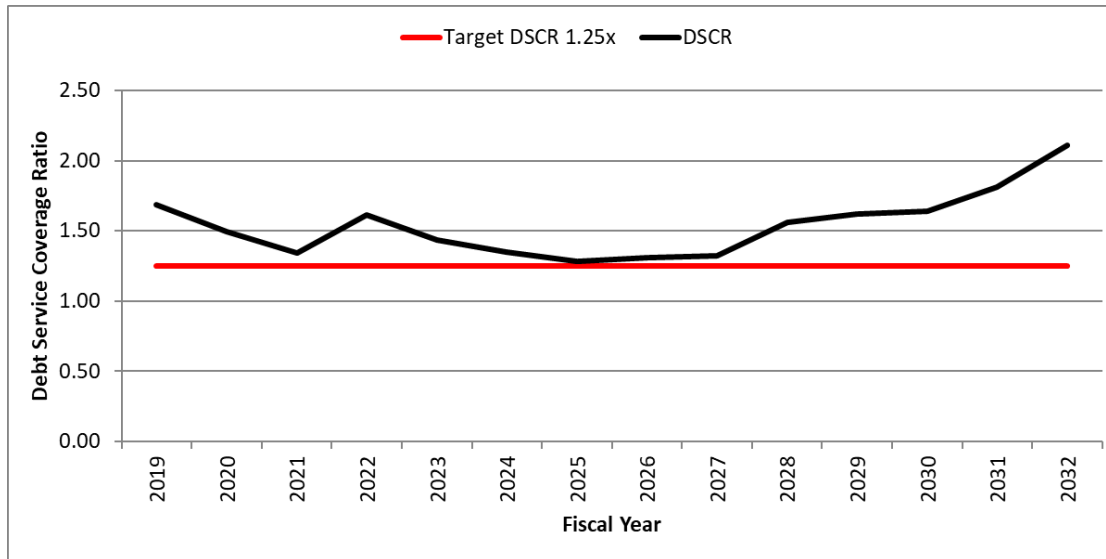


## 4.8 Cash Flow Scenario 2

Figure 9 summarizes the cash flow results for Scenario 2, which includes the additional capital costs. Based on the proposed budgets, no increases are assumed for FY 2023 – FY 2025. If rates increase 3% per year, additional revenues help to better support operating and debt service expenses. For the period FY 2023 to FY 2027, existing cash reserves are used to cash fund a portion of the CIP. As summarized in Figure 10, based on the results for this scenario, the debt service coverage ratio is at the target ratio of 1.25x in FY 2025 and increases through FY 2032.

