



**FISCAL YEAR 2022**

# **Proposed Capital Improvement Program**



**MASSACHUSETTS WATER RESOURCES AUTHORITY**

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# MASSACHUSETTS WATER RESOURCES AUTHORITY

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February 2021

Louis M. Taverna, Chairman  
MWRA Advisory Board  
100 First Avenue  
Boston, MA 02129

Dear Chairman Taverna:

This letter transmits to the Advisory Board the MWRA's Proposed Capital Improvement Program (CIP) for Fiscal Year 2022. The MWRA Board of Directors approved the transmittal of the Proposed CIP at its December 16, 2020 meeting. The FY22 Proposed CIP represents an update to the FY21 CIP approved by the Board in June 2020 and includes the latest cost estimates, revised schedules, and new projects. The FY22 CIP spending falls within the FY19-23 approved spending cap of \$984.8 million.

The FY22 Proposed Capital Improvement Program projects \$260.5 million in spending for FY22, of which \$145.2 million supports Wastewater System Improvements, \$95.0 million supports Waterworks System Improvements, and \$20.2 million is for Business and Operations Support. The projects with significant spending in FY22 include Nut Island Odor Control and HVAC Headworks Upgrades, Prison Point CSO Facility Rehabilitation, Deer Island Fire Alarm Replacement, Northern Intermediate High Sections 89 and 29 Replacement, Metropolitan Tunnel Redundancy Preliminary Design and MEPA Review, and Weston Aqueduct Supply Mains 3 CP-1.

Asset Protection accounts for the largest share of capital expenditures for the FY19-23 period. The FY22 Proposed CIP includes \$560.6 million for asset protection initiatives, representing over 54% of total MWRA spending in this timeframe. Water System Redundancy project spending totals \$203.3 million in the same FY19-23 period, accounting for nearly 20% of total spending.

The FY22 Proposed Capital Program reaffirms MWRA's commitment to the community financing assistance programs on both the water and wastewater sides.

A copy of the CIP document is available on-line at [www.mwra.com](http://www.mwra.com). Questions or comments on this document should be directed to the MWRA Budget Department at (617) 788-2206.

Thank you for your continued support, comments, and recommendations on the capital budget.

Sincerely,

A handwritten signature in blue ink that reads "Fred A. Laskey". The signature is fluid and cursive, written over the printed name.

Frederick A. Laskey  
Executive Director

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# 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, 54 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: \$8.8 billion since 1984
- Total Current Indebtedness: \$4.8 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*

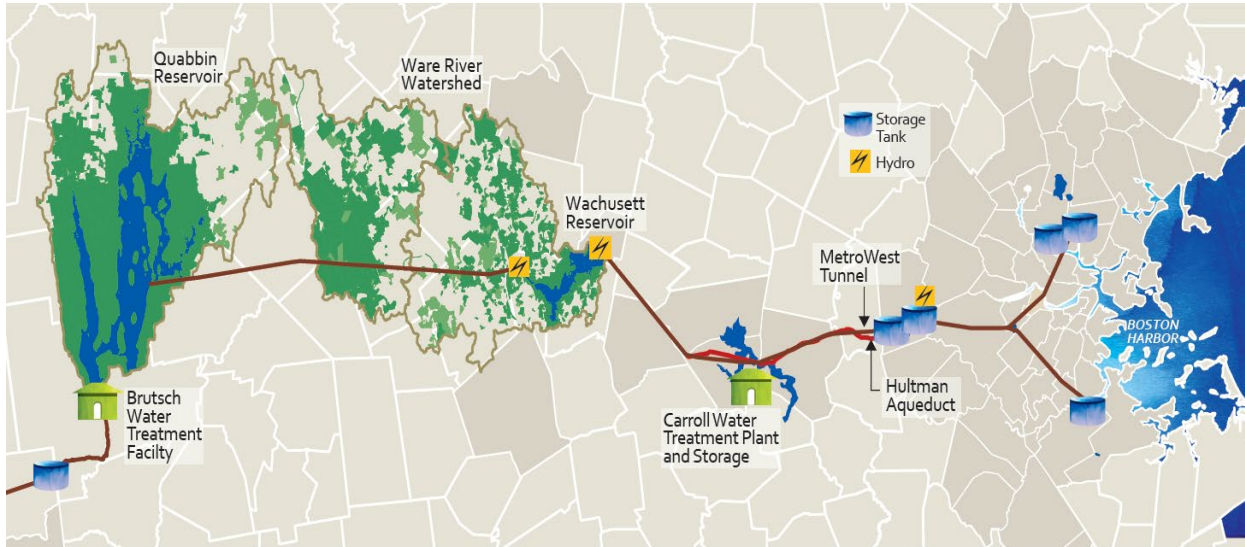
## Wastewater System

- 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.

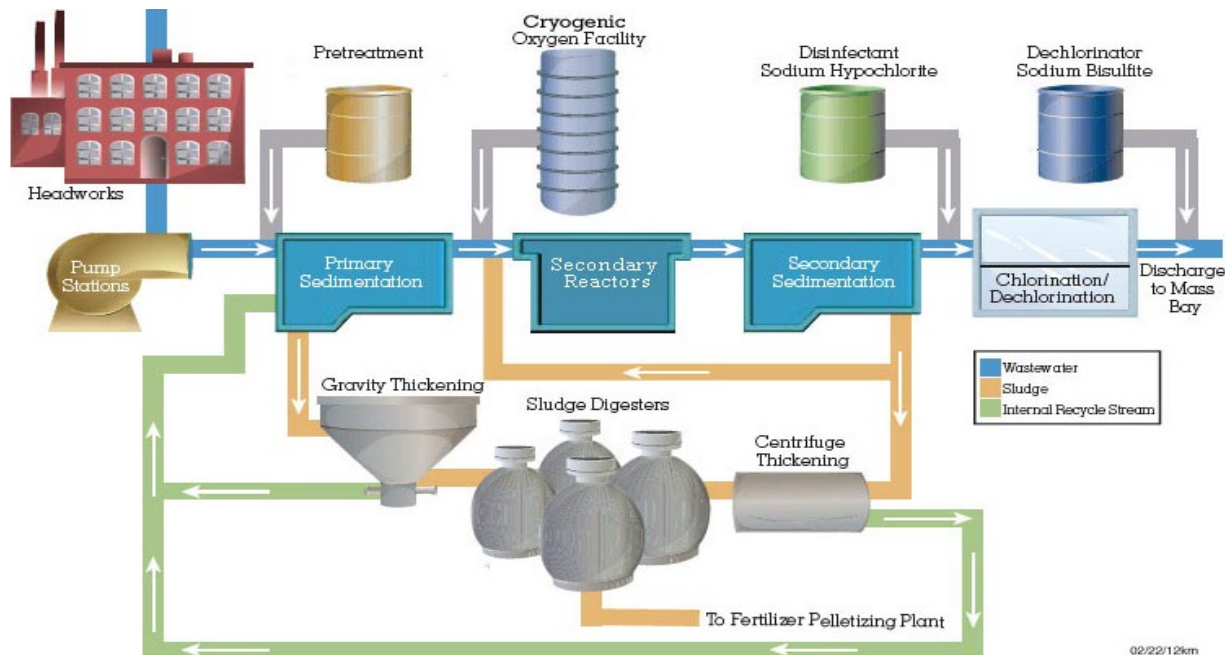
Water for most MWRA communities is treated at the Carroll Water Treatment Plant in Marlborough, Massachusetts. Water from the Quabbin and Wachusett Reservoirs enters the plant through the Cosgrove or Wachusett Aqueduct. The treated water leaves the plant through the MetroWest Water Supply Tunnel and 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 \$8.8 billion to improve the wastewater and waterworks systems serving its 61 customer communities with projected future spending of \$4.0 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 70% of spending to date:

- Boston Harbor Project - \$3.8 billion
- Combined Sewer Overflow - \$913 million
- MetroWest Tunnel - \$697 million
- Carroll Water Treatment Plant - \$425 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 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 FY22 Proposed CIP 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 December 31, 2020, MWRA's total debt was \$4.8 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 FY22 Proposed 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.

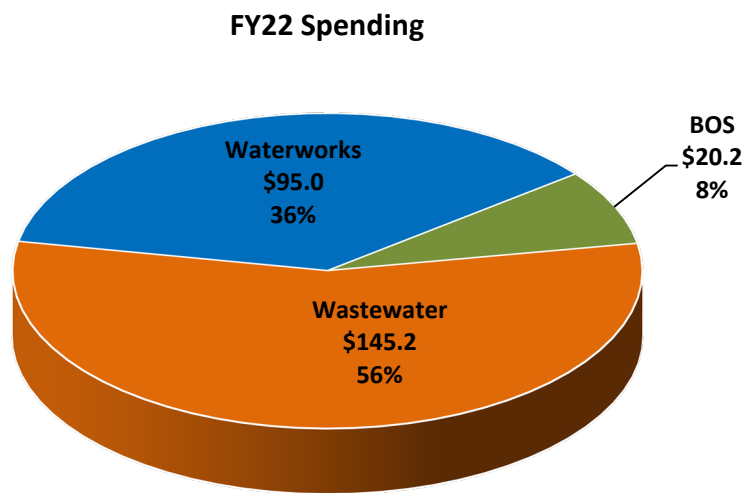
The FY22 Proposed CIP represents an update to the FY21 CIP approved by the MWRA Board in June 2020. The spending projections are the result of prioritizing the projects, establishing realistic estimates based on the latest information, striking a balance between maintenance and infrastructure improvements, and ensuring that there is adequate support for MWRA's core operations to meet all regulatory operating permit requirements.

## FY22 Proposed CIP

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### FY22 Spending

The FY22 Proposed Capital Improvement Program projects expenditures of \$260.5 million for FY22, of which \$145.2 million supports Wastewater System Improvements, \$95.0 million supports Waterworks System Improvements, and \$20.2 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.



The FY22 CIP includes \$38.6 million for community assistance programs, which are a combination of loan and partial grant programs, with net expenditures of \$23.2 million for the local Infiltration/Inflow program and net expenditures of \$15.3 million for the local water pipeline program.

The \$260.5 million in projected spending is driven by 46 active wastewater and water projects. Project contracts with spending greater than \$5 million in FY22, excluding local community assistance programs, total \$95.1 million and account for 36.5% of the total annual spending. These projects are presented in the following table:

Project	Subphase	FY22 \$s in Millions	% of Total
Corrosion & Odor Control	NI Odor Ctrl HVAC Improvement Construction Phase 2	\$22.9	8.8%
Deer Island Treatment Plant Asset Protection	Clarifier Rehab Phase 2 - Construction	\$21.8	8.4%
Facility Asset Protection	Prison Point Rehab - Construction	\$21.2	8.2%
Deer Island Treatment Plant Asset Protection	Fire Alarm System Replacement - Construction	\$7.8	3.0%
NIH Redundancy & Storage	Section 89 & 29 Replacement - Construction	\$5.8	2.2%
Metro Tunnel Redundancy	Preliminary Des & MEPA Review	\$5.4	2.1%
Metro Redundancy Interim Improvement	WASM 3 CP-1	\$5.2	2.0%
Central Monitoring System	CWTP SCADA Upgrade Construction	\$5.0	1.9%
<b>Total Contracts &gt; \$5 million</b>		<b>\$95.1</b>	<b>36.5%</b>
<b>Other Project Spending</b>		<b>\$165.3</b>	<b>63.5%</b>
<b>Total FY22 Spending</b>		<b>\$260.5</b>	<b>100.0%</b>

A project description of some of the major FY22 spending projects are included below.

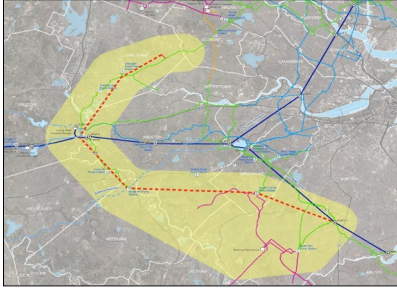
**Nut Island Odor Control and HVAC Improvements - Construction Phase 2 - \$22.9 million** (\$58.3 million total construction cost). Improvements to the Nut Island Headworks odor control, HVAC and energy management systems. These are the long-term improvement projects that arose following the January 2016 fire, and the evaluation contract of the odor control, HVAC, and energy management completed in February 2017.



**Prison Point Rehabilitation Construction - \$21.2 million** (\$42.5 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.

**Northern Intermediate High Redundancy Section 89 and 29 Replacement Construction - \$5.8 million** (\$28.9 million total construction cost). This is a redundancy project for MWRA's Northern Intermediate High service area. Section 89 will be replaced now that the redundant pipeline is completed.





**Tunnel Preliminary Design & MEPA Review - \$5.4 million** (\$15.7 million total cost) Preliminary design, geotechnical investigation, permitting and MEPA environmental review of the Northern and Southern Tunnels a part of the Metro Tunnel Redundancy project.

**WASM 3 CP-1 - \$5.2 million** (\$19.5 million total construction cost) construction of the WASM 3 rehabilitation This first construction contract includes rehabilitation of approximately 13,800 feet of 56-inch and 60-inch diameter water main in Arlington, Somerville and Medford. Construction will include cleaning and cement mortar lining, some sliplining and some pipe replacement. This is a key element of the Metro Redundancy Interim Improvement project.



**Carroll Water Treatment SCADA Upgrade Construction - \$5.0 million** (\$13.0 million total construction cost). This project includes the replacement of PLC's nearing their end of life with an updated PLC platform. New PLC's will provide enhanced security capabilities, continued vendors support and future reliability. Project will also include standardizing PLC logic and HMI graphics, and upgrading aging field instrumentation.

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

**Clarifier Rehabilitation Phase 2 Construction - \$21.8 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.



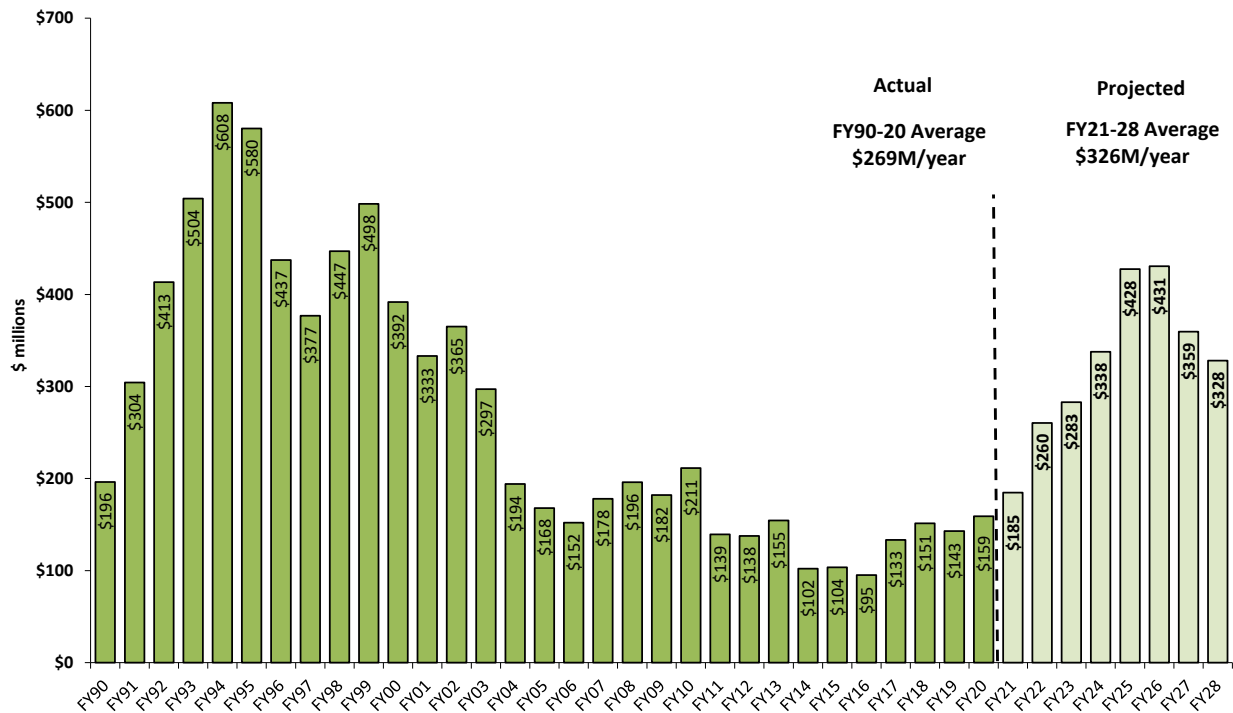


**Fire Alarm System Replacement** - \$7.8 million (\$28.8 million total construction cost) Project will replace obsolete fire alarm monitoring & control systems. Design awarded October 2015; construction phase to commence in FY21 and approximately every 20 years thereafter.

### Historical and Projected Capital Spending

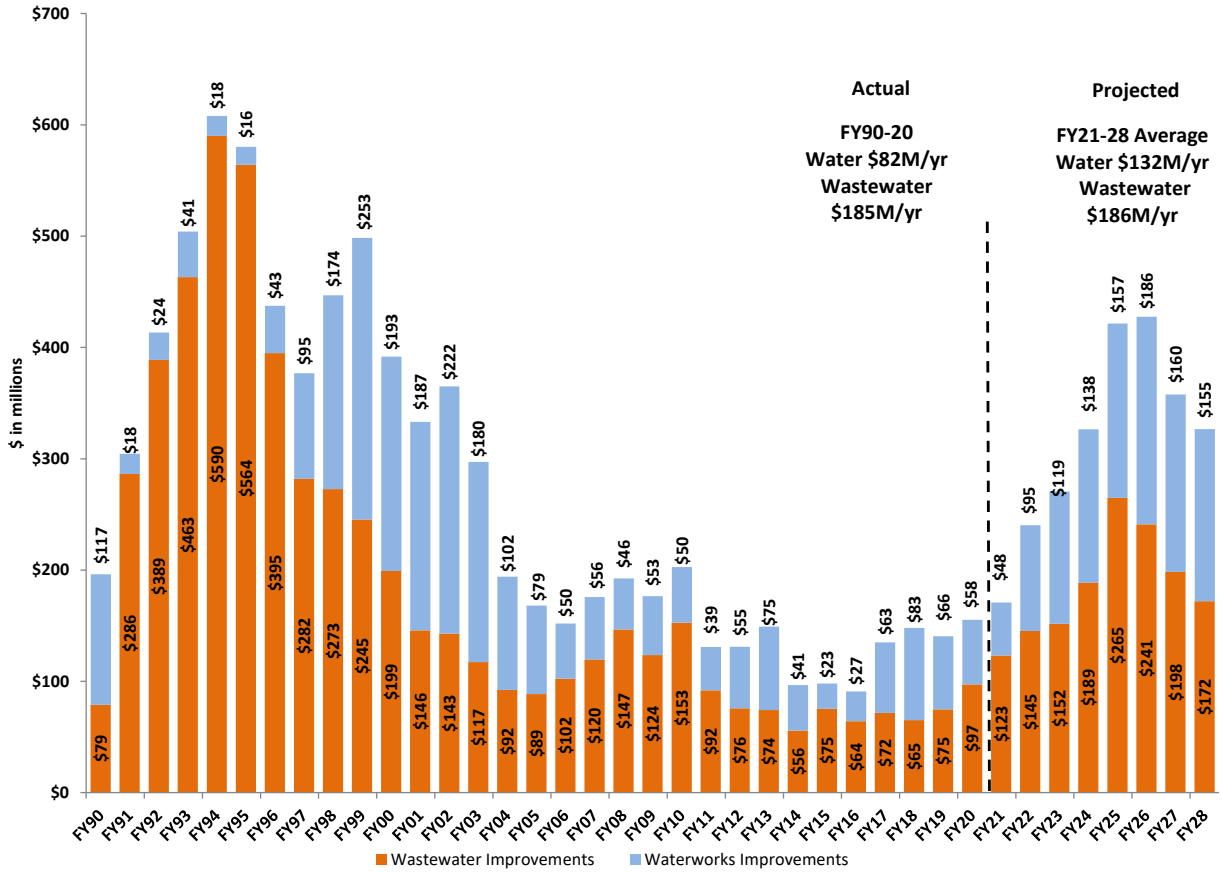
The chart below captures the historical CIP spending through FY20 and projects spending through FY23 based on the FY22 Proposed CIP. Average annual CIP spending through FY20 was \$269 million. Average annual CIP spending for the proposed FY21-28 period is projected to be \$326 million.

Annual CIP Spending



The following chart shows the historical CIP spending from FY90 through FY20 by utility with projections through FY28. Average annual CIP spending through FY20 was \$82 million for Waterworks and \$185 million for Wastewater. Average annual CIP spending for FY21-28 is projected to be \$132 million for Waterworks and \$186 million for Wastewater.

## Annual CIP Spending by Utility



The spending projections set forth here include updates to the approved FY20 CIP with the latest cost estimates, revised schedules, and new projects.

### FY19-23 Spending and the Five-Year Spending Cap

Spending during the FY19-23 timeframe is planned to be \$1.0 billion, including local community spending of \$149.2 million for the I/I loan and grant program and \$42.6 million for the water pipeline loan program. Spending under the Wastewater and Waterworks programs is projected at \$592.3 million and \$385.3 million, respectively, followed by Business and Operations at \$52.6 million.

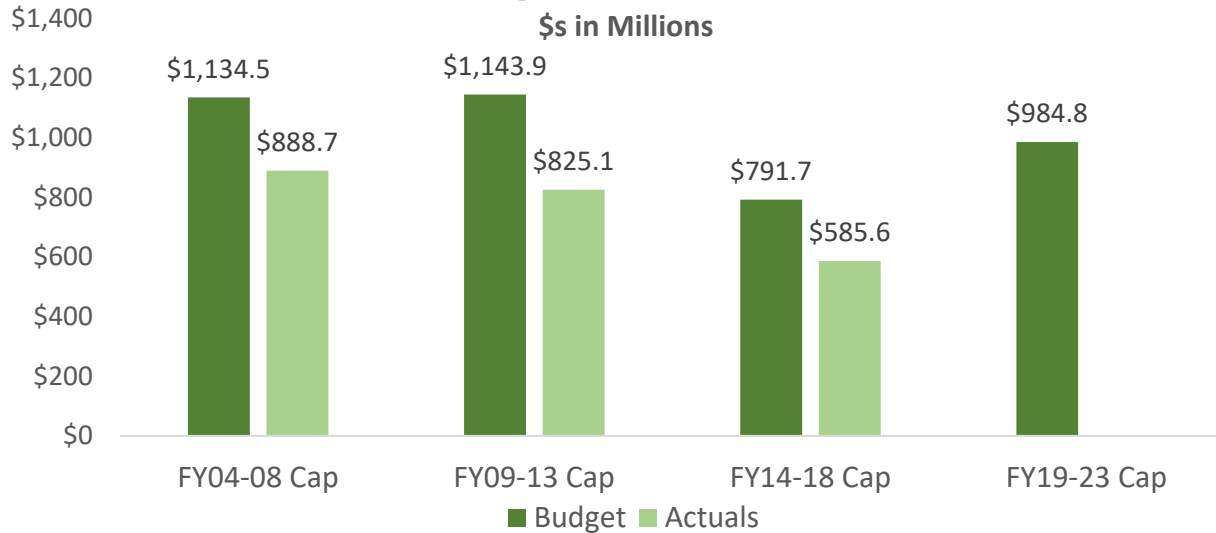
Yearly projected expenditures for the Proposed FY19-23 period by program are shown below in millions:

	Projected Spending Beyond FY20	FY19	FY20	FY21	FY22	FY23	Total FY19-23
<b>Wastewater System Improvements</b>	<b>\$1,649.2</b>	<b>\$74.8</b>	<b>\$97.2</b>	<b>\$123.2</b>	<b>\$145.2</b>	<b>\$151.8</b>	<b>\$592.3</b>
Interception & Pumping	582.0	23.1	33.1	50.7	65.9	47.8	220.6
Treatment	841.7	10.0	14.2	37.7	53.8	80.1	195.9
Residuals	90.3	0.8	13.4	1.5	0.1	0.8	16.5
CSO	7.7	1.2	1.3	5.2	2.3	0.1	10.0
Other Wastewater	127.7	39.6	35.2	28.1	23.2	23.0	149.2
<b>Waterworks System Improvements</b>	<b>\$2,263.5</b>	<b>\$65.6</b>	<b>\$58.1</b>	<b>\$47.8</b>	<b>\$95.0</b>	<b>\$118.8</b>	<b>\$385.3</b>
Drinking Water Quality Improvements	57.0	0.8	1.5	3.4	6.4	4.1	16.2
Transmission	1,721.2	9.9	12.8	20.1	39.7	52.7	135.2
Distribution & Pumping	525.1	36.6	26.6	15.3	24.6	53.6	156.7
Other Waterworks	-39.8	18.4	17.0	8.9	24.4	8.5	77.2
<b>Business &amp; Operations Support</b>	<b>70.0</b>	<b>2.4</b>	<b>3.7</b>	<b>13.9</b>	<b>20.2</b>	<b>12.4</b>	<b>52.6</b>
<b>Total MWRA</b>	<b>\$3,982.7</b>	<b>\$142.9</b>	<b>\$159.0</b>	<b>\$184.8</b>	<b>\$260.5</b>	<b>\$283.0</b>	<b>\$1,030.2</b>

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.

## Cap Spending Budget and Actual



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 FY22 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 \$23.0 million related to the tunnels.

Annual cash flows for the FY22 Proposed Cap period total \$888.1 million, \$96.3 million below the established CAP of \$984.4 million set in FY19.



FY22 Proposed		FY19	FY20	FY21	FY22	FY23	Total FY19-23
	Projected Expenditures	\$142.9	\$159.0	\$184.8	\$260.5	\$283.0	\$1,030.2
	I/I Program	(39.6)	(35.2)	(28.1)	(23.2)	(23.0)	(149.2)
	Water Loan Program	(13.8)	(11.4)	(6.4)	(15.3)	4.4	(42.6)
	<b>MWRA Spending</b>	<b>\$89.4</b>	<b>\$112.3</b>	<b>\$150.3</b>	<b>\$221.9</b>	<b>\$264.5</b>	<b>\$838.4</b>
	Contingency	0.0	0.0	9.2	13.9	17.6	40.8
	Inflation on Unawarded Construction	0.0	0.0	0.0	2.1	6.8	8.9
	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>\$112.3</b>	<b>\$159.5</b>	<b>\$237.9</b>	<b>\$288.9</b>	<b>\$888.1</b>	

The format of the Cap table is adjusted 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.

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 \$14 million for the FY19-23 period total \$643.3 million, which includes local community assistance programs, and accounts for over 62.4% of total spending. Large construction initiatives include the Clarifier Rehabilitation at Deer Island and Nut Island Odor Control at \$75.3 million (\$137.2 million total cost) and \$58.3 million (\$58.3 million total cost), respectively between FY19-23. Net of the community loan programs and grants, the top construction related projects greater than \$14 million total \$331.9 million and account for over 32.2% of FY19-13 spending.

The table below highlights major project spending in the FY19-23 timeframe:

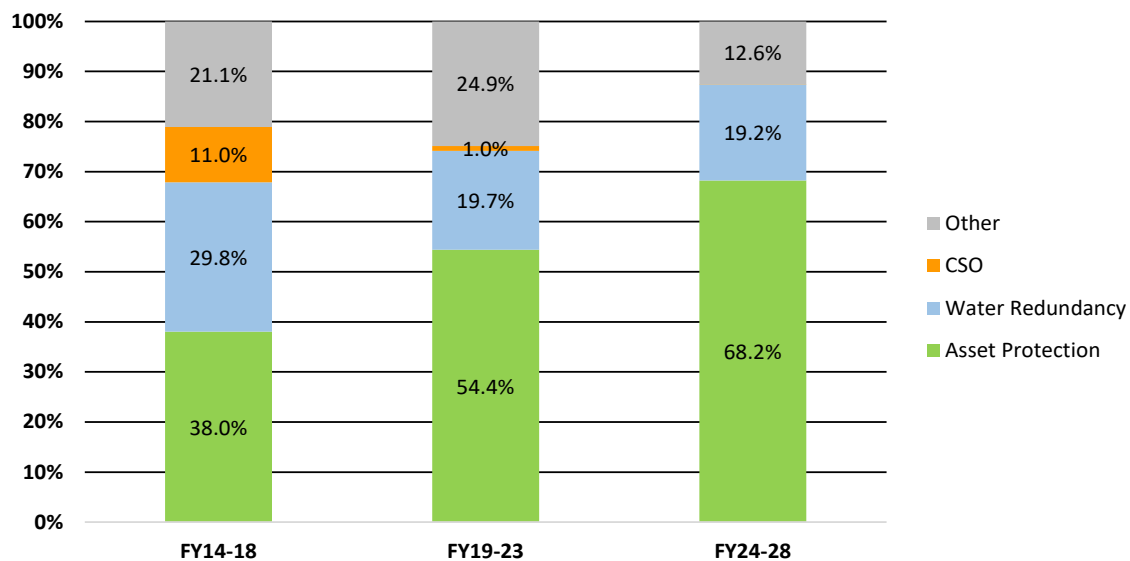
Project	Subphase	FY19-23 Spending \$s in Millions
Local Water Pipeline Improvement	LWSAP Phase 3 Distributions	\$85.6
Deer Island Treatment Plant Asset Protection	Clarifier Rehab Phase 2 – Construction	\$75.3
Local Water Pipeline Improvement	Local Water System Assistance Loans	\$59.9
Corrosion & Odor Control	NI Odor Ctrl HVAC Imp Construction Phase 2	\$58.3
Facility Asset Protection	Chelsea Creek Upgrades – Construction	\$51.9
I/I Local Financial Assistance	Phase XI Grants	\$44.6
Facility Asset Protection	Prison Point Rehab – Construction	\$42.5
I/I Local Financial Assistance	Phase X Grants	\$32.5
I/I Local Financial Assistance	Phase XII Grants	\$28.2
I/I Local Financial Assistance	Phase IX Grants	\$23.2
Local Water Pipeline Improvement	Lead Service Line Replace Loans	\$22.7
SEH Redundancy & Storage	Redundancy Pipeline Sect 111 - Construction 3	\$20.2

NIH Redundancy & Storage	Section 89 & 29 Redundancy Construction Phase 2	\$19.8
Deer Island Treatment Plant Asset Protection	Gravity Thickener Rehab	\$19.6
Deer Island Treatment Plant Asset Protection	Fire Alarm System Replacement - Construction	\$15.8
I/I Local Financial Assistance	Phase XI Loans	\$14.9
Metro Tunnel Redundancy	Prelm Des & MEPA Review	\$14.4
SEH Redundancy & Storage	Redundancy Pipeline Sect 111 - Construction 2	\$14.2
<b>Total Contracts &gt; \$14 million</b>		<b>\$643.3</b>
<b>% of 19-23 Spending</b>		<b>62.4%</b>
<b>Spending Excluding Community Loan Programs</b>		<b>\$331.9</b>
<b>% of 19-23 Spending</b>		<b>32.2%</b>
<b>Total Projected FY19-23 Spending</b>		<b>\$1,030.2</b>

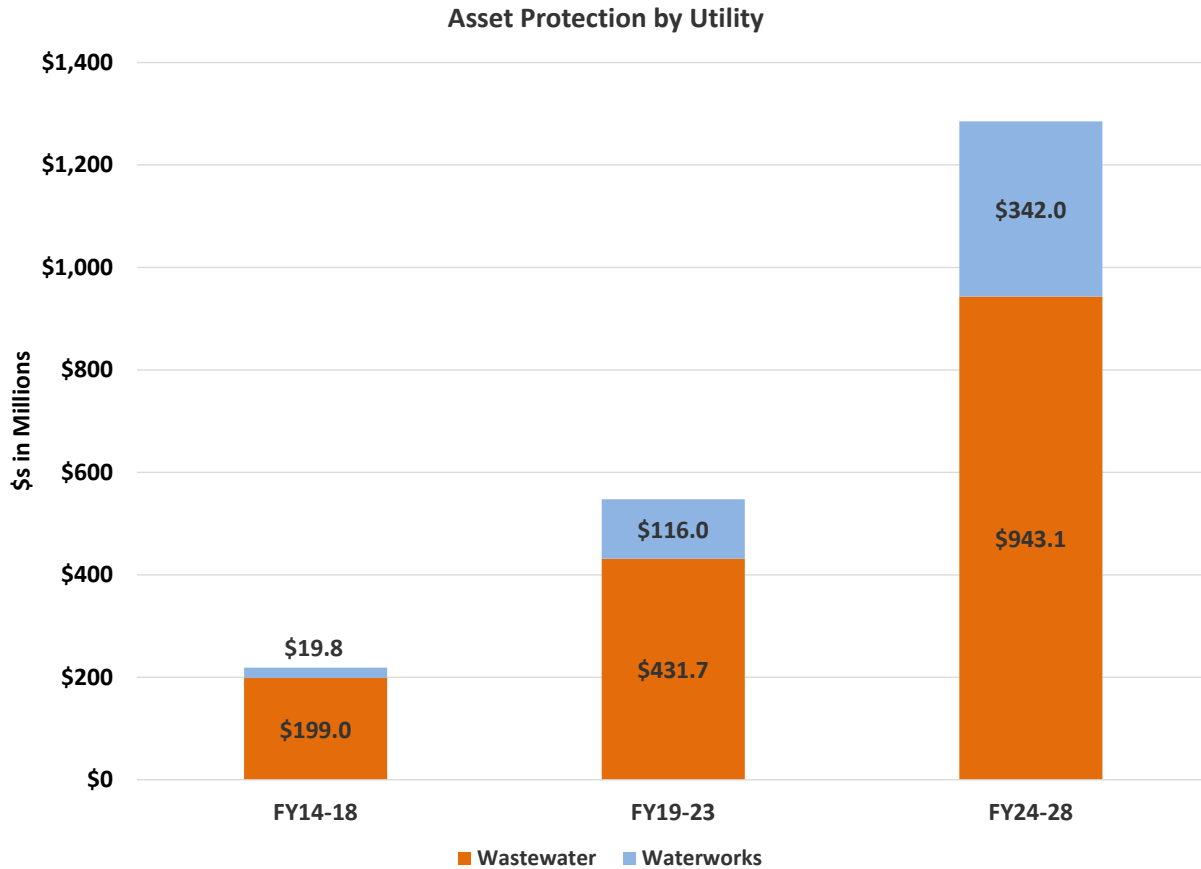
### Asset Protection & Water System Redundancy

Asset Protection accounts for the largest share of capital expenditures for the FY19-23 period. The FY22 Proposed CIP includes \$560.6 million for asset protection initiatives, representing 54.4% of total MWRA spending in this timeframe. Asset protection spending by program is as follows: Wastewater (\$431.6 million), Waterworks (\$116.0 million), and Business and Operations Support (\$13.0 million). Deer Island Treatment Plant Asset Protection accounts for over \$187.3 million in spending. Spending for water system redundancy projects totals \$203.3 million in the same FY19-23 period, accounting for 19.7% of the total FY19-23 spending. Asset Protection as a percent of FY24-28 spending increases to 68.2% while Redundancy drops slightly to 19.2% of FY24-28 spending.

