

# Executive Summary

## TABLE OF CONTENTS

MWRA At A Glance	1
Overview	4
FY21 CIP	6
FY21 Capital Spending	6
Major Planned Contract Awards for FY21	9
New Projects	11
MWRA Future Capital Expenditures	11
FY19-23 Capital Expenditures	12
Historical and Projected Capital Spending	14
Asset Protection and Water System Redundancy	16
FY19-23 Five-Year Spending Cap	19
Community Loan Programs	20
MWRA Capital Improvement and Debt Service	21
Project Level Budget Summaries and Detail of Changes	22

### Appendices

1. Project Budget Summaries and Detail of Changes
2. Expenditure Forecast Report with Planned Notice To Proceed and Substantial Completion Dates
3. New Capital Projects Added During the FY21 CIP
4. Overview of the FY21 CIP and Changes from the FY20 Final CIP
5. Master Plan/CIP Status
6. Municipality and Project Reference by Municipality
7. MWRA Completed Projects
8. Expected Useful Life of Capital Projects

# MWRA AT A GLANCE

## Purpose

Provide wholesale water and sewer services to customer communities, funded primarily through rates and charges

## Legal Status

Massachusetts public authority established by an enabling act in 1984 – Chapter 372 of the Acts of 1984 as most recently amended January 2019

## Management

- 11-member Board of Directors (3 Governor appointees, 3 Mayor of Boston appointees, 1 City of Quincy appointee, 1 Town of Winthrop appointee, and 3 Advisory Board appointees)
- 1 Executive Director (5 divisions: Office of the Executive Director, Operations, Finance, Administration, Law)

## Advisory Board

Established by the enabling act to make recommendations to the MWRA on the MWRA budget and programs and to serve as liaison to the customer communities

## Service Area

- 61 customer communities (43 sewerage, 51 water)
- 3.0 million people (44% of MA population)
- 5,500 businesses

## FY21 Operating Budget (\$ in millions)

Direct Expenses	\$252.2
Indirect Expenses	\$57.3
<u>Capital Finance</u>	<u>\$481.9</u>
Total Operating Budget	\$791.4
Revenues*	\$791.4

\*97.2% of Revenues raised from rate assessments

## Bond Ratings - General Revenue Bonds (senior/subordinate)

Moody's -	Aa1/Aa2
S&P -	AA+/AA
Fitch -	AA+/AA

## Capital Improvement Program

- Total CIP spending: \$8.7 billion since 1984
- Total Current Indebtedness \$4.9 billion
- FY21 CIP Budget: \$266.2 million

## Water System

- 2 protected reservoirs
  - Quabbin
  - Wachusett
- 2 water treatment facilities
  - John J. Carroll
  - William A. Brutsch
- 350 miles of distribution infrastructure including aqueducts, deep rock tunnels, and pipeline
- 14 active storage reservoirs and standpipes
- 11 active pumping stations
- Average Daily flow: 200 mgd
- Safe yield: 300 mgd
- Treatment Capacity: 405 mgd
- Percentage of capacity utilized: 67%\*  
*\*based on safe yield*

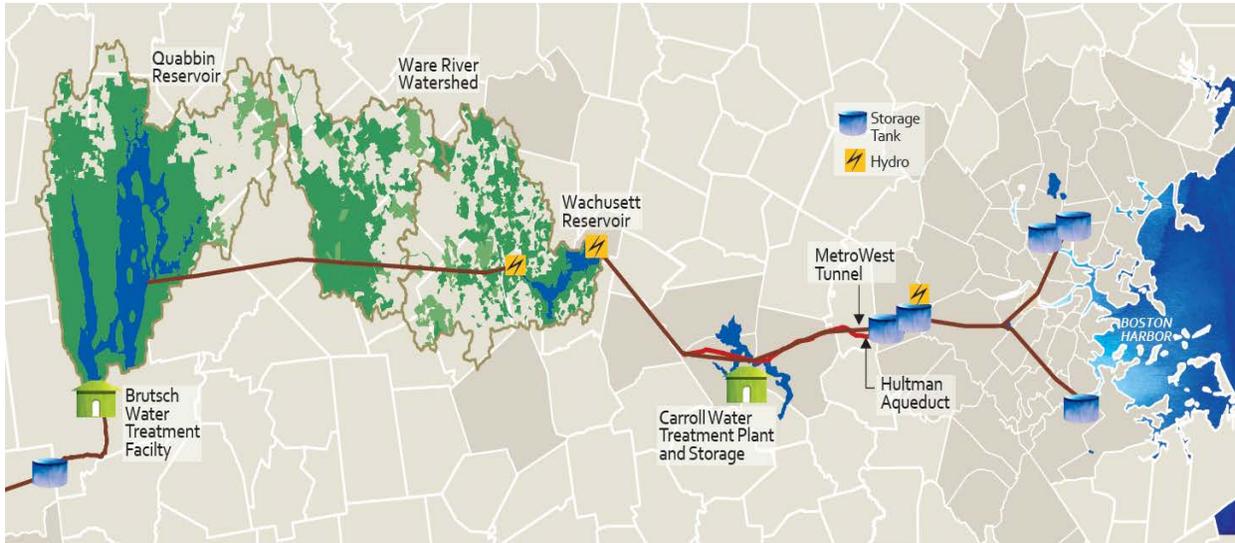
## Wastewater System

- 240 miles of sewer pipelines and cross-harbor tunnels
- 13 pump stations
- 1 screening facility
- 1 gate house
- 6 CSO treatment/storage facilities
- 2 wastewater treatment plants
  - Deer Island Treatment Plant
  - Clinton Wastewater Treatment Plant
- 4 remote headworks
- 1 Pellet Plant for residuals processing
- Average daily flow: 365 mgd
- Peak wet weather capacity: 1,270 mgd
- Percentage of capacity utilized on average: 30%

## Renewable Energy

Approximately 27% of MWRA's energy requirement was self-generated from renewable sources (biomass, hydro, wind, & solar assets) in FY20.

## MWRA AT A GLANCE



MWRA's water comes from the Quabbin Reservoir, 65 miles west of Boston, and the Wachusett Reservoir, 35 miles west of Boston. The Quabbin alone holds a 4-year supply of water.

The reservoirs are filled naturally. Rain and snow fall onto watersheds (protected land around the reservoirs) and eventually turn into streams that flow into the reservoirs. This water comes into contact with soil, rock, plants and other material as it follows its path. This process helps to clean the water.

The Quabbin and Wachusett Reservoirs are protected. Over 85% of the watershed lands that surround the reservoirs are covered in forest and wetlands. About 75% of the total watershed land cannot be built on. The natural undeveloped watersheds help to keep MWRA water clean and clear. Because they are well-protected, the water in the Quabbin and Wachusett Reservoirs is of very high quality. The MWRA has won numerous awards for quality, taste, and sustainability.