**Figure 9. Scenario 2 WPC Revenues and Expenditure**



**Figure 10. Scenario 2 Debt Service Coverage Ratio**


## 4.9 Typical Residential Bill and Household Income

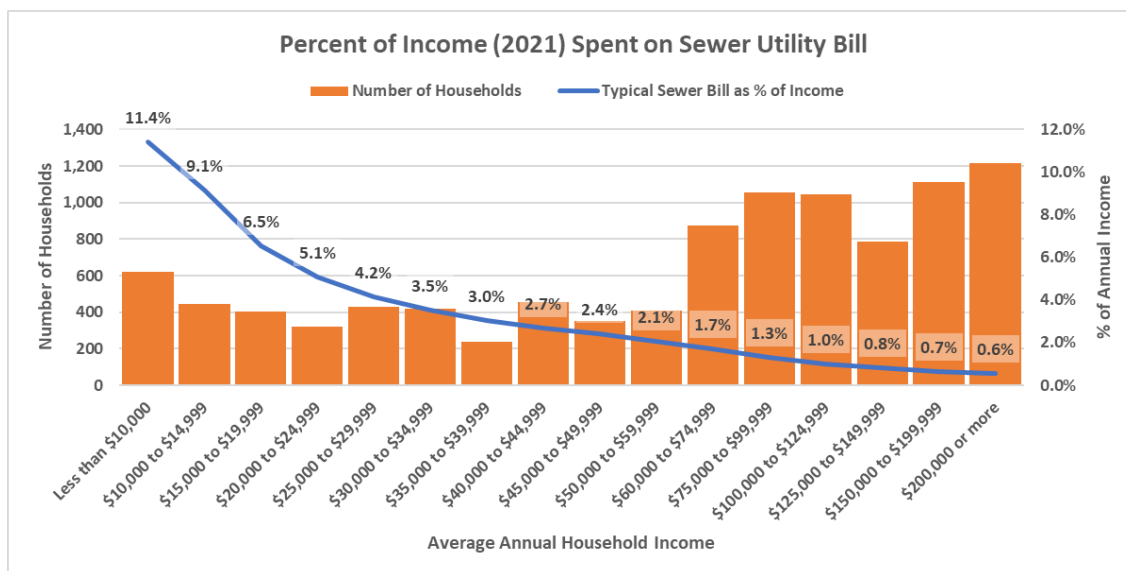
For purposes of this TM, water and sewer bills are considered for evaluating a typical residential bill as a percentage of household income. As a preliminary look at the affordability of water and sewer rates, this section compares median household income (MHI) and the upper limit of the lowest quintile income (LQI). It is assumed that a typical residential bill is based on a 5/8 inch meter and 4,000 gallons of water usage per month. Sewer bills are based on the amount of water usage. The following bullet points summarize information for water and sewer rates and household income for 2021 (the latest American Community Survey information available for the US Census).

- Water rates effective July 1, 2022 (RI PUC Order for Docket 4933):
  - \$6 per month base charge for a 5/8 inch meter
  - \$10.91 per thousand gallons
- Sewer rates effective July 1, 2018 (City Ordinance 2018-07):
  - \$19.80 per thousand gallons of water usage
  - \$192 per year CSO fixed fee
- Typical Residential Annual Bill (rounded to nearest dollar):
  - Water:  $(\$6 \times 12) + (\$10.91 \times 4 \times 12) = \$596$  per year
  - Sewer:  $\$192 + (\$19.80 \times 4 \times 12) = \$1,142$  per year
  - Total Water and Sewer: \$1,738 per year
- 2021 Household Income (US Census American Community Survey):
  - MHI: \$77,092
  - LQI: \$28,152
- Typical Residential Bill as Percent of Household Income:
  - MHI
    - Water:  $\$596 / \$77,092 = 0.77\%$  compared to 2% threshold

- Sewer: \$1,142 / \$77,092 = 1.48% compared to 2% threshold
- Total: \$1,718 / \$77,092 = 2.23% compared to a combined 4% threshold
- LQI
  - Water: \$596 / \$28,152 = 2.12% compared to 2% threshold
  - Sewer: \$1,142 / \$28,152 = 4.06% compared to 2% threshold
  - Total: \$1,718 / \$28,152 = 6.10% compared to a combined 4% threshold

While the MHI is a general measure of affordability, there are other metrics that should be considered based on EPA’s updated FCA guidance, such as the lowest quintile income. For households at the median income level, the typical residential bill as % of income is below the 2% threshold. However, for 20% of the City’s households with income of approximately \$28,000 per year, the typical residential bill for water and sewer exceeds the combined threshold of 6%. Figure 11 summarize the income distribution compared to typical residential sewer bill. Based on the data presented in the figure, households with income less than \$60,000 per year would exceed the 2% threshold. When the combined water and sewer bill is considered, the potential for hardship increases for lower income households.