CIP Spending By Category  
% of Total

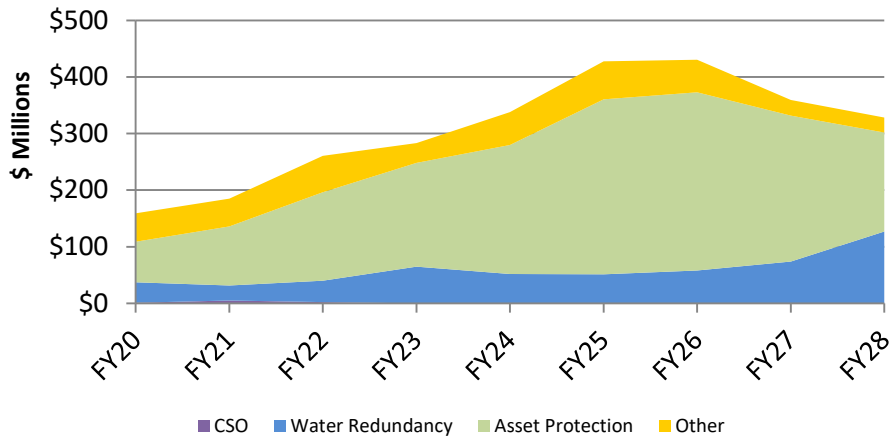


In terms of utility spending, wastewater asset protection accounts for 77.0% of the FY19-23 projected asset protection spending at \$431.7 million of which \$187.3 million is designated for the Deer Island Wastewater Treatment Plant and \$244.4 million for headworks and pipelines. The \$116.0 million targeted for waterworks asset protection includes \$57.1 million for water pipeline projects.



As illustrated by the following graph, the next two waves of spending over the FY19-23 Cap period and the FY24-28 Cap 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 \$560.6 million or 54.4% of projected spending. Similarly, water redundancy spending for FY19-23 is projected at \$203.3 million or 19.7% of projected FY19-23 spending. For the FY24-28 spending window, total asset protection is projected at \$1.3 billion or 68.2% of projected spending. Similarly, water redundancy spending for FY24-28 is projected at \$361.4 million or 19.2% of projected FY24-28 spending.

**FY22 Proposed  
Expenditure Forecast by Major Category**



**FY22 Proposed CIP Future Expenditures**

Every year, the MWRA updates its anticipated future spending. The FY22 Proposed CIP projects future spending of \$4.0 billion, including \$1.6 billion for Wastewater System Improvements and \$2.3 billion for Waterworks System Improvements. Projected spending totals \$1.0 billion for the FY19-23 period and \$1.9 billion for the FY24-28 timeframe. The project mix includes more wastewater spending, much of it asset protection projects, before pending tilts in favor of the Waterworks program as tunnel redundancy projects skew future spending.

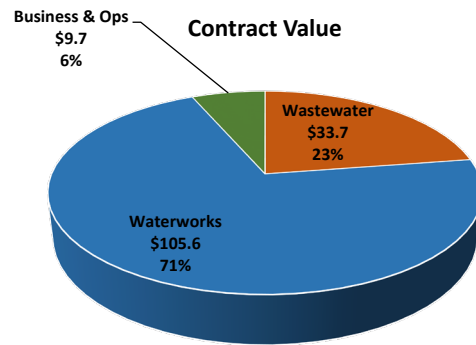
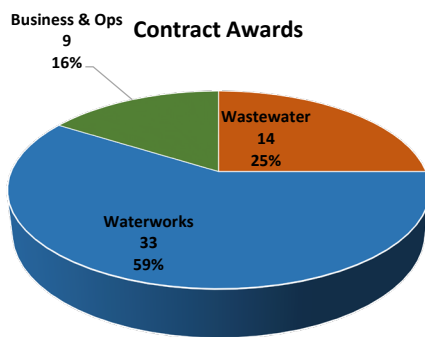
The table below represents the projected spending by the major project categories:

	Future Spending Beyond FY20	Total FY19-23	Total FY24-28	Beyond 28
<b>Wastewater System Improvements</b>	<b>\$1,649.2</b>	<b>\$592.3</b>	<b>\$1,064.9</b>	<b>\$164.2</b>
Interception & Pumping	582.0	220.6	332.9	84.7
Treatment	841.7	195.9	596.5	73.6
Residuals	90.3	16.5	22.2	65.7
CSO	7.7	10.0	0.1	0.0
Other Wastewater	127.7	149.2	113.2	(59.8)
<b>Waterworks System Improvements</b>	<b>\$2,263.5</b>	<b>\$385.3</b>	<b>\$795.2</b>	<b>\$1,206.8</b>
Drinking Water Quality Improvements	57.0	16.2	14.8	28.3
Transmission	1,721.2	135.2	320.1	1,288.7
Distribution & Pumping	525.1	156.7	369.3	62.3
Other Waterworks	-39.8	77.2	91.0	(172.5)
<b>Business &amp; Operations Support</b>	<b>70.0</b>	<b>52.6</b>	<b>23.5</b>	<b>-</b>
<b>Total MWRA</b>	<b>\$3,982.7</b>	<b>\$1,030.2</b>	<b>\$1,883.5</b>	<b>\$1,370.9</b>

## Major Planned Contract Awards for FY22:

In Fiscal Year 2022, 56 contracts totaling \$149.0 million are projected to be awarded. The largest ten projected contract awards total \$82.7 million and account for nearly 56% of expected awards and are presented in the following table.

Project	Subphase	Notice to Proceed	Total Contract Amount \$ in Millions
Metro Redundancy Interim Improvements	Waltham Water Pipeline Const	Feb-22	\$13.8
Metro Redundancy Interim Improvements	CHEPS Impr Construction	Jul-21	\$13.5
NHS - Revere & Malden Pipelines	Section 56 Replacement- Construction	Feb-22	\$9.8
Cathodic Protection of Distribution Mains	Cath Prot Metro System Des/CA	Jul-21	\$9.2
Braintree-Weymouth Relief	B/W Improvements - Construction	Jul-21	\$8.0
Northern Low Service Rehab Sec 8	Sec 50 & 57 Water Rehab	Jul-21	\$8.0
DI Treatment Plant Asset Protection	CHP Des/ESDC/REI	Jun-22	\$5.6
New Connect Mains-Shaft 7	Replace of Sect 25 - Const CP-2	Apr-22	\$5.3
Info Security Program ISP	MSSP/SIEM	Nov-21	\$5.2
Northern Extra High Service New Pipelines	CP-1 NEH Improvements	Apr-22	\$4.4
<b>Top 10 Contracts</b>			<b>\$82.7</b>
<b>% of Total Planned Awards</b>			<b>55.5%</b>
<b>56 Contract Awards Planned</b>			<b>\$149.0</b>



## Community Loan Programs

The MWRA offers its water and wastewater communities loan and grant opportunities for infrastructure preservation. Support programs total \$191.8 million over the FY19-23 timeframe with \$38.6 million targeted for FY22. 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.

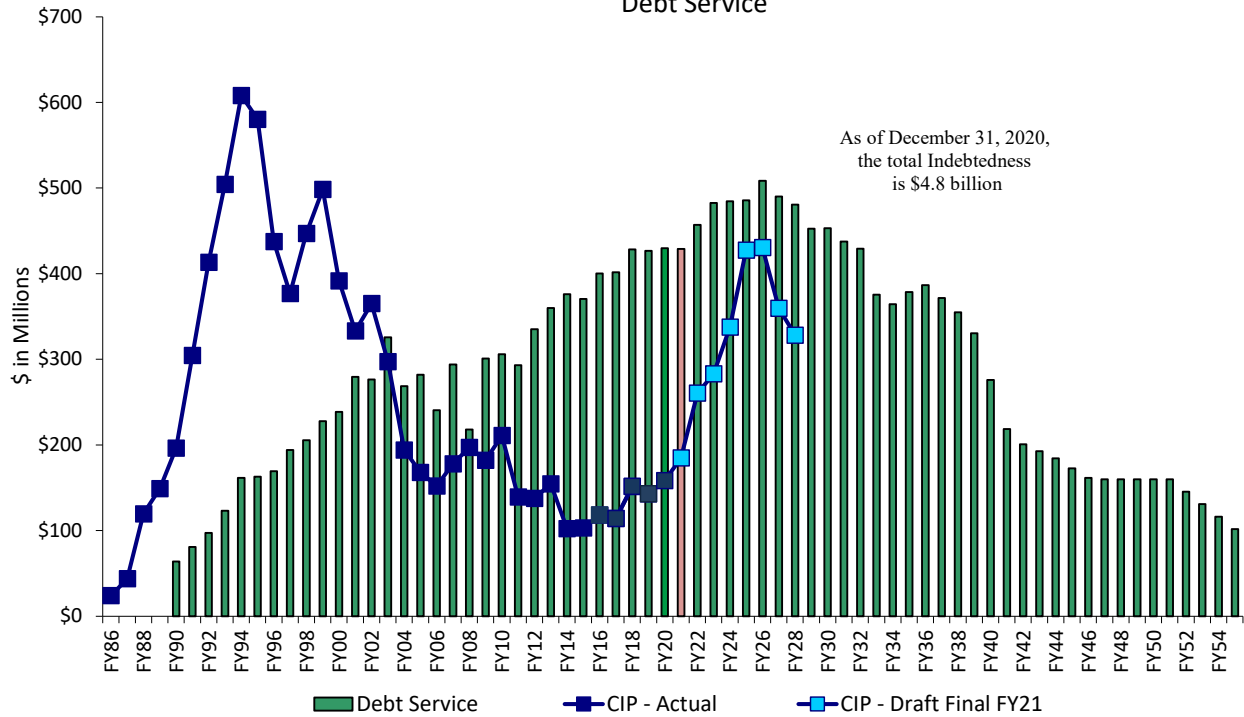
Over the FY19-23 timeframe \$149.2 million in funding is projected to be distributed to MWRA wastewater communities and \$42.6 million is projected to be distributed to MWRA water communities.

\$s in Millions	FY19	FY20	FY21	FY22	FY23	FY19-23
I/I Financial Assistance (Net of repayments)	\$39.6	\$35.2	\$28.1	\$23.2	\$23.0	\$149.2
Local Water System Assistance (Net of Repayments)	\$13.8	\$11.4	\$6.4	\$15.3	(\$4.4)	\$42.6
Total Community Loan Programs	\$53.5	\$46.7	\$34.5	\$38.6	\$18.5	\$191.8

## MWRA Capital Improvement Spending and Debt Service Projected Thru 2023

As of December 31, 2020, MWRA's total debt is \$4.8 billion, which is \$89.9 million less than the MWRA's total debt as of December 31, 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



### CIP Review and Adoption Process

The Advisory Board will have 60 days from the transmittal of the FY22 Proposed CIP to review the budget and prepare comments and recommendations. During the review period, Advisory Board and MWRA staff will continue to meet and discuss the changes to the capital budget. The Advisory Board will then transmit its comments and recommendations to MWRA in the spring after its review. Staff will prepare draft responses to the Advisory Board’s recommendations for discussion at the budget hearing. During the spring, MWRA will update the CIP to incorporate the latest information into the Final budget. In June, staff will present the FY22 Final to the Board for adoption.

### 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.

# Capital Improvement Program

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**PROPOSED  
FISCAL YEAR 2022**

**APPENDICES**



MASSACHUSETTS WATER RESOURCES AUTHORITY



# APPENDIX 1

## Project Budget Summaries and Detail of Changes

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## Project Budget Summaries and Detail of Changes

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# Wastewater System Improvements



Deer Island Wastewater Treatment Plan

## S. 104 Braintree-Weymouth Relief Facilities

### Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Fulfills a regulatory requirement*
- Extends current asset life*
- Improves system operability and reliability*

*In accordance with a DEP administrative consent order, construction of relief facilities and the resulting reduction in community infiltration and inflow will provide capacity for peak sewage flow from Braintree, Hingham, Holbrook, Randolph, Weymouth, and sections of Quincy. This project will reduce surcharging in Braintree and Weymouth, and reduce frequent overflows into the Weymouth Fore River during wet weather.*

### Project History and Background

The Braintree-Weymouth interceptor system and pump station serves Braintree, Hingham, Holbrook, Randolph, Weymouth, and sections of Quincy. Because of population increases, the sewerage system could not handle the volume of sewage received and sewage overflows were frequent along the Weymouth Fore River during wet weather.

Interim rehabilitation work was required to ensure continued operation of the existing Braintree-Weymouth Pump Station during the long-term design and construction period. After initially proceeding with a dual track design approach for part of this project, MWRA decided to construct a deep rock tunnel rather than a marine pipeline from the new pump station to the Nut Island shaft of the Inter-Island Tunnel to Deer Island. Construction of the Emergency Mill Cove Siphon was completed in June 1998. Construction of the deep rock tunnel was completed in September 2003, and the North Weymouth Relief Intercept was completed in June 2002. The Intermediate Pump Station and sludge pumping facilities at Deer Island were completed in April 2005. The Fore River Siphons construction contract was completed in May 2005. Construction of the Replacement Pump Station was completed in April 2008. Rehabilitation of Section 624 was completed in December 2010. Remaining phases include Braintree-Weymouth Improvements.

### Scope

Sub-phase	Scope	Status
Design 1/CS/RI – Tunnel & IPS	Design of the tunnel and Intermediate Pump Station (IPS). Includes completion of design modifications for sludge pumping facilities at Deer Island and residuals filtrate facilities at Fore River.	Completed
Sediment Tests	Tests required as part of the evaluation of marine pipeline option.	Completed
Design 2/CS/RI – Surface	Design of remaining construction including siphons and replacement pump station.	Completed

Sub-phase	Scope	Status
Tunnel Construction & Rescue	Construction of a 2.9-mile, 12-foot diameter tunnel beginning at the Nut Island shaft of the Inter-Island Tunnel and ending at the Fore River Staging Area. Two 14-inch sludge pipelines within the tunnel will convey Deer Island sludge from the Inter-Island Tunnel to the pelletizing plant. 0.4 miles of twin 12-inch pipelines within the tunnel will convey filtrate from the pelletizing plant to the Intermediate Pump Station. 2.5 miles of 42-inch force main will carry flows and filtrate to the Inter-Island Tunnel. Also includes a MOA with Quincy, Braintree, and Weymouth for tunnel rescue and fire support services.	Completed
Intermediate Pump Station Construction	Construction of a 45-mgd pump station and headworks in North Weymouth. Also includes modifications to the sludge pumping facilities at Deer Island and the filtrate facilities at Fore River.	Completed
No. Weymouth Relief Interceptor Construction	Construction of 2,000 linear feet of 60-inch gravity sewer running from the Intermediate Pump Station and along the Exelon Energy site.	Completed
Fore River Siphons Construction	Construction of 36-inch, 3,900-foot long twin siphons beneath the Fore River from the Idlewell section of Weymouth to the southeast corner of the Exelon Energy site in North Weymouth. Constructing 1,000 linear feet of 36-inch to 54-inch new sewers in Idlewell.	Completed
B-W Replacement Pump Station	Construction of a new 28-mgd Braintree-Weymouth Pump Station which will handle flows from Hingham, Weymouth, and portions of Quincy.	Completed
Rehab Section 624	Rehabilitation of 2,000 feet of Section 624 in North Weymouth.	Completed
Mill Cove Siphon Construction	Installation of 1,700 linear feet of 42-inch siphon pipe between Newell Playground and Aspinwall Street in North Weymouth to act as second barrel of existing Mill Cove Siphon.	
Construction –Rehab	Interim rehabilitation of the existing Braintree-Weymouth Pump Station.	Completed
Community Tech Assistance	Technical assistance for the Town of Weymouth for hydraulic modeling of its sewer system, leak detection for the water system, and mitigation.	Completed
Geotechnical Consultant	Consulting services related to the tunnel shaft excavation.	Completed
Communication System	Radio systems for the intermediate and replacement pump stations.	Completed
Mill Cove Sluice Gates Design and Construction	Install a single gate to provide for system flushing to reduce sediment deposition and to control odors at the Braintree-Weymouth Pump Station.	Future
Braintree-Weymouth Improvements Design CS (7435), Construction (7366), and REI (7683)	Design/ESDC services for modifications needed to improve facility safety, reliability, and performance. Design and construction improvements are required to address deficiencies in odor control, monitoring/instrumentation systems, solids screenings/handling, and pumping operations.	Active

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$241,526	\$228,390	\$13,135	\$277	\$692	\$2,372	\$11,449	\$0

Project Status 12/20	94.7%	Status as % is approximation based on project budget and expenditures. Braintree-Weymouth Improvements Design/Construction Services commenced in December 2018
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$241,415	\$241,526	\$111	Apr-26	Apr-26	None	\$1,797	\$2,372	\$575

**Explanation of Changes**

- Project cost changed due to Braintree/Weymouth Improvements REI updated cost estimate.
- Project spending changed due to updated cashflow for Braintree Weymouth Improvements – Construction as a result of accelerated schedule and updated REI cost.

**CEB Impacts**

- None identified at this time.

## S. 130 Siphon Structure Rehabilitation

### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Extends current asset life*
- ☑ *Improves system operability and reliability*

**Master Plan Project ☑ 2009 Priority Rating 2 (see Appendix 3)**

*Design and construction of improvements to headhouses and structures.*

### Project History and Background

Siphon chambers are located at the upstream and downstream ends of depressed sewers. Depressed sewers are constructed to avoid obstructions in sewer alignments such as rivers and subsurface utilities. Upstream siphon chambers allow attainment of proper water elevation so that the depressed sewer flows under pressure. Downstream chambers provide transitions between depressed sewers and downstream gravity sewers.

Connecting structures are facilities at which flows from sewers are redirected to converge with or receive flows from other sewers.

There are 92 siphon chambers and 111 connecting structures in the MWRA wastewater system. Wastewater flows through many of these siphon chambers and connecting structures can be impacted by irregular maintenance due to the inaccessibility of many structures. Inadequate or reduced hydraulic capacity could in turn contribute to significant surcharges or overflows. Odor problems have also been identified at some siphon chambers and connecting structures due to hydraulic transitions.

MWRA completed a study in 1998 to evaluate rehabilitation of these structures in order to permit greater accessibility to provide regular maintenance to alleviate the above problems. 83 siphon chambers and 63 connecting structures were included in the study which recommended rehabilitation and improvements to 127 of these structures. MWRA has prioritized the design and construction of improvements to these structures. Phase 1 will provide access improvements and rehabilitation of structures at locations that are subject to inundation from potential surface flooding and are in greatest need of access and/or repair.

### Scope

Sub-phase	Scope	Status
Planning	Identification of methods to improve accessibility and structures. Inspection of the siphon chambers and diversion structures along with recommendations for rehabilitation.	Completed
Phase 1 Design/CS/RI and Construction	Design, ESDC, REI and construction of improvements at high priority siphon locations. Scope includes 41 structures.	Active
Phase 2 Design/CS/RI and Construction	Design, ESDC, and construction of improvements at high priority siphon locations. Scope anticipated to include 40 structures.	Future



**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$14,668	\$1,015	\$13,653	\$1,198	\$1,160	\$3,520	\$10,208	\$0

Project Status 12/20	11.9%	Status as % is approximation based on project budget and expenditures. Initial Planning subphase was completed in 1998. Design began in April 2020.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$14,668	\$14,668	\$0	Dec-26	Dec-26	None	\$3,520	\$3,520	\$0

**Explanation of Changes**

- N/A

**CEB Impacts**

- None identified at this time.

## S. 132 Corrosion and Odor Control

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### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Extends current asset life*
- ☑ *Improves system operability and reliability*

*High sulfide levels in the Framingham Extension System cause corrosion and odors in that system and downstream in the Wellesley Extension Sewer System and West Roxbury Tunnel. A study has identified the causes of corrosion and odors and recommended corrective measures. Completion of corrosion control measures will extend the useful life of these assets and minimize the impact on the existing wastewater conveyance infrastructure. Improved odor control will mitigate the impact on surrounding areas.*

### Project History and Background

Hydrogen sulfide produces sewer odors and is highly corrosive to pipes and pump stations. Collapses in the Framingham Extension Sewer (FES) have alerted MWRA to problems in that area. Odor complaints have been received from residents abutting both the Framingham Extension Relief Sewer (FERS) and the Wellesley Extension Sewer (WES) systems resulting in legal claims totaling several hundred thousand dollars. Severe corrosion has occurred in the drop chamber leading to the West Roxbury Tunnel as well as documented corrosion in the tunnel itself.

While MWRA attempts to minimize odor and corrosion impacts through chemical intervention and sealing locations where odors escape, a more permanent solution is being sought. MWRA awarded a Planning/Study contract in January 1997. The consultant completed inspections in Ashland, Framingham, and Natick and drafted a report identifying, locating, and categorizing the sources and the extent of odor and corrosion problems. The Odor and Corrosion report indicated that significant levels of sulfides are discharged into the FES from Ashland and Framingham. These sulfide levels were documented to increase as the wastewater flows through the FES/FERS system. The report recommends a combination of MWRA and community actions, such as modifications to industrial discharge limits and municipal permits, chemical addition at community pump stations and the FES, and air treatment. The final planning/inspection report was completed in December 1998.

Following the Planning/Study the MWRA began the Interim Corrosion Control project. This design project included modifications to the FERS pump station, FES Tunnel, and air treatment systems. The design project was discontinued in June 2005, leaving the different project components at various levels of design. At the time, a decision was made to allow other recommendations made during the Planning/Study phase to be further implemented (i.e., modifications to community collection systems, industrial discharge limits, municipal permit modifications). This decision has proven to be prudent given the significant reduction in hydrogen sulfide over the past decade. However, the high hydrogen sulfide levels are still prevalent enough to require chemical addition during the seasonal high period of the year to maintain hydrogen sulfide levels in an acceptable range for both corrosion control and to help reduce nuisance odors.

The Corrosion and Odor Control program has recently been expanded to include odor control and mechanical/electrical modification to the downstream Nut Island Headworks.

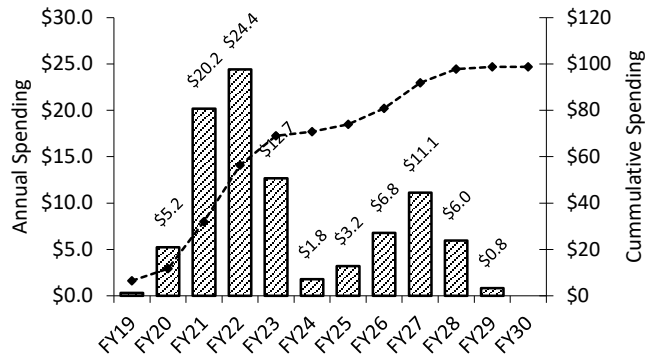
**Scope**

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
Planning	Identification of causes and sources of odors; collection of local sewer system information in Ashland, Natick, and Framingham; recommendations for long-term corrective measures.	Completed
Design/CS/RI	Design, construction services, and resident inspection for FERS Pump Station, FES tunnel, and air treatment systems. By June 2005, the FERS Pump Station achieved 50% Design status, the FES tunnel achieved 30% Design status and the air treatment systems achieved 100% Design status.	Completed
Interim Corrosion Control	Implementation of chemical addition program at the FERS Pump Station. The program includes the addition of potassium permanganate, and monitoring of the wastewater flows and hydrogen sulfide levels downstream.	Completed
FES/FERS Biofilters Design & Construction	FES/FERS Corrosion Control (Biofilters) is a design and construction project to make improvements in the MWRA sewers. Three air treatment systems (biofilters) are recommended to remove and treat hydrogen sulfide in the FES, FERS, WESR and WERS sewer systems. Rehabilitation of hydrogen sulfide meters will be included.	Future
Nut Island Mechanical and Electrical Upgrades Design CA, REI and Construction	This project provides design, ESDC/REI and construction for replacement/upgrades to the mechanical, electrical, instrumentation, and support systems at the Nut Island Headworks Facility.	Future
System-wide Odor Control Study	The prevalence of Hydrogen Sulfide gas in the collection system has been responsible for system wide odor complaints and infrastructure deterioration. This project will evaluate the system, identify the critical needs, and provide solutions.	Future
NI Headworks Odor Control and HVAC Improvements Evaluation, Design, ESDC, REI and Construction Phase 2	Design ESDC/REI and construction for improvements for the Nut Island Headworks Odor Control and HVAC systems and energy management system. This is the long term improvements project following the January 25-26, 2016 fire and following the Contract 7494 Odor Control, HVAC and Energy Management System Evaluation completed in February 2017. Failure of the odor control system would result in odors being released to surrounding areas and the discharge limits of the facility's air permit being exceeded.	Active

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY20</b>	<b>Remaining Balance</b>	<b>FY21</b>	<b>FY22</b>	<b>FY19-23</b>	<b>FY24-28</b>	<b>Beyond FY28</b>
\$98,697	\$11,725	\$86,972	\$20,183	\$24,415	\$62,828	\$28,850	\$840

### Corrosion & Odor Control



Project Status 12/20	18.8%	Status as % is approximation based on project budget and expenditures. Odor Control Evaluation was completed in February 2017. NI Odor Control & HVAC Design CA/REI commenced in March 2017 and construction began in FY20 Q3.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$97,949	\$98,697	\$748	Nov-27	Nov-27	None	\$62,051	\$62,828	\$777

#### Explanation of Changes

- Project cost change primarily due to change orders for Nut Island Headworks Odor Control and HVAC Improvements Construction.
- Project spending changed primarily due to updated change orders for Nut Island Headworks Odor Control and HVAC Improvements Construction and updated cash flow.

#### CEB Impacts

- None identified at this time.

## S. 136 West Roxbury Tunnel

### **Project Purpose and Benefits**

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefit*
- ☑ *Extends current asset life*
- ☑ *Improves system operability and reliability*

**Master Plan Project ☑ Priority Rating 1 (See Appendix 3)**

*Investigation and rehabilitation of the West Roxbury Tunnel sewer. This sewer, built in 1964, transports flows from the Wellesley Extension Relief Sewer System through the West Roxbury portion of Boston to the High Level Sewer. A structural failure could result in surcharging and overflows.*

### **Project History and Background**

During construction of the Wellesley Extension Replacement Sewer and inspection of the tunnel in 1999, visual observations indicated that severe corrosion due to hydrogen sulfide had occurred in a portion of the sewer directly upstream of the West Roxbury Tunnel (WRT), and that the tunnel entrance structure had lost cement lining, exposing the reinforcing steel. Manholes and other structures had been affected more severely.

A structural failure of the WRT would affect the tributary communities of Ashland, Brookline, Dedham, Framingham, Natick, Needham, Newton, Wellesley, and the Hyde Park and West Roxbury portions of Boston. Local failure of the tunnel could result in the discharge of 53 to 128 mgd of raw sewage into the Charles River until emergency repairs could be made, back-up of sewage into local residences and businesses, and the interruption of service to as many as 125,000 people. Section 138 is immediately upstream of the tunnel and crosses beneath the VFW Parkway in West Roxbury. Structural failure beneath this major transportation corridor would result in a severe public safety hazard.

Design for structural repairs to Section 138 and the West Portal of the tunnel were completed in June 2001. Construction of these repairs, Contract 6569, repairs to Sections 137 & 138, including the slipline of Section 138, were completed in June 2002. The design contract to rehabilitate the tunnel was awarded in February 2009 and ended in June 2011. The tunnel was inspected in August 2010 and there has been negligible deterioration since the 1999 inspection. Based on these findings and the significant reduction in hydrogen sulfide levels in the tributary sewers over the past decade, it was determined that the tunnel is not in need of immediate repair. In lieu of immediate repair, a tunnel inspection program will be implemented to monitor the conditions of the tunnel.