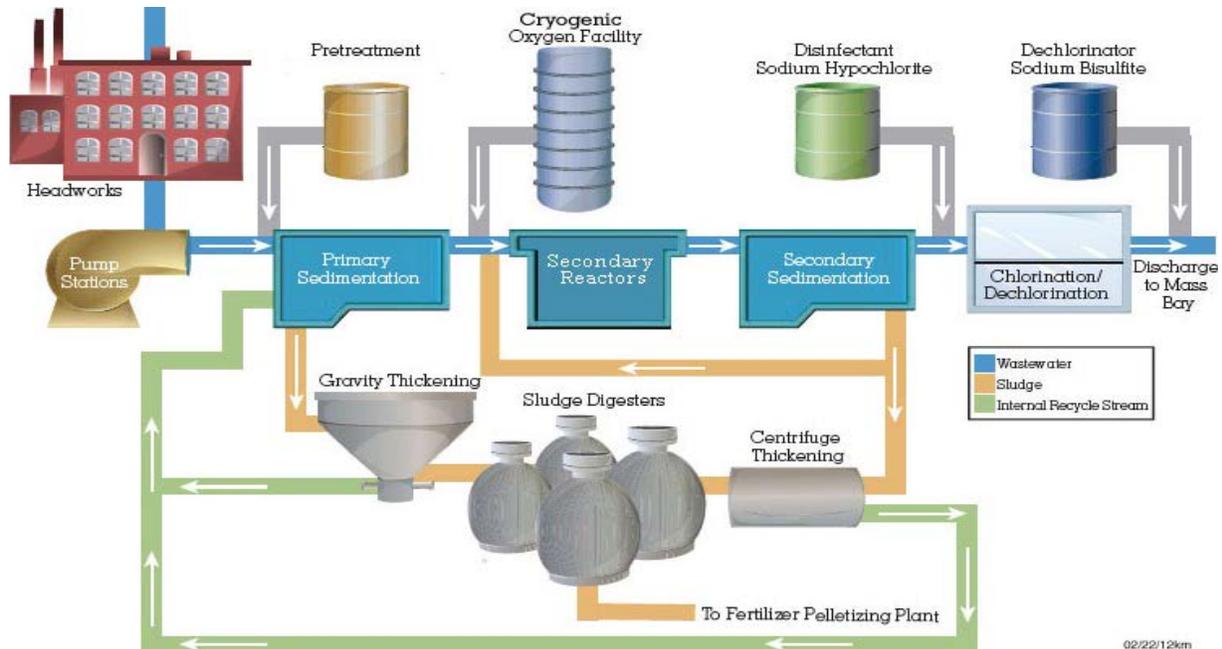
Water for most MWRA communities is treated at the Carroll Water Treatment Plant in Marlborough, Massachusetts. Water from the Quabbin and Wachusett Reservoirs enters the plant through the Cosgrove or Wachusett Aqueduct. The treated water leaves the plant through the MetroWest Water Supply Tunnel and the Hultman Aqueduct. Water from the Quabbin Reservoir for Chicopee, South Hadley Fire District #1 and Wilbraham is treated at the Brutsch Water Treatment Facility in Ware, Massachusetts, and leaves the plant through the Chicopee Valley Aqueduct.

For MetroWest and Metro Boston communities, treated water is sent through the MetroWest Water Supply Tunnel and the Hultman Aqueduct and is stored in covered tanks. From there it is drawn into distribution mains and many smaller community pipes. For Chicopee Valley Area Communities, treated water is sent through the Chicopee Valley Aqueduct to the local distribution mains and smaller community pipes. Water meters log the water entering each community.

Local pipes serve each street in the customer communities and eventually carry water into buildings. Meters installed by the local communities measure the amount of water delivered to each home or business.

To maintain and measure water quality, MWRA tests over 1,600 water samples per month, from the reservoirs all the way to household taps.

## MWRA AT A GLANCE – Wastewater System



Water is flushed through a building's pipes into customer community sewers. These 5,100 miles of local sewers transport the wastewater into 227 miles of MWRA interceptor sewers. The interceptor sewers, ranging from 8 inches to 11 feet in diameter, carry the region's wastewater to two MWRA treatment plants. Most communities' wastewater flows to the Deer Island Treatment Plant with the Clinton Wastewater Treatment Plant serving the town of Clinton and the Lancaster Sewer District.

The following describes the Deer Island treatment process:

**Collection and Pumping:** Sewage is piped to headworks where bricks, logs and other large objects are screened out. Pumps draw the screened sewage through deep-rock tunnels under Boston Harbor to Deer Island.

**Preliminary Treatment:** Mud and sand settle in a tank called a grit chamber. This material, known as grit and screenings, is taken to a landfill for environmentally safe disposal.

**Primary Treatment:** The sewage then flows to primary settling tanks where up to 60% of the solids in the waste stream settle out as a mixture of sludge and water.

**Secondary Treatment:** Plant oxygen is added to the wastewater to speed up the growth of microorganisms. These microbes then consume the wastes and settle to the bottom of the secondary settling tanks. After secondary treatment, 80-90% of human waste and other solids have been removed.

The treated wastewater is disinfected before it is discharged to the Massachusetts Bay. The treated wastewater, known as effluent, travels through a 9.5-mile Outfall Tunnel bored through solid rock more than 250 feet below the ocean floor. The tunnel's last mile and a quarter include 55 separate release points known as "diffusers." With water depths up to 120 feet, this outfall provides a much higher rate of mixing and/or dilution than possible with discharges into the shallow waters of Boston Harbor.

Sludge from primary and secondary treatment is processed further in sludge digesters, where it is mixed and heated to reduce its volume and kill disease-causing bacteria. It is then transported through the Inter-Island Tunnel to the pelletizing plant in Quincy, Massachusetts where it is dewatered, heat-dried and converted to a pellet fertilizer for use in agriculture, forestry and land reclamation.

## **MWRA Capital Improvement Program Overview**

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In 1984, legislation was enacted to create the Massachusetts Water Resources Authority, an independent agency with the ability to raise its revenues from ratepayers, bond sales and grants. The primary mission was to modernize the area's water and sewer systems and clean up Boston Harbor. Since its establishment, the MWRA has invested over \$8.7 billion to improve the wastewater and waterworks systems serving its 61 customer communities with projected future spending of \$4.1 billion. The system serves 3.0 million people and more than 5,500 businesses.

Since 1985, MWRA has been subject to a Clean Water Act enforcement action to end years of wastewater pollution of Boston Harbor and its tributaries from the old Deer Island and Nut Island treatment plants and combined sewer overflows (CSOs). The enforcement case was initiated by the Conservation Law Foundation in 1983 and taken up by the U.S. Environmental Protection Agency in 1985. The Commonwealth of Massachusetts, the Boston Water and Sewer Commission, the City of Quincy and the Town of Winthrop are also parties to the case.

The Orders of the Court set forth the schedules of activities to be undertaken to achieve compliance with the law. Since 1985, MWRA has complied with 420 milestones which include the completion of extensive new wastewater treatment facilities at Deer Island in Boston and Nut Island in Quincy, a residuals facility in Quincy, and 35 CSO control projects in Boston, Cambridge, Chelsea and Somerville which comprise the long-term CSO control plan, the last of which were completed in December 2015.

As part of compliance with the Court's Orders, MWRA was required to file monthly compliance and progress reports on its ongoing activities through December 15, 2000 and quarterly compliance and progress reports through December 2016. MWRA is currently required to submit bi-annual compliance and progress reports through December 2020.

During the same time, MWRA complied with regulatory mandates to improve waterworks facilities. The mandated waterworks projects included the MetroWest Water Supply Tunnel, the Carroll Water Treatment Plant, and several covered water storage facilities.

The mandated projects account for most of the Capital Improvement Program (CIP) spending. The five initiatives below account for over \$6.0 billion or nearly 70% of life spending to date:

- Boston Harbor Project - \$3.8 billion
- Combined Sewer Overflow - \$913 million
- MetroWest Tunnel - \$697 million
- Carroll Water Treatment Plant - \$424 million
- Covered Storage Facilities - \$239 million

As the MWRA reaches maturity as an agency, the infrastructure modernization and new facilities construction phase is nearing completion, and, barring new mandates, most of the Authority's

future capital budget will be designated for Asset Protection, Water System Redundancy, Pipeline Replacement and Rehabilitation, and Business System Support.