**Figure 11. Typical residential sewer bill as a percent of income.**



#### 4.10 Lowest Quintile Poverty Indicator (LQPI)

Section 3.3 of this TM summarizes the LQPI, which indicates that the prevalence of poverty is a medium impact for the City. The LQPI consists of six indicators used to benchmark the prevalence of poverty for the City and is a new indicator included EPA’s updated FCA guidance. The City values are compared to national values for each indicator, except for trend in household growth. The six indicators include the following:

- Upper Limit of Lowest Quintile Income (LQI)
- Percentage of Population with Income Below 200% of Federal Poverty Level
- Percentage of Households Receiving Food Stamps/SNAP Benefits
- Percentage of Vacant Housing Units
- Trend in Household Growth

- Percentage of Unemployed Population 16 and Over in Civilian Labor Force

### 4.11 Updates with Water System Costs

As previous described, water system costs are evaluated as part of the RI discussed in Section 3.1 of this TM. One of the main components includes the capital costs related to the lead service line replacements, as presented in Table 30. Using the high program estimate values, the total CIP amounts for water and wastewater were evaluated to determine the unfunded portion. For purposes of this analysis, it is assumed that the unfunded portion is debt financed using 3% interest rate, 20 year period, and 0.0672 annualization factor, as presented in Table 31.

**Table 30. Estimate Capital Costs for the Lead Service Line Program**

Replacement Year	Program Estimated Costs - High	Program Estimated Costs - Middle	Program Estimated Costs - Low
Year 1	\$1,999,000	\$1,749,000	\$1,499,000
Year 2	4,393,000	3,844,000	3,295,000
Year 3	5,721,000	5,006,000	4,291,000
Year 4	8,363,000	7,318,000	6,272,000
Year 5	8,603,000	7,528,000	6,453,000
Year 6	7,879,000	6,894,000	5,909,000
Year 7	8,109,000	7,096,000	6,082,000
Year 8	8,347,000	7,303,000	6,260,000
Year 9	8,591,000	7,518,000	6,444,000
Year 10	\$8,843,000	\$7,738,000	\$6,633,000

**Table 31. Estimated Unfunded CIP and Annualized Debt Service.**

System / CIP Category	Total FY2024 - FY2033	Grant Funding	Net CIP, unfunded	Annualized Debt Service
Water				
Non-lead service line	\$ 117,250,000	\$ 602,636	\$ 116,647,364	\$ 7,841,000
Lead service line - high estimate	<u>70,848,000</u>	<u>917,364</u>	<u>69,930,636</u>	<u>4,762,000</u>
Total Water CIP - Unfunded Projects	188,098,000	1,520,000	186,578,000	12,603,000
Total Wastewater CIP - Unfunded Projects	<u>136,175,000</u>	-	<u>136,175,000</u>	<u>9,153,000</u>
Total Water and Wastewater	<u>\$ 324,273,000</u>	<u>\$1,520,000</u>	<u>\$322,753,000</u>	<u>\$ 21,756,000</u>

To help understand how the increase in capital costs impact affordability, Figure 12 summarizes the cost per household as a percent of MHI and Figure 13 summarizes the cost per household as a percent of LQI. The CPH for households with mediana level of income appear relatively affordable. However, the CPH for households with income at or near the poverty level (i.e., LQI), is above the 4% combined affordability threshold. This means, as water and wastewater CIP program are implemented, for 20% - 50% of the households, their water and wastewater bills could exceed the affordability threshold.