### **Scope**

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
Inspection	Inspection of Section 137 of the West Roxbury Tunnel, which includes 12,500 linear feet of 84-inch reinforced and unreinforced concrete tunnel. Initial inspection completed in 1999.	Completed
Design/CS/RI	Design, construction services, resident inspection for corrective actions to repair/rehabilitate 1,000 feet of Section 138 and the West Portal, and a conceptual design report for the rehabilitation of the tunnel. Design/construction completed in June 2002.	Completed
Construction	Rehabilitation of 1,000 feet of Section 138 and the West Portal. Completed in June 2002.	Completed

Tunnel Inspection	Inspection contract to monitor the conditions of the tunnel in 10 years	Future
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**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$11,314	\$10,314	\$1,000	\$0	\$0	\$0	\$1,000	\$0

Project Status 12/20	91.2%	Status as % is approximation based on project budget and expenditures. Tunnel Inspection is expected to begin in FY24.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$11,314	\$11,314	\$0	Jun-24	June-24	None	\$0	\$0	\$0

**Explanation of Changes**

- N/A

**CEB Impacts**

- None identified at this time.

## S. 137 Wastewater Central Monitoring

### Project Purpose and Benefits

- Extends current asset life.
- Results in a net reduction in operating costs
- Improves system operability and reliability

*To study, define, design, and implement a centralized monitoring and control system most appropriate for MWRA's wastewater transport system. Through facility automation and remote monitoring and control, SCADA implementation will result in cost savings and improve wastewater system operation and maintenance.*

### Project History and Background

MWRA has implemented automation and central monitoring and control of its water and wastewater systems and facilities. Substantial investments have been made in implementing such systems for the Deer Island Wastewater Treatment Plant, and Supervisory Control and Data Acquisition System (SCADA) implementation is fully operational at the wastewater transport facilities and the water conveyance and treatment system.

The SCADA Master Plan, which was completed in July 1999, recommended expansion of the automated control concepts developed for water system operation and identified long-term savings related to staffing reductions and optimization of operations and maintenance. Following the master planning recommendations, a detailed scope of services was prepared to procure professional services contract to provide design, integration, training, construction administration and resident inspection services for various SCADA improvements. Camp Dresser & McKee, Inc. (CDM) was awarded this contract in June 2002. The construction effort on the first and most complex of two construction packages began in March 2006 and reached substantial completion in January 2008. This construction addressed SCADA needs at most pumping and CSO facilities, as well as establishing overall data communications improvements. The second construction package provided for SCADA needs at the remote headworks facilities, taking into consideration future CIP improvements at Chelsea, Columbus Park, and Ward Street Headworks facilities. This contract reached substantial completion in July 2009.

Additional CIP sub-phases have been added and are being implemented to replace existing SCADA equipment that is nearing the end of its useful life or is no longer supported by the manufacturer. Additional efforts will be performed to enhance SCADA communications and improve on computer graphics used by operators to monitor and control facilities (Human Machine Interfaces) and PLC related systems to improve upon cyber security and maintainability.

### Scope

Sub-phase	Scope	Status
Planning	Development of a plan for a monitoring and control system for the MWRA wastewater transport system.	Completed
Design and Integration Services	Includes design, integration (PLC programming, operator graphics development, MIS/CMMS data transfer), and development and implementation of training. Also covers preparation of documentation and manuals for automating equipment and systems and for remote monitoring and control of the wastewater transport systems and facilities. Includes construction administration, engineering services during and after construction, and resident inspection.	Completed

Sub-phase	Scope	Status
Construction 1 (CP1)	Construction and installation of SCADA equipment and systems at seven pumping facilities, three CSOs and one screen house. Also covers Operation Control Center improvements. Facilities include Alewife, Caruso, Hingham, New Neponset, Hayes, Delauri, Houghs Neck, Chelsea Screen House, Cottage Farm, Prison Point, and Somerville Marginal. This construction package included the major components of the SCADA communications infrastructure (microwave radios, routers, etc.).	Completed
Construction 2 (CP2)	Construction and installation of SCADA instrumentation and control equipment at the three older headworks facilities and Nut Island Headworks. OCC improvements were also made to support these additional facilities.	Completed
Equipment Pre-purchase	Purchase SCADA system components including computer hardware to ensure consistency with MWRA MIS infrastructure through existing Commonwealth of MA blanket contracts and low cost small quantity system components (ex. fuel tank monitoring units and interfaces, Prison Point Flow meter, CSU/DSUs), and additional instrumentation and control equipment at the Arthur St. Pump Station to ensure consistency and/or compatibility with installed systems.	Completed
Technical Assistance	Technical assistance work to support all subphases.	Completed
Wastewater Redundant Communications	To study and implement redundant communications alternatives for Wastewater facilities and improve upon existing communication systems, with an emphasis on wireless options. It is critical to have alternative communication means to ensure facility data, including important facility alarms from unstaffed facilities can reach the Operations Control Center.	Active
Wastewater SCADA/PLC Upgrades Design and Programming Services, Construction, and Equipment Hardware	Replacement of existing SCADA PLCs nearing their end of useful life with an updated PLC platform. New PLC platforms further provide increased security capabilities, improved programming functionality and maintainability enhancements. Secondary goals include standardizing PLC logic and HMI graphics, and upgrading aging field instrumentation. Project includes Design and Programming Services, Construction, and Equipment Hardware. During FY19 a contract was issued to provide programming to upgrade BOS019 and Framingham SCADA systems. Hardware has been purchased and the project is anticipated to be complete early FY22.	Active

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$27,482	\$19,913	\$7,569	\$130	\$447	\$1,154	\$6,546	\$0



Project Status 12/20	72.5%	Status as % is approximation based on project budget and expenditures. Construction 1 contract was substantially complete in December 2007. Construction 2 contract was substantially complete in July 2009. Wastewater SCADA/PLC Upgrades Design and Programming Services began in April 2018.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$27,482	\$27,482	\$0	Oct-31	Oct-31	None	\$1,226	\$1,154	(\$72)

**Explanation of Changes**

- Spending changed primarily due to updated cashflow for Design and Programming Services.

**CEB Impacts**

- None identified at this time.

## S. 139 South System Relief Project

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### Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Extends current asset life*
- Improves system operability and reliability*

*To protect public health and property from sanitary system overflows and back-ups into homes and businesses during extreme wet weather events. Completion of the project will also extend the useful life of system assets and potentially avoid extraordinary costs resulting from system failures.*

### Project History and Background

#### Archdale Road Diversion Structure

On October 20, 1996 a 100-year rainstorm caused the MWRA High Level Sewer (HLS) (Section 70) to overflow in the area of Archdale Road in Boston. Following this overflow event, MWRA established a task force to recommend action to mitigate and/or prevent future overflows. The task force developed an emergency response plan and examined several relief alternatives. The first component of the recommended relief plan consisted of construction of a diversion structure that includes two 30-inch by 60-inch sluice gates connecting the HLS to BWSC's Stony Brook drainage conduit. The diversion structure is located at the end of Bradeen Street in Roslindale. If, based on monitoring results, it appears that the High Level Sewer is about to overflow in the Archdale Road area due to an extraordinary storm event, the overflow volume is diverted to the Stony Brook Conduit through the sluice gates. This eliminates the need to deploy large emergency response crews to build temporary sandbag dikes. Construction of the diversion structure was completed in August 1999.

#### High Level Sewer Repair

Subsequent to the October 1996 storm, MWRA initiated some short-term modifications to the sewer system to reduce overflows. However, during a June 1998 storm, these modifications actually pressurized the HLS. As a result, MWRA began an emergency evaluation of the HLS in June 1998 to analyze its hydraulic capacity and structural integrity. The evaluation, which was completed in January 1999, discovered cracking at a 77-degree bend in the sewer in the Archdale Road area that required immediate attention. Inspection also indicated that approximately 40 feet of the HLS, located in the Arnold Arboretum, needed repair. A construction contract notice-to-proceed was issued in June 1999 and construction was completed in October 1999.

#### Outfall 023 Cleaning and Structural Improvements

Following the October 1996 storm, the City of Boston engaged a consultant to review the events and recommend remedial actions to prevent future flooding under similar conditions. One recommendation was to clean sediment and debris from the Stony Brook Conduit. Boston Water & Sewer Commission (BWSC) has cleaned the upstream portion of the conduit and MWRA has cleaned the outfall from the Metropolitan District Commission (MDC) gatehouse at Charlesgate to the Charles River. This part of the project also covers structural modifications to Outfall 023 to permit access points and diversion capabilities for future cleaning. This portion of the project has been moved out to fiscal year 2024 after a 2019 inspection discovered acceptable sedimentation levels. Staff will continue to periodically inspect the outfall for increased sedimentation levels and report if schedule modification need to be made.

Milton Financial Assistance

Two residential areas in the Town of Milton have experienced sewage backups into homes during wet weather events and periods of prolonged wet weather. One area affected is a direct tributary of MWRA’s High Level Sewer and the other is a tributary to MWRA’s New Neponset Valley Sewer. In September 1999, MWRA and Milton entered into a financial assistance agreement to fund design and construction of new sewers, rehabilitation of an existing pump station, and construction of a new pump station to mitigate downstream impacts from high flow conditions in the improved High Level Sewer.

Pump Station Feasibility

MWRA considered investigating the feasibility of constructing a small pump station to convey wastewater from a small area of Quincy away from the Braintree Howard Street Pump Station. The flow would be re-routed back to the Quincy collection system. The City of Quincy would own and operate the pump station. Upon further evaluation, MWRA has decided to delete this project and instead, will continue an MOU with Braintree to pay the town annually for use of 25 percent capacity of Braintree’s Howard Street Pump Station.

**Scope**

Sub-phase	Scope	Status
Archdale Des/CS/RI and Construction	Design, construction services, and resident inspection for the Archdale Road Diversion Structure. Construction of an underground diversion structure that houses two 30-inch by 60-inch horizontal sluice gates on the sidewall of the HLS. This structure controls flow into BWSC’s Stony Brook Conduit.	Completed
Sections 70 and 71 HLS Evaluation/Construction	Initial evaluation and construction of recommended improvements.	Completed
Milton Financial Assistance	Payment to the Town of Milton for local projects to mitigate downstream impacts from high flow conditions.	Completed
Construction and Improvements for Outfall 023	Removal and disposal of sediment and debris from Outfall 023 as well as continuation of structural improvements to enable future cleaning operations.	Future

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$4,939	\$3,439	\$1,500	\$0	\$0	\$0	\$1,500	\$0

Project Status 12/20	69.6%	Status as % is approximation based on project budget and expenditures. All sub-phases are complete except for Outfall 023 Structural Improvements which is scheduled to commence in FY24.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY20	FY21	Chge.
\$4,939	\$4,939	\$0	Dec-25	Dec-25	None	\$0	\$0	\$0

**Explanation of Changes**

- N/A.

**CEB Impacts**

- None identified at this time.

## S. 141 Wastewater Process Optimization

### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Extends current asset life*
- ☑ *Improves system operability and reliability*

*To optimize wastewater system operating procedures and make system improvements and modifications to ensure maximum wastewater treatment, minimum operating and maintenance costs, and extension of the useful life of system assets.*

### Project History and Background

This project was established to support MWRA Business Plan strategies, which recommend the development of a wastewater process optimization plan, central monitoring facilities for the sewerage system, rehabilitation of wastewater interceptors, and the utilization of automation and new technology to increase efficiency.

The completed planning phase included the development of an updated hydrologic and hydraulic model (InfoWorks CS) and the evaluation of optimization alternatives under typical and extreme storm events. MWRA has evaluated several of the alternatives and has been using hydraulic information gained during this phase to develop facility control logic under the Wastewater Transport SCADA Implementation Project. Two alternatives, which include pipeline modifications, will be taken further as defined below. The model developed under this project continues to be used by MWRA staff for in-house system evaluation and NPDES reporting requirements and by outside consultants to support CSO-related and collection system improvement projects.

### Scope

Sub-phase	Scope	Status
Planning	Evaluate collection system and facility modification alternatives to maximize wastewater treatment and minimize operating and maintenance costs.	Completed
Somerville Sewer	Design and construct a connection between the upstream end of the Somerville Medford Branch Sewer and the North Metropolitan Relief Sewer to reduce surcharge and divert flow away from the Cambridge Branch Sewer and DeLauri Pump Station.	Future
North System Hydraulic Study	Review the frequency and extent of sanitary sewer overflows (SSOs) in the area tributary to Chelsea Creek Headworks and to evaluate and recommend alternatives to optimize the performance of the collection system and to eliminate or reduce SSOs or relocate them to minimize potential human health risks or environmental impacts.	Completed
Siphon Planning	Further evaluate the benefits of constructing a redundant siphon crossing the Mystic River from the Cambridge Branch Sewer to the DeLauri Pump Station to assist in frequency of CSO discharges. A planning level evaluation was performed under the Cambridge Branch Sewer Study completed in December 2017.	Completed

Hydraulic Modeling Engineering Design and Construction	Model impacts of outfall on Mass Bay which is required under the NPDES permit using the Bay Eutrophication Model. Also, phase will be for future implementation of system optimization measures or more significant system modifications which were identified during the North System study. Additional follow-up analysis or project implementation may be done under this phase.	Active/Future
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**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$8,933	\$1,721	\$7,212	\$281	\$200	\$701	5,154	\$1,577

Project Status 12/20	19.9%	Status as % is approximation based on project budget and expenditures. The Notice-to-Proceed for the North System Hydraulic Study was completed in June 2015. Modeling Massachusetts Bay Water Quality contract Notice to Proceed was issued in May 2019.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY20	FY21	Chge.	FY21	FY22	Chge.
\$8,933	\$8,933	\$0	Jun-31	Jun-31	None	\$701	\$701	\$0

**Explanation of Changes**

- N/A.

**CEB Impacts**

- \$75,000 for Eutrophication modeling to be done in-house starting in FY23.

## S. 142 Wastewater Metering System – Equipment Replacement Project

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### Project Purpose and Benefits

- ☑ *Replace Existing Permanent Wastewater Metering System*
- ☑ *Evaluate and Update Community's Flow Metering Methodologies*
- ☑ *Continue providing the most accurate and reliable Wastewater metering data for rates*
- ☑ *Improves system operability and reliability*

*The Wastewater metering system primary purpose has been to quantify wastewater flow from each of the 43 MWRA wastewater member communities for use in the formulation of sewer charges. The existing metering system is 12 years old, it was designed with a life expectancy of 7 to 10 years; it is still running reasonably and MWRA's staff has taken great care to ensure that the accuracy and reliability of meter data is not affected and the metering data is based upon sound engineering and business practices for rate purposes. The project will include planning, design, and Resident Engineering/Inspector (REI) services for the replacement of the wastewater metering system, conduct wastewater flow measurements in unmetered areas and incorporate them in the evaluation of existing community metering methodologies*

### Project History and Background

The MWRA's permanent wastewater metering system was initially constructed in 1994. The primary purpose has been to quantify wastewater flow from each of the 43 MWRA wastewater member communities for use in the formulation of sewer charges, which includes a flow-based component. Other uses of the data include collection and treatment system analysis and planning, infiltration and inflow quantification in member communities, use in hydraulic models and to a limited extent, operations support.

In 2005 the first wastewater metering system replacement project was completed, the existing MWRA wastewater meters were installed with wireless phone communication and data collection system. Currently the wastewater metering system consist of 212 metering sites located throughout the 43 wastewater member communities, 189 are rate meters and 23 non rate meters. Of the 212 meters, 187 are located inside of sewer manholes and 25 Remote Terminal Units (RTU) are installed inside of MWRA and community facilities. The majority of the meters are installed in gravity sewer lines, owned and operated by the Authority or its member communities. These sewer lines have various pipe shapes, ranging in size from 8 inches to 150 x 138 inches, with manhole depths ranging from 5 feet to over 40 feet deep. The metering sites are located in residential, commercial and industrial areas.

Contract 6739 is comprised of two phases. Phase One includes the evaluation, planning and design of the wastewater metering system of approximately 225 permanent meter sites. Phase Two consists of the metering system replacement installation which includes Resident Engineering and Resident Inspection Services to oversee meter equipment installation and acceptance.

Under Phase One of this project, the flows from all unmetered areas will be updated, using temporary meters, weirs and instantaneous depth of flow and velocity measurements, to account for any changes in flow from those areas over time. The metered areas and meter locations will be evaluated and recommendations to improve the percentage of metered flow above the 85% threshold will be considered where is reasonably feasible bearing in mind the benefits of adding meters versus associated capital and operational/maintenance cost. All existing and any proposed new metering sites will be evaluated and for each meter location the most suitable meter type to provide flow data with a high degree of accuracy and reliability will be recommended.

Phase One also includes the evaluation of the most current and emerging wastewater metering, wireless communication, data collection and analysis software technologies, including reviews of similar systems currently

in use elsewhere in the country. The metering system replacement design documents (plans and specifications) for public bidding will be prepared for Contract 7191 and title Permanent Metering System Equipment Purchase and Installation.

Phase Two will include Resident Engineering and Resident Inspection Services to oversee meter equipment installation and acceptance plus the one-year warranty period. The purchase and installation of the meters will be a separate contract overseen by the Phase 2 services.

The wastewater metering system evaluation (including field evaluation and measurement of currently unmetered areas), planning, design and bidding services for purchasing a replacement meter system and equipment is estimated to take 26 months from Notice to Proceed. Phase Two meter installation and acceptance is estimated to take 15 months, followed by a 12-month warranty period.

**Scope**

Sub-phase	Scope	Status
Planning/Design/REI	Development of a long-term plan to upgrade or replace the existing wastewater metering system (technology, hardware, software, telemetry). Conduct Wastewater flow measurements in unmetered areas, evaluate and update Community Flow Formulas (CFF). Oversee purchase of metering system and perform REI services during meter installation.	Active
Equipment Purchase/Installation	Purchase and installation of equipment.	Completed
Wastewater Metering Asset Protection/Equipment Purchase	Rehabilitation, replacement and upgrades (planning, design and construction) for the Wastewater Metering System to be required every 10 years over the 40 year planning period. Includes meter purchases and installation. Also, under this phase the Authority will purchase and replace 182 Telog RU-35 data loggers with pre-installed 4-G LTE compatible wireless modems, 4G antennas and interface cables.	Active

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$21,938	\$7,838	\$14,100	\$2,317	\$2,200	\$7,087	\$0	\$9,126
Project Status 12/20	36.0%	Status as % is approximation on project budget and expenditures. The purchase and installation of 2 <sup>nd</sup> generation of meters is complete. Planning/Design/REI contract was awarded in June 2017. Metering Equipment Purchases and Installation was awarded in October 2020.					



**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$21,938	\$21,938	\$0	Dec-30	Dec-30	None	\$7,391	\$7,087	(\$304)

**Explanation of Changes**

- Project spending changed due to Meter Equipment and Installation contract award being less than budgeted.

**CEB Impacts**

- Potential cost savings associated with this project have yet to be quantified.

## S. 145 Interception and Pumping Facility Asset Protection

### Project Purpose and Benefits

- Extends current asset life
- Improves system operability and reliability

*To protect the investment of MWRA ratepayers by ensuring timely replacement of equipment and systems.*

### Project History and Background

This project was developed to ensure that MWRA maintains ongoing service while optimizing operations in its wastewater facilities. This project, in its current form, addresses immediate critical facility and equipment issues. This project will eventually include five areas:

1. Equipment replacement (pumps, HVAC equipment, blowers, etc.).
2. Architectural projects (concrete corrosion, etc.).
3. Utilities projects (water, sewer, drainage, electrical wiring, heating system, etc.).
4. Support Projects (process control system upgrades, etc.).
5. Specialty Projects (instrumentation upgrades, fuel storage tanks, etc.).

The Interception and Pumping Asset Protection project will be ongoing throughout the useful life of the facilities.

### Scope

Sub-phase	Scope	Status
Rehabilitation of Section 93A Lexington	Rehabilitation of 4,000 linear feet of pipeline in Lexington (Section 93A). Completed in April 2004.	Completed
Sections 80 and 83	Evaluation of the condition of Sections 80 and 83 and design and construct repairs to damaged portions. TV inspection revealed numerous cracks and holes, which impair the structural integrity of the pipe. Contract completed in September 2007.	Completed
Section 160	Rehabilitation of 11,000 linear feet of Section 160 of the Mystic Valley Sewer in Winchester due to extensive deterioration of the brick and concrete sewer. Rehabilitation of sewer completed.	Completed
93A Force Main Replacement	Replacement of 1,100 feet of 24-inch ductile iron force main due to extensive corrosion from hydrogen sulfide. Contract was substantially complete in January 2007.	Completed
Mill Brook Valley Sewer Sections 79 & 92	Rehabilitation of a portion of Section 79 pipeline in Arlington. Under MOU trust agreement, MWRA to absorb 50% of total cost of rehabilitation.	Completed

Sub-phase	Scope	Status
Prison Point HVAC Upgrades, Design & Construction	The HVAC system improvements are complete and included the replacement of components for the HVAC system as well as the ductwork, air handling equipment, dampers, louvers, and odor control were in need of upgrade. The conversion of the control system for the HVAC to electronic digital control was completed in FY05/FY06 under the CEB. The diesel engine fuel system modifications at this facility were completed under the SCADA contract and included the fuel oil delivery feed to the system boiler.	Completed
Chelsea Screenhouse Upgrades and ESDC/REI	The Chelsea Screenhouse has four climber screens and seven hydraulic gates and was built to screen sewage upstream of the Chelsea Creek Siphons and Caruso Pump Station, and to provide screening of flows diverted from the Chelsea Creek Headworks during wet weather events. Most of the operating equipment has passed its useful lifespan. A preliminary evaluation of the gates in 2007 identified maintenance and operational issues. In November 2011, a conceptual design report for the facility was performed within the Remote Headworks Upgrades Design contract, with recommendations for replacements and upgrades to equipment at the facility. A task order, under the As-Needed Technical Assistance contract, was executed in August 2012 to perform final design of the upgrades. ESDC/REI was performed under a separate contract.	Completed
Remote Headworks Heating System Upgrades	Existing boilers at each of the remote headworks require significant maintenance and consume substantial fuel. A preliminary design report was completed and alternative energy-saving systems are recommended to replace the existing heating systems. The replacement of the existing heating system at the Chelsea Creek Headworks has been completed. The systems at Ward Street and Columbus Park will be replaced under the Ward Street and Columbus Park Headworks Upgrade Project.	Completed
Remote Headworks Concept Design	A Concept Design was performed to identify the needs of the three remote headworks facilities to recommend equipment replacement and upgrades for further design and construction. The Concept Design included a Condition Assessment of all equipment and non-equipment assets to establish a basis for improvements and upgrades to meet business goals and objectives.	Completed
Hingham Pump Station Isolation Gate Construction	The Hingham Pump Station was built without an influent gate. The station services the Town of Hingham and had no direct means to isolate the flow to this station. Labor intensive and inefficient means using stop logs, sand bags, sewer plugs and pumps were required to isolate and divert flow. This project included the design and installation of a sluice gate in a diversion chamber, to isolate the station and bypass flow allowing maintenance to take place in the station without interruption of service.	Completed

Sub-phase	Scope	Status
Study Cambridge Branch 27,26,25, 25.5, 24,23	The Cambridge Branch Sewer was completed between 1892 and 1895. The study will evaluate rehabilitation needs, feasibility, and scope.	Completed
Melrose Sewer	Design and construct an 18-inch diameter sewer extension of an existing MWRA sewer on Melrose St. to reduce MWRA sewer overflows at the Roosevelt School. The construction contract was awarded in January 2010 and completed in September 2010.	Completed
Nut Island Headworks Fire Alarm/Wire Conduit	This project will replace the existing obsolete and problematic fire alarm system and faulty wiring at Nut Island Headworks. There have been significant repair costs over the past several years to keep the system functional and to correct deteriorated connections and ground faults. An engineering task order was used to design upgrades to the system and upgrades and replacements were completed in FY10.	Completed
Nut Island Headworks Electrical & Grit/Screenings Conveyance System Design CA/RI & Construction	This subphase includes the design and construction of improvements to the electrical system, which is subject to groundwater infiltration, and to the grit and screenings conveyance system which have alignment and operations problems, at the Nut Island Headworks. Based on final preliminary design reports completed in July and August 2011, recommendations were made to improve or replace these systems. Design recommendations were included in one construction contract.	Completed
Cottage Farm Fuel System Upgrade	Replacement of existing fuel oil system to meet current code requirements, ensure reliable operation, and provide safeguards against accidental oil spills.	Completed
Somerville/Marginal Inflow Gates and Stop-Log Replacement	The Somerville Marginal facility has two 5'X6' sluice gates that were installed in 1987. These 22-year old gates are used to hold wastewater in the upstream combined sewer system until the level reaches a predetermined elevation, at which point the sluice gates are opened and the facility is activated (chemicals added, screenings removed). The treated CSO is conveyed to the MWRA permitted CSO discharges MWR205 or MWR205A, upstream and downstream of the dam on the Mystic River. During October of 2009, MWRA staff discovered non-continuous, wet weather gate leakage. Repairs to the gates were made and an air barrier was created using stop planks and temporary sump pumps upstream of the gates to minimize gate leakage. However, given the age and frequent problems with these gates and need to create a more permanent and effective barrier between the CSO system and downstream receiving waters, this project was initiated. The project will replace the facility gate, as well as upstream and downstream stop planks and install permanent sump pumps downstream of the gates to create an air void to ensure CSO does not enter the receiving waters until a facility activation is required. Project design was completed under Task Order 20 (contract 7070) and construction was substantially complete in November 2011.	Completed

Sub-phase	Scope	Status
Caruso Pump Station Improvements Design, CA/RI (7037), and Construction (7362)	This project will replace the existing standby generator, HVAC system, fire detection/suppression system and security system at the Caruso Pump Station. The standby generator is 25 years old and is a one of a kind of this type of generator. The manufacturer is no longer making spare parts and there is only a limited quantity of available spare parts. The generator is being replaced with a newer model with readily available parts to ensure reliable back-up power and increased to 1,000 kW to provide power for the full design capacity of the station. The HVAC system is in need of improvement as is the fire detection/ suppression system and security system. Construction contract 7362 was awarded with an NTP dated March 24, 2016. Project substantial completion achieved June 9, 2017.	Completed
Prison Point/Cottage Farm Facilities Diesel Engine Upgrades/Pump and Gearbox Rebuilds ESDC and Construction	Refurbishment of the Prison Point CSO Gearboxes and pumps based on an inspection report performed in May 2010. It is critical during major wet-weather events to have all four pumps operational to provide maximum station capacity and provide redundancy at this critical CSO facility. Also, MWRA non-emergency generator upgrades required by EPA National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations for Prison Point and Cottage Farm CSO facilities.	Completed
Section 156 Design/Build	Rehabilitation of sewer Section 156 and a portion of adjacent Sections 17 and 19, and associated structures/manholes located between Air Force Road and the Malden River in the City of Everett. The sewer is a 120-year old, 61-inch by 56-inch rounded horseshoe brick sewer, which conveys flows of up to 40 million gallons per day from Wakefield, Stoneham, Woburn, Winchester, and parts of Medford. The sewer is 1,800 feet long of which 125 feet was repaired in 2001. The design/build contract, including Cured-in-Place lining was completed.	Completed
Design/ESDC/REI and Construction Cambridge Branch 1 Sections 27, 26	Design and construction of the Rehabilitation of Cambridge Branch Sewer Sections 27 and 26 in Charlestown, Somerville, and Cambridge.	Future
Prison Point Piping Rehabilitation	As a recommendation of the Prison Point/Cottage Farm CSO Preliminary Design/Study, this project will repair weak spots, replace pipe saddle supports, and install an erosion/corrosion liner in the discharge piping.	Completed
Quincy/Hingham Pump Station Fuel Storage Upgrades Construction	Project to improve diesel fuel storage capacity at Quincy and Hingham pump stations. Hingham's underground tank failed and will be replaced with an above ground tank. Quincy tank storage to be increased from 1 day to 5 days of storage with the addition of an above ground tank.	Completed
Design/ESDC/REI and Construction Cambridge Branch 2 Everett Sections 23 and 24	Design and Construction of the Rehabilitation of Cambridge Branch Sewer Sections 23 and 24 in Everett and Charlestown. Rehabilitation of Sections 25 and 25.5 to be determined.	Future
Interceptor Renewal 7 Malden & Melrose Study/Design/CA, Construction, and REI	Rehabilitation of Melrose, Malden Sections 41,42,49,54 and 65.	Active

Sub-phase	Scope	Status
Interceptor Renewal No. 6 Chelsea Sections 12/14/15/62 Design CA/REI and Construction	Rehabilitation of portions of Sections 12/14/15/62 in Chelsea.	Future
Ward Street and Columbus Park. Headworks Upgrade Design/ESDC, REI Services, and Ward Street Headworks Construction and Columbus Park Headworks Construction	Upgrade to include replacement of the screens, grit and screenings collection and conveyance systems, odor control, HVAC, mechanical, plumbing, instrumentation, and electrical systems, as well as the antenna tower at Columbus Park Headworks. It also includes an evaluation of a new facility to replace the existing superstructure at Ward Street and Columbus Park, and rehabilitation of the effluent channels and shafts at Ward Street, Columbus Park and Chelsea Creek Headworks facilities.	Active
Hayes Pump Station Rehab Design, Construction, and REI	The Hayes Pump Station was constructed in 1987. Due to its age, all major facility components require replacement or rehabilitation including the following: sluice/slide gates, climber screen and grinder system, pumps, valves, instrumentation, motor control center, and emergency generator. The odor control system will be redesigned with the odor control fan relocated outside of the Reading Pump Station. The architectural, fire protection, and building code requirements identified in the previous Code Evaluation Technical Memorandum will be constructed or waivers pursued where applicable. Hazardous materials identified from previous testing will be abated during construction. The project will also improve site drainage.	Active
Somerville-Marginal CSO Facility Rehabilitation Design/CA, Construction and REI	Design & construction of upgrades to DeLauri, Hingham, and Hough's Neck Pump Stations & Somerville Marginal CSO Facility. At pump stations and CSO facilities, operability of mechanical equipment and maintenance of electric/standby power systems are key elements to minimize risk of facility failure. Malfunction of mechanical equipment may impact sewer service. Replacement of aging equipment will reduce emergency and corrective maintenance requirements. Somerville Marginal CSO followed by Hingham Pump Station have been selected as the first to facilities for rehabilitation. Scopes of services are under development with Design/ESDC services expected in FY22.	Active
DeLauri Pump Station Rehabilitation Design/CA, Construction and REI		
Hingham Pump Station Rehabilitation Design/CA, Construction and REI		
Houghs Neck Pump Station Rehabilitation Design/CA, Construction and REI		