Asset Protection focuses on the preservation of the Authority's building facilities. Water System Redundancy aims to reduce the risks of service interruption and facilitate planned maintenance where major sections of the water delivery system assets can be taken off-line. Long-term water redundancy will be the largest single future CIP initiative with estimated spending in excess of \$1.5 billion over 17 years. Pipeline Replacement and Rehabilitation focuses on the maintenance and replacement of water and sewer pipelines. Business System Support provides for the continuing improvement and modernization of technology and security systems.

The FY21 CIP Budget reaffirms MWRA's commitment to the community financial assistance programs on both the water and wastewater side.

Capital initiatives to date have been primarily funded through long-term borrowings, and the debt service on these outstanding bonds represents a significant and growing portion of the Authority's operating budget. As of June 30, 2020, MWRA's total debt was \$4.9 billion. The Authority's capital finance (including debt service) obligation as a percent of total expenses has increased from 36% in 1990 to 60.9% in the Final FY21 Current Expense Budget.

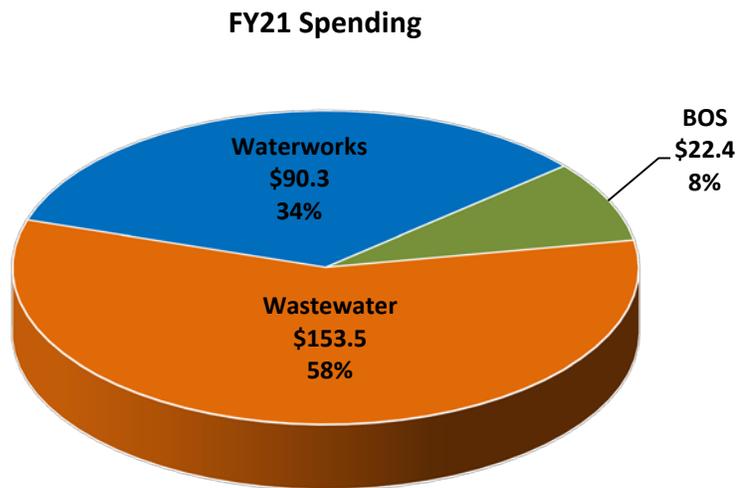
The MWRA's credit ratings of Aa1 from Moody's, AA+ from S&P, and AA+ from Fitch, reflect strong management of financial performance, application of operating surpluses to early debt defeasance, satisfactory debt service coverage ratios, well maintained facilities, comprehensive long-term planning of both operating and capital needs, and the strong credit quality of its member service communities.

To arrive at the FY21 CIP, the Authority identified the needs of the capital programs taking into account the recommendations of the Master Plan. The long-term strategy for capital work is identified in the Authority's Master Plan which was published in 2006, updated in 2013, and in 2018. The Master Plan serves as a road map for inclusion of projects in the CIP in every budget cycle.

The FY21 CIP represents an update to the FY20 CIP approved by the MWRA Board in June 2019. The spending projections are the result of prioritizing the projects, establishing realistic estimates based on the latest information, striking a balance between maintenance and infrastructure improvements, and ensuring that there is adequate support for MWRA's core operations to meet all regulatory operating permit requirements.

**FY21 Capital Spending**

The FY21 Final Capital Improvement Program projects \$266.2 million spending for FY21, of which \$153.5 million supports Wastewater System Improvements, \$90.3 million supports Waterworks System Improvements, and \$22.4 million is for Business and Operations Support. Capital spending continues to target asset protection to preserve the integrity of the Authorities operating assets and the initial funding in preparation for the next major redundancy initiative.



FY21 spending includes \$65.2 million for community assistance programs, which are a combination of loan and partial grant programs, with net expenditures of \$32.0 million for the local Infiltration/Inflow Program and net expenditures of \$33.2 million for the Local Water Pipeline Program. In response to the COVID-19 pandemic and in an effort to ease financial hardship, member communities are able to defer loan repayments due in FY21 and FY22 which will provide some cash flow relief and improve financial flexibility.

The table below lists project contracts with spending greater than \$5.0 million in FY21 and totals \$127.4 million or 47.9% of projected spending for the year. When local community assistance programs are excluded, projected spending with spending greater than \$5.0 million drops to \$81.7 million or 30.7% of projected FY21 spending.

Project	Contract	Projected FY21 Expenditures \$s in millions
Corrosion & Odor Control	NI Odor Ctrl HVAC Imp Constr Ph 2	\$20.0
Facility Asset Protection	Chelsea Creek Upgrades - Construction	\$17.7
Local Water System Assistance Program	LWSAP Phase 3 Distributions	\$16.0
Facility Asset Protection	Prison Point Rehab - Construction	\$15.7
DI Treatment Plant Asset Protection	Clarifier Rehab Phase 2 - Construction	\$14.5
Local Water System Assistance Program	Local Water System Assistance Loans	\$11.2
I/I Local Financial Assistance	Phase X Grants	\$7.5
SEH Redundancy & Storage	Redundancy Pipeline Sect 111 - Constr 3	\$7.3
DI Treatment Plant Asset Protection	Gravity Thickener Rehab	\$6.6
I/I Local Financial Assistance	Phase XI Grants	\$6.0
Local Water System Assistance Program	Lead Service Line Replace Loans	\$5.0
<b>Total Contracts &gt; \$5.0 million</b>		<b>\$127.4</b>
<b>% of FY21 Spending</b>		<b>47.9%</b>
<b>Excluding Community Loan Programs</b>		<b>\$81.7</b>
<b>% of FY21 Spending</b>		<b>30.7%</b>
<b>Total Projected FY21 Spending</b>		<b>\$266.2</b>



**Nut Island Odor Control and HVAC Improvements - Construction Phase 2** - \$20.0 million (\$57.6 million total construction cost). Improvements to the Nut Island Headworks odor control, HVAC and energy management systems. These are the long-term improvement projects that arose following the January 2016 fire and the odor control, HVAC and energy management systems evaluation contract completed in February 2017.

**Chelsea Creek Headworks Upgrade Construction** - \$17.7 million (\$83.3 million total construction cost).

This major rehabilitation project includes replacement/upgrade to the screens, grit collection system, grit and handling systems, odor control systems, HVAC, mechanical, plumbing and instrumentation. Solids handling systems are being automated and the building's egress and fire suppressions systems are also being upgraded.



**Prison Point Rehabilitation Construction** - \$15.7 million

(\$41.8 million total construction cost). This rehabilitation will include upgrades to the facility including replacement of diesel pump engines, dry weather screens, wet weather screens, sluice gates, chemical tanks, updating of other facility equipment including electrical distribution and chemical disinfection systems, and repair/replacement of miscellaneous equipment. Improvement/installation of systems as appropriate for energy efficiencies, security, and fire alarm will also be included.



**Southern Extra High Redundancy Section 111 Phase 3 Construction** - \$7.3 million (\$20.4 million total construction cost).

This is a redundancy project for MWRA's Southern Extra High service area. This project will provide redundancy to Sections 77 and 88 serving Boston, Norwood, Stoughton, and Dedham-Westwood through construction of a redundant pipeline. Phase 1 was substantially complete in September 2018. Phase 2 and Phase 3 began in October 2017 and August 2018, respectively.

**Deer Island Wastewater Treatment Plant Asset Protection and Residuals:**

**Clarifier Rehabilitation Phase 2 Construction** - \$14.5 million (\$137.2 million total construction cost). This project will rehabilitate the sludge removal system in the primary tanks and the aeration/recirculation systems in the secondary tanks. The influent gates, effluent launders and aeration systems, and concrete corrosion in primary clarifiers will also be addressed and repaired.