Figure 12. Cost per Household as a % of MHI

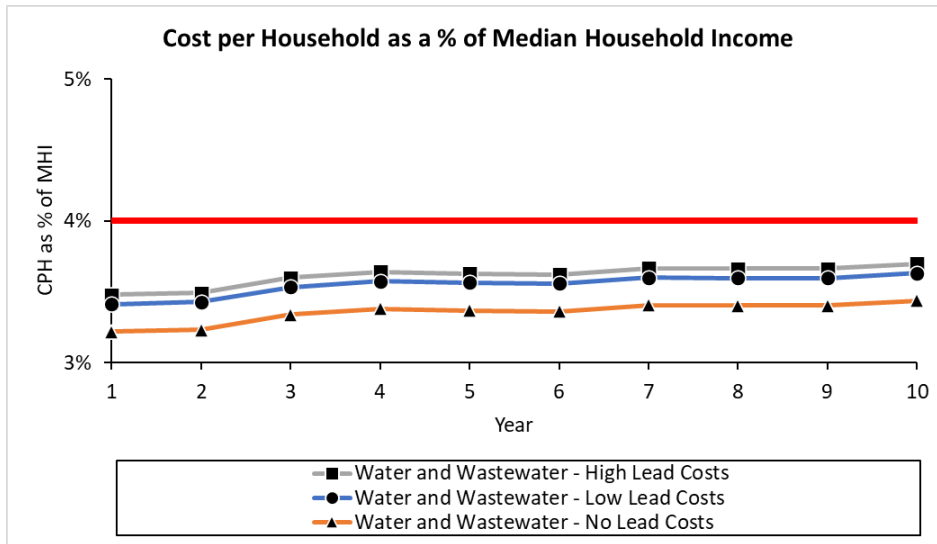
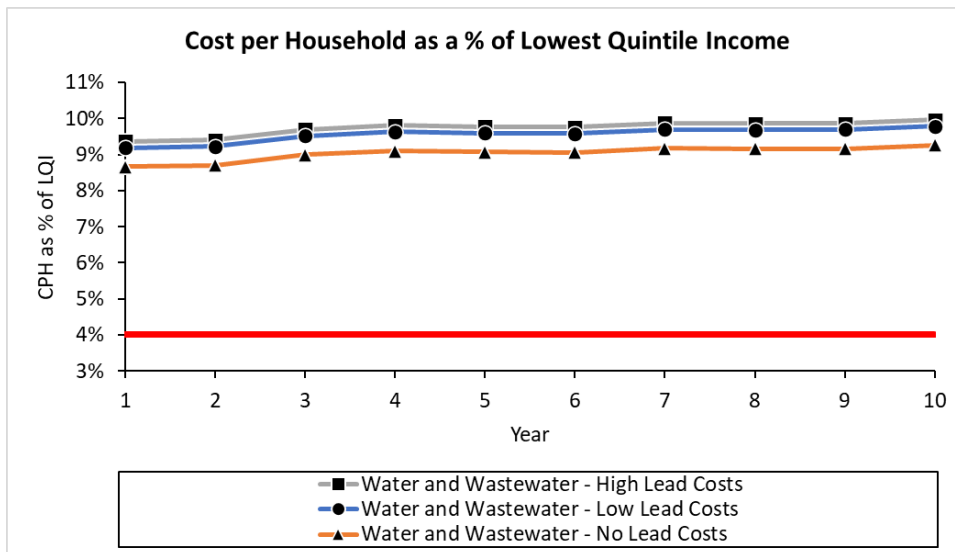


Figure 13. Cost per Household as a % of LQI



## 5. Summary and Conclusions

As previously stated in Section 2, below are the key conclusions from the current FCA update:

- There is no change in the burden when comparing the 2019 FCA and the 2023 FCA. The traditional FCA matrix correlates to a medium burden.
- The LQPI score is 2 and represents a medium impact with regards to the severity and prevalence of poverty.
- The new Lowest Quintile Poverty Indicator (LQPI) matrix correlates to a medium burden. When considering income levels, poverty, and the City's financial condition, there would be a medium burden associated with water and wastewater utility operating and capital costs.
- The water and wastewater CPH as % of MHI is below 4% combined affordability threshold. The CPH for households with income at or near the poverty level (i.e., LQI), is above the 4% combined affordability threshold.
- WPC generates approximately \$20 million in sewer user fee revenues, spends \$10.3 million in operating expenses (net of depreciation), and makes approximately \$6.5 million in annual debt service payments. The debt service coverage ratio (DSCR) is 1.61x as of June 30, 2022.
- No sewer rate increases are planned for FY 2023 – FY 2025. This results in the DSCR dropping below the target ratio of 1.25x in 2025. However, this should be confirmed and compared against the required coverage ratio identified in Revenue Bond indenture document.
- At current rates, the typical residential water and sewer annual bill is \$1,718 and represents 2.23% of MHI and 6.1% of the LQI. This is compared to a combined affordability threshold of 4% for water and sewer.
- If rates increase 3% per year, the typical residential bill increases approximately \$30 per year and would present additional burden on certain households.