Sub-phase	Scope	Status
Cottage Farm Rehabilitation Design CA/RI and Construction	The Cottage Farm CSO Facility was constructed in 1971. Cottage Farm Rehabilitation to include updating of facility equipment including pumps, sluice gates, gearboxes for coarse screens, electrical distribution and chemical disinfection systems and repair/replacement of miscellaneous equipment and structures as identified in the 2012 Cottage Farm CSO Planning Report. Improvement/installation of systems as appropriate for energy efficiencies, security, and fire alarm will also be included. Also, remediation of PCB containing paint by removal and encapsulation where appropriate in accordance with the PCB abatement plan for Cottage Farm. More immediate project needs to address aging equipment in the Cottage Farm chemical treatment facility are being considered as an initial project phase.	Active
System Relief & Contingency Planning Study	This project will investigate what can be done to avoid serious flooding issues. Increased capacity or controlled relief points must be identified in order to address flooding issues that occur during emergency scenarios. Scope may also include facility specific plans for a failure at MWRA facilities.	Future
Fuel Oil Tank Replacements at Various Facilities Construction Phases 1,2, and 3	Fuel tank replacement at all facilities (water and wastewater) to avoid tank failures. Phase 1 includes two tanks at Gillis Pump Station (one is out of service), one tank at Lexington Street Pumping Station, and one tank at Hayes Pumping Station. For Phase 2, two vehicle fuel tanks (one diesel, one gasoline) will be replaced at the Lonergan Intake Lower Garage and two vehicle fuel tanks (one diesel, one gasoline) at Southborough Facilities. Vehicle fuel management systems to be replaced at these two facilities, as well as at Weston Reservoir. For Phase 3, four tanks will be replaced at four facilities.	Active
Interceptor Renewal No. 3 Dorchester Interceptor Sewer Design CA/RI and Construction	Rehabilitation of Dorchester Interceptor Sewer Sections 240, 241, and 242.	Active
Interceptor Renewal No. 5 New Neponset Valley Sewer Sections 607/608/609/610 Design/CA/REI and Construction	Rehabilitation of 15,000 linear feet of New Neponset Valley Sewer in Milton.	Future
Interceptor Renewal No. 1 Reading Extension & Metropolitan Sewer Design CA/RI (7163) & Construction (7164)	Reading Extension Sewer (Sections 75, 74, and 73), rehabilitation of 12,400 linear feet of 15, 18, 20-inch Vitrified Clay (V.C.) pipe, primarily in Stoneham, with short reaches in Wakefield and Woburn. Approximately 1,400 linear feet of Reading Extension Sewer Section 74 were CIPP lined in the mid 1990's. Also, included is rehabilitation of 2,280 linear feet of 15-inch V.C. pipe of the Metropolitan Sewer Section 46 in Stoneham. Construction contract 7164 was issued a NTP in August 2017. Project substantial completion achieved on December 10, 2018.	Completed

Sub-phase	Scope	Status
Alewife Brook Pump Station Rehabilitation Design CA/RI and Construction	The Alewife Brook Pump Station was built in 1951. The wet weather pumps are original equipment. The rehabilitation includes replacing the three wet weather pumps, motors, and piping, replacing the influent screens and grinders, updating the HVAC system, upgrading the electrical system, remediating PCB-containing paints, and modifying the building interior to meet current building codes, energy efficiency improvements, flood protection measures, and security improvements.	Completed
Remote Headworks Shaft Study	At each of the four remote Headworks, Chelsea Creek, Ward Street, Columbus Park and Nut Island, the wastewater is discharged into a vertical shaft connected to a tunnel that conveys the sewage to the Deer Island Treatment Plant. A past inspection of the shaft at Chelsea Creek indicated that the walls of the shaft are severely deteriorated. Failure of a shaft could incapacitate the Headworks facility. There is concern this may cause additional problems at Deer Island. To-date, there have been no reported issues but it is suggested that deterioration of the interior surfaces could be detrimental to pumps or other wastewater equipment. The Remote Headworks Shaft Study was completed and evaluated the condition and rehabilitation needs of the four effluent shafts and connecting structures receiving flow from the remote headworks facilities, and the three shafts located at Deer Island. The Study recommendations will be carried forward under the upcoming Ward Street and Columbus Park Headworks Upgrade design and construction subphase. A smaller project was designed under the current study to remove grating in the three older Headworks and replace the shaft covers. Construction will be performed under other subphases.	Completed
Remote Headworks Shaft Access Improvements Construction, and ESDC & REI	Removal of grating/ associated supports and shaft cover replacement at the following remote headworks; Chelsea Creek, Ward Street and Columbus Park. This project will allow for improved access to the shafts at the remote headworks for inspections and rehabilitation under the upcoming Ward Street and Columbus Park Headworks Upgrade design and construction subphase.	Active
Remote Headworks Upgrades Design, ESDC, REI and Construction	The Remote Headworks Preliminary Design proposed recommendations to upgrade the Chelsea Creek, Columbus Park, and Ward Street Headworks, to be included in final design and construction documents. The recommendations include replacement/upgrades to the screens; grit and screenings collection and conveyance systems; odor control, HVAC, mechanical, plumbing, instrumentation, and electrical systems; PCB removal; and antenna towers at Chelsea Creek and Columbus Park. Chelsea Creek Headworks Upgrade construction is ongoing, and will be followed by design, construction and REI contracts for Ward Street and Columbus Park Headworks under a separate subphase. Chelsea Creek Headworks REI is being performed under a separate contract.	Active



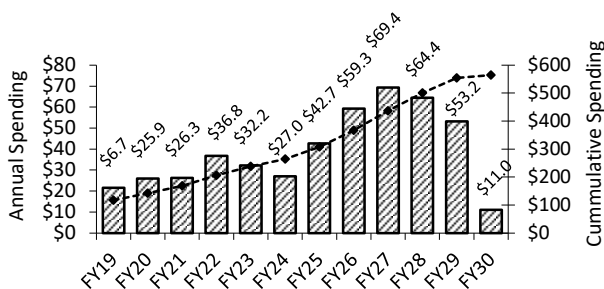
Sub-phase	Scope	Status
Prison Point Rehabilitation Design/CA/RI and Construction	The Prison Point CSO Facility was constructed in 1981. This rehabilitation will include upgrades to the facility including replacement of diesel pump engines, dry weather screen, wet weather screens, sluice gates, chemical tanks, updating of other facility equipment including electrical distribution and chemical disinfection systems, and repair/replacement of miscellaneous equipment as identified in the 2012 Prison Point CSO Planning Report. Improvement/installation of systems as appropriate for energy efficiencies, security, and fire suppression and alarming systems will also be included.	Active
Study and Rehabilitation of Sections 186, 4, 5, and 6 Design CA/RI and Construction	Rehabilitation projects in 1991 and 1997 lined Sections 4, 5, and 6 with silica/shotcrete covered with epoxy. Emergency removal of delaminated plastic liner from Section 186 was performed in June 2011. A Preliminary Engineering Report, completed in April 2018, included a manned inspection which identified rehabilitation needs, feasibility, and scope. Scope development for the design of the recommended rehabilitation improvements is on hold pending decision on construction packaging to minimize community impacts.	Future
DeLauri Pump Station Screens & Security	This project replaces the existing catenary bar screens and will install security upgrades. Design was developed in-house with the security improvements reviewed by an outside consultant. The security improvements include motion detectors, door switches, small security items in the main building and emergency generator room. This includes work associated with bringing signals underground into underground conduit to run sensor lines for SCADA. The Construction contract was awarded in January 2018. Substantial completion was achieved in February 2019.	Completed
Wiggins Terminal Pump Station Design and Construction	The Wiggins Terminal Pump Station services a small seasonal flow from Castle Island and Conley Terminal. The Station is in need of rehabilitation and updating of remote operational control. The facility is located within Conley Terminal and requires MassPort security clearance to access.	Future
Section 191 & 192 Rehabilitation (Charles River Valley Sewer)	Section 192 of Charles River Valley Sewer is approximately 4,500-ft in length and is located in the City of Newton. Section 191 of Charles River Valley Sewer, located immediately downstream of Section 192, is approximately 3,738-ft in length. Inspections performed by MWRA found crown cracks in portions of both Sections 192 and 191. Due to these structural deficiencies of both Section 192 and 191, the affected sections require rehabilitation. A cured in place pipe system was designed by in-house engineering staff to rehabilitate the sewers. The construction contract was awarded in January 2020 with a 6-month contract duration. Construction was completed in June 2020.	Completed

Sub-phase	Scope	Status
Chelsea Headworks Radio Equipment	This project will provide furnishing and installation of radio equipment at the Chelsea Creek Headworks and the Chelsea Tower Equipment Building at 2 Griffin Way in order to establish a radio communications link between the Chelsea Creek Headworks and the Chelsea Main Office. The scope of this project will include furnishing & installing a list of proprietary radio equipment, waveguide, required cabling & training.	Active
Charlestown Pump Station (Alford St.) Demolition Design, Construction and ESDC	<b>The project is for the demolition of the Charlestown Pump Station while retaining and protecting the Cambridge Branch Sewer that is located beneath and through the substructure and sea wall while maintaining continued access to the wastewater infrastructure and uninterrupted service of the wastewater system.</b>	Future

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$573,689	\$142,532	\$431,157	\$26,279	\$36,769	\$142,699	\$262,796	\$73,142

### I&P Asset Protection



Project Status 12/20	27.0%	Status as % is approximation based on project budget and expenditures. Chelsea Creek Headworks Upgrades Construction commenced in November 2016. Alewife Brook Pump Station Rehabilitation was substantially complete in March 2019. Fuel Oil Tank Replacement Phase 1 Construction commenced in March 2020. Dorchester Interceptor Sewer Rehabilitation was awarded in March 2020. Interceptor Renewal 7 Malden/Melrose Design/ESDC was awarded in June 2020. Section 191 & 192 Rehabilitation was substantially complete in June 2020. Ward Street & Columbus Park Headworks Design/CA was awarded in December 2020.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$572,379	\$573,689	\$1,310	Nov-30	Nov-30	None	\$144,301	\$142,699	(\$1,602)

#### Explanation of Changes

- Project cost changed primarily due to updated cost estimates for Prison Point Rehabilitation Design/CA/RI (amendment) and Construction, Remote Headworks Shaft Access Improvements Construction and Fuel Oil Tank Replacement Construction Phase 2, addition of Chelsea Creek Headworks Radio Equipment contract, change orders for Chelsea Creek Upgrades, amendment and change order for Interceptor Renewal 3 Dorchester Interceptor Sewer Design/CA/RI and Construction, award less than budgeted amount for Hayes Pump Station Rehabilitation Design, as well as inflation adjustments on unawarded contracts.
- Spending change primarily due updated cost estimates, change orders, and inflation adjustments listed above, rescheduled Notice-to-Proceed dates for Prison Point Rehabilitation, Remote Headworks Shaft Access Improvements Construction, Ward Street & Columbus Park Headworks Design/CA and REI, Columbus Park Headworks Construction, Wiggins Terminal Pump Station Design & Construction, and System Relief & Contingency Planning, in addition to updated cashflows.

#### CEB Impacts

- None identified at this time.

## S. 146 Inspection of Deer Island Cross Harbor Tunnels

### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Extends current asset life*
- ☑ *Results in a net reduction in operating costs*
- ☑ *Improves system operability and reliability*

**Master Plan Project ☑ 2008 Priority Rating 2 (see Appendix 3)**

To inspect, design, and repair MWRA deep rock tunnels to ensure proper wastewater system operation.

### Project History and Background

The MWRA sewer system includes three deep rock tunnels that carry wastewater from the headworks to the DITP. The MWRA currently does not have the technology and capability of inspecting deep rock tunnels.

### Scope

Sub-phase	Scope	status
Tunnel Inspection and Condition Assessment	The MWRA sewer system includes three deep rock tunnels that carry wastewater from the headworks to the DITP. The MWRA currently does not have the technology and capability of inspecting deep rock tunnels. This subphase includes inspection and condition assessment.	Future

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$5,000	\$0	\$5,000	\$0	\$0	\$0	\$5,000	\$0

Project Status 12/20	0.0%	Status as % is approximation based on project budget and expenditures.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$5,000	\$5,000	\$0	Jun-29	Jun-29	None	\$0	\$0	\$0

### Explanation of Changes

- N/A.

### CEB Impacts

- None identified at this time.

## S. 147 Randolph Trunk Sewer Relief

### Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Extends current asset life*
- Results in a net reduction in operating costs*
- Improves system operability and reliability*

**Master Plan Project  2009 Priority Rating 3 (see Appendix 3)**

*To identify system improvements to reduce sanitary sewer overflows that occur at MWRA's Sewer section 628 and Pearl Street siphon.*

### Project History and Background

The Randolph Trunk Sewer was constructed in 1958 and consists of three sections: 627, 628 and 628A. Section 628 is a 42-inch diameter reinforced concrete sewer located in Braintree. During extreme wet weather events, Section 628 experiences overflows, particularly at a 50-foot long double-barrel siphon located at Pearl Street next to residential property. A study will be performed to determine the best method of reducing excessive wet weather flows or to provide hydraulic relief to this section of the Randolph Trunk Sewer.

### Scope

Sub-phase	Scope	Status
Study	Study to identify system improvements at Sewer Section 628 and Pearl Street Siphon.	Future

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$698	\$0	\$698	\$0	\$0	\$262	\$436	\$0

Project Status 12/20	0.0%	Status as % is approximation based on project budget and expenditures.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$698	\$698	\$0	Jun-24	Jun-24	None	\$262	\$262	\$0

**Explanation of Changes**

- N/A.

**CEB Impacts**

- None identified at this time.

## S. 206 Deer Island Treatment Plant Asset Protection

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### **Project Purpose and Benefits**

- Contributes to improved public health*
- Fulfills a regulatory requirement*
- Extends current asset life*
- Improves system operability and reliability*

*To protect the investment of MWRA ratepayers in the Deer Island Treatment Plant by ensuring timely replacement of DI's systems, which contain more than 60,000 pieces of equipment with an approximate value of \$1 billion. Based on the Master Plan developed in 2006, most recently updated in 2013, MWRA expects to sequentially replace equipment and structures in the facility as they reach the end of their useful life. Upon completion of the 2018 Master Plan update, additional changes may be incorporated in FY20 for future projects, beyond FY27.*

*Construction of the Deer Island Treatment Plant was one of the largest wastewater projects ever undertaken in the United States. DITP construction was a 12-year, \$3.8 billion effort (not including the cost of off-island residuals facilities) started in 1988. MWRA commenced primary treatment in 1995 and secondary treatment in 1997. With the Effluent Outfall Tunnel completion in September 2000, the plant discharges treated effluent 9.5 miles offshore into the Massachusetts Bay through 55 diffusers spaced along the last 1.25 miles of the tunnel.*

### **Project History and Background**

At an expansive and complex facility like the Deer Island Treatment Plant (DITP), unanticipated equipment and system failures can cause operational and/or maintenance crises. It is prudent industry practice to take a proactive approach by establishing programs to anticipate when equipment and systems are near the end of their reliable service lives, and then overhaul, upgrade, or replace the equipment, systems, and structures as needed.

DITP staff implemented a "reliability-centered maintenance" (RCM) program to monitor, evaluate, and maintain all of the equipment and major systems within the facility. RCM includes using non-invasive methods of assessing the operational condition of equipment through programs such as vibration monitoring, lubricant and oil testing, thermography, and ultrasonics (audible sound). These programs involve developing a "base line" for equipment when it is relatively new or rehabbed, then comparing future test results to determine if there is a change in the base line which warrants invasive action or other maintenance procedures to mitigate the problems. In addition to RCM, staff follows original equipment manufacturer (OEM) maintenance protocols when appropriate. To assist staff in keeping all of the historic data; storing OEM maintenance instructions; monitoring costs associated with maintaining the equipment; providing work orders as needed, etc. - the maintenance software program MAXIMO was implemented at DITP and other Authority locations.

To augment the DITP maintenance program, contracts are issued to obtain the services of factory-authorized technicians with the expertise to maintain specialized equipment and systems, such as electricity-generating turbines (hydro, wind, steam and combustion-driven), the oxygen generation facility, Thermal Power Plant equipment, etc. Recommendations to add capital projects to the budget also come from staff managing these maintenance programs and service contracts.

The DITP Asset Protection project encompasses the following major functional categories:

1. Equipment Replacement (chains, pumps, motors, control systems, discrete process equipment, etc.).
2. Architectural projects (expansion joint replacements, concrete corrosion, etc.).
3. Utilities projects (water, sewer, drainage, piping, electrical wiring, heating systems, etc.).
4. Support projects (Technical Information Center projects, security projects, etc.).
5. Specialty projects (chemical pipelines and storage tanks, fuels storage tanks, etc.).

**Scope**

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
<i>Equipment Replacement:</i>		
Equipment Condition Monitoring	Installed temperature & vibration-monitoring equipment in NMPS and Winthrop Terminal Facility. Complete January 2005.	Completed
CEMS Equipment Replacement	Replaced data collection computers, upgraded software, and added PLCs to the Continuous Emissions Monitoring Systems on the two high-pressure Zurn boilers. Complete March 2006.	Completed
Pump Packing Replacement	Replace pump packing seals with mechanical seals in the North Main, South System, and Winthrop Terminal pump stations. Purchases completed in FY08, installations completed in FY09.	Completed
Cathodic Protection Construction (Designed under Digester & Storage Tank Rehab project)	Construction project to replace DI's cathodic protection systems as required. Design will be performed under the Digester & Storage Tank Rehab Design.	Future
Digester Chiller Replacement	Replaced the refrigeration-based digester gas chiller with a chilled water system that performs better at low operational loads. Completed in May 2006.	Completed
Dystor Tank Membrane Replacement	Emergency replacement of a torn gas membrane on one digester storage tank, and preventive replacement on the second. Completed both by October 2005.	Completed
Dystor Membrane Replacements	Periodic replacement of the two gas & sludge storage tank membranes in the digester complex. Replaced both in 2005; expect 15 year life cycle. The membranes are scheduled to be replaced in FY22	Future
Digested Sludge Pump Replacement Design & Construction (Phase 1)	The three positive displacement Abel pumps caused pipe vibration and required extensive maintenance. In Phase 1, one centrifugal pump and a flushing pump were installed in 2011, and tested to ensure they worked well before the three remaining pumps were replaced. (See Phase 2, below).	Completed
Digested Sludge Pump Replacement (Phase 2)	Sub-phase added in FY14, to complete replacement of the Abel pumps. Centrifugal pumps with higher flow rates were installed to minimize grit settlement in the pipes. Completed July 2017.	Completed
Centrifuge Back-drive Replacements	Replaced the centrifuge back-drives, which had become obsolete. Completed March 2015.	Completed
Grit & East/West Odor Ctrl Air Handler Unit (AHU) Replacements	Replaced deteriorated air handlers in FY09-16, then every 15 years. Grit AHU replacement completed in June 2010. The E/W Odor Control AHU Replacements are now in the HVAC Equipment Replacement project, below.	Completed
Fire Alarm System Replacement – Design & Construction and REI	To replace obsolete fire alarm monitoring & control systems. Design awarded October 2015; construction phase to commence in late FY21 and approximately every 20 years thereafter.	Active



<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
<i>Equipment Replacement:</i>		
Bidirectional Radio Repeater System Upgrade 1 and 2	Install a bidirectional radio amplification system in throughout Deer Island to maintain emergency radio communications for Boston/Winthrop Fire Departments to meet current safety code. Equipment for Phase 1 was completed in FY20. Phase 2 Construction to commence in FY22.	Active
HVAC Equipment Replacement – Design/ESDC, HVAC Control System Replacement, HVAC Fume Hoods Replacement, HVAC Mechanical Equipment Replacement Construction and REI	Replace the system-wide HVAC control system due to obsolescence. Redesign is required to include three separate construction contracts to ensure competitive bidding.	Active
Centrifuge Replacements – Design & Construction	Replace the sludge centrifuges are at the end of their useful life or after a catastrophic failure. Centrifuges thicken secondary waste sludge before it goes to the digesters. Units have a 25 to 30-year life.	Future
Cryogenics Plant Equipment Replacement – Design & Construction	Design and construction to the existing compressors, cold boxes, lox tanks and appurtances due to end of useful life and obsolescence. Replacement of 3 chillers was necessary in FY16; see below. Remaining plant overhaul work to commence in FY23-26 with future rehab and upgrade work occurring every 20 years. An annual maintenance contract keeps this facility in good operating condition, since it is critical to secondary treatment.	Future
Cryogenics Chillers Replacement	Replaced failing air chillers that required frequent maintenance in the oxygen generation plant. Completed in September 2016.	Completed
Digester Modules 1 & 2 Pipe Replacement Design & Construction	During digester cleaning in 2007, deterioration of the glass lining was noted. This project was completed by August 2014. Scope included plug valve replacements. A project for additional digester storage tank rehab work was added in FY13; see the DITP Digester & Storage Tank Rehab project under “Specialties”.	Completed
Butterfly Valve Replacements, North Main Pump Station (NMPS) & Winthrop Terminal Facility (WTF)	There are twenty 60-inch butterfly valves in NMPS and eight 36-inch plug valves in WTF, for isolating the pumps when maintenance is required. One valve in NMPS was replaced; several others began to leak (gaskets and seals were failing). Scope revisions in FY10 added replacement of the magnetic flow meters, replacement of PSL piping and Eight (8) hydraulic actuators for the SSPS pump check valves. Work began in June 2014 and was completed in September 2017.	Completed

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
<i>Equipment Replacement:</i>		
Gas Protection Systems Replacement	Replace gas detection devices in 13 DITP locations: pump stations (NMPS, SSPS, Winthrop Terminal), odor control (East/West, Residuals, Winthrop Terminal) and process areas (Thermal Power Plant, Digesters, gas handling, primary & secondary galleries, disinfection, Grit Facility, and gravity thickeners). These detectors measure levels of oxygen, hydrogen sulfide, sulfur dioxide, chlorine, and other combustible gases. They are integral to ensuring the health & safety of employees and contractors. Scheduled in FY20 in two phases; construction to be complete in FY23. First phase completed in FY21, Second phase to commence in FY23.	Future

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
<i>Architectural:</i>		
Expansion Joint Repairs	Replace failed expansion joints in the concrete clarifier decks and/or various retaining walls. Phase 1 complete November 2003; phase 2 February 2014, Phase 3 has been include in Contract 7395.	Future
Eastern Seawall Design/ESDC/REI & Construction	Design and construction of repairs to the base of the seawall from tidal damage, exposing rebar. Seawall condition is monitored on a biannual basis. Design was awarded in FY20.	Future
Roof Replacement Phase 1	Added in FY10, based on decision to capitalize these costs. Replaced the rubber membrane roof at Winthrop Terminal, the Admin./Warehouse building, the Cryogenics Facility, and the lower roofs on the Digester Modules. Completed March 2010.	Completed
DITP Roof Replacements Phase 2	Added in FY10 to replace roof membranes at the North & South Main Pump Stations; East & West Odor Control; the Grit Facility; and the Centrifuge Thickener building. Completed July 2011.	Completed
Personnel Dock Rehabilitation	Rehabilitate the floating docks at Deer Island. To improve the safety, appearance, and reliability of the floating docks. Awarded in FY17, completed in mid-FY18.	Completed
Barge Berth and Facility Replacement Design/ESDC and Construction	Major rehabs of the barge berth & pier facilities due to damage and/or normal wear. Added per the Master Plan. Barge berth/facility work in FY23-28, then on a 20-year repeat cycle.	Future
Rip-rap Material	Purchased 6,400 tons of rip-rap to reduce and prevent ocean wave soil erosion along the northeast and eastern shoreline at Deer Island. Placement completed by staff in June 2017.	Completed
DITP Roof Replacement Phase 3	New roofing was needed at the Grit Facility, North Main Pump Station, Main Switchgear Building, and the gravity thickeners to protect the equipment in the buildings. Completed in July 2014.	Completed
DITP Roofing Replacement	Replacement of the following rubber roofs that are in need of replacement: Cryogenics, Residuals (Mod #1 and #2 Vestibule Roof), Gravity Thickener Buildings), Garage Building, Reception Training (slate tiles), and Admin Lab Building.	Future

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
<i>Utilities:</i>		
Outfall Modifications	Inspection of the old outfall tunnels (decommissioned after startup of the new outfall tunnel). Inspection completed in July 2002.	Completed
Electrical Equipment Upgrades Design & Construction (including future cycles from the Master Plan)	Replace substation equipment. Phase 1-Bus duct 2 & 22 replacement completed October 2001; Phase 2 completed by March 2007; Phase 3 completed in August 2011. Phase 4 completed in June 2016; Phase-5 design to commence in FY23.	Future
VFD Replacements	Replace obsolete variable frequency drives (VFDs) in the North Main Pump Station (in FY12-16); South System Pump Station in FY07-08, with the next cycle to start in FY23 (South System Pump Station Lube System Replacement was added to the scope in the FY19; Winthrop Terminal Facility (FY16-22); and miscellaneous smaller VFDs throughout the plant (on-going). Future replacements every 12-15 years.	Future
Power System Improvement Design & Constr. (Contracts 7061, 7061A, 7061B, 7061C, 7061D)	For modifications to DITP's electrical system as recommended in the consultant report after an FY04 power outage. Design completed in FY09-11. Completing the construction in a series of projects in FY09-14; added 7061C, dump condenser replacement and 7061D for NMPS fuel tank removal in FY11. Two awarded in FY09, two in FY11. The last, 7061A, Thermal Power Plant Fuel System Upgrade was substantially completed by May 2017.	Completed
TPP Boiler Control Replacement	Replaced boiler controls in the Thermal Power Plant that were obsolete. Completed by November 2016.	Completed
Switchgear Replacements Design/ESDC/REI and Construction including future cycles added per the Master Plan	On-going program to replace obsolete electrical switchgear. Future cycles beyond that time are not currently funded.	Future
Transformer Replacements	Approximately 42 electrical substations and 87 transformers have been in service since DITP start-up. Sub-phase eliminated in FY14; replacements are now done in Electrical Equipment Upgrades.	Completed
PICS Replacement including future cycles from the Master Plan	Replace or upgrade the Process Information Control System (PICS) including keypads, consoles, and software when obsolete. Completed in FY16; may need to be repeated every 10-12 years.	Completed
PICS Fiber Loop Replacement	Replace the PICS system "backbone", the fiber optic loop. Scheduled for FY24-26.	Future
Chemical Tank & Pipe REI and Construction (to include Gravity Thickener Overflow Pipe Replacement)	Strip and reline three of the four Sodium Hypochlorite Tanks and the two Sodium Bisulfite Tanks, which are in fair condition on the outside (shows staining, rusting, and corrosion). If one bisulfite tank fails, there is no longer any back-up. (Tanks have been in service for 26 years; Hypo tanks 1 & 3 were relined in 2007, tanks 2 & 4 in 2008). Added the replacement of the Gravity Thickener overflow pipe in this project. Work will be completed in FY21.	Active
Chemical Pipe Replacement Design and Construction	Planned periodic replacement of the various chemical pipelines in the odor control and disinfection facilities due to deterioration from corrosion. Scheduled construction for FY25-27.	Future

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
<i>Utilities:</i>		
Heat Loop Pipe Replacement Construction	Rerouted heat loop piping into galleries to reduce underground corrosion and improve accessibility. Phase 1 complete Dec. 2005, Phase 2 complete February 2008. Phase 3 complete June 2011. Includes periodic valve replacements. Another project phase needs to be added to provide redundancy to the heat loop.	Completed
Fuel Pipe Abandonment	Cleaned and cemented the existing fuel pipeline in place instead of removing it. Completed December 2012.	Completed
North Main Pump Station Motor Control Center (MCC) Construction	Replaced MCC equipment that had become obsolete and unreliable. Designed by As-Needed Design task order, construction completed in two phases in FY12-13. See Phase 2 below.	Completed
Motor Control Center (MCC) and Switchgear Replacement Design ESDC/REI and Construction	Sub-phase pulled from the project above, second phase being done FY20-22. In FY17, the design scope was revised to include replacement of switchgear in the Admin/Lab building. Construction is scheduled for FY21-FY24.	Active
Combustion Turbine Generator (CTG) Rebuilds	Rebuilds of the combustion turbines in the Thermal Power Plant. Scheduled for FY24-27 with repeat cycles every 15 years. With the addition of the "Combined Heat & Power" facility, this work may eventually be eliminated.	Future
STG System Modifications Design & Construction	Added equipment to the steam turbine generator to increase electricity output by using the current steam production more efficiently. Helps the MWRA meet energy goals set out by executive order. Completed in February 2011. Added Pressure Reducing Valve to maximize electrical generation by July 2014.	Completed
DI Digester Flare No. 4 Design/ESDC and Construction	Install a fourth gas flare to reduce the potential for air permit violations when an existing flare is out of service and/or the boilers have to be taken off-line.	Future
Hydroturbine Replacements Design and Construction	There are two 1.1 megawatt hydroturbine generators (HTGs) at Deer Island. Electricity is generated using the force of plant effluent as it drops from the disinfection basins into the intake channel beneath each HTG. This facility came on line in July 2001. The HTGs have reached the end of their useful life, and repairs are costly. A condition assessment and LCCA is presently being performed to determine future repair/replacement options.	Future

<b>Sub-phase Support:</b>	<b>Scope</b>	<b>Status</b>
DISC Application	Hardware, software, and contract services to implement a plant-wide computerized database of all plant utility systems. Existing programs deemed sufficient, project removed in FY14.	Completed
Document Format Conversion	Convert DITP construction documents into electronic format and develop a document-reference database. Work is in process, and has several phases. Completed by the end of FY19.	Completed
As-Needed Design Phases 5, 6, 7, 8 and 9	On-going technical design services and/or construction support to supplement existing engineering resources for specialized or complex engineering issues. Initially, two contracts were issued and ran for two years each. For Phase 6, contract length was extended to three years each. Phases 6-1 and 6-2 ended by October 2012, phase 7-1, 7-2, and 7-3 (at \$1.6M each, end April 2016). Phases 8-1, 8-2, and 8-3 were awarded in FY16 at \$1.6M each, for FY17-FY19. Phase 9 Phases 9-1, 9-2, 9-3 were awarded in FY20.	Active
Deer Island As-Needed Technical Design	A placeholder used to continue the technical design services as described above. Each series of new contracts will be deducted from this placeholder. Funding now runs from FY24 to FY30.	Future

<b>Sub-phase Specialties:</b>	<b>Scope</b>	<b>Status</b>
Sodium Hypochlorite Tank Liner Removal	Removed the failed lining in tank #1 of the four sodium hypochlorite storage tanks. Completed in September 2006.	Completed
Hypochlorite Tanks 1&3 Reline	Renamed the "Sodium Hypo Tank Repair 1" sub-phase. Included stripping, repairs and relining tank 3. Completed November 2007.	Completed
Hypochlorite Tanks 2 & 4 Reline	Strip & reline the two remaining sodium hypochlorite storage tanks. Scope included removing ladders and replacing safety railings on the tanks. Completed in October 2008.	Completed
Sodium Hypochlorite and Bisulfite Tanks Replacement Design/ESDC and Construction	Based on condition assessments, expect to start replacing tanks beginning in FY26.	Future
Primary & Secondary Clarifier Rehab – Design (ESDC/REI)	ESDC/REI Services during the Primary & Secondary Clarifier Rehab Constr., below (design by As-Needed Design consultant). Included secondary clarifiers due to deterioration in the longitudinal chains and scum collection systems. Completed September 2013.	Completed
Primary & Secondary Clarifier Rehab Construction	Replace longitudinal & cross collector chains and sprockets, chain drives, wear shoes; modify tip tubes, replace hose bibs; repair wall expansion joints, add more drop boxes, etc. Added secondary clarifier work in FY09, specified a higher-grade stainless steel which increased the cost by \$30M. Separated out the gravity thickener scope due to the need for separate, distinct schedules. Project awarded at \$59.4M; completed February 2012.	Completed
Gravity Thickener Rehabilitation - Design	Designing gravity thickener improvements, as discussed further below. Project staff determined that a separate design phase is not needed, dropped this subphase in FY14.	Completed