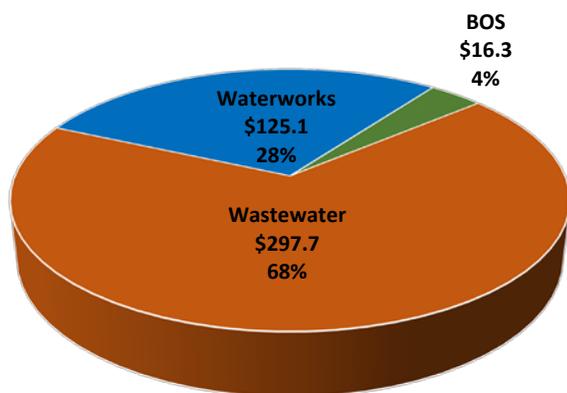
**Gravity Thickener Rehabilitation** - \$6.6 million (\$19.9 million total construction cost). This project involves installing catwalks around the perimeter of several tanks, removing concrete blocks in the effluent channels, and modifying the sludge thickener roofing to improve staff access and operating efficiency.

**Major Planned Contract Awards for FY21**

In Fiscal Year 2021, 74 contracts totaling \$439.1 million are projected to be awarded. The largest ten projected contract awards total \$312.1 million and account for 71.1% of expected awards and are presented in the following table.

Project	Subphase	Notice to Proceed	Total Contract Amount \$s in Millions
DI Treatment Plant Asset Protection	Clarifier Rehabilitation Phase 2 - Construction	Sep-20	\$137.2
Facility Asset Protection	Prison Point Rehab - Construction	Sep-20	\$41.8
DI Treatment Plant Asset Protection	Fire Alarm System Replacement - Construction	Jan-21	\$28.8
Facility Asset Protection	Ward St & Columbus Park Headworks Des/CA	Jul-20	\$22.0
NIH Redundancy & Storage	Section 89 & 29 Repl - Construction	Jul-20	\$21.3
New Connecting Mains-Shaft 7	CP3-Section 23,24,47, Rehabilitation	Sep-20	\$14.7
Metro Redundancy Interim Improvements	WASM 3 CP-1	Jul-20	\$13.0
Central Monitoring System	CWTP SCADA Upgrade Construction	Dec-20	\$13.0
DI Treatment Plant Asset Protection	MCC & Switchgear Replace Construction	Sep-20	\$11.2
Cathodic Protection Of Distribution Mains	Cathodic Protection Metropolitan System Des/CA	Jan-21	\$9.2
<b>Top 10 Contracts</b>			<b>\$312.1</b>
<b>% of Total Planned Awards</b>			<b>71.1%</b>
<b>74 Contract Awards Planned</b>			<b>\$439.1</b>

Of the 74 planned awards, 29 are Wastewater totaling \$297.7 million, followed by 34 Waterworks awards for \$125.1 million and finally 11 Business and Operations & Support for \$16.3 million.



## New Projects

The FY21 Draft Final CIP adds \$55.0 million in new projects of which Waterworks projects total \$50.3 million and Wastewater projects total \$4.7 million. Most of the projected spending is beyond FY23 at \$47.8 million. Projected new project spending over the FY19-23 timespan is \$7.2 million.

\$s millions			
Program	Total Contract Amount	FY19-23 Expenditures	Expenditures Beyond FY23
Total Waterworks Projects	\$ 50.3	\$ 3.3	\$ 47.0
Total Wastewater Projects	\$ 4.7	\$ 3.9	\$ 0.8
Total Projects	\$ 55.0	\$ 7.2	\$ 47.8

The top three new Waterworks projects include the Phase 2 painting of Bellevue, Park Circle and Walnut Hill Water Tanks at \$14.0 million, Cosgrove Tunnel Rehabilitation Design at \$10.0 million, and Beacon Street Line Rehabilitation at \$6.9 million. The largest new Wastewater project is a new roof at Deer Island with an estimated cost of \$2.0 million.

A complete list of new projects with cash flows and descriptions can be found in Appendix 3.

## MWRA Future Capital Spending

Every year, the MWRA updates its anticipated future spending. The FY21 Final CIP projects total MWRA future spending of \$4.1 billion. This is an increase of \$210.2 million over the FY20 Final CIP transmitted to the Board of Directors in June 2019, with most of the additional spending in years beyond FY23.

Incremental Change in FY21 CIP  
(*\$s in millions*)

Division	FY20 Final Future Spending	FY21 Final Future Spending	\$ Change	% Change
<b>Total Wastewater</b>	\$ 1,658.1	\$ 1,698.3	\$ 40.2	2.4%
<b>Total Waterworks</b>	\$ 2,188.3	\$ 2,352.8	\$ 164.4	7.5%
<b>Business &amp; Operations Support</b>	\$ 64.0	\$ 69.6	\$ 5.6	8.8%
<b>Total MWRA</b>	\$ 3,910.4	\$ 4,120.6	\$ 210.2	5.4%

Of the \$210.2 million future spending added to the CIP for FY21, a net of \$155.2 million (Net of New Projects) is due to revised construction cost estimates following completion of studies or engineering designs for the projects. Increased cost estimates may be due to updated cost estimates, such as \$64.0 million for the Metropolitan Tunnel Construction due primarily to

inflation, \$12.6 million for Nut Island Corrosion & Odor HVAC Improvements Construction, \$12.0 million for Northern Extra High Service CP-1 NEH Improvements, \$10.6 million for Ward Street and Columbus Park Headworks Design, \$10.0 million for North Main Pump Station VFD Replacements, and \$9.0 million for the Cryogenics Plant Equipment Replacement. Cost estimates may also decrease. The largest decrease was \$48.1 million for Deer Island HVAC Equipment Replacement Design due to revised scope/cost followed by an \$18.8 million decrease for Northern Low Service Sections 50/57 Water and Sections 21/20/19 Sewer reflecting updated cost estimates.

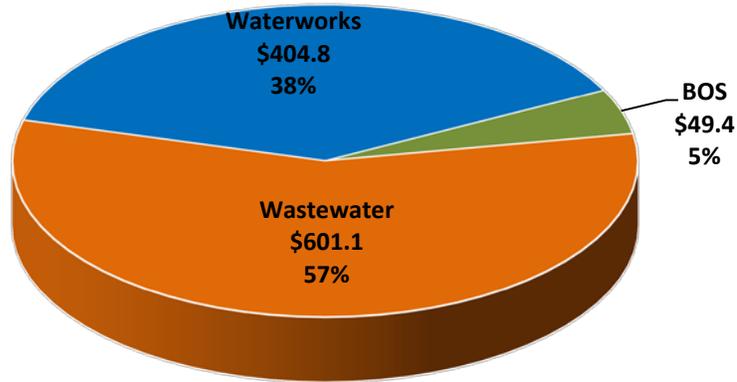
### FY19-23 Capital Expenditures

The FY21 CIP contains future spending (beyond FY19) estimated at \$4.1 billion with 19-23 spending projected at \$1,055.2 million. The table below represents the projected spending by the major project categories:

	Future Spending Beyond FY19	FY19	FY20	FY21	FY22	FY23	Total FY19-23	Beyond 23
<b>Wastewater System Improvements</b>	<b>\$1,698.3</b>	<b>\$74.8</b>	<b>\$96.6</b>	<b>\$153.5</b>	<b>\$143.4</b>	<b>\$132.8</b>	<b>\$601.1</b>	<b>\$1,172.0</b>
Interception & Pumping	612.9	23.1	34.9	74.2	57.8	31.1	221.2	414.8
Treatment	810.1	10.0	17.3	38.5	56.7	78.5	201.1	619.1
Residuals	103.4	0.8	10.9	3.7	0.5	0.8	16.8	87.5
CSO	8.9	1.2	2.0	5.0	1.7	0.1	10.0	0.1
Other Wastewater	162.9	39.6	31.5	32.0	26.6	22.3	152.0	50.5
<b>Waterworks System Improvements</b>	<b>\$2,352.8</b>	<b>\$65.6</b>	<b>\$53.6</b>	<b>\$90.3</b>	<b>\$98.3</b>	<b>\$96.9</b>	<b>\$404.8</b>	<b>\$2,013.6</b>
Drinking Water Quality Improverment	57.3	0.8	1.5	2.8	8.1	3.2	16.4	41.7
Transmission	1,785.8	9.9	13.5	25.1	39.0	42.9	130.4	1,665.4
Distribution & Pumping	538.8	36.6	26.2	24.6	31.7	44.4	163.4	412.0
Other Waterworks	(29.2)	18.4	12.5	37.9	19.5	6.4	94.6	(105.5)
<b>Business &amp; Operations Support</b>	<b>69.6</b>	<b>2.4</b>	<b>8.0</b>	<b>22.4</b>	<b>10.2</b>	<b>6.3</b>	<b>49.4</b>	<b>22.6</b>
<b>Total MWRA</b>	<b>\$4,120.6</b>	<b>\$142.9</b>	<b>\$158.3</b>	<b>\$266.2</b>	<b>\$251.9</b>	<b>\$236.0</b>	<b>\$1,055.2</b>	<b>\$3,208.3</b>

Spending over the FY19-23 period totals \$1,055.2 million with Wastewater projects accounting for \$601.1 million of total period spending or 57% and Waterworks planned spending following at \$404.8 million or 38%. Total Projected Expenditures for the Final FY19-23 Cap period by category, including community loan and grant programs, is illustrated in the pie chart below:

### FY19-23 Spending



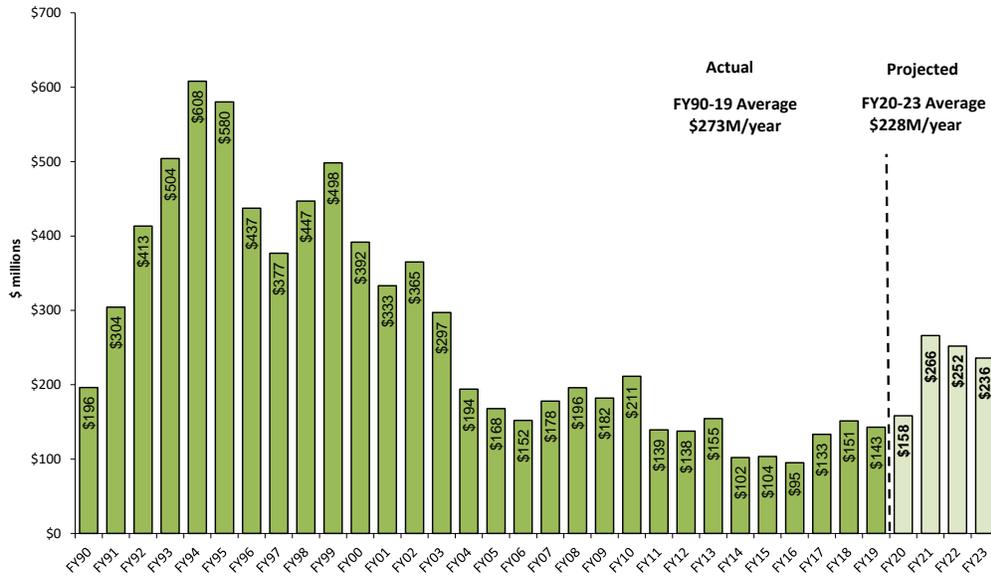
It is important to emphasize that the majority of spending within the Wastewater and Waterworks programs is concentrated in several larger projects with significant spending in the FY19-23 timeframe. Project contracts with expenditures greater than \$15.0 million for the FY19-23 Cap total \$631.7 million and are listed in the table below. This total includes local community assistance programs, and accounts for nearly 60% of total spending. When loan program funding is excluded, top spending projects greater than \$15.0 million drops to \$318.6 million or 30.6% of FY19-23 spending. The FY19-23 timeframe is dominated by several large projects with the top five construction projects totaling \$246.8 million and accounting for 23.4% of FY19-23 spending. Large construction initiatives include the Clarifier Rehabilitation at Deer Island, Nut Island Odor Control & HVAC Improvements, and Chelsea Creek Upgrades at \$75.3 million (total cost \$137.2 million), \$59.9 million (total cost \$59.9 million, and \$51.4 million (total cost \$83.4 million), respectively between FY19-23.

Project	Contract	Projected FY19-23 Expenditures \$s in millions
Local Water Pipeline Improvement	LWSAP Phase 3 Distributions	\$85.6
DI Treatment Plant Asset Protection	Clarifier Rehab Phase 2 - Construction	\$75.3
Local Water Pipeline Improvement	Local Water System Assistance Loans	\$59.9
Corrosion & Odor Control	NI Odor Ctrl HVAC Imp Constr Ph 2	\$57.6
Facility Asset Protection	Chelsea Creek Upgrades - Construction	\$51.8
I/I Local Financial Assistance	Phase XI Grants	\$46.5
Facility Asset Protection	Prison Point Rehab - Construction	\$41.8
I/I Local Financial Assistance	Phase X Grants	\$33.2
I/I Local Financial Assistance	Phase XII Grants	\$26.1
I/I Local Financial Assistance	Phase IX Grants	\$23.6
Local Water Pipeline Improvement	Lead Service Line Replace Loans	\$22.7
SEH Redundancy and Storage	Redundancy Pipeline Sect 111 - Constr 3	\$20.4
NIH Redundancy & Storage	Section 89 & 29 Redun Const. Phase 2	\$19.8
DI Treatment Plant Asset Protection	Gravity Thickener Rehab	\$19.5
NIH Redundancy & Storage	Section 89 & 29 Repl - Constr	\$16.7
DI Treatment Plant Asset Protection	Fire Alarm System Replacement - Construc	\$15.8
I/I Local Financial Assistance	Phase XI Loans	\$15.5
<b>Total Contracts &gt; \$15.0 million</b>		<b>\$631.7</b>
<b>% of FY19-23 Spending</b>		<b>59.9%</b>
<b>Excluding Community Loan Programs</b>		<b>\$318.6</b>
<b>% of FY21 Spending</b>		<b>30.2%</b>
<b>Total Projected FY19-23 Spending</b>		<b>\$1,055.2</b>