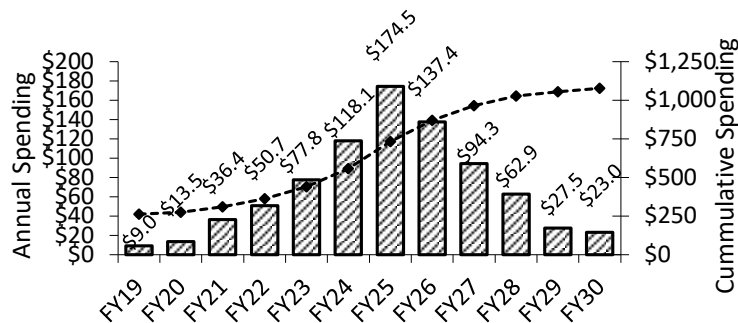
<b>Sub-phase</b> <i>Specialties:</i>	<b>Scope</b>	<b>Status</b>
Gravity Thickener Improvements - Construction	This subphase was eliminated in FY08, and the scope was included with the Primary Clarifier Rehab work above. Made a stand-alone project again in FY09. The first phase (6966) involved replacing failed fiberglass covers in FY10-12. 6966A, B, and C were added for emergency repairs to center columns in three tanks in FY11. Project completed in June 2012.	Completed
Gravity Thickener Rehabilitation	Sub-phase pulled from the project above. This phase 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 the operating efficiency. Project completion expected in FY21.	Active
Gravity Thickener Center Column Replacement	Complete replacement of the center columns in all 4 tanks with a higher grade steel, due to the failures experienced in FY11. Contract awarded in FY13, completed by January 2014.	Completed
Odor Control Rehabilitation Design/ESDC, Construction and REI	Dropped the Preliminary Design phase and added ESDC/REI to the scope in FY11. The project involves modifications to the plant-wide odor control systems, including the digester gas systems and wet scrubber improvements. Design begins in FY21, construction currently scheduled for FY25-29.	Future
Clarifier W3H Flushing System	Replaced deteriorated water flushing lines in the clarifier batteries, completed July 2013.	Completed
Clarifier Rehabilitation Phase 2 Design/ESDC, REI and Construction	Project to correct deficiencies noted during the first Primary & Secondary Clarifier project. Influent gates not sealing off tanks adequately; effluent launders and aeration systems need repair; and concrete corrosion in primary clarifiers above the water line needs repair and coating to prevent future corrosion. The sludge removal system in primary tanks and aeration/recirculation systems in secondary tanks need to be rehabilitated as well. Design/ESDC contract began in FY15, and construction is currently scheduled for FY21-25.	Active
Scum Skimmer (Clarifier Tip Tube) Replacement	Scum tip tubes not working properly results in scum build-up in clarifiers that has to be manually collected and transported to the gravity thickeners. Secondary tip tubes replacement was added to the scope, greatly increasing the cost. Done Oct-13 to Oct-16.	Completed
Digester and Storage Tank Design/ESDC/REI and Rehabilitation Phase 2	The DITP residuals facility includes twelve digesters and two gas handling/sludge storage tanks. During Digester Mods Pipe Replacement (7055), it was noted that additional digester work was needed. Issues with plugged digester recirculation pipes, mixer failures, and overflow box deterioration resulted in increasing the scope needed to correct all deficiencies. Some steel plates in the digesters may also need repair or replacement, and the interior of the digesters needs to be coated. Begin design in late FY21, construction and REI scheduled for FY24 to FY28.	Future

Sub-phase <i>Specialties:</i>	Scope	Status
Combined Heat & Power (CHP) Study, Design and Construction	A system review was done to determine possible options for optimizing the use of methane gas produced from the existing sludge processing system. One option is to construct a CHP facility containing more efficient gas-fired turbines to increase electrical self-generation, and ensure beneficial re-use of all methane gas in the summer while still meeting all plant heat requirements. The CHP facility would be designed to handle the increased methane gas produced by co-digestion, if that project becomes feasible. Depending on the CHP facility design, portions of the 17-year old Thermal Power Plant will be modified or eliminated. A detailed energy alternatives project commenced in FY19, and will be followed by design in FY22 and construction in FY25.	Active
Co-Digestion Design/ESDC/REI and Construction	Co-digestion construction is for the addition of piping and a receiving tank for the liquid food waste to be delivered to Deer Island. Food waste would be barged to the plant, pumped into the receiving tank, and from there pumped into the digesters.	Future
Co-Digestion Temporary Facility	Moved from the Residuals CIP to DITP in FY16. The budget was reduced to actual costs incurred since this project is not likely to be continued.	Completed

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$ 1,100,570	\$274,838	\$825,732	\$36,366	\$50,710	\$187,311	\$587,343	\$73,556

**DI Asset Protection**



Project Status 12/20	25.8%	Status as % is approximation based on project budget and expenditures. Several previously completed phases for this project are included in the Completed Project list. Contracts in process include the following: As-Needed Design Phase 9-1, 9-2 and 9-3, Clarifier Phase 2 Design and REI, Fire Alarm System Replacement Design, DITP MCC & Switchgear Replacement Design, ESDC and REI, Gravity Thickener Rehabilitation, Winthrop Terminal Facility VFD Replacement, Gas Protection System Replacement Phase 1, Chemical Storage Tanks Relining and Digester Piping. Contracts scheduled to begin in late FY21 and early FY22 are: Clarifier Rehab Phase 2 – Construction and REI, Fire Alarm System Replacement Construction, SSPS VFD Replacement Design, Odor Control Rehab Design, Digester and Storage Tank Rehab Design, HVAC Design, Dystor Membrane Replacement, Cryogenics Plant Equipment Replacement Design among others.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$1,055,309	\$1,100,570	\$45,261	Dec-31	Dec-31	None	\$192,954	\$187,311	(\$5,643)

**Explanation of Changes**

- Project cost change primarily due to updated cost estimates for Cryogenics Plant Equipment Replacement Construction, Odor Control Rehabilitation Design, Construction and REI, Digester/Storage Tank Rehab Construction, South System Pump Station VFD Replacement Construction, Digester Cover Replacement, Digester Gas Flare No. 4 Design and Construction, Barge Berth Design and Construction, Cathodic Protection Construction, and DITP Roofing Replacement. Also, greater than budgeted contract awards for Chemical Tank and Digester Pipe and Gas Protection System Replacement Phase 1, offset by less than budgeted contract award for Eastern Seawall Design/ESDC/REI. Also, inflation adjustments on unawarded contracts.
- Spending change primarily due to updated Notice-to-Proceed and Substantial Completion dates for HVAC Replacement contracts, Hydroturbine Replacement Construction, Eastern Seawall Construction, South System Pump Station VFD Replacement Construction, Dystor Membrane Replacement, Combined Heat & Power Design, Digester Cover Replacement, and updated cost estimates listed above.

**CEB Impacts**

- The majority of the projects are required to replace obsolete equipment and systems. Some of the projects are expected to result in decreased maintenance and/or operating costs such as the HVAC equipment replacement. However, the potential benefits from most of the projects are not quantified at this time.
- Benefits of several energy-related projects have been estimated resulting in anticipated annual electrical savings. Some examples include: Winthrop Terminal Facility VFD Replacement (\$30,000 in starting in FY23), HVAC Equipment Replacement of \$140,000 (starting in FY30 and \$30,000 for outside lab testing and \$10,000 for overtime in FY23-24), Future SSPS VFD Replacements (\$120,000 beginning in FY33). Any potential impacts of co-digestion and the combined heat and power facility have not yet been quantified or included in the planning estimates due to uncertainty regarding the scope and feasibility of the projects.



- Projects that are expected to reduce maintenance time and other resources are the Gravity Thickener Rehabilitation, Cryogenic Plant Equipment Replacement, Hydroturbine Replacement, and Clarifier Rehabilitation Phase 2.

## S. 210 Clinton Wastewater Treatment Plant

### Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Extends current asset life*
- Improves system operability and reliability*

### Project History and Background

The Clinton Wastewater Treatment Plant Rehabilitation was completed in 1992. The plant is generally in good condition. Some equipment rehabilitation and replacement projects were recommended in past CIP cycles. Operability of mechanical equipment and maintenance of electric/standby power systems are key elements to minimizing the risk of component failure. Any malfunction of mechanical equipment may impact wastewater treatment, particularly during large storm events that stress the hydraulic capacity of the facility. Key decision making to minimize risks includes the cost/benefit of when to replace aging equipment and which/how many spare parts to pre-purchase. Other uncertainties include technology upgrades to meet future regulatory requirements.

### Scope

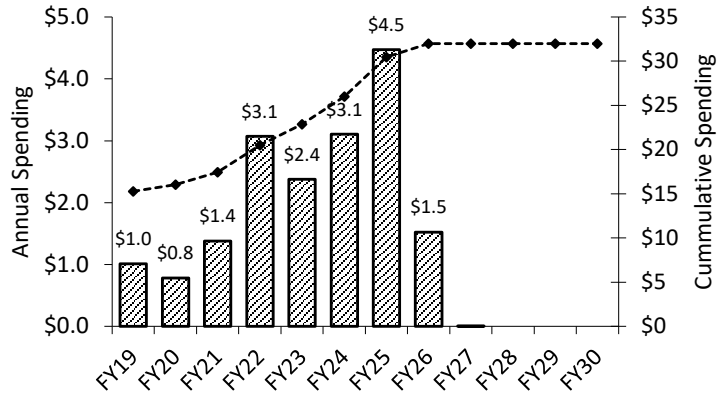
Sub-phase	Scope	Status
Clinton Soda Ash Replacement	The soda ash delivery system needed for pH control in the activated sludge process was replaced. Completed August 2008.	Completed
Clinton Permanent Standby Generator	Install a permanent standby generator at the Clinton Wastewater Treatment Plant. Completed November 2007.	Completed
Clinton Digester Cleaning & Rehabs (added concrete repairs and Influent Gates)	Clinton's two digesters were 20% filled with compacted grit, limiting their efficiency. The new discharge permit's phosphorus limits require both digesters to be used at all times. Therefore, the digesters needed to be emptied, cleaned, and rehabilitated. In FY12, the scope expanded to include installation of two 36-inch influent gates to control flow, to prevent flooding and protect plant assets. In FY14, plant-wide concrete repairs were added to the scope because rebar was exposed in walls, walkways and structural support beams across the primary clarifiers. All construction was completed in FY16; the warranty period ended in FY17.	Completed
Clinton Aeration Efficiency Improvement (and Auxiliary Pumps)	A study by FS&T recommended replacing mechanical mixers with fine bubble diffusers in three of the six secondary aeration tanks to improve the oxygen transfer and reduce electric costs. In FY12, the scope was expanded to include installation of four submersible auxiliary pumps to increase pumping capacity during high flow conditions. This avoids renting pumps, which was required four times in two prior years. Work completed February 2013.	Completed
Phosphorus Reduction Design/ESDC and Construction	The new NPDES permit requires compliance with lower phosphorus limits by April 2019 (18 months after the December 2017 start-up). New process equipment was installed to meet the set limit. Design began in FY14, construction in FY16 (which included adding a natural gas line for building heating, and a new electrical back-up generator) completed December 2017. The warranty extends to March 2019.	Completed

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
Clinton Roofing Rehabilitation	Replace the tar and gravel roofing on the Administration Building, Chemical Building, Headworks, Digester building, and the Dewatering and Maintenance Shop with EPDM rubber in FY19.	Completed
Clinton Facilities Rehab Design/ESDC/REI and Construction	Rehabilitate or replace the grit removal facilities, two belt filter presses, and close Cell #1 of the landfill.	Future
NGRID Gas Line	Agreement with NGrid to construct a natural gas pipeline to convert the plant from oil to natural gas heating. Completed FY17.	Completed
Screw Pumps Replacement Phase 1 and 2 and Valves and Pipe Replacement	There are fifty 4-inch to 8-inch return aerated sludge valves that need replacing, and six 48-inch screw pumps that are 25 years old. Design by As-Needed Consultant. Replace three plant influent screw pumps that are functioning poorly. The three intermediate screw pumps are scheduled to be replaced after Phase 1 is completed; and the valves and pipe replacements are scheduled in a separate project.	Future
Digester Cover Replacement	The primary digester cover has reached its useful life and needs to be replaced. Project broken out from the Clinton Facilities Rehab project.	Future
Clinton Storage Facility	A new facility to be built for parts storage, (valves, pumps, motors, etc.) receiving freight deliveries, and PVC pipe storage. Design commenced in FY20.	Future
Clinton SCADA Upgrades	Replace existing plant control system with a PLC based system. Existing system is obsolete and cannot attain spare parts. System is over 20 years old.	Future
Clinton Fire Alarm Replacement	Replace existing plant fire alarm system with a new compliant system. Existing system is obsolete and cannot attain spare parts. System is over 20 years old.	Future
Clinton Landfill Cell #1 Closure	Closure of Clinton Landfill Cell #1 since it has reached its capacity. Cell will be capped and will include proper drainage. This is regulated per Dep – 310 CMR 19 (Mass Solid Waste Management Facility Regulations).	Future

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY20</b>	<b>Remaining Balance</b>	<b>FY21</b>	<b>FY22</b>	<b>FY19-23</b>	<b>FY24-28</b>	<b>Beyond FY28</b>
\$31,994	\$16,056	\$15,938	\$1,380	\$3,070	\$8,618	\$9,111	\$0

### Clinton Wastewater Treatment Plant



Project Status 12/20	50.5%	Status as % is approximation based on project budget and expenditures. Phosphorus Reduction Construction completed by March 2018. The Clinton Roofing Rehab work was completed in September 2019. Valve and Pipe Replacement was awarded in May 2020. Screw Pumps Replacement Phase 1 is expected to commence in late FY21.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$31,487	\$31,994	\$507	Jan-26	Jan-26	None	\$8,096	\$8,618	\$522

#### Explanation of Changes

- Project cost change due to updated cost estimates for Equipment Storage Building, and Digester Cover Replacement.
- Project spending changed due to updated cost estimates listed above.

#### CEB Impacts

- The projects are required to replace obsolete equipment and systems. The plant influent screw pump and valve and pipe replacements may result in decreased maintenance and/or operating costs although the potential benefits have not been quantified at this time.

## S. 271 Residuals Asset Protection

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### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Extends current asset life*
- ☑ *Results in a net reduction in operating costs*
- ☑ *Improves system operability and reliability*

**Master Plan Project ☑ 2008 Priority Rating 1 (see Appendix 3)**

*To protect the investment of MWRA ratepayers by ensuring timely replacement of equipment and systems. MWRA expects to replace equipment and structures in the facility as they reach the end of their useful life.*

### Project History and Background

The Residuals Asset Protection program was created in FY08 as part of the Master Plan. The program consists of the anticipated contracts for maintaining and improving the operations and infrastructure of the biosolids processing plant in the long term. MWRA's Biosolids Processing Facility (aka the "pellet plant") was built in 1991 and expanded in 2001. By 2019, most of the major pieces of processing equipment will be 30 years old. The facility is currently in good condition, but some reinvestment is planned in the FY18-22 timeframe, as discussed in more detail below. For this facility, operability of mechanical equipment and maintenance of electric/standby power systems are key elements to minimizing the risk of component failure. Key decisions to minimize risk hinge on the results from cost/benefit analyses, to determine when to replace equipment. The residuals pelletizing process is also currently energy-intensive; future uncertainties include long-term energy costs and supply.

Under the terms of the contract for operation of the biosolids processing facility, New England Fertilizer Company (NEFCO) was responsible for all facility operation and maintenance including any necessary capital improvements until December 2015. They were obligated to turn the facility back over to the MWRA in an operable condition. The Asset Protection phase is intended to provide a dual-track planning approach addressing: (1) the existing facility capital improvement needs beyond the year 2015, if the Authority continues with pelletization, and (2) the option of assessing alternative technologies prior to the current contract expiration date; which culminated in a decision point in FY15, and was performed as mentioned below.

A comprehensive Residuals Condition Assessment/Reliability Study begun in May 2009 was completed in July 2010. The study found the facility to generally be in good condition with only a few recommendations for improvement. A study to assess the latest technology and regulatory trends planned as a second phase started in FY13 and finished in FY14. The study was intended to narrow the list of viable options for the Authority to consider for long-term implementation. The study examined the feasibility of co-digestion which involves digestion of food wastes and/or fats, oils, and greases (in the digesters at Deer Island Treatment Plant (DITP) and Clinton Wastewater Treatment Plant) to generate additional methane, and determine if there are any changes in the sludge characteristics that may impact the pellet plant. This study also reviewed the adequacy of existing facility components and processes, to provide replacement recommendations based upon the latest existing or alternative technologies. Information developed by these projects will be used by MWRA to produce a prioritized list of recommended design and construction projects that will be scheduled over a 10-year period (FY19-28). Scheduling of upgrade projects will be based on equipment failure risk, construction sequencing to maintain facility operations, and capital expenditure planning.

The Technology and Regulatory Review study provided several major recommendations to the Authority. First, the study found co-digestion to be feasible and potentially beneficial and therefore recommended that the Authority proceeds with projects needed to further evaluate the benefits of that process. As a result, several projects were

added to the DITP CIP to achieve that goal. Throughout 2016, efforts were made to determine the best means to transport food waste to DITP. It was determined that barging food waste was the primary acceptable option, but the collection, transport, and delivery via barge was not economically feasible at this time, so co-digestion is currently on hold until the market becomes more developed and associated costs can be more accurately predicted.

Secondly, it was determined that the Authority should continue with pelletization and pursue a five-year extension to the NEFCO contract. Third, it was recommended that larger sludge dryers be installed for increased pelletization capacity at a lower energy cost per ton of sludge processed (further cost-benefit analysis is needed before proceeding). Funding for this element of the project (and other capital expenditures) were also to be points of negotiation with NEFCO.

After considering these recommendations, Authority staff decided to continue with pelletization and negotiated a five-year extension to the pellet plant operations contract with NEFCO. On March 11, 2015 the Board of Directors approved Amendment 1 to contract S345 with NEFCO, which extends the end date to December 31, 2020 and included a \$7 million capital budget funding commitment by the Authority for potential capital projects identified as being necessary over the five-year extension. The projects deemed necessary are being separately bid by the MWRA, and awarded subject to Board approval. This extension will be followed by another long-term competitive procurement. The additional time in this extension allows for a potential increase in competition over the five-year extension; the Authority to better define the operating parameters which may potentially increase competition for the next long-term competitive bid.

For the residuals biosolids processing facility, proposed spending of \$180.3 million on eighteen projects was identified in the 40-year master plan timeframe of FY07 through FY48. The projects identified were merely placeholders in recognition that some capital improvements will likely be required at DITP and/or the pellet plant. Fifteen projects (equaling \$148.6M) out of the eighteen were included in the FY08 CIP. The other three (addressing the rehabilitation of the polymer system, building envelope, and thermal oxidizers) have a priority rating of 3, and therefore have not yet been included in the CIP.

In the FY14 Proposed CIP cycle, the conceptual plan for future design and construction projects was modified; the overall project cost estimate was reduced to \$103.83 million and fewer sub-phases included funding to cover the potential construction projects, since the plan for the future would not be fully developed until after the technology study mentioned above was completed and the findings evaluated, which has been done.

**Scope**

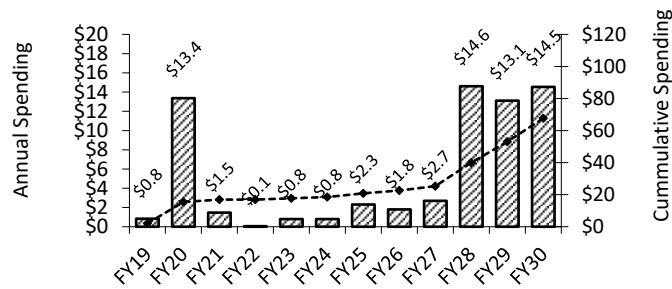
Sub-phase	Scope	Status
Condition Assessment/ Reliability Study	Evaluate the condition of the entire facility at the mid-point of the current contract and then assess other residuals processing options and regulatory changes which may provide cost-saving opportunities. First phase work (present condition assessment) began in May 2009 and finished in July 2010. Work on implementing any short-term recommendations from this phase began in FY11. The 2 <sup>nd</sup> phase, Technology & Regulatory review began in FY13 and finished in January 2014; recommendations were as discussed above.	Completed

Sub-phase	Scope	Status
Residuals Plant Facility Plan/EIR	The design and construction of improvements to the plant utilities infrastructure (electric, water, sanitary, and drainage) may be necessary. This CIP project will address issues and/or recommendations identified during the initial study.	Future
Residuals Plant Upgrades – Phase 1 Design & Construction (includes initial phases to repaint sludge storage tanks and silos; mechanical and electrical improvements as part of the \$7M commitment to NEFCo). Dryer Drum Replacements was added to the scope.	The \$7M included in the NEFCo agreement is under Construction Phase 1, as part of the 5-year NEFCo extension. Funding of \$10.5M is allocated in the Final FY21 CIP for (repainting the sludge storage tanks and pellet storage silos; mechanical improvements and electrical improvements) as agreed to by MWRA and NEFCo. Dryer Drum Replacements was added to the scope and \$3.4M were used from the Residuals Phase 2 Construction Phase.	Completed
Residuals Phase 2 Design and Construction	For selection of a consultant to design a series of equipment replacements funded at \$15M for design/ESDC and \$71.6M for various unspecified construction phases. Following approval of the five year extension with NEFCo, phase 2 design work was moved out to begin in FY24; first construction project in FY26. Late in FY18, NEFCo staff informed DITP management that 2 of the 8 dryer drums were no longer functional, and a third drum was nearing the point of failure. NEFCo needs 6 dryer drums to process delivered sludge over a 5-day work week. Failure of a third drum would require adding weekend operations, increasing processing costs.	Future
Residuals Pellet Conveyance Piping Relocation	Build a separate support system to relocate the pipes (that convey pellets to the "high silo system") that are currently attached to the wall of a building that the MWRA does not own. This project commenced in FY20 and was completed in FY21.	Completed

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$105,694	\$15,438	\$90,256	\$1,469	\$56	\$16,522	\$22,209	\$65,726

### Residuals Asset Protection



Project Status 12/20	15.9%	Status as % is approximation based on project budget and expenditures. The Residuals Plant Condition Assessment/Reliability Study was completed in July 2010. The Technology & Regulatory Review contract was completed in January 2014. Residuals Sludge Tank and Silo Coating was completed in September 2018. The Mechanical Improvements/Electrical/Drum Dryer Replacement contract began in June 2019. Pellet Pipe Relocation contract commenced in August 2019. Both were substantially completed by December 2020.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$105,470	\$105,694	\$224	Apr-32	Apr-33	12 mos.	\$16,760	\$16,522	(\$238)

#### Explanation of Changes

- Project cost change due to change orders for Mechanical Improvements/Electrical/Drum Dryer Replacement and Pellet Pipe Relocation contracts.
- Project schedule changed due to updated schedule for Residuals Phase 2 Construction.
- Project spending change due to schedule change for Residuals Facility Upgrades Design, and change orders listed above.

#### CEB Impacts

The majority of the projects are required to replace obsolete equipment and systems. Some of the projects may result in decreased maintenance and/or operating costs, however the potential benefits are not quantified at this time.



# **Introduction to Combined Sewer Overflow (CSO) Program**

In 1987, MWRA entered a stipulation in the Federal District Court Order in the Boston Harbor Case ("First Stipulation") by which it accepted responsibility for developing and implementing a long-term CSO control plan for all combined sewer overflows hydraulically connected to MWRA's system, including the outfalls owned and operated by the communities of Boston (BWSC), Cambridge, Chelsea and Somerville (the "CSO communities"). In response to the First Stipulation, MWRA conducted site-specific and watershed based planning both to meet short-term CSO control requirements pursuant to federal regulations, including EPA Nine Minimum Controls ("NMC"), and to develop a long-term control plan to bring Boston area CSOs into compliance with the Federal Clean Water Act and Massachusetts Surface Water Quality Standards. MWRA developed these plans in conformance with federal and state CSO policies and associated guidance documents, which evolved during MWRA's nearly 20-year planning period, to 2006.

EPA's National CSO Policy (April 1994) requires CSO permittees to develop and implement a set of system optimization measures and reporting procedures intended to quantify and minimize CSO discharges in the short term, in part using detailed system characterization, easily implemented and less expensive system improvements and optimized operations and maintenance. In compliance with the policy, MWRA submitted its NMC compliance documentation by January 1, 1997, as required. While most of the reported compliance measures involve operations, maintenance and regulatory functions of MWRA that are funded through the Current Expense Budget, system characterization and hydraulic optimization measures described below were funded through the CIP.

The National Policy also requires permittees to develop and implement a long-term control plan in accordance with the provisions of the policy. In the CIP, MWRA undertook two major planning efforts: one in the period 1986 through 1990, which produced the 1990 CSO Facilities Plan primarily in accordance with the EPA CSO Strategy of 1989, and a second and final planning effort in 1992-1997, which produced a revised long-term plan for CSO control that MWRA recommended in July 1997. With subsequent modifications to the plan, MWRA attained full regulatory and court approval of the revised control plan in April 2006.

MWRA's CSO planning efforts were primarily conducted under the System Master Planning phase of the CIP and produced the following components of a broad plan to control CSO discharges and meet water quality standards:

- Through extensive inspections, system monitoring and modeling, MWRA developed a detailed, field-calibrated assessment of its planned collection and treatment system performance in advance of developing a long-term CSO control plan. The performance assessment incorporated major capital investments in the sewer system already underway or planned by MWRA, including upgrades to the transport system, pumping stations, headworks and Deer Island Treatment Plant. Together with MWRA's and the CSO communities' efforts in the late 1980's and the 1990's to operate and maintain their respective systems more efficiently, these improvements were shown to effectively maximize the system's capacity to control wet weather flows and markedly reduce CSO discharges system-wide. In the period 1988 through 1992, total annual CSO discharge predicted for the Typical Year Rainfall dropped from 3.3 billion gallons to 1.5 billion gallons, with approximately 51% of the remaining discharge treated at five MWRA CSO screening and disinfection facilities. The Charles River especially benefited from these improvements.
- In 1993-1994, MWRA presented a System Optimization Plan ("SOP"), which recommended approximately 160 low cost, easily implemented system modifications to maximize wet weather storage and conveyance. The SOP projects, which were fully implemented by MWRA and the CSO communities by 1997, further reduced CSO discharge by about 20 percent.
- MWRA recommended an extensive set of larger projects covering a range of control technologies to achieve long-term, site-specific CSO control goals using watershed-based assessments of receiving water impacts and uses. MWRA presented a conceptual plan of these improvements in 1994 and refined the recommendations in a facilities plan and environmental impact report it issued in 1997. The long-term plan received initial federal and state approvals in early 1998, allowing MWRA to move the projects into design and construction.
- As MWRA proceeded with implementation of the projects, it evaluated and recommended several adjustments and additions to the long-term plan in the period 1998 through 2006. These adjustments and additions

responded to regulatory inquiries seeking higher levels of control (Charles River) or to new information that raised concerns about construction requirements, cost or CSO control performance (North Dorchester Bay, Reserved Channel, East Boston, and Alewife Brook). A final, comprehensive long-term control plan was approved by EPA and DEP in March 2006 and accepted by the Federal Court in April 2006. This plan and its predicted level of CSO control for each outfall was formally amended in May 2008 to revise the long-term CSO discharges at the Prison Point Facility, based on hydraulic optimization MWRA incorporated into the operations of the facility pursuant to milestones in Schedule Seven. MWRA predicts that the long-term plan, scheduled to be completed in December 2015, will reduce total annual CSO discharge for the Typical Year Rainfall to 0.4 million gallons (an 88% reduction from the 1988 level), with 93% of the remaining discharge to be treated at four MWRA screening and disinfection/dechlorination facilities.

On April 27, 2006, Federal District Judge Richard G. Stearns approved a joint motion of the U.S. Department of Justice (DOJ), EPA, and MWRA that provides a comprehensive resolution of outstanding issues related to MWRA's CSO program. Under the approved motion, MWRA entered a Second CSO Stipulation by which it agreed to implement its previously recommended plans for Alewife Brook/Upper Mystic River and East Boston and to undertake additional work to further reduce CSO discharges to the Charles River from its Cottage Farm CSO Facility. The Cottage Farm facility had been the subject of discussions between EPA and MWRA and related investigations by MWRA since MWRA first issued its long-term control plan in 1997. The additional Charles River work is predicted to reduce CSO discharges from Cottage Farm to 2 activations and 6.3 million gallons in the Typical Year, from the previous goal of 6 activations and 23.6 million gallons. The scope, milestones and performance goals of other CSO projects remain unchanged.

The Federal Court ordered schedule had also contained three unmet milestones related to completion of the CSO control plans for Alewife Brook/Upper Mystic River, East Boston, and region-wide floatables control and outfall closings. The accepted joint motion and the revised court schedule ("Schedule Seven") that was created from it adjusted several previous project milestones and added milestones for the revised Charles River CSO control plan.

In exchange for MWRA agreeing to implement its revised long-term control plan, DEP agreed to issue a series of five (5), up to three-year extensions to the water quality variances for the Lower Charles River Basin and the Alewife Brook/Upper Mystic River through 2020. As they relate to MWRA, the terms and conditions of the variance extensions would be limited to the requirements of the Court Order (i.e. MWRA's responsibility is to implement the long-term control plan contained in the revised Schedule Seven). Pursuant to an agreement reached by MWRA, DEP and EPA in the spring of 2019, MWRA will perform water quality modeling of Alewife Brook/Upper Mystic River and Lower Charles River Basin as part of its CSO performance assessment. In turn, DEP issued 5-year variances for these water bodies on August 30, 2019, effective through August 31, 2024. These variances, issued to MWRA, the City of Cambridge (Charles River, Alewife Brook/Upper Mystic River) and the City of Somerville (Alewife Brook/Upper Mystic River), also require public notification of CSO discharges, progress reports and public briefings on the 2018-2021 CSO Performance Assessment, the evaluation of additional CSO mitigation projects defined in the variances, and the development of updated CSO control plans for these waters, among other CSO and CSO impact mitigation requirements.

The Second CSO Stipulation (2006) replaces the stipulation entered in 1987 that established MWRA's responsibility to develop and implement a region-wide CSO long-term control plan. The Second CSO Stipulation states that once MWRA has implemented the recommended plan and demonstrated that it meets the specified goals for activation frequency and discharge volumes, each CSO community will be solely responsible for level of control and other regulatory requirements at the CSO outfalls it owns and operates in accordance with its NPDES discharge permit. These important conditions in the Second Stipulation provided much greater certainty to the MWRA and its ratepayers relative to the scope and cost of the CSO program and its projects through 2020. The elements of the final long-term CSO control plan and its numerical CSO discharge goals for each receiving water segment are presented in Table 1 on the following page.

The CSO project schedules in Schedule Seven are aggressive and reflect project-specific design, permitting and construction requirements. Cost risks include unforeseen subsurface conditions, utility conflicts and the need to manage traffic and community impacts in densely populated neighborhoods. MWRA entered into memoranda of understanding (MOU) and financial assistance agreements (FAA) with BWSC, City of Cambridge and Town of Brookline, by which each community implemented one or more of the 35 CSO projects and MWRA funded eligible engineering, construction and force account costs. The BWSC MOU/FAA (9 projects) ended on June 30, 2017.

MWRA and BWSC entered into a new four-year financial assistance agreement for Dorchester Interceptor Inflow Removal (formerly part of the South Dorchester Bay sewer separation project) effective beginning July 1, 2017. The Town of Brookline MOU/FAA (1 project) ended on July 31, 2014, and the City of Cambridge MOU/FAA (5 projects) ended on June 30, 2018.

**Table 1: Approved CSO Control Plan and Capital Cost by Receiving Water Segment**

Receiving Water	CSO Discharge Goals (Typical Year Rainfall)		Projects*	Capital Cost* (\$ millions)
	Activations	Volume (million gallons)		
Alewife Brook/Upper Mystic River	7 untreated and 3 treated @ Somerville Marginal	7.3 3.5	<ul style="list-style-type: none"> <li>• Cambridge/Alewife Sewer Separation</li> <li>• MWR003 Gate and Rindge Siphon Relief</li> <li>• Interceptor Connections/Floatables</li> <li>• Connection/Floatables at Outfall SOM01A</li> <li>• Somerville Baffle Manhole Separation</li> <li>• Cambridge Floatables Control (portion)</li> </ul>	110.0
Mystic River/Chelsea Creek Confluence and Chelsea Creek	4 untreated and 39 treated @ Somerville Marginal	1.1 57.1	<ul style="list-style-type: none"> <li>• Somerville Marginal CSO Facility Upgrade</li> <li>• Hydraulic Relief at BOS017</li> <li>• BOS019 Storage Conduit</li> <li>• Chelsea Trunk Sewer Replacement</li> <li>• Chelsea Branch Sewer Relief</li> <li>• CHE008 Outfall Repairs</li> <li>• East Boston Branch Sewer Relief (portion)</li> </ul>	92.0
Charles River (including Stony Brook and Back Bay Fens)	3 untreated and 2 treated @ Cottage Farm	6.8 6.3	<ul style="list-style-type: none"> <li>• Cottage Farm CSO Facility Upgrade</li> <li>• Stony Brook Sewer Separation</li> <li>• Hydraulic Relief at CAM005</li> <li>• Cottage Farm Brookline Connection and Inflow Controls</li> <li>• Brookline Sewer Separation</li> <li>• Bulfinch Triangle Sewer Separation</li> <li>• MWRA Outfall Closings and Floatables Control</li> <li>• Cambridge Floatables Control (portion)</li> </ul>	88.9
Inner Harbor	6 untreated and 17 treated @ Prison Point	9.1 243.0	<ul style="list-style-type: none"> <li>• Prison Point CSO Facility Upgrade</li> <li>• Prison Point Optimization</li> <li>• East Boston Branch Sewer Relief (portion)</li> </ul>	47.5
Fort Point Channel	3 untreated and 17 treated @ Union Park	2.5 71.4	<ul style="list-style-type: none"> <li>• Union Park Treatment Facility</li> <li>• BOS072-073 Sewer Separation and System Optimization</li> <li>• BWSC Floatables Control</li> <li>• Lower Dorchester Brook Sewer Modifications</li> </ul>	62.0
Constitution Beach	Eliminate		<ul style="list-style-type: none"> <li>• Constitution Beach Sewer Separation</li> </ul>	3.7
North Dorchester Bay	Eliminate		<ul style="list-style-type: none"> <li>• N. Dorchester Bay Storage Tunnel and Related Facilities</li> <li>• Pleasure Bay Storm Drain Improvements</li> <li>• Morrissey Blvd Storm Drain</li> </ul>	253.7
Reserved Channel	3 untreated	1.5	<ul style="list-style-type: none"> <li>• Reserved Channel Sewer Separation</li> </ul>	70.5
South Dorchester Bay	Eliminate		<ul style="list-style-type: none"> <li>• Fox Point CSO Facility Upgrade (interim improvement)</li> <li>• Commercial Pt. CSO Facility Upgrade (interim improvement)</li> <li>• South Dorchester Bay Sewer Separation</li> </ul>	126.6
Neponset River	Eliminate		<ul style="list-style-type: none"> <li>• Neponset River Sewer Separation</li> </ul>	2.4
Regional			<ul style="list-style-type: none"> <li>• Planning, Technical Support and Land Acquisition</li> </ul>	55.2
<b>TOTAL</b>		<b>410</b>		<b>912.5</b>
<b>Treated</b>		<b>381</b>		

\*Floatables controls are recommended at remaining outfalls and are included in the listed projects and capital budgets.

MWRA commenced implementation of the long-term CSO control plan projects in 1996. Project schedules, which reflect compliance with Federal Court milestones, are presented in Table 2 on the following page. By December 2015, MWRA and the CSO communities had completed all 35 projects in the plan. The completed CSO projects, together with earlier improvements to MWRA's wastewater conveyance and treatment systems, including the upgraded Deer Island Treatment Plant and associated pump stations, are predicted and intended to reduce the total annual volume of CSO discharge in MWRA's federal and state regulatory-approved Typical Rainfall Year from 3.3 billion gallons in 1988 to 0.4 billion gallons, an 88% reduction, with 93% of the remaining overflow receiving treatment at MWRA's four long-term CSO facilities.

**Table 2: CSO Control Plan Project Schedules**

Project		Commence Design	Commence Construction	Complete Construction
North Dorchester Bay Storage Tunnel and Related Facilities		Aug 97	Aug 07	May 11
Pleasure Bay Storm Drain Improvements		Sep 04	Sep 05	Mar 06
Hydraulic Relief Projects	CAM005 Relief	Aug 97	Jul 99	May 00
	BOS017 Relief		Jul 99	Aug 00
East Boston Branch Sewer Relief		Mar 00	Mar 03	Jul 10
BOS019 CSO Storage Conduit		Jul 02	Mar 05	Mar 07
Chelsea Relief Sewers	Chelsea Trunk Sewer Relief	Jun 97	Sep 99	Aug 00
	Chelsea Branch Sewer Relief		Dec 99	Jun 01
	CHE008 Outfall Repairs		Dec 99	Jun 01
Union Park Detention/Treatment Facility		Dec 99	Mar 03	Apr 07
CSO Facility Upgrades and MWRA Floatables Control	Cottage Farm Upgrade	Jun 96	Mar 98	Jan 00
	Prison Point Upgrade		May 99	Sep 01
	Commercial Point Upgrade		Nov 99	Sep 01
	Fox Point Upgrade		Nov 99	Sep 01
	Somerville-Marginal Upgrade		Nov 99	Sep 01
	MWRA Floatables Control and Outfall Closings		Mar 99	Mar 00
Brookline Connection and Cottage Farm Overflow Interconnection and Gate		Sep 06	Jun 08	Jun 09
Optimization Study of Prison Point CSO Facility		Mar 06	Mar 07	Apr 08
South Dorchester Bay Sewer Separation		Jun 96	Apr 99	Jun 07
Stony Brook Sewer Separation		Jul 98	Jul 00	Sep 06
Neponset River Sewer Separation			Apr 96	Jun 00
Constitution Beach Sewer Separation		Jan 97	Apr 99	Oct 00
Fort Pt Channel Conduit Sewer Separation and System Optimization		Jul 02	Mar 05	Mar 07
Morrissey Boulevard Storm Drain		Jun 05	Dec 06	Jul 09
Reserved Channel Sewer Separation		Jul 06	May 09	Dec 15
Bulfinch Triangle Sewer Separation		Nov 06	Sep 08	Jul 10
Brookline Sewer Separation		Nov 06	Nov 08	Apr 13
Somerville Baffle Manhole Separation			Apr 96	Dec 96
Cambridge/Alewife Brook Sewer Separation	CAM004 Stormwater Outfall and Detention Basin		Apr 11	Apr 13
	CAM004 Sewer Separation	Jan 97	Jul 98/Sep 12	Dec 15
	CAM400 Manhole Separation	Oct 08	Jan 10	Mar 11
	Interceptor Connection Relief/Floatables Control at Outfalls CAM002, CAM401B and CAM001	Oct 08	Jan 10	Oct 10
	MWR003 Gate and Rindge Ave. Siphon Relief	Mar 12	Aug 14	Oct 15
	Connection Relief/Floatables Control at SOM01A	Mar 12	Sep 13	Dec 13
Region-wide Floatables Control and Outfall Closings		Sep 96	Mar 99	Dec 07

MWRA's CSO program includes temporary flow metering and other efforts to collect and evaluate new data to track system performance. The performance of the MWRA and CSO community sewer systems is continuously improving as CSO and non-CSO projects are completed. Updated assessments of the system's hydraulic performance and updated estimates of CSO discharges using actual field data and computer model simulations are essential to verify the predicted benefits of the CSO-related improvements as they are completed, to ensure that the system hydraulic model reflects updated conditions, and to support continuing CSO mitigation efforts and long-term goal tracking.

MWRA's NPDES permit and the variances for the Charles River and Alewife Brook/Upper Mystic River require MWRA to estimate CSO discharges at each permitted outfall for all storm events on an annual basis. This is accomplished by MWRA staff using the InfoWorks collection system model and data from permanent and temporary meters located in the interceptor system, at CSO treatment facilities, and at other CSO outfalls. In addition, the Federal Court schedule requires MWRA to conduct a system-wide performance assessment after completing the CSO projects. The court schedule requires MWRA to commence the performance assessment by January 2018 and submit a report on the assessment findings to EPA and DEP by December 2021. MWRA issued the Notice to Proceed with Contract 7572, CSO Post-Construction Monitoring and Performance Assessment, on November 8, 2017, ahead of and in compliance with the January 2018 milestone.

Anticipated operating cost impacts of the CSO program are summarized below and will be further developed as part of the planning and design phases for individual projects.

### Program

The following projects are court mandated, are recommended in MWRA's approved long-term CSO control plan, and are required to meet Massachusetts Surface Water Quality Standards.

Project	Purpose
<b>MWRA Managed</b>	
North Dorchester Bay & Reserved Channel	Virtually eliminate CSO discharges (25-year storm control) and provide a 5-year storm level of separate stormwater control to minimize beach closings along North Dorchester Bay in South Boston.
Hydraulic Relief	Eliminate hydraulic restrictions between local and MWRA systems at two locations, in Boston (Outfall BOS017) and Cambridge (Outfall CAM005) to improve collection and conveyance of wet weather flows, thereby reducing CSO discharges into the Mystic and Charles Rivers, respectively.
East Boston Branch Sewer Relief	Increase hydraulic capacity and provide long-term structural integrity to MWRA's East Boston Branch Sewer through the replacement or rehabilitation of the existing sewers. Completion of this project will increase wet weather transport capacity and reduce CSO discharges along the East Boston shoreline, minimizing CSO impacts to the Mystic/Chelsea Confluence, Chelsea Creek and Boston Inner Harbor and facilitating the beneficial uses of these receiving water segments.
BOS019 Storage Conduit	Control CSO discharges at Outfall BOS019, which discharges to the Little Mystic Channel in Charlestown, by storing most of the overflows and pumping them back into the interceptor system after storms.
Chelsea Trunk Sewer Relief	Control CSO discharges at Outfalls CHE002, CHE003, CHE004, and CHE008, which discharge to the Mystic/Chelsea Confluence and Chelsea Creek, by relieving a local trunk sewer and the MWRA Chelsea Branch Sewer and by repairing Outfall CHE008. The Chelsea Branch Sewer relief project also provides relief to the lower portion of the Revere Extension Sewer to improve service and control surcharging.
Union Park Detention Treatment Facility	Reduce the frequency and impacts of CSO discharges from the BWSC Union Park Pumping Station, which discharges into the Fort Point Channel at Outfall BOS070, by providing fine screening, disinfection, dechlorination and a level of detention and solids removal.

<b>Project</b>	<b>Purpose</b>
Upgrade Existing CSO Facilities and MWRA Floatables Control	Minimize CSO impacts to the Lower Charles River, Upper Inner Harbor, Mystic/Chelsea Confluence and South Dorchester Bay receiving waters by upgrading five MWRA CSO treatment facilities (Fox Point, Commercial Point, Cottage Farm, Prison Point, and Somerville Marginal), and providing floatables control at MWRA CSO outfalls along the Lower Charles River Basin that are not associated with treatment facilities.
MWR003 Gate, Rindge Ave. Siphon Relief and SOM01A	Minimize CSO discharges to Alewife Brook as part of MWRA's Alewife Brook CSO control plan and provide sewer system flood control in extreme storms with a control gate at outfall MWR003 and relief of MWRA's Rindge Ave. Siphon. Upgrade local connection capacity and provide floatables control at the City of Somerville's Outfall SOM01A.
Charles River CSO Controls	Bring the MWRA's "Brookline Connection" into service and implement Cottage Farm influent gate controls and other facility inflow controls to minimize treated discharges to Lower Charles River Basin at the Cottage Farm facility.
<b>Community Managed</b>	
South Dorchester Bay Sewer Separation (Fox Point)	Eliminate CSO discharges to South Dorchester Bay by separating combined sewer systems in Dorchester. This project allows MWRA to decommission the Fox Point CSO Facility. Includes additional inflow removal by BWSC from its Dorchester Interceptor system following the closing of CSO outfalls.
South Dorchester Bay Sewer Separation (Commercial Point)	Eliminate CSO discharges to South Dorchester Bay by separating combined sewer systems in Dorchester. This project allows MWRA to decommission the Commercial Point CSO Facility.
Stony Brook Sewer Separation	Minimize CSO discharges to Stony Brook Conduit and the Back Bay Fens, both of which drain to the Lower Charles River Basin, by separating combined sewer systems in parts of Roxbury and Jamaica Plain. Implementation of this project is intended to reduce the number of overflows to the Stony Brook Conduit from as many as 22 to 2 in the Typical Year and reduce annual CSO discharge volume by 99.7%.
Neponset River Sewer Separation	Eliminate CSO discharges to the Neponset River and protect water quality at downstream swimming areas in South Dorchester (primarily Tenean Beach) by separating combined sewer systems in the Neponset section of Dorchester and by permanently closing CSO regulators associated with Outfalls BOS093 and BOS095.
Constitution Beach Sewer Separation	Eliminate CSO discharges at the Constitution Beach CSO Facility, allowing decommissioning of the facility, by separating combined sewer systems in parts of East Boston.
Cambridge Alewife Brook Sewer Separation	Minimize CSO discharges to Alewife Brook by separating combined sewer systems in parts of Cambridge and upgrading local system connections to MWRA's Alewife interceptors. Close certain outfalls.
BWSC Floatables Control	Limit the discharge of floatable materials from five BWSC combined sewer outfalls along Boston Inner Harbor and Fort Point Channel.
Cambridge Floatables Control	Limit the discharge of floatable materials from Cambridge CSO outfalls that will remain following completion of MWRA's CSO control plan.
Fort Point Channel Sewer Separation	Minimize CSO discharges to Fort Point Channel by separating sewer systems tributary to Outfalls BOS072 and BOS073. Implementation of the recommended sewer separation plan will reduce the number of overflows from these outfalls from as many as 23 to zero in the Typical Year. Also, relocate a CSO regulator and perform limited sewer separation to reduce CSO discharges from the Lower Dorchester Brook Sewer to Fort Point Channel with a MWRA funding cap of \$2.03 million to BWSC.

Project	Purpose
Morrissey Boulevard Drain	Reroute stormwater away from the Outfall BOS087 tributary area and the North Dorchester Bay storage tunnel to Savin Hill Cove in large storms, to increase the level of stormwater control along the South Boston beaches provided by the tunnel.
Reserved Channel Sewer Separation	Minimize CSO discharges to Reserved Channel by separating combined sewer systems in a portion of South Boston. Implementation of the recommended sewer separation plan will reduce the number of overflows to Reserved Channel from as many as 37 to 3 in the Typical Year.
Brookline Sewer Separation	Separate several areas of Brookline, totaling 72 acres, where there are remaining combined sewers tributary to MWRA's Charles River Valley Sewer. The project is intended to reduce treated CSO discharges to the Lower Charles River Basin at the Cottage Farm Facility.
Bulfinch Triangle Sewer Separation	Separate the combined sewers in a 61-acre area of Boston bounded by North Station, Haymarket Station, North Washington St., and Cambridge St. The project is intended to reduce CSO discharges to the Lower Charles River Basin and Upper Inner Harbor, reduce overflows to the Prison Point CSO Facility, and close outfall BOS049.
<b>CSO Support</b>	
CSO Planning and Support	The goals of the CSO Program are to minimize CSO discharges, greatly reduce beach closings following wet weather events, and maximize the beneficial use of CSO receiving waters, in compliance with state water quality standards. This project includes CSO conceptual planning, system master planning, and facilities planning/environmental review that support these goals. It also includes directly related watershed planning activities, development of short-term CSO control measures (known as System Optimization Plans, or SOPs), various as-needed technical support and system performance assessments, including the court-mandated CSO performance assessment in the period 2018-2021, project evaluations required by conditions in CSO variances, and the acquisition of land, easements and construction permits required for CSO project implementation.

#### Expenditure Forecast (in \$000s) and Program Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$912,524	\$904,870	\$7,654	\$5,221	\$2,271	\$10,038	\$90	\$0

Program Status 12/20	99.0%	Status as % is approximation based on project budget and expenditures. MWRA and the CSO communities completed the remaining Long-Term CSO Control projects in December 2015 in compliance with Schedule Seven. (See individual project status and background information).
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#### Changes to Program Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	Prop. FY22	Chge.	FY21	Prop. FY22	Chge.	FY21	Prop. FY22	Chge.
\$912,524	\$912,524	\$0	Apr-22	Apr-22	None	\$10,041	\$10,038	(\$3)

**Explanation of Changes**

- Project spending changed primarily due to updated cash flow for CSO Land Acquisition/Easement.

**CEB Impacts**

- \$500,000 for South Boston CSO Tunnel Inspection/Cleaning and Outfalls Inspection in FY27.



# S. 341 South Dorchester Bay Sewer Separation (Commercial Point)

## Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Fulfills a regulatory requirement*

*This project, together with sewer separation at Fox Point, will eliminate CSO discharges to South Dorchester Bay by separating combined sewer systems in Dorchester. The project is court mandated, is in accordance with MWRA's approved long-term CSO control plan, and is required to meet DEP water quality standards.*

## Project History and Background

This project involves the construction of new storm drains and appurtenant structures, relocation of storm runoff connections from the existing combined sewers to the new storm drains, and rehabilitation of the existing combined sewers for use as sanitary sewers. The plan calls for construction of approximately 65,000 feet of new storm drains. BWSC is implementing the project with MWRA funds.

A contract for design services was executed by Boston Water & Sewer Commission (BWSC) in June 1996, and a preliminary design report was submitted in December 1997. BWSC executed a separate contract for construction management services in December 1998 and commenced construction in April 1999. BWSC completed all of the sewer separation contracts and closed all of the CSO regulators tributary to South Dorchester Bay by June 2007, and MWRA decommissioned the Commercial Point CSO Facility in November 2007. BWSC is conducting flow monitoring and hydraulic model evaluations to verify that sufficient inflow has been removed from the sewer system and the project performance objectives for the sewer system have been achieved. Downspout disconnection and other infiltration/inflow removal is scheduled to continue through June 2021.

## Scope

Sub-phase	Scope	Status
Design	Design services for construction contracts to be bid, awarded, and managed by BWSC.	Completed
Construction	Construction of 65,000 feet of new storm drains and appurtenant structures, managed by BWSC. Relocation of storm runoff connections from the existing combined sewers to the new storm drains, rehabilitation of the existing combined sewers for use as sanitary sewers, individual building downspout removal and street paving are also included.	Completed
Dorchester Interceptor Inflow Removal Construction	Phase to address Dorchester Interceptor Inflow Removal work with funding pursuant to a phase-specific financial assistance agreement with BWSC. Previously, work was included in Construction phase listed above.	Active

## Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$63,625	\$59,862	\$3,763	\$3,763	\$0	\$3,763	\$0	\$0

Project Status 12/20	94.1%	Status as % is approximation based on project budget and expenditures.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$63,625	\$ 63,625	\$0	Jun-21	Jun-21	None	\$3,763	\$3,763	\$0

**Explanation of Changes**

- N/A.

**CEB Impacts**

- No impacts identified at this time.

## S. 324 CSO Planning and Support

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### Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Fulfills a regulatory requirement*

*The goals of the CSO Program are to minimize CSO discharges and their impacts, eliminate beach closings caused by CSOs, and maximize the beneficial use of CSO receiving waters, in accordance with national and state CSO policies and in compliance with state water quality standards. This project includes CSO conceptual planning, system master planning, and facilities planning/environmental review. It also includes directly related watershed planning activities, development of short-term CSO control measures (known as System Optimization Plans or SOPs), various as-needed technical support activities and project evaluations required by conditions in CSO variances, and acquisition of land and easements required for CSO control plan implementation.*

### Project History and Background

MWRA CSO planning work began in 1986. A revised Final Conceptual Plan and System Master Plan were completed in 1994, and a Final CSO Facilities Plan and Environmental Impact Report were filed with MEPA in August 1997. A MEPA certificate was issued in October 1997. In December 1997, DEP issued water quality determinations that were necessary for final CSO plan approval by DEP and EPA. DEP issued a two-year variance for the Charles River in October 1998 and has extended this variance several times. DEP issued a three-year variance for Alewife Brook and Upper Mystic CSOs in March 1999 and has extended the term of the variance several times. Consultant services have included assistance to MWRA in satisfying variance conditions.

As part of CSO Planning and Support, MWRA provided financial and technical assistance to the Charles River Watershed Association in its watershed planning efforts for the Charles River in the 1990s, known as the IM3 Study. MWRA also funded a portion of the costs of a U.S. Geological Survey (USGS) water quality study of the Charles River Basin. Results of these studies will provide additional technical information to support the reassessment of the appropriateness of the recommended Charles River controls in MWRA's CSO plan. To comply with its requirements under the Charles River CSO variance, in 1999 MWRA began funding USGS efforts to collect updated information on Charles River water quality. Final payments to the Charles River Watershed Association and USGS were made in the fall of 1998 and the fall of 2001, respectively.

The federal court order in the Boston Harbor Case required MWRA to develop, by June 1993, a plan for optimizing the existing combined sewer systems to maximize transport and in-system storage capacities, thereby minimizing CSO discharges prior to developing and implementing a long-term control plan. In June 1993, MWRA completed a report entitled System Optimization Plans (SOP) for CSO Control, which recommended more than 100 relatively low cost and easily implemented projects to optimize operation of existing systems. The projects were designed and constructed primarily by the CSO communities, pursuant to SOP financial assistance agreements executed between MWRA and each CSO community. Under the agreements, MWRA reimbursed the communities for design and construction costs. SOP work also includes two projects that are part of the long-term plan: Somerville Baffle Manhole Separation and Somerville Floatables Control. Short-term plans for CSO SOPs were completed in 1997 and MWRA obtained regulatory approvals for its long-term plan in 1997 and 1998.

Various CSO plan reevaluations and systems assessments have been performed under amendments to the CSO Master Planning contract. These include: reevaluation of the Alewife Brook sewer separation plan; assessment of Cottage Farm CSO Facility performance; reevaluation of the need for the Dorchester Brook In-line Storage Project (not included in the CSO Plan or the CIP); reevaluation of the feasibility of closing MWR010; reassessment of CSO discharges from the Boston Marginal Conduit to reevaluate the need for floatables control; and reevaluation of the cost-effectiveness of the East Boston Branch Sewer Relief project in light of cost increases.

By amendment to the Master Planning contract MWRA also added system modeling services to estimate and report actual CSO discharges on an annual basis (through 2003), in compliance with provisions in MWRA's renewed NPDES permit. Since 2004, the annual modeling activities have been conducted by MWRA staff.

The performance of the sewerage system is constantly improving as CSO and non-CSO projects are completed and as maintenance efforts continue to increase the system's capacity. Updated assessments of the system's hydraulic performance and estimates of CSO discharges based on actual field data are essential to verify the predicted benefits of various CSO-related improvements, to recalibrate the system hydraulic model to reflect updated conditions, and to provide up-to-date information to support CSO planning and design efforts. This project provides for temporary flow metering and other efforts to gather and evaluate new data and track system performance. It also includes technical support and system assessments to support the CSO performance assessment required by Schedule Seven and project evaluations required by conditions in CSO variances.

This project has also supported land and easement acquisitions and funded permit costs for all MWRA managed projects in the long-term CSO Control Plan.

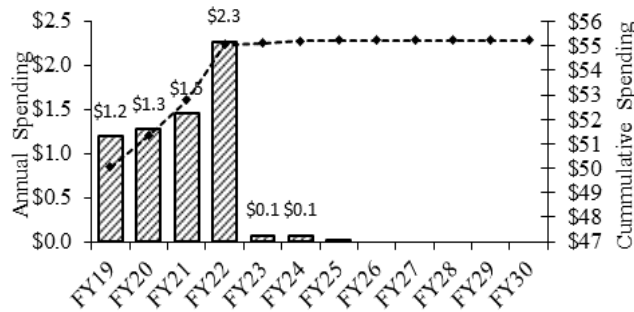
### Scope

Sub-phase	Scope	Status
Technical Assistance	Preliminary planning services prior to and in support of the 1988-90 Facilities Planning/EIR efforts.	Completed
Planning/EIR	Facilities planning and environmental review of CSO control alternatives (1990 Recommended CSO Control Plan).	Completed
Master Planning	System inspections, flow monitoring, water quality monitoring, and performance assessments to improve MWRA's understanding of the combined sewer and regional wastewater systems, optimize the performance of the existing systems, and reassess CSO control needs in the context of evolving EPA policy and a system master plan. Development of the 1997 Facilities Plan/EIR and subsequent reassessments of, and revisions to, that plan.	Completed
Watershed Planning	External watershed planning efforts that may affect CSO control needs, including the Charles River Watershed Association IM3 Study and ongoing USGS water quality studies.	Completed
Modeling	Receiving water quality modeling support to the Master Planning efforts.	Completed
SOP Program	Development and implementation of System Optimization Plans for short-term CSO control. Implemented by CSO communities. Also includes funding for Somerville Baffle Manhole Separation in the long-term control plan.	Completed
System Assessment	Temporary flow metering and other efforts to gather and evaluate new data on system performance.	Active
Technical Review	Technical assistance for the entire CSO control plan including affordability analysis.	Active
CSO Performance Assessment	Study to assess the performance of completed CSO projects to verify whether CSO control goals are met.	Active
Land/Easements	Acquisition of land and easements for construction of MWRA-implemented projects. Also, permits not covered in design and construction contracts.	Active
Somerville Marginal In-System Storage	Memorandum of Agreement between MWRA and the City of Somerville approved on September 14, 2016 and executed on August 29, 2018. MWRA agreed to share the cost of the City's rehabilitation of a major combined sewer upstream of the Somerville Marginal CSO treatment facility, since MWRA's CSO control plan utilizes both the in-line storage and conveyance capacity of the current brick sewer to control and reduce the CSO volume discharged to the Mystic River from the CSO facility.	Active

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$55,210	\$51,318	\$3,892	\$1,458	\$2,271	\$6,275	\$90	\$0

**CSO Support**



Project Status 12/20	94.3%	Status as % is approximation based on project budget and expenditures. Master Planning was substantially complete in September 2004. On September 14, 2005, the MWRA Board of Directors approved an MOU with Massport that governs the Authority’s construction and long-term operation on land owned by Massport, including the North Dorchester Bay tunnel mining shaft and dewatering pump station. Payments to Massport for temporary and permanent easements are complete. Schedule Seven requires MWRA to complete a CSO performance assessment in the period 2018-2021. MWRA issued the Notice to Proceed for Contract 7572, CSO Post-Construction Monitoring and Performance Assessment, on November 8, 2017, ahead of and in compliance with the January 2018 milestone. Five-year CSO variances issued by DEP effective September 1, 2019 include conditions requiring additional CSO control measures for the Lower Charles River and the Alewife Brook/Upper Mystic River, including but not limited to the evaluation of CSO optimization measures and the evaluation of alternatives that may provide further control of treated discharges from the Somerville-Marginal CSO Facility (outfalls MWR205 and SOM007/MWR205A). These were added to the scope of Contract 7572.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY21	Chge.	FY20	FY21	Chge.	FY21	FY22	Chge.
\$55,210	\$55,210	\$0	Apr-22	Apr-22	None	\$6,279	\$6,275	(\$4)

**Explanation of Changes**

- Project spending changed due to updated cash flow for CSO Land Acquisition/Easement.

**CEB Impacts**

- No impacts identified at this time.

## S. 128 Infiltration/Inflow (I/I) Local Financial Assistance Program

### Project Purpose and Benefits

- Contributes to improved public health
- Provides environmental benefits
- Fulfills a regulatory requirement

*Infiltration and inflow (I/I), groundwater and storm water that enter the collection system, contributes significantly to the total wastewater flow treated by MWRA. This depletes capacity that would otherwise be available to transmit sanitary flows, resulting in sewer surcharging, overflows of untreated sewage, more frequent combined sewage overflows, and higher pumping and treatment costs. The I/I Local Financial Assistance Program provides funding assistance for communities to rehabilitate their collection systems with the goal of structurally reducing I/I flows. Funding assistance for local projects complements other MWRA strategies for regional I/I reduction including wastewater metering to support flow based rates, provision of I/I estimates to communities, technical assistance to communities on local projects, regional coordination of I/I policy issues, and interaction with DEP and EPA.*

### Project History and Background

MWRA's Deer Island Wastewater Treatment Plant receives flow from 43 communities. The collection system encompasses 230 miles of MWRA interceptors and over 5,300 miles of community sewers. These sewers are of varying size, shape, age, material, depth, and conditions. All contribute some quantity of infiltration and inflow.

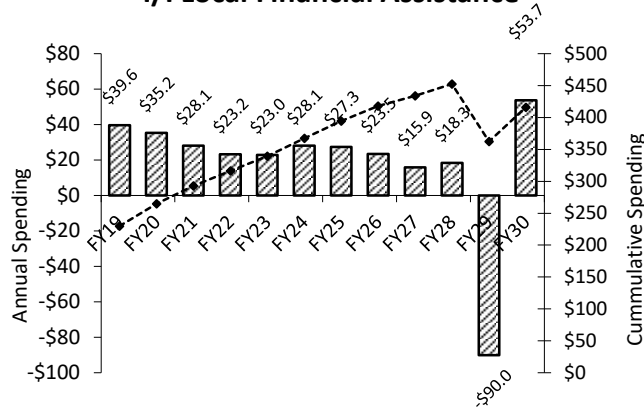
In August 1992, the Board of Directors approved \$25 million to fund the initial phase of the I/I Local Financial Assistance Program. In June 1995, the Board approved \$38.8 million to fund a second phase of the program. Both Phase 1 and 2 funds were distributed as 25% grants and 75% interest-free loans. The Board approved \$37 million to fund a third phase of the program in June 1998, an additional \$40 million for Phase 4 in June 2001, an additional \$40 million for Phase 5 in June 2004, an additional \$40 million for Phase 6 in June 2006, an additional \$40 million for Phase 7 and an additional \$40 million for Phase 8 in June 2009. The grant/loan ratio was revised for Phases 3 through 8 to 45% grants and 55% interest-free loans. During the FY15 Final CIP development in June 2014, Phases 9 and 10 were added to the CIP at \$80 million each to be distributed as 75% grants and 25% interest-free loans. Payback period for Phases 9 and 10 loans was also extended from 5 years to 10 years. During the FY19 Final CIP development, Phases 11 and 12 were added at \$100 million each to be distributed as 75% grants and 25% interest-free loans. During the FY19 Final CIP, \$100 million in Phase 13 I/I Loans only was also added. All program funds are allocated to the 43 member communities based on their share of MWRA's wholesale sewer assessment. Binding commitments for funds are issued by MWRA in the form of Financial Assistance Agreements. Distribution of funds is authorized through FY2030.

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$392,585	\$264,924	\$127,661	\$28,084	\$23,232	\$149,170	\$113,168	(\$59,789)

Project Distribution Status 12/20	60.1%	Through December 2020, MWRA has distributed \$237.3 million in grants and \$219.4 million in interest-free loans to fund 616 separate projects in 43 communities under the I/I Local Financial Assistance Program.
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### I/I Local Financial Assistance



Project Repayment Status 12/20	49.1%	Through December 2020, a total of \$180.5 million has been repaid by member communities receiving interest-free loans.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY20	FY21	Chge.	FY20	FY21	Chge.
\$392,585	\$392,585	\$0	Jun-40	Jun-40	None	\$152,017	\$149,170	(\$2,847)

#### Explanation of Changes

- Project spending changed primarily due to updated cash flows.

#### CEB Impacts

- No impacts identified at this time.