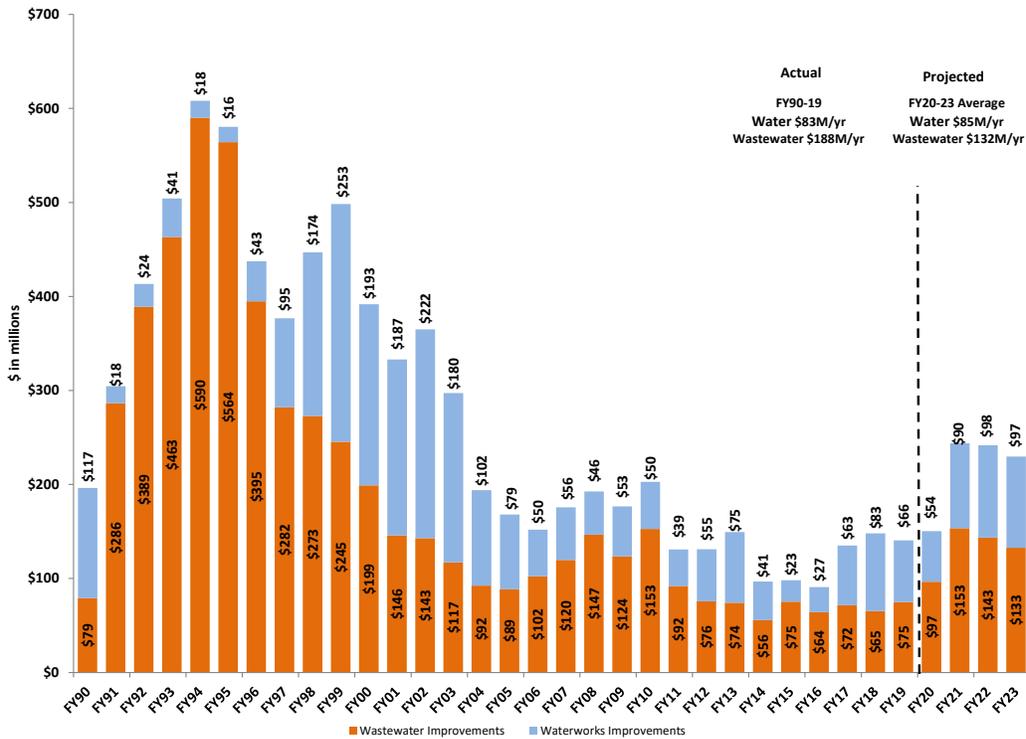
### Historical and Projected Spending

The following two charts below capture the historical CIP spending through FY19 and projects spending through FY23 based on the FY21 CIP both overall at the MWRA level and by utility. Average total annual CIP spending through FY19 was \$273 million. Average annual CIP spending for the proposed FY20-23 is projected to be \$228 million. Average annual CIP spending through FY19 was \$83 million for Waterworks and \$188 million for Wastewater. Average annual CIP spending for the proposed FY20-23 is projected to be \$85 million for Waterworks and \$132 million for Wastewater.

### Total Annual CIP Spending



### Total Annual CIP Spending By Utility



The FY21 Final CIP includes approximately \$2.0 billion in future expenditures for asset protection and \$1.9 billion for redundancy, including \$1.5 billion for the critical redundancy of the Metropolitan Tunnels System to be completed over a seventeen-year period. The initial contract for Program Support Services began in April 2019 and Preliminary Design and MEPA Review is expected to commence in May 2020.

	Total FY19-23	Total FY24-28
<b>Wastewater System Improvements</b>	<b>\$601.1</b>	<b>\$1,044.7</b>
Interception & Pumping	221.2	356.4
Treatment	201.1	550.0
Residuals	16.8	30.9
CSO	10.0	0.1
Other Wastewater	152.0	107.3
<b>Waterworks System Improvements</b>	<b>\$404.8</b>	<b>\$791.8</b>
Drinking Water Quality Improvements	16.4	13.5
Transmission	130.4	365.3
Distribution & Pumping	163.4	349.7
Other Waterworks	94.6	63.3
<b>Business &amp; Operations Support</b>	<b>49.4</b>	<b>22.6</b>
<b>Total MWRA</b>	<b>\$1,055.2</b>	<b>\$1,859.1</b>

The table to the left depicts CIP projected spending for the FY19-23 period and FY24-28 period by major program categories for Wastewater Systems Improvements, Waterworks System Improvements and Business and Operations Support. Spending during the FY19-23 timeframe is planned to be \$1.1 billion. Wastewater System's \$601.1 million in spending is led by Deer Island Asset Protection (\$193.0 million), Facility Asset Protection (\$144.3 million), and Corrosion & Odor Control (\$62.1 million) which combine to account for over 81% of Division expenditures. Similarly, Waterworks Division FY19-

23 spending of \$404.8 million includes these major spenders: the Metro Redundancy Interim Improvement (\$65.9 million), NIH Redundancy & Storage (\$45.6 million), and Southern Extra High Redundancy & Storage (\$38.5 million) which combine for over 37% of Division spending. Additionally, Wastewater and Waterworks spending include local community spending of \$152.0 million for the I/I loan and grant program and \$54.2 million for the water pipeline loan program.

FY24-28 spending of nearly \$1.9 billion is dominated by asset protection projects and water redundancy initiatives totaling \$1.3 billion and \$386.6 million, respectively, accounting for 88.5% of planned expenditures. Top Wastewater spenders include Deer Island Asset Protection \$540.9 million and Facility Asset Protection \$285.8 million. Top Water Division spenders include Metropolitan Tunnel Redundancy (\$197 million) and Metro Redundancy Interim Improvement (\$95 million). The Metropolitan Tunnel Redundancy project is expected to drive Beyond FY28 spending with planned expenditures of \$1.3 billion. Redundancy project spending accelerates in the FY24-28 window.

### Asset Protection and Water System Redundancy

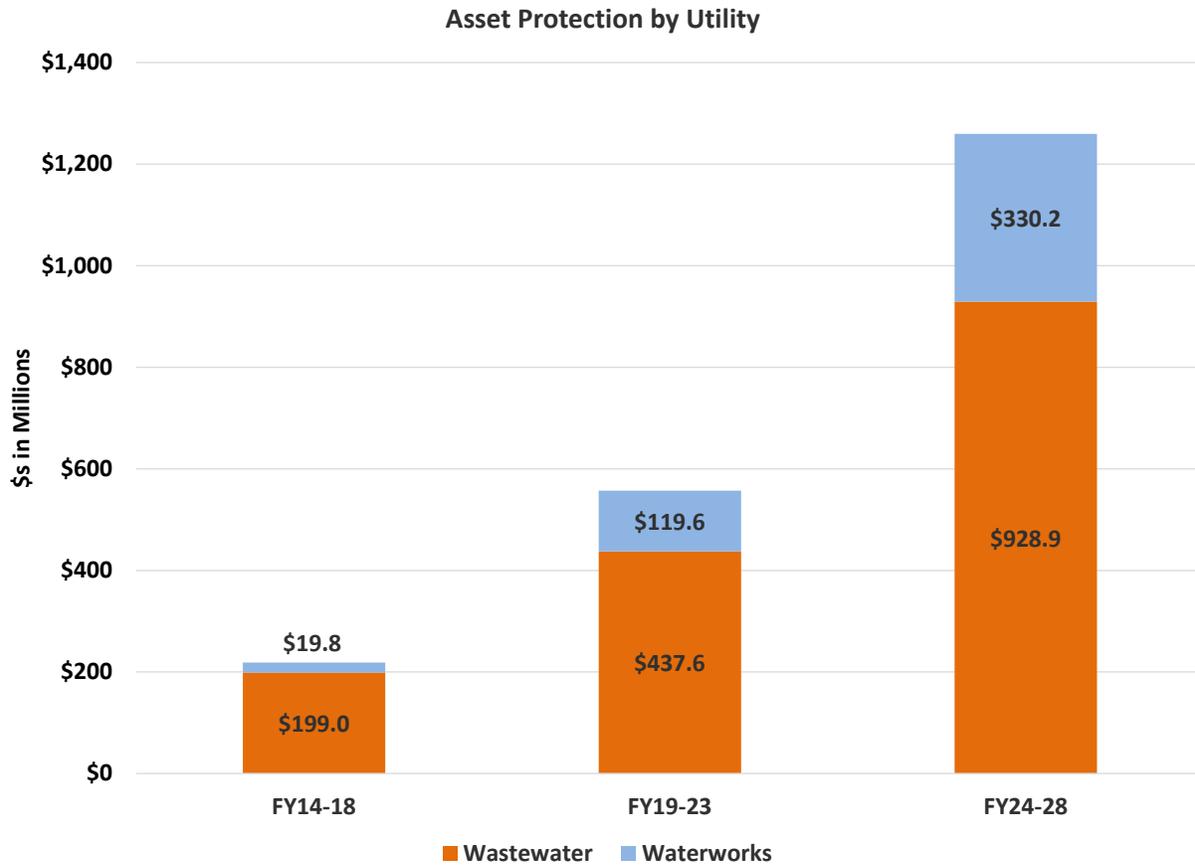
Asset Protection accounts for the largest share of capital expenditures for the FY19-23 period. The FY21 CIP includes \$570.5 million for asset protection initiatives, representing over 54% of total MWRA spending. Wastewater and Waterworks Asset Protection are \$437.6 million and \$119.6 million, respectively. Deer Island Treatment Plant Asset Protection alone accounts for

\$193.0 million in spending. Spending for water system redundancy projects total \$206.8 million in the same FY19-23 period, accounting for 20% of total spending.