# Waterworks System Improvements



Wachusett Reservoir

# **Integrated Water Supply Improvement Program**

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MWRA's Integrated Water Supply Improvement Program is an initiative consisting of a series of projects to protect reservoir watersheds, build new water treatment and transmission facilities, upgrade distribution storage and MWRA and community pipelines and interim improvements to the Metropolitan Tunnel system redundancy. The program improves each aspect of the water system from the watersheds to the consumer to ensure that high quality water reliably reaches MWRA customers' taps. The program began in 1995 with the initial components which were completed by 2005 and the program remains active as the scope was expanded to continue to improve the water system. The main program components are as follows:

**Watershed Protection** The watershed areas around Quabbin and Wachusett Reservoirs are pristine areas with 85% of the land covered in forest or wetlands and about 75% protected from development by direct ownership or development restrictions. MWRA works in partnership with the Department of Conservation and Recreation (DCR) to manage and protect the watersheds. MWRA also finances all the operating and capital expenses for the watershed activities of DCR and on-going land acquisition activities.

**MetroWest Water Supply Tunnel** The 17-mile-long 14-foot diameter tunnel connects the new Carroll Water Treatment Plant at Walnut Hill in Marlborough to the greater Boston area. It is now working in parallel with the rehabilitated Hultman Aqueduct to move water into the metropolitan Boston area. Construction began on the tunnel in 1996 and the completed tunnel was placed in service in October 2003.

**Carroll Water Treatment Plant** The water treatment plant in Marlborough began operating in July 2005 and it has a maximum day capacity of 405 million gallons per day. This project consolidates all treatment steps into one plant which uses ozone for primary disinfection because ozone is a strong disinfection agent against pathogens such as Giardia and viruses while reducing levels of chlorine disinfection byproducts. Ultraviolet light treatment was added in 2014 as a second primary disinfection process for Cryptosporidium inactivation. The plant also provides corrosion control by adding carbon dioxide and sodium carbonate to raise the water's pH and alkalinity and thus control lead leaching from home plumbing fixtures. The treatment process concludes with fluoridation and residual disinfection with chloramines. A 45 million gallon storage tank on the site allows for daily variation in demand and flexibility in plant operation.

**Water Storage Tanks** As required by Massachusetts Department of Environmental Protection (DEP) rules, MWRA is building covered storage tanks to replace open distribution storage reservoirs near cities and towns to lessen the risk that contaminants will get into the tap water. A 20 million gallon tank in Stoneham replaced the open Fells Reservoir, two 12.5 million gallon circular tanks in Ludlow replaced the Nash Hill Reservoir and the 20 million gallon Loring Road tank replaced the Weston Reservoir. The largest tank, the 115 million gallon Norumbega Covered Storage Facility replaced the open Norumbega Reservoir in Weston and was placed in full service in 2004. In 2009, MWRA completed construction of a 20 million gallon tank to replace the currently off-line Blue Hills Reservoir in Quincy. The 20 million gallon Spot Pond Storage Facility replaced the off-line Spot Pond Reservoir in Stoneham and was put in service in 2015.

**Pipeline Rehabilitation** An important component of the overall Integrated Water Supply Improvement Program is focus on the long-term rehabilitation of older, unlined cast iron and steel water mains in the MWRA and community systems. Water in direct contact with the metal surface corrodes through both biological and chemical processes resulting in tuberculation, thus narrowing the pipes and providing surfaces for bacteria growth. These processes also often result in consumer complaints about rusty water. To reap the full value of the other investments in the water system, MWRA decided to replace or rehabilitate the poor quality pipe particularly given that as of 1993, more than 80 percent of MWRA pipes were unlined. Since then, MWRA has been proceeding with a program of replacing or rehabilitating (normally through cleaning and lining) unlined cast iron and steel mains. Furthermore, in 1998, almost half (47%) of community pipes were unlined. In 1999, MWRA created a \$250 million zero-interest loan program to encourage and facilitate rehabilitation of local mains. An additional \$210 million was added in FY11 for

the Phase 2 program known as Local Water System Assistance Program of which \$10 million is allocated among the Chicopee Valley Aqueduct (CVA) communities. The Local Water System Assistance Program was expanded beginning in FY17 to include \$100 million in interest-free loans to communities solely for efforts to fully replace lead service lines. In FY18 Local Water Assistance Program Phase 3 was added in the amount of \$278 million and Phase 3 CVA for \$14 million. The Local Water System Assistance Program was expanded beginning in FY17 to include \$100 million in interest-free loans to communities solely for efforts to fully replace lead service lines. The Lead Service Line Replacement Loan Program is budgeted over twenty years.

**Metropolitan Tunnel System Redundancy – Interim Improvements** Plans for interim improvements to reduce the risk of failure and improve system operating conditions in the event that an emergency occurs are underway. The projects include the Top of Shafts Interim Improvements, Chestnut Hill Emergency Pump Station improvements, Chestnut Hill Emergency Generator, WASM/SPSM PRV Improvements and rehabilitation of WASM 3. These projects will be completed while the proposed tunnel redundancy project goes through environmental review, design, and construction.

**Metropolitan Tunnel System Redundancy** The Metropolitan Tunnel System includes the City Tunnel (1950), the City Tunnel Extension (1963), and the Dorchester Tunnel (1976). Together, these tunnels carry approximately 60% of the total system daily demand with no redundancy. The tunnels and shafts represent a low risk of failure. However, many of the valves and piping at the surface are in need of repair or replacement. Failure of some valves could cut off a majority of the system's capacity to supply water and have not been exercised for fear of failing in a closed position. These valves should be, but cannot be, replaced because shut down of the City Tunnel would be required. The Metropolitan Tunnel Redundancy program consists of two deep rock tunnels beginning at the same location in Weston near the Massachusetts Turnpike/Route 128 interchange. The 4.5-mile Northern Tunnel generally follows the route of MWRA's existing Weston Aqueduct Supply Main (WASM) 3 transmission main to a point about midway along the pipeline near the Waltham/Belmont border, which will allow flow in WASM 3 in both directions. The 9.5-mile Southern Tunnel runs east to southeast to tie into the surface connections at Shaft 7C of the Dorchester Tunnel. After the tunnels are constructed, the existing tunnels can be removed from service for rehabilitation. The Metropolitan Tunnel Redundancy Program is currently at the very early stages of planning and design. The organizational framework to manage the program within MWRA is in place in the form of the Tunnel Redundancy Department. Program Support Services contract began in April 2019 and the Preliminary Design and MEPA Review contract was awarded in May 2020.

## S. 542 Carroll Water Treatment Plant

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### Project Purpose and Benefits

- Contributes to improved public health*
- Fulfills a regulatory requirement*

*To provide high quality drinking water to MWRA customers and to ensure that the water delivered from the Wachusett Reservoir meets the drinking water quality standards established by the federal Safe Drinking Water Act (SDWA). Part of this objective was met by constructing a 405 million-gallon per day (maximum) water ozonation/chloramination treatment plant primarily in Marlborough with portions of the facility located in Southborough and Northborough. Ultraviolet light disinfection facilities were added in 2014 to comply with new drinking water regulations.*

### Project History and Background

MWRA provides drinking water to 2.3 million people in 42 metropolitan Boston communities. The source water supply comes from the Quabbin and Wachusett reservoirs; two large, high quality water bodies in Central Massachusetts. About 50% of the water flowing from the Wachusett Reservoir comes first from the Quabbin Reservoir, the larger reservoir to the west. MWRA received a waiver from filtration requirements for the Quabbin Reservoir in 1991 from the Massachusetts Department of Environmental Protection (Mass DEP), the agency granted primacy to enforce the Safe Drinking Water Act (SDWA) by the United States Environmental Protection Agency (USEPA) in Massachusetts.

In June 1993, MWRA negotiated an administrative consent order with DEP setting forth the steps needed to comply with the Surface Water Treatment Rule (SWTR). The consent order required MWRA to find a site, design a filtration plant, and build it, unless MWRA along with MDC could demonstrate to Massachusetts DEP no later than 1998 that the system met the criteria for avoiding filtration and therefore that filtration was not required. After an extensive research and decision-making process, the MWRA Board of Directors voted in October 1998 to request a waiver of the filtration requirements from Mass DEP and to build a new water treatment facility using ozonation with chloramination for the water from Wachusett Reservoir as part of the Integrated Water Supply Improvement Program. The decision recognized that an ozonation/chloramination plant would provide appropriate treatment of the MWRA water supply from Wachusett Reservoir and that adding filtration components costing \$180 million to the new plant would not provide as much additional benefit as using funds to rehabilitate old, unlined cast iron pipes in the MWRA and local distribution systems. As part of the treatment technology decision, MWRA's Board also made a commitment to an expanded program of public health surveillance, financial incentives for communities to target rehabilitation of community pipes, and a full review of the need for further treatment including filtration when the plant was complete.

Mass DEP agreed with the MWRA approach in December 1998 and determined that filtration was not required for the MWRA system. Through the Department of Justice, USEPA sued under its SDWA "overfiling" rights, seeking to require MWRA to build a filtration plant and contending that the SDWA allowed no other option. After an extended trial, on May 5, 2000 Judge Stearns issued his decision that MWRA currently complies with all 11 federal criteria for avoiding filtration under the Surface Water Treatment Rule of the Safe Drinking Water Act. He evaluated the current quality of MWRA water and found MWRA's integrated drinking water improvement program including ozonation treatment technology the better approach to "preserving its safety." He found EPA failed to show that filtration of MWRA water was required either as a matter of cost-benefit or scientific necessity. The judge denied EPA's request for injunctive relief but ordered MWRA to give the Court notice of any future violations of the avoidance criteria to allow the consideration of whether the type of relief requested by USEPA might be necessary. No other order was issued. On July 16, 2001, the U.S. Court of Appeals for the First Circuit affirmed Judge Stearns ruling.

The Carroll Water Treatment Plant (formerly Walnut Hill Treatment Plant) was placed in service in July 2005. It provides treatment necessary to fully comply with all current drinking water regulations. EPA issued new regulations in January 2006 for microbial protection (Long Term 2 Enhanced Surface Water Treatment Rule) and disinfection byproduct control (Stage 2 Disinfectants/Disinfection Byproducts Rule). MWRA will not need to make changes to comply with the Stage 2 D/DBP rule. The LT2ESWT rule required a second primary disinfectant and a somewhat more stringent inactivation of cryptosporidium than the plant's current design. This project included the addition of an ultraviolet light disinfection treatment process at the plant to meet requirements of the LT2ESWT rule. The UV system was placed in service in February 2014.

### Scope

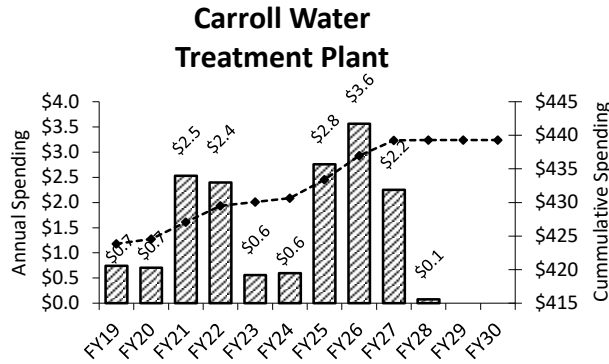
Sub-phase	Scope	Status
Study 1	Investigation of the potential impacts of SDWA amendments on the MWRA system and evaluation of the need, feasibility, and benefits of improved treatment processes.	Completed
Study 2	Evaluation of alternative filtration, disinfection, and corrosion control processes to determine the most appropriate for MWRA source waters. Construction and operation of a pilot plant at the Wachusett Reservoir to allow testing of various treatment technique combinations. Identification of potential locations for treatment facilities.	Completed
AWWARF Red Water Control Strategy Study	Evaluation of treatment options for eliminating discolored water caused by unlined cast-iron pipe. Also investigation of the fundamental aspects of iron chemistry and corrosion using unlined cast-iron pipe from the MWRA community distribution system.	Completed
Emergency Distribution Reservoir Water Management Study	Investigation of potential impacts on the emergency distribution reservoirs resulting from their replacement by new covered distribution reservoirs, and study of ways to maintain their water quality for emergency supply. Norumbega, Weston, Spot Pond, Fells, and Blue Hills Reservoirs have been studied. A pilot study was conducted to evaluate in-reservoir algae treatment for Wachusett Reservoir.	Completed
<i>Cryptosporidium</i> Inactivation Study	Determination of the site-specific efficacy of inactivating <i>Cryptosporidium</i> in Wachusett Reservoir source water using disinfectant alternatives (chlorine/chloramine and ozone/chloramine), and then development of design criteria for the full-scale disinfection contacting system.	Completed
Construction: Cosgrove Disinfection Facility Phases I and II	Construction of the Cosgrove Disinfection Facility. Free chlorine is applied at the Cosgrove Aqueduct to utilize travel time to achieve primary disinfection prior to corrosion control treatment and secondary disinfection.	Completed
Immediate Disinfection-MECo	Massachusetts Electric Co. power line installation to support the disinfection process at the Cosgrove Disinfection Facility.	Completed
Distribution Water Consultant	To provide technical assistance related to distribution system management.	Completed
EIR/Conceptual Design	Environmental reviews, data collection and analyses, and facility designs to support the dual track compliance approach, evaluation of design criteria, site plans, plant hydraulics, and construction of a small-scale demonstration water treatment plant.	Completed

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
Design/CS/RI: Walnut Hill WTP	Design and Engineering Services During Construction for the water treatment plant and associated components.	Completed
WHCP1: Wachusett and Cosgrove Intakes	Upgrade of the Cosgrove Intake and powerhouse to allow automatic, unstaffed operation of the facility. Replacement of the valves and piping in the Wachusett Intake is required to allow this facility to serve as a backup water supply.	Completed
WHCP2: Interim Aqueduct Rehabilitation	Shotcrete lining of the Wachusett Aqueduct to ensure supply of water continues to greater Boston during modifications to Shaft C and to enable it to serve as a backup to the Cosgrove Tunnel.	Completed
WHCP3: Site Work and Storage Tank	Includes clearing and excavation, site access roads, yard piping, and construction of a 45-million gallon storage tank.	Completed
WHCP4: Treatment Facilities	Construction of ozonation, corrosion control, chloramination operations and emergency generator buildings, modifications to Shafts B and C, and installation of system wide instrumentation from Wachusett Reservoir to Norumbega Reservoir.	Completed
WHCP6: Late Site Work	Final grading, landscaping, and paving of treatment facility site.	Completed
Design & Construction WHCP7: Existing Facilities Modifications	Modification to and conversion of the Interim Corrosion Control Facility, Cosgrove Disinfection Facility, Transmission Maintenance Facility. These buildings will be converted from water treatment/quality uses to expanded maintenance shops and SCADA technicians shop facilities for the new water treatment plant. In addition, the project includes demolition of old electrical building, some miscellaneous items at Cosgrove Intake Building, conversion of Cosgrove Disinfection Facility to a Boat Storage Facility and replacement of the roof, lab improvements and HVAC system for Water Quality Lab at Southboro. Also, buildings rehab will incorporate achievable LEED (Leadership on Energy & Environmental Design) goals.	Active
Design Management Support	Professional services and value engineering support to MWRA in review of the water treatment plant design.	Completed
Construction Management/RI	Construction management and resident inspection during construction of the water treatment plant.	Completed
Cosgrove Disinfection Facility Underwater Improvements	Installation of underwater piping needed to apply sodium hypochlorite at Shaft A.	Completed
Community Chlorine Analyzers	Purchase of free chlorine residual analyzers for eight communities to work in association with interim chloramination facilities.	Completed
OCIP	Owner Controlled Insurance Program, providing pollution liability, workers' compensation, general liability, and excess loss coverage during construction of the CWTP.	Completed
Professional Services	As needed legal, insurance, design, and construction specialty services for the Carroll Water Treatment Plant.	Completed
Marlborough MOA	Agreement to mitigate the impacts of the construction of the Carroll Water Treatment Plant on Marlborough.	Completed
WHWTP – MECo	Relocation of electric power lines.	Completed
Site Security Services	Site security services at the Carroll Water Treatment Plant.	Completed

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
CSX Crossing	Railroad track improvements adjacent to CWTP.	Completed
Wachusett Algae Design and Construction	Design and Construction of automated chemical dispensing system for algae control.	Future
Public Health Research	With the assistance of public health agencies and researchers, evaluation of the public health impact of the water treatment changes that occurred in 2004.	Completed
Security Equipment	Design and installation of card access, improved motion and intrusion alarm systems, video surveillance, and monitoring equipment for MWRA facilities.	Completed
WHCP8– Cosgrove Screens Design/CS/RI and Construction	Replace existing manual screens with finer automatically controlled traveling screens.	Completed
AWWARF-Evaluation Ozone and UV	Study of the effects of ozone and ultraviolet treatment on cryptosporidium to ensure inactivation in Wachusett Reservoir.	Completed
Fitout/Construction	Non-construction related items for start-up and operation of the new water treatment plant including furnishings, shop and maintenance equipment, audio/visual supplies, laboratory equipment, and miscellaneous consumable supplies.	Completed
Carroll Ultra Violet Disinfection Design, and Construction	Design and construction programs to add Ultra Violet (UV) to the CWTP. UV system placed into service in February 2014.	Completed
As-Needed Technical Assistance No. 1 and No. 2	As-needed design services to support the start-up of the CWTP including electrical engineering, HVAC engineering, mechanical engineering, civil engineering and a variety of geotechnical, environmental, and architectural technical assistance.	Completed
Ancillary Modifications Construction 1	Follow-up construction from the As-Needed Technical Assistance contracts.	Completed
Ancillary Modifications Construction 2	Address improvements in reliability, optimization of plant performance and/or reduce plant operating costs.	Active
Ancillary Mods Design 3 and 4	Additional As-Needed design services as a follow-up for additional improvements at the Carroll Water Treatment Plant.	Completed
Technical Assistance No. 5 and #6	Continuation of as-needed engineering technical assistance for ancillary modifications design and plant optimization.	Completed
Carroll Water Treatment Plant Storage Tank Roof Drainage System Repair	Design and construct a solution that addresses trench drainage system's poor performance. Poor roof drainage could possibly result in water quality problems.	Future
Technical Assistance No. 7 and No. 8	Continuation of as-needed engineering technical assistance for ancillary modifications design and plant optimization.	Completed
Technical Assistance No. 9 and No. 10	Continuation of as-needed engineering technical assistance for ancillary modifications design and plant optimization.	Completed
Technical Assistance No. 11 and No. 12	Continuation of as-needed engineering technical assistance for design and plant optimization.	Active

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$439,307	\$424,567	\$14,740	\$2,530	\$2,400	\$6,941	\$9,250	\$0



Project Status 12/20	96.8%	<p>Status as % is approximate based on project budget and expenditures. Closed Loop Cooling System, a contract of Ancillary Modifications Construction 2 subphase, was substantially complete in April 2010. Second Gaseous Oxygen Line was substantially complete in May 2012. Wachusett Emergency Connection Valves reached substantial completion in August 2013. Carroll Ultraviolet Disinfection Facility Construction reached substantial completion in February 2014. Existing Facilities Modifications CP-7 Southborough Water Quality Laboratory Upgrades was substantially complete in November 2016 and Marlborough Maintenance Facility was substantially complete in July 2018. Technical Assistance 7 was completed in November 2015. Technical Assistance 8 was completed in June 2018 and 9 and 10 commenced in July 2018. Technical Assistance 11 and 12 commenced in January 2021. Hypochlorite Pump and Pipe Replacement was awarded in September 2020. Cosgrove Boat expected to be awarded in February 2021.</p>
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$438,652	\$439,307	\$655	Dec-26	Dec-26	None	\$6,285	\$6,941	\$656

**Explanation of Changes**

- Project cost and spending changed primarily due to updated cost estimates for Ancillary Modifications Construction and Technical Assistance 10.

**CEB Impact**

- Expect \$100,000 in FY29 for utilities for the Wachusett Algae Facility.



## S. 555 Carroll Water Treatment Plant Asset Protection

### *Project Purpose and Benefits*

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*
- Fulfills a regulatory requirement*

*To protect the investment of MWRA ratepayers by ensuring timely replacement of equipment and systems.*

### **Project History and Background**

The John J. Carroll Water Treatment Plant has been in service since 2005. Some components of the plant are approaching the end of their service lives while others will need replacement in the future. This project was developed to ensure that MWRA maintains ongoing service while optimizing operations in its water facilities. This project in its current form addresses immediate critical facility and equipment issues.

While the current schedule indicates a completion date of 2034 for construction, the CWTP Facility Asset Protection project will be ongoing throughout the useful life of the facilities.

### **Scope**

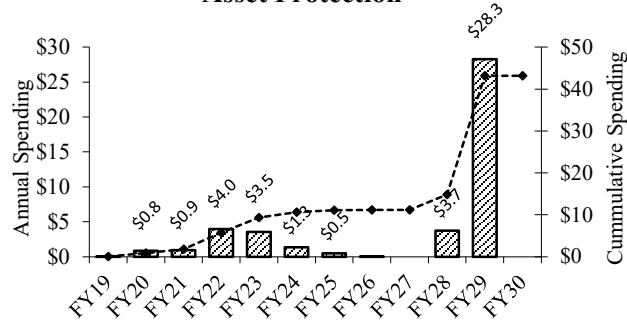
<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
Carroll Water Treatment Plant Asset Protection Study (7593)	A consultant's evaluation of CWTP's capital assets and recommendations for upgrades or modifications to ensure operational efficiency of these assets.	Future
LOX Yard Redundancy (7594)	Provide new piping, valves, vaporizer and/or additional liquid oxygen storage to eliminate single points of failure in the CWTP Liquid Oxygen Yard.	Future
Carroll Water Treatment Plant Water Pump Variable Frequency Drives Replacement (7595)	The variable frequency drives on the CWTP Plant Water System are 13 years old and should be replaced in the near future. The normal life of VFDs is shorter than the pumps they control. It is unlikely that the existing VFDs will be operable until 2030 when the plant water pumps are scheduled to be replaced.	Future
Ozone Generator Re-Build (7596)	Periodic re-building of the ozone generators, including cleaning and gasket replacement, is necessary to maintain proper operation.	Future

Sub-phase	Scope	Status
Soda Ash & Ammonia Equipment Replacement (7598)	Replace the existing fluoride weigh feeder system and chemical feed piping and the soda ash feed equipment to maintain operability. Design nearing completion.	Active
Carroll Water Treatment Plant Chemical System Pipe Pumps, and Tank Replacement (7597)	The condition of the plant chemical system components varies. There have been leaks in the hypochlorite pipes and tanks. The ammonia, bisulfite and fluoride feed systems are aging. This project will rehabilitate these systems as needed.	Future
HVAC Equipment Replacement (7605)	The HVAC equipment at CWTP is over 10 years old. The refrigerant used in this equipment (R-22) is being phased out. The existing equipment will not function with the new refrigerant. Replacement of this equipment will be necessary.	Active
Water Pump Replacement (7606)	The plant water pumps will need to be replaced in the future as they approach the end of their useful life. The current schedule is to replace these pumps by 2030.	Future
Ozone Generator Replacement (7607)	The ozone generators are currently scheduled to be rebuilt in 2022. Eventually spare parts will no longer be available. The current schedule is to replace the ozone generators by 2030.	Future
Ultra Violet Reactor Replacement (7608)	Replacement of the UV reactors will likely be required by 2034 as spare parts for the existing units may no longer be available then.	Future
Carroll Water Treatment Plant Control Room Fire Suppression System (7592)	Replace the existing wet fire sprinkler system in the CWTP Control Room, Communications Room, Electrical Room and Emergency Operations Center with a clean agent type system that does not use water to suppress a fire.	Future
CWTP Emergency Generator No. 1 Replacement (7642)	Replace the generator/alternator on emergency generator No. 1 due to failure.	Complete
CWTP UV Rooms Dehumidification (7790)	Address the tripping of the existing refrigerant type dehumidification units in the UV Rooms by installing desiccant type dehumidifiers, which will operate during the warmer months.	Active
CWTP Parapet Wall Repairs (7755)	Cover the CWTP parapet walls with aluminum caps and a waterproof membrane to prevent leaks into the walls. Replace portions of the existing lightning protection system. Install safety railings around roof hatches and equipment within 10 feet of roof edges.	Active
Marlborough Emergency Pump Station Connection	Install a connection to emergency pumps that will be installed by the City of Marlborough near the Cedar Hill Pump Station to establish water supply redundancy. Design nearing completion.	Active

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$43,127	\$869	\$42,258	\$918	\$3,971	\$9,295	\$5,561	\$28,271

**Carroll Water Treatment Plant  
Asset Protection**



Project Status 12/20	1.9%	HVAC Equipment Replacement reached substantial completion in April 2020. CWTP Emergency Generator No. 1 Replacement was completed in May 2020.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$42,563	\$43,128	\$565	Oct-34	Oct-34	None	\$10,092	\$9,296	\$(796)

**Explanation of Changes**

- Project cost changed due to new contract for Marlborough Emergency Connection.
- Spending changed primarily due to new contract above and CWTP UV Rooms Dehumidification. Contract broken out from CWTP HVAC Construction.

**CEB Impacts**

- None identified at this time.

## S. 597 Winsor Station/Pipeline Improvements

### Project Purpose and Benefits

Extends current asset life  Results in a net reduction in operating costs

**Master Plan Project  2008 Priority Rating 1 (See Appendix 3)**

*Rehabilitation of the water supply infrastructure at the Winsor Station in Belchertown. Design and construct station piping improvements which would allow water to go to the Swift River without going through the isolation valve. Design and construct means to control flow in the Quabbin Aqueduct. Quabbin Release Pipeline work is also included.*

### Project History and Background

Winsor Dam impounds the Quabbin Reservoir. At the dam, an intake feeds two conduits that are interconnected at a powerhouse below the dam. One conduit discharges to the Chicopee Valley Aqueduct; the other conduit feeds a now inoperative hydroelectric turbine/generator unit. A bypass valve at the Winsor Station house also allows flow to be discharged directly to the Swift River.

The water supply infrastructure within the Winsor Station is in need of major repair and upgrade as much of it is over 75 years old. Several other sub-phases are needed to address the extensive work on the Quabbin Transmission System and the Swift River bypasses. These sub-phases include:

- Winsor Station Chapman Valve Repair & Purchase of Sleeve Valves - Immediate replacement of the existing damaged Chapman Valve with sleeve valves.
- Pipeline Replacement Phase 1 – To repair and upgrade large-diameter piping and valving in the basement of the Winsor Station including the bypasses.
- Quabbin Aqueduct – To replace the antiquated and unreliable shutter system at Shaft 12 with a gate to control flow in the Quabbin Aqueduct and inspect the Quabbin Tunnel and recommend maintenance or repairs. Make repairs to the Shaft 12 building and Shaft 2.
- Winsor Power Station Upgrades -. Rehabilitate Winsor Power Station and the CVA Intake Structure.
- Hatchery Pipeline- To convey cold, well-oxygenated hypolimnetic water from Quabbin Reservoir to the downstream trout hatchery, a hydro turbine is located in a vault near the connection of the pipeline to the CVA that captures some of the hydraulic energy contained in the pipeline as the water is conveyed to the hatchery. The power generated is sold back to the grid.

### Scope

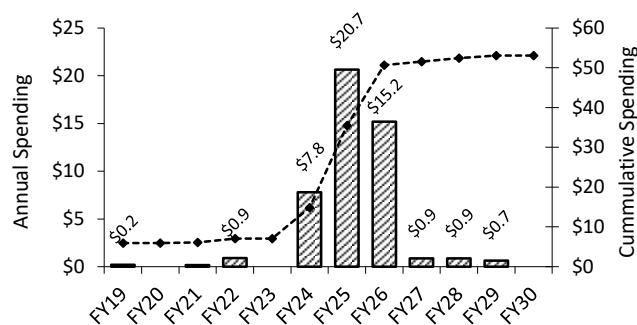
Sub-phase	Scope	Status
Quabbin Aqueduct & Winsor Power Station Preliminary Design (7114)	Preliminary design of improvements at Shafts 1, 2, 9 and 12 of the Quabbin Aqueduct and the Winsor Power Station.	Completed
Shaft 12 Isolation Gate Design CA/RI (7509) and Construction (7197)	Installation of a gate to control flow at Shaft 12, the intake to the Quabbin Aqueduct, thereby improving safety and reliability of the transmission system.	Future

Sub-phase	Scope	Status
Quabbin Aqueduct Inspection (6277)	TV inspection of the Quabbin Aqueduct.	Future
Winsor Power Station Upgrades and Quabbin Buildings Rehabilitation Design CA/RI (7460) and Construction (7115)	Design and Construction to address piping improvements and building rehabilitation for water supply and Swift River discharge. Will also include improvements to the CVA Intake Structure.	Future
Quabbin Aqueduct Shaft 2 Repairs (7198)	Replacement of deteriorated outer concrete layer at Shaft 2. Replacement of fence posts and cast iron vent pipes. Repainting of manhole frames and covers.	Active
Hatchery Pipeline Design (7017) and Construction (7235)	Design and construction of approximately 5,000 feet of pipeline to convey 6 MGD of water from the CVA to the downstream trout hatchery. The project would provide a consistent and reliable source of high quality cold water to the hatchery, as well as supplement flows to the Swift River. The project will also include a hydro turbine that would capture some of the hydraulic energy contained in the pipeline as the water is conveyed to the hatchery which will be sold back to the grid. The hydro turbine portion is funded under the Alternative Energy Initiatives project and Massachusetts Leading by Example Program.	Completed
Winsor Station Chapman Valve Repair (7212)	Construction of replacement valving for the existing 36" Chapman Butterfly Valve (design by Technical Assistance consultant).	Completed
Purchase of Sleeve Valves (7234)	For replacing the damaged Chapman Butterfly Valve.	Completed

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$53,081	\$5,938	\$47,144	\$183	\$917	\$1,304	\$45,391	\$653

**Winsor Station/Pipeline Improvements**



Project Status 12/20	11.2%	Status as % is approximation based on project budget and expenditures. Winsor Station Chapman Valve Repair was completed in November 2009. Shaft 12 isolation gate Design CA/RI notice to proceed was issued in March 2017. Preliminary design was completed and final design was subsequently cancelled. Hatchery Pipeline Design/ESDC/RI commenced in August 2013 and construction was substantially complete in September 2017.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY20	FY21	Chge.	FY21	FY22	Chge.
\$53,203	\$53,081	(\$122)	Jan-26	Jan-26	None	\$1,304	\$1,304	\$0

**Explanation of Changes**

- Project cost change primarily due to inflation adjustments for Quabbin Aqueduct and Winsor Power Station Construction, Shaft 12 Isolation Gate Construction and Quabbin Aqueduct TV Inspection contracts.

**CEB Impacts**

- None identified at this time.

## S. 604 MetroWest Water Supply Tunnel

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### Project Purpose and Benefits

- Contributes to improved public health*
- Fulfills a regulatory requirement*
- Extends current asset life*
- Improves system operability and reliability*

*To provide transmission redundancy for the Hultman Aqueduct ensuring reliable water delivery and providing sufficient hydraulic capacity to support the John J. Carroll Water Treatment Plant and covered storage distribution facilities. This project consists of construction of a 17.6-mile deep rock tunnel from Shaft D in Marlborough to Shaft 5 of the City Tunnel in Weston, and to Shaft W in Weston, as well as the construction of a covered storage facility at Loring Road in Weston. Also included construction of shafts and valve chambers for connections of Shaft 4 in Southborough and to the Norumbega Covered Storage facility.*

### Project History and Background

Adequate transmission capacity is a critical component of MWRA's Integrated Water Supply Improvement Program. MWRA's water delivery depends on a system of tunnels and aqueducts that transport water from the Quabbin and Wachusett Reservoirs to the distribution reservoirs in metropolitan Boston. The existing tunnels and aqueducts were deficient in several respects. First, the transmission system was unable to supply sufficient hydraulic capacity during peak flow periods, leading to pressure deficiencies in all high service areas during the summer months. Second, key sections of the transmission system, such as the Hultman Aqueduct and the Southborough Tunnel, relied on a single conduit. In the event of failure of any of the major transmission sections, the remaining waterworks system could not meet the demand for water.

Construction of the MetroWest Water Supply Tunnel and its extension to the Weston Aqueduct Terminal Chamber has provided the critically needed minimum level of transmission redundancy for the Hultman Aqueduct. Enhancements and improvements to the reliability of the City Tunnel and the City Tunnel Extension are being planned as part of the Long-Term Redundancy project. This will also enhance system maintenance by allowing each major supply conduit to be taken out of service for inspection, cleaning, and repair.

In June 1989, MWRA began engineering work on reconstruction of the Sudbury Aqueduct. In May 1990, the Board of Directors directed staff to put minimum effort into further study of the Sudbury Aqueduct reconstruction alternatives and maximum effort into study of the all-tunnel alternative. The advantages of tunneling included a large reduction in surface activities resulting in a reduced environmental impact, and the potential to obtain a large increase in water transmission capacity to enable the tunnel to supplant the Weston Aqueduct as well as provide redundancy to the Hultman Aqueduct. Other advantages included a higher pressure rating by constructing a tunnel deeper into rock, and the ability to construct along a straight line, reducing the overall length of the project by three miles.

In November 1990, the Board of Directors directed staff to eliminate the planned tunnel from Norumbega Reservoir to the Chestnut Hill Reservoir in favor of connecting to Shaft 5 of the City Tunnel and to the eastern end of the Weston Aqueduct. The connection allowed the Weston Aqueduct and Weston Reservoir to be taken off-line and used only for emergency supply as required by the Safe Drinking Water Act.

In December 1995, the Board of Directors authorized solicitation of bids on the first major construction contract of the MetroWest Tunnel project. In June 1996, a notice to proceed was issued on this contract, beginning the transition from design to construction of the project. In November 2003, the tunnel was placed in service.

In September 2005, the Board of Directors authorized an engineering services contract to rehabilitate the existing Hultman Aqueduct and to interconnect the MetroWest Tunnel with the Hultman Aqueduct. In the interim, Valve Chamber E-3 at Southborough was constructed in order to facilitate system operations and the demolition of an existing chlorine building was completed in preparation for construction of the interconnections.

In May 2013 construction was substantially complete on Contract CP6A to interconnect the MetroWest Tunnel with the Hultman Aqueduct and to rehabilitate the Hultman Aqueduct from Shaft 4 in Southborough to Shaft 5 of the City Tunnels and to Shaft W of the MetroWest Tunnel in Weston. A second construction contract (CP6B) was substantially complete to rehabilitate the remainder of the Hultman Aqueduct from Shaft C of the Cosgrove Tunnel to Shaft I of the Southborough Tunnel, and to rehabilitate the top-of-shaft facilities at Shaft 4 of the Southborough Tunnel in Southborough.

**Program Elements**

The MetroWest Tunnel is 17.6 miles long with a 14-foot finished diameter. The first segment of the tunnel extends from the water treatment plant site at Walnut Hill on the Marlborough/Southborough line to Shaft 4 of the Hultman Aqueduct in Southborough. From there, the tunnel continues to a "WYE" connection east of Norumbega Reservoir, and continues east from the "WYE" to Shaft 5 of the City Tunnel and northward to the Weston Aqueduct Terminal Chamber. The tunnel depth varies from 200 to 500 feet below ground surface along the alignment.

After the MetroWest Tunnel and the John Carroll Water Treatment Plant were in service, the Hultman Aqueduct was inspected and rehabilitated. Surface distribution facilities, including piping, valve chambers, and risers connect the tunnel to the Hultman Aqueduct and local community services. Intermediate connections between the MetroWest Tunnel and the Hultman Aqueduct permit operation of segments of either the aqueduct or the tunnel interchangeably, allowing flexibility in the maintenance of the two conduits.

**Scope**

Sub-phase	Scope	Status
Study	Study of the aqueduct/tunnel system to determine the best alternative to improve hydraulic capacity and create redundancy.	Completed
Construction-Sudbury Pipe Bridge	Rehabilitation of the Siphon Pipe Bridge at the Weston Aqueduct which experienced significant leakage.	Completed
Design/EIR-Tunnel-Engineering Services During Construction	Environmental impact report (EIR) process and design of the 17.6-mile long, 14-foot diameter tunnel. Construction support services, including environmental and safety compliance, claims assistance, contract administration, quality assurance testing, and community relations.	Completed
Construction: Western Tunnel Segment – CP1	Construction of the western portion of the tunnel and associated surface facilities. Shaft E was constructed at the Sudbury Dam and a tunnel was excavated 4.9 miles to Shaft D, located adjacent to the clear well of the Walnut Hill Water Treatment Plant (WHWTP). A riser shaft has been excavated to connect the tunnel to Southborough's Hosmer Pump Station and includes the surface piping facilities necessary to bring water from the Wachusett Reservoir.	Completed



Sub-phase	Scope	Status
Construction: Middle Tunnel Segment – CP2	Construction of approximately 11.9 miles of tunnel between Southborough and Weston. Construction was staged from Shaft L, located at a sand and gravel pit in Framingham, where a permanent connection to the Hultman will be constructed. Along the alignment, four small-diameter shafts have been constructed for community connections to Framingham and Weston. The western reach of the Middle Tunnel Segment portion of the tunnel terminates at Shaft E. The eastern reach terminates at the "WYE" where it meets the East Tunnel Segment. Shafts NE and NW will be constructed on the northwest side of Norumbega Reservoir where surface work included construction of valve chambers and surface piping to allow connections to the Hultman Aqueduct and Norumbega Reservoir. The design at Shaft N included provisions for connections to the Norumbega Covered Storage Facility and the proposed Metropolitan Tunnel Loop.	Completed
Construction: Shaft 5A-CP3	Shaft 5A was excavated near the intersection of Route 128 and the Massachusetts Turnpike.	Completed
Construction: Eastern Tunnel Segment – CP3A	Construction of the eastern portion of the tunnel. An approximately 4,400-foot long, 12-foot finished diameter tunnel was constructed from the Shaft 5A bottom through the "WYE" where it meets the Middle Tunnel Segment and on to Shaft W where a shaft connection to the Loring Road storage tanks was made.	Completed
Construction: MHD Salt Sheds – CP5	Massachusetts Highway Department (MHD) salt storage operations were relocated from the Shaft 5A site to a new, nearby location on MHD property on Recreation Road in Weston. This allowed demolition of the MHD salt sheds at the Shaft 5A site.	Completed
Testing and Disinfection – CP7	Pressure testing of the MWWST from Shaft E (west) to Shaft W and 5A, and disinfection and dechlorination of the entire tunnel from Shaft D to Shafts W and 5A, and final disinfection of the Norumbega Covered Storage tanks. Also included the disinfection and dechlorination of the Wachusett Aqueduct and the piping connections through Walnut Hill to MetroWest Shaft D.	Completed
Construction: Loring Road Covered Storage-CP8	Construction of surface facilities at the Shaft W site included a 20 million-gallon storage facility that replaced the function of the existing Weston Aqueduct/Weston Reservoir system, allowing the system to be taken off-line and placed on emergency stand-by status. The storage facility has been constructed as two concrete tanks partially buried in a hillside adjacent to Shaft W. Connections were made under this contract at Shaft W to two WASM (1 and 2) low service mains and the WASM 4 high service main, as well as to the 7-foot diameter branch of the Hultman Aqueduct. Also included rehabilitation of 4,100 linear feet of 60-inch diameter pipe and four master meters.	Completed
Construction Management/RI	Full inspection of all construction activity, as well as provision of construction support services including environmental and safety compliance, claims assistance, contract administration, quality assurance testing, community relations, labor relations, engineering services during construction, and provision of technical assistance.	Completed

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
Hultman Study	Risk analyses to determine which leaks should be repaired now and a monitoring plan for leaks which presently do not threaten the integrity of the aqueduct.	Completed
Hultman Leak Repair	Test pit excavation and leak repair on the Hultman Aqueduct.	Completed
Hultman Repair Bands	Purchase of external repair bands to be installed as part of Hultman investigation and repair.	Completed
Hultman Investigation and Repair	Evaluation of various segments of the Hultman Aqueduct and installation of repair bands at major leak sites.	Completed
Land Acquisition	Easements along the 17.6-mile tunnel construction route, as well as land at the Shaft W and Shaft L sites.	Completed
Professional Services	Services such as construction safety, contractor audit, legal services, risk management consulting services, and other miscellaneous services.	Completed
Framingham MOU	Agreement to mitigate the impacts of the construction on the Town of Framingham.	Completed
Weston MOU	Agreement to mitigate the impacts of the construction on the Town of Weston.	Completed
Southborough MOU	Agreement to mitigate the impacts of the construction on the Town of Southborough.	Completed
Local Water Supply Contingency Design/CA/RI and Construction	Design and implementation of a Water Supply Contingency Plan including the installation of new local mains where residential well supplies could be affected by tunnel construction.	Completed
Community Technical Assistance	Funds to assist communities with the redesign of utility plans.	Completed
Owner Controlled Insurance	Owner controlled insurance program providing workers' compensation, general liability, and pollution liability insurance for MetroWest Water Supply Tunnel construction.	Completed
Design CA/RI Hultman Interconnect CP6	Design CA/RI of the interconnections between the MetroWest Water Supply Tunnel and the Hultman Aqueduct as well as inspection of the Southboro Tunnel and rehabilitation of the Hultman Aqueduct.	Completed
Construction: Hultman CP9	Construction of Valve Chamber E-3.	Completed
Interim Disinfection	Temporary disinfection related to CP-7 sub-phase.	Completed
Equipment Prepurchase	Pre-purchased one 10-foot diameter butterfly valve for installation in Valve Chamber E3.	Completed
Construction CP6A Lower Hultman Rehab. and 6B Upper Hultman Rehab.	Construction of interconnections between Metrowest Tunnel and the Hultman Aqueduct, and rehabilitation of Hultman Aqueduct including replacement or repair of air relief structures, blow off valves, culverts beneath the aqueduct; replacement of existing valves; and additional items to restore the aqueduct to safe and efficient operation after more than 70 years of service without an overhaul.	Completed
Construction 6A Demolition	Demolition of existing chlorine storage building to allow for construction of a new valve chamber on the Hultman Aqueduct.	Completed

Sub-phase	Scope	Status
CP6 Easements	Easements for CP-6 Contract.	Completed
Valve Chamber and Storage Tank Access Improvements Design (7283) and Construction (7476)	Design and construction to provide better and safer access to valve chambers for Water Quality and Maintenance personnel. Provide secure hatches at Loring Road Tanks.	Future
Shafts 5A/5 Surface Piping Cathodic Protection Construction (7477)	Construction to replace cathodic protection systems.	Completed
Hultman Shaft 5A Leak	Repair Hultman Leak at Shaft 5A.	Completed

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$700,184	\$697,182	\$3,002	\$0	\$0	\$0	\$3,002	\$0

Project Status 12/20	99.6%	Status as % is approximation based on project budget and expenditures. CP6A Lower Hultman Rehab was substantially complete in May 2013. Upper Hultman CP6B contract was substantially complete in June 2013. Shaft 5A/5 Surface Pipe Cathodic Protection was substantially complete in June 2017.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY20	FY21	Chge.	FY21	FY22	Chge.
\$700,184	\$700,184	\$0	Mar-27	Mar-27	None	\$0	\$0	\$0

#### Explanation of Changes

- N/A.

#### CEB Impact

- None identified at this time.

## S. 616 Quabbin Transmission Rehabilitation

### Project Purpose and Benefits

- ☑ Provides environmental benefits
- ☑ Extends current asset life
- ☑ Improves system operability and reliability

To ensure continued reliable delivery of high quality water to MWRA customer communities through inspection, evaluations, and rehabilitation of the aging transmission system. Many of the transmission facilities and structures were constructed in the 1930s and 1940s and are in need of repair, routine maintenance, updating, and modifications for code compliance, health and safety, and security. Based on the findings and recommendations of this inspection phase, MWRA has and will continue to add design and construction phases to the CIP.

### Project History and Background

This project provided an engineering assessment of key water transmission facilities, structures, and operations. Many of the 44 facilities were constructed in the 1930s and 1940s and are in need of repairs, routine maintenance, and modifications for code compliance, health and safety, and security. The facilities and structures include dams and spillways, structures on tops of shafts, hydraulic diversion facilities, gatehouses, intake buildings, service buildings, and garages. The facilities are spread over a large geographic area ranging from Quabbin Reservoir eastward to the Boston Metropolitan area.

The engineering assessment utilized existing information and site visits to inventory the condition of each facility. The work yielded a facility report that identifies existing conditions and provides recommendations for needed improvements, rehabilitation, and repairs. The project resulted in the development of a conceptual design for each facility including alternatives, basic design criteria, cost estimates, required permits, and schedules. MWRA uses the final conceptual design reports to develop a detailed scope of work for the future procurement of engineering services for subsequent design, construction administration, and resident inspection services. Staff will integrate and coordinate project findings with MWRA's current master planning efforts.

One critical component of the Quabbin Tunnel, the pressure-reducing valves at the Oakdale Power Station, was targeted for immediate replacement. These valves were in poor condition. Due to their important function of reducing hydraulic head to allow water from the Quabbin Reservoir to flow into Wachusett Reservoir, replacement of the Oakdale Valves was a high priority.

### Scope

Sub-phase	Scope	Status
Facilities Inspection	Assessment of existing conditions; update of infrastructure rehabilitation evaluation; identification of improvements/repairs/upgrades, establishment of priorities for repairs, and preparation of cost estimates.	Completed
Oakdale Valves Phase 1	Study, design, and construction for the rehabilitation/replacement of two valves and miscellaneous support equipment at the Oakdale facility.	Completed
Equipment Pre-Purchase	The two large butterfly valves (84 inch and 72 inch) and the fixed orifice valve (48 inch) that were needed in Phase I Valve Rehabilitation, required 6 to 10 months to fabricate and had to be pre-purchased so the valves were available for installation.	Completed

Sub-phase	Scope	Status
Oakdale Phase 1A Design & Construction	Upgrade the 60-year old Oakdale facility and electrical control systems and the switchyard which are antiquated and unsafe to personnel. Will lower the station service voltage from 2,200 to 480.	Completed
Ware River Intake Valve Replacement Design and Construction	Replace oil-actuated valves currently underwater and inaccessible for maintenance with electric actuated valves. Also, replace siphons with hard piped intakes and automate equipment with remote control capabilities.	Future
CVA Intake Motorized Screen Replacement Construction	Replace current motorized screens on the CVA Intake. One screen has failed. Both have reached the end of their useful life. The screens keep debris from entering CVA.	Completed
Rehabilitation of Oakdale Turbine Design and Construction	Rehabilitate turbine. Turbine was last rehabilitated in 1986 and we will be approaching thirty years which is the expected life of an overhaul.	Future
Rehabilitate Wachusett Bastion Design (7333), Construction (7697) and REI (7716)	Make structural improvements to the Bastion including a new roof, repairs of the concrete walls, and drainage and ventilation systems.	Active
Wachusett Lower Gatehouse Pipe Replacement Construction (7380) and REI (7727)	Replace the oldest piping in the Lower Gatehouse. Existing piping and valves have failed or are of poor condition. Other piping and valves of the same age in this facility have already been replaced.	Future
Wachusett Lower Gatehouse Interim Pipe Repair (7379)	Install blind flanges on the three 48-inch pipes in the Lower Gatehouse to isolate the pipes from the broken Equalizer pipe.	Completed
Wachusett Lower Gatehouse Boiler and Hazardous Material Abatement Constr. (7698)	Replace the existing propane fueled boilers and radiators. Abate the lead based paint on the exterior brick walls and turbines and the asbestos tile near the windows/radiators.	Active
Wachusett Lower Gatehouse Windows and Doors (7788), Roof and Repointing (7789) and REI (7726)	Replace the leaking roof, gutters, and repair/seal masonry and degraded windows and doors. Sealing of the building will allow more efficient heating of building space to prevent further deterioration.	Future
Oakdale High Line Replacement	Replacement of 70 year old 69kv overhead transmission line and ground operated switch that supplies power and delivers power from the Oakdale Power Station.	Future
Wachusett Dam Bridge Crane Removal (7780)	Demolition of old bridge crane that must be removed from the Wachusett Dam Lower Gatehouse as it represents a safety hazard.	Active

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$21,658	\$9,175	12,483	\$1,706	\$4,076	\$10,563	\$2,403	\$25

Project Status 12/20	42.8%	Status as % is approximation based on project budget and expenditures. Valves were received in February 2006 and Phase I Design was substantially complete in June 2007. Phase 1A Construction was substantially complete in July 2013. CVA Motorized Screens Replacement Construction was substantially complete in August 2017. Wachusett Dam Lower Gate House Interim Pipe Repair commenced in October 2019.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$22,246	\$21,658	(\$588)	Jan-27	Jan-27	None	\$11,099	\$10,563	(\$536)

**Explanation of Changes**

- Project cost and spending changed due to updated cost estimate for Wachusett Lower Gatehouse Building Boiler & Lead Rehabilitation contract as a result of being separated into three smaller contracts, and for Wachusett Lower Gatehouse Pipe Replacement Resident Engineering/Inspection (REI).

**CEB Impacts**

- None identified at this time.

## S. 617 Sudbury/Weston Aqueduct Repairs

### Project Purpose and Benefits

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*

*To ensure continued reliable delivery of high quality water to MWRA customer communities through study, design, and implementation of repairs to the Sudbury and Weston Aqueducts. These backup systems are both more than 100 years old, and need to be ready for emergency use.*

### Project History and Background

This project includes the inspection of the Sudbury Aqueduct in preparation for future repairs. This aqueduct constructed in 1878 is almost 140 years old and is in need of renewal and upgrade. This is a critical back-up facility for the City Tunnel and the Sudbury Reservoir emergency supply. The inspection phase of the Sudbury Aqueduct was conducted in 2006. The Inspection Report identified several short-term repairs required to better prepare the aqueduct for short-term use. This project will also fund inspections of the Weston Aqueduct which is more than 110 years old. The results of the inspection will allow MWRA to evaluate and prioritize future construction and repair work for this aqueduct.

### Scope

Sub-phase	Scope	Status
Hazardous Materials	Remove contaminated sediment from aqueduct.	Completed
Sudbury Aqueduct Inspection	Inspection of the Sudbury Aqueduct to identify need for future repair work.	Completed
Weston Aqueduct Sluice Gates Construction	Construct a means to isolate the Weston Reservoir from a break west of Ash Street that could detrimentally affect the elevation in the Weston Reservoir. The construction contract will replace antiquated stop-plank gates in Siphon Chambers 3 and 4 blow-off valves along the Weston Aqueduct and an air valve on the Sudbury River Pipe Bridge. Under construction.	Active
Weston Aqueduct Gatehouse Rehabilitation	Evaluation of the structural integrity of the gatehouse and design of modifications necessary to rehabilitate the structure. Design for replacement of stop logs and stop log guides.	Future
Sudbury Short-Term Repairs Phase 1 and 2 Construction	Repairs needed in order to better prepare the Sudbury Aqueduct for short-term use (flow test and emergency activation).	Future
Rosemary Brook Siphon Building Repairs	Repairs to stabilize structures for functional use as emergency water supply facility. Repairs include re-pointing and rebuilding of brick structures and roof replacement. Rosemary Brook Siphon in conjunction with the Sudbury Aqueduct supplies raw water to the Chestnut Hill Reservoir in the event of an emergency.	Completed
Evaluation of Farm Pond Buildings- Waban Arches (7473)	Assessment of historic structures to determine measures to repair and stabilize facilities. Will include Massachusetts Historical Commission review of proposed alternative.	Completed

Sub-phase	Scope	Status
Waban Arches Rehabilitation Design (7616) and Construction (7617)	Design and construction of repairs to the Waban Arches of the Sudbury Aqueduct.	Future
Farm Pond Inlet Chamber & Gatehouse Design (7618) and Construction (7619)	Design and repairs to the Farm Pond Inlet Chamber and Gatehouse of the Sudbury Aqueduct.	Future

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$12,495	\$2,627	\$9,868	\$1,546	\$400	\$2,341	\$7,255	\$667

Project Status 12/20	21.3%	Status as % is approximation based on project budget and expenditures. Inspection of Sudbury Aqueduct was completed in October 2006. Rosemary Brook Building Repair and Evaluation of Farm Pond Buildings-Waban Arches reached substantial completion in FY18. Weston Aqueduct Sluice Gates Construction was awarded in October 2020.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$12,495	\$12,495	\$0	Oct-28	Oct-28	None	\$2,341	\$2,341	\$0

#### Explanation of Changes

- N/A.

#### CEB Impacts

- None identified at this time.



## S. 621 Watershed Land

### Project Purpose and Benefit

- Fulfills regulatory requirement.*
- Provides water quality benefits.*
- Continues to improve public health.*

*Acquire, in the name of the Commonwealth, parcels of real estate or interests in real estate that are important or critical to the maintenance of water quality in MWRA water supply sources and the advancement of watershed protection.*

### Project History and Background

The Watershed Protection Act (WsPA) regulates land use and activities within critical areas of the Quabbin Reservoir, Ware River, and Wachusett Reservoir watersheds for the purpose of protecting the quality of drinking water. Since the passage of the WsPA in 1992, watershed lands had been purchased by the Commonwealth through its bond proceeds. The MWRA was then billed for and, over the years, paid increasing percentages of the debt service on those bonds, eventually reaching 100% of the debt service. MWRA also makes Payments in Lieu of Taxes (PILOT) to each watershed community for the land owned for water supply protection.

Since 1992, land acquisition has evolved into program-status and is a significant component of the Watershed Protection Plans for Quabbin Reservoir/Ware River and Wachusett Reservoir. Land in the watersheds undergoes analysis by the Land Acquisition Panel (LAP), which is comprised of Department of Conservation and Recreation (DCR) and MWRA staff. The LAP analyzes critical criteria for protection of the source water resources, including presence of streams and aquifers, steep slopes, forest cover, and proximity to the reservoirs. Parcels are ranked as to their value to the water supply system and, when the desirable parcels become available, are pursued through the LAP for acquisition through a “friendly taking” in fee or conservation restriction. LAP maintains an active list of parcels to pursue as seller and LAP interest, and funding availability, exist to support acquisition.

Under the revised Memorandum of Understanding between MWRA and DCR, executed April 2004, MWRA will utilize its own bond issuances for the purpose of acquiring, in the name of the Commonwealth, parcels of real estate or interests in real estate for the purpose of watershed protection. At its December 2004 meeting, the MWRA Board of Directors approved the use of MWRA bond proceeds for such purpose.

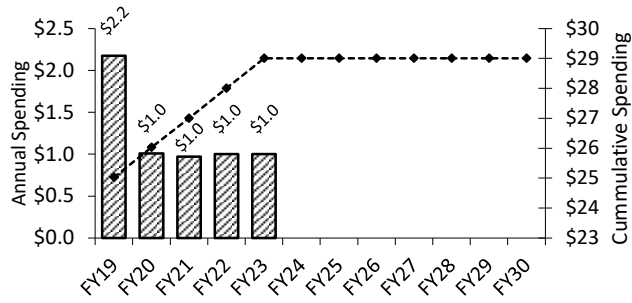
### Scope

Sub-phase	Scope	Status
Land Acquisition	Acquire parcels of real estate or interests in real estate critical to protection of the watershed and source water quality.	Active

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY19	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$29,000	\$26,029	\$2,971	\$971	\$1,000	\$6,154	\$0	\$0

### Watershed Land



Project Status 12/20	90.4%	Status as % is approximation based on project budget and expenditures. MWRA began purchasing land in FY07.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY20	FY21	Chge.	FY21	FY22	Chge.
\$29,000	\$29,000	\$0	Jun-23	Jun-23	None	\$6,154	\$6,154	\$0

#### Explanation of Changes

- N/A.

#### CEB Impacts

- None identified at this time.

## S. 622 Cosgrove Tunnel Redundancy

### Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Extends current asset life*
- Results in a net reduction in operating costs*
- Improves system operability and reliability*

**Master Plan Project  2008 Priority Rating 1 (See Appendix 3)**

*To plan, design and construct the recommended redundancy improvements the Cosgrove Tunnel.*

### Project History and Background

This project evaluated alternatives and developed conceptual designs and cost estimates to provide redundancy for the metropolitan tunnel system and the Cosgrove Tunnel.

For the western system, the Board of Directors approved the construction of a new pump station to provide redundancy for water supply to the John J. Carroll Water Treatment Plant and to support the shutdown and repair of the Cosgrove Tunnel.

### Scope

Sub-phase	Scope	Status
Wachusett Aqueduct Pump Station Design/ESDC/RI and Construction (7156/7517)	Design and construction of an emergency pump station to pump water from the Wachusett Aqueduct to the Carroll Water Treatment Plant. Pump station will provide redundancy in the event of a failure at the Cosgrove Tunnel or Intake and for the inspection/rehabilitation of the Cosgrove Tunnel. During a planned or emergency shutdown of the Cosgrove Tunnel, the existing gravity Wachusett Aqueduct with the proposed emergency pump station could deliver approximately 240 million gallons per day (mgd) of raw water to the CWTP for full treatment. The 240-mgd capacity would allow for unrestricted supply for at least eight months during the lower-demand fall/winter/spring period. This project, along with the completed Hultman Aqueduct rehabilitation and interconnections project, provide fully treated water transmission redundancy from the Wachusett Reservoir to the beginning of the metropolitan distribution system in Weston.	Completed

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$58,628	\$58,619	\$9	\$9	\$0	\$6,610	\$0	\$0

Project Status 12/20	100.0%	Status as % is approximation based on project budget and expenditures. Wachusett Aqueduct Redundancy Pump Station Design/ESDC/RI contract was awarded in January 2012. Wachusett Aqueduct Pump Station Construction was substantially complete in February 2019.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY20	FY21	Chge.	FY21	FY22	Chge.
\$58,592	\$58,628	\$36	Feb-19	Feb-19	None	\$6,574	\$6,610	\$36

**Explanation of Changes**

- Project cost and spending changed due to Wachusett Aqueduct Pump Station change order.

**CEB Impacts**

- None identified at this time.

## S. 623 Dam Projects

### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Extends current asset life*
- ☑ *Results in a net reduction in operating costs*
- ☑ *Improves system operability and reliability*

**Master Plan Project ☑ 2008 Priority Rating 2 (See Appendix 3)**

*To evaluate, design, and make necessary safety modifications and repairs to dams for proper operation as a result of the 2004 MOU between MWRA and DCR.*

### Project History and Background

Massachusetts Dam Safety Regulations, 302 CMR 10.00, require modifications to the Framingham Reservoir No. 3 (Foss) Dam to provide a spillway system capable of passing the applicable Spillway Design Flood (SDF) or safely storing this same flood within the reservoir without a spillway or other emergency overflow structure. Based on existing Hydraulics and Hydrology studies for Foss Dam, needed improvements include dam embankment armoring and turf improvements to protect against wind-induced overtopping at the Spillway Design Flood (SDF).

All earthen dams and masonry dams under MWRA responsibility were built in the late 1800s to early 1900s and are in periodic need of maintenance. Based on completed internal inspections, repairs are needed including rip rap re-setting and replacement, mitigation of erosion features, and addressing mortar loss and consequent minor leakage at gatehouses are necessary at Foss, Weston, Chestnut Hill, Sudbury and Wachusett Open Channel Lower dams.

### Scope

Sub-phase	Scope	Status
Dam Safety Modifications and Repairs	Provide Design and ESDC for required Dam Safety Modifications and Repairs. Construct parapet wave walls on dam crests to safely contain the SDF at the Weston Reservoir Dam. At present, alternatives are being evaluated at Foss.	Completed
Quinapoxet Dam Removal Design/ESDC, Construction, and REI	Provide final design, ESDC/RI, and construction for the removal of the Quinapoxet Dam adjacent to the Oakdale Pump Station. The removal of the dam will help landlocked fish in the Wachusett Reservoir to reach spawning grounds in the Quinapoxet River.	Active

Sub-phase	Scope	Status
Sudbury/Foss Dam Improvements/Wachusett North Dike Overtopping Protection Design CA/RI and Construction	Regulatory requirement for dam safety compliance for the Sudbury/Foss Dams to ensure spillway will properly function and regulatory requirement for dam safety compliance for the Wachusett North Dike to ensure earthen dam structure will withstand overtopping. Dike requires reconnection of earthen berm around Leominster Pump Station to protect against wave run-up/overtopping at the spillway design flood. Area of dike was removed in mid 1960s to build the P.S. instrumentation (piezometers) is required to monitor internal conditions at all High Hazard class earthen dams. Wachusett North and South Dikes will be the first of the remaining dams to have this installed.	Active

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY23
\$7,223	\$3,259	\$3,964	\$323	\$1,076	\$3,532	\$575	\$0

Project Status 12/20	46.8%	Status as % is approximation based on project budget and expenditures. Design phase for Dam Safety Modifications and Repairs began in September 2009. Dam Safety Modifications and Repairs Construction reached substantial completion in September 2012. Sudbury/Foss Dam Design CA/RI commenced in March 2019. Quinapoxet Dam Removal Design/ESDC commenced in November 2019.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$7,023	\$7,223	\$200	Mar-23	Sep-23	6 mos.	\$3,861	\$3,532	(\$329)

#### Explanation of Changes

- Project cost and schedule change due to updated cost estimate and schedule for Sudbury Foss Dam Construction contract.
- Project spending change due to updated cash flows for Sudbury Foss Dam Design CA/RI and Construction contracts.

#### CEB Impacts

- None identified at this time.

## S. 625 Metropolitan Tunnel Redundancy

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### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Extends current asset life*
- ☑ *Improves system operability and reliability*

**Master Plan Project ☑ 2018 Priority Rating 1 (See Appendix 3)**

*To plan, design and construct the recommended redundancy improvements to the City Tunnel, the City Tunnel Extension and the Dorchester Tunnel and the Cosgrove Tunnel.*

### Project History and Background

This project includes the study, permitting, design, and construction of redundancy improvements to critical elements of the water transmission system. The study phase evaluated alternatives and developed conceptual designs and cost estimates to provide redundancy for the metropolitan tunnel system.

The metropolitan tunnel system was evaluated first with emphasis on providing redundancy for Shaft 7 of the City Tunnel. Historically, the plan for providing redundancy for the metropolitan tunnel system was based on one or more proposed parallel deep rock tunnel loops from the terminus of the Hultman Aqueduct and MetroWest Tunnel in Weston into the metropolitan area. The focus of this study was to develop and evaluate alternative surface pipe improvements, in addition to revisiting previously proposed tunnel loops, to achieve an acceptable level of redundancy at a lower cost.

The tunnels in the Metropolitan Boston area, i.e. the City Tunnel, City Tunnel Extension, and Dorchester Tunnel remain a weak link in the water transmission system. While the integrity of the underground tunnel sections is believed to be good based on very low unaccounted-for-water in the MWRA transmission system, there is still risk of failure mainly due to pipe and valve failures at the surface connections to the distribution system or due to major subsurface failures as a result of earthquakes or movement along geological faults. A rupture of piping or a valve failure at critical surface connections points on the metropolitan area tunnel