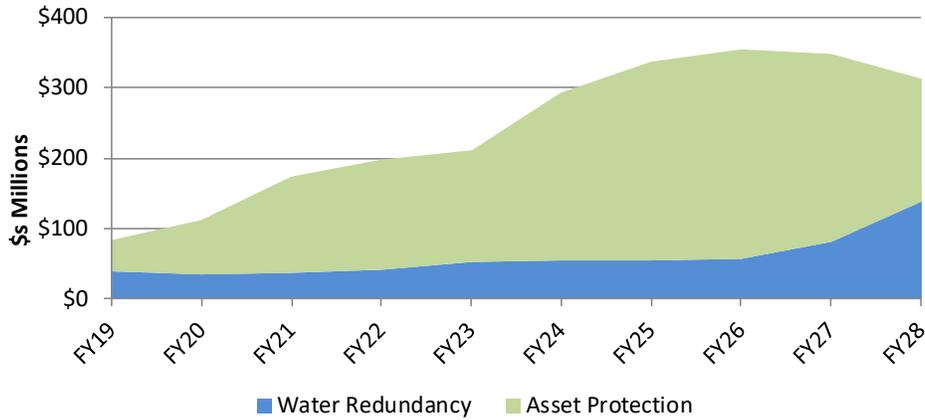
**Changing nature of the CIP by Category**

<b>Project Category</b>	<b>Total Contract</b>	<b>FY19-23</b>	<b>FY24-28</b>
Asset Protection	\$3,069.3	\$570.5	\$1,259.2
Water Redundancy	\$3,108.3	\$206.8	\$386.6
CSO	\$887.8	\$10.0	\$0.1
Other	\$1,471.8	\$267.9	\$213.3
<b>Total</b>	<b>\$8,537.3</b>	<b>\$1,055.2</b>	<b>\$1,859.1</b>
<b>Asset Protection</b>	<b>36.0%</b>	<b>54.1%</b>	<b>67.7%</b>
<b>Water Redundancy</b>	<b>36.4%</b>	<b>19.6%</b>	<b>20.8%</b>
CSO	10.4%	1.0%	0.0%
Other	17.2%	25.4%	11.5%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

In terms of utility spending, wastewater asset protection accounts for nearly 42% of the FY19-23 projected spending at \$437.6 million of which \$193.0 million is designated for the Deer Island Wastewater Treatment Plant and \$244.6 million for headworks, pump stations, residuals facility, and pipelines. The \$120.0 million targeted for waterworks asset protection and includes \$54.3 million for water pipelines.



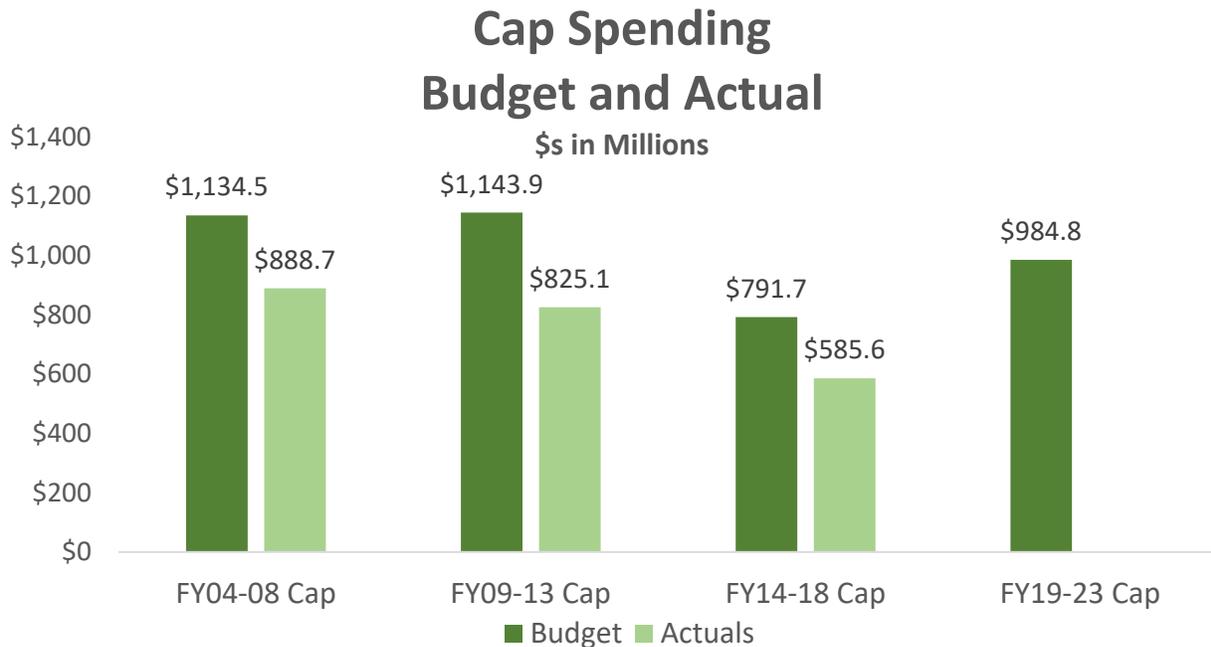
As illustrated in the following graph, the next two waves of spending over the FY19-23 period and the FY24-28 period will be for asset protection and water redundancy. This reflects MWRA’s commitment to maintaining its physical plant and addressing the need for water system redundancy in some critical service areas. Total asset protection spending for FY19-23 is projected at \$570.5 million or 54.1% of projected spending. Similarly, water redundancy spending for FY19-23 is projected at \$206.8 million or 19.6% of projected FY19-23 spending. For the FY24-28 period, asset protection expenditures increased to \$1.2 billion or 67.7% of period spending. Similarly, redundancy expenditures increased to \$386.6 million, 20.8% of period spending.



### FY19-23 Five-Year Spending Cap

The concept of a five-year spending Cap was first introduced at the Advisory Board’s recommendation in 2003 for the FY04-08 period. The Cap represents targeted spending levels to ensure adequate capital program funding and to serve as a guide for long-term planning estimates and community assessments. The graph below describes the history of the past three five-year caps and the Final FY19-23 Cap, both in terms of the Cap budget levels and actual spending.

The most recent Cap (FY19-23) of \$984.8 million is significantly higher than the prior Cap (FY14-18) of \$791.7 million for a variety of reasons including increased spending on asset protection and the initial phases of the long-term redundancy program.



Today, the Authority is better positioned to reinvest in rehabilitation and replacement of aging facilities as result of conservative fiscal management which includes judicious control of expenses, and the fact that MWRA has implemented the practice of utilizing available funds resulting from positive current expense budget variances for defeasances resulting in the reduction of future fiscal years debt service expense. MWRA projects an overall reduction in outstanding principal of debt during the FY19-23 cap period.

It is important to note that the spending on capital programs is largely determined by the nature, magnitude, and number of upcoming projects. In the prior five-year Caps, specifically FY04-08 and FY09-13, the majority of spending was driven by court-mandated projects and building new facilities. During the FY14-18 Cap, the Authority reached substantial completion on its court-mandated CSO Control Plan at an approximate total cost of \$912.0 million. The Authority’s main focus going forward is asset protection and water system redundancy. The FY21 Final CIP includes approximately \$2.0 billion in future expenditures for asset protection and continues to fund the critical redundancy for the Metropolitan Tunnels System at approximately \$1.5 billion over a seventeen-year period. However, the FY19-23 period includes only \$23.9 million related to that tunnel project.

The FY21 Final FY19-23 cap cash flow totals \$905.1 million, \$79.7 million under the approved Cap of \$984.8 million. Annual cash flows for the proposed Cap period are shown below in millions:

FY21 Final		FY19	FY20	FY21	FY22	FY23	Total FY19-23
	Projected Expenditures	\$142.9	\$158.3	\$266.2	\$251.9	\$236.0	\$1,055.2
I/I Program	(39.6)	(31.5)	(32.0)	(26.6)	(22.3)	(152.0)	
Water Loan Program	(13.8)	(5.8)	(33.2)	(9.7)	8.3	(54.2)	
<b>MWRA Spending</b>	<b>\$89.4</b>	<b>\$121.0</b>	<b>\$201.0</b>	<b>\$215.7</b>	<b>\$222.0</b>	<b>\$849.1</b>	
Contingency	0.0	0.0	12.1	14.2	15.1	41.5	
Inflation on Unawarded Construction	0.0	0.0	1.4	5.2	8.1	14.6	
Chicopee Valley Aqueduct Projects	(0.0)	0.0	0.0	0.0	0.0	(0.0)	
<b>FY21 Final FY19-23 Spending</b>	<b>\$89.4</b>	<b>\$121.0</b>	<b>\$214.5</b>	<b>\$235.0</b>	<b>\$245.2</b>	<b>\$905.1</b>	

The format of the Cap table has changed to account separately for MWRA spending, which excludes the local I/I grant and loan program and the local water pipeline loan spending which are both outside of MWRA’s control. As in past Caps, contingency for each fiscal year is incorporated into the CIP to fund the uncertainties inherent to construction. The contingency budget is calculated as a percentage of budgeted expenditure outlays. Specifically, contingency is 7% for non-tunnel projects and 15% for tunnel projects. Inflation is added for unawarded construction contracts. Finally, the Cap excludes Chicopee Valley Aqueduct system projects.

### Community Loan Programs

The MWRA offers its water and wastewater communities loan and grant opportunities for infrastructure preservation. Community loans are interest-free and repaid to MWRA over a 5-year or a 10-year period. On the water side, the program's goal is to improve local water system pipeline conditions to help maintain high water quality distribution from MWRA's treatment

plant through local pipelines to customers' taps. The water loan program was established in 1998 and over 546 miles of pipeline have been improved. Similarly, on the wastewater side, the local financial assistance program provides MWRA sewer communities funding to perform local infiltration and inflow "I/I" reduction and sewer rehabilitation. The I/I program was established in 1993 and funds are currently approved for distribution through Fiscal Year 2025. Unlike the water loan program, the I/I program is a partial grant program.

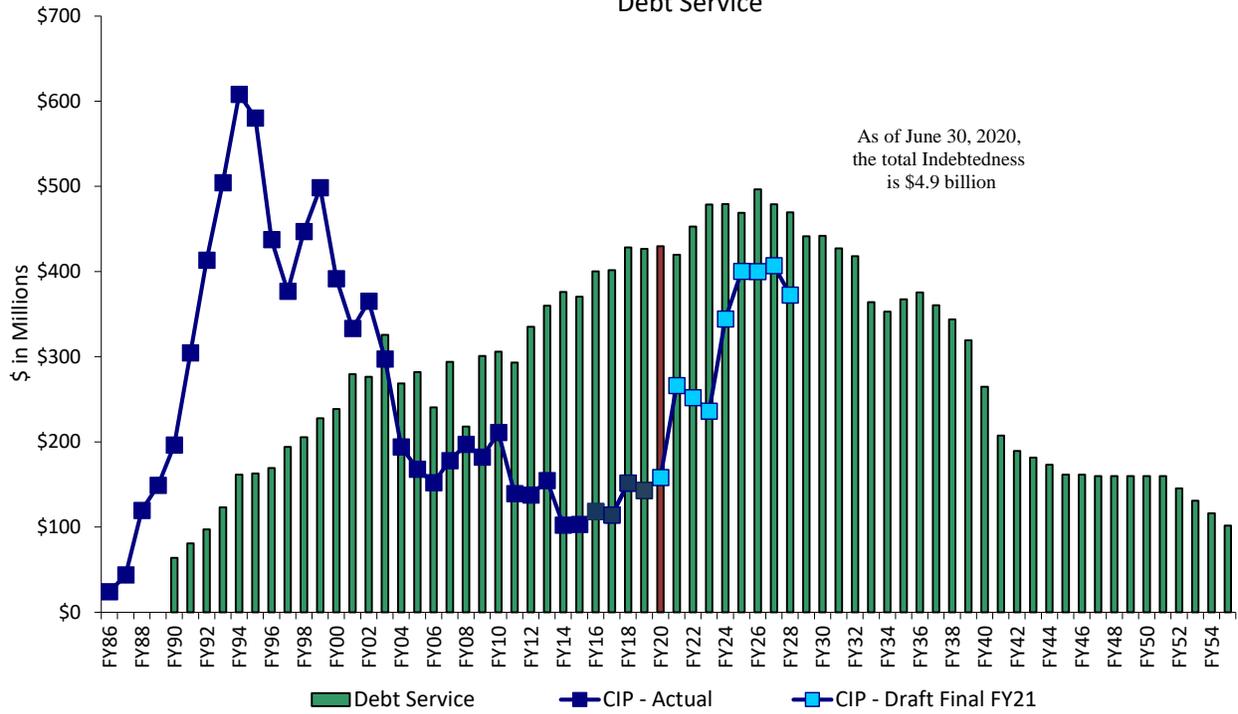
Over the FY19-23 timeframe \$152.0 million in funding is projected to be distributed to MWRA wastewater communities and \$54.2 million is projected to be distributed to MWRA water communities. In response to the Covid pandemic and to provide some financial relief to member communities, the MWRA allowed for the deferral of I/I and water loan repayments in FY21 and FY22. Deferred payments will be amortized over a five-year period.

	FY19	FY20	FY21	FY22	FY23	FY19-23
I/I Financial Assistance (Net of repayments)	\$39.6	\$31.5	\$32.0	\$26.6	\$22.3	\$152.0
Local Water System Assistance (Net of Repayments)	\$13.8	\$5.8	\$33.2	\$9.7	(\$8.3)	\$54.2

**MWRA Capital Improvement Spending and Debt Service**

As of June 30, 2020, MWRA's total debt is \$4.9 billion, which is \$156.6 million less than the MWRA's total debt as of June 30, 2019. While total outstanding debt is decreasing, debt service obligations continue to rise and are projected to increase in coming years.

### MWRA Capital Spending & Debt Service



### Project Level Budget Summaries and Detail of Changes

Information on individual project budgets and detail of changes is provided in the supplemental appendices attached to this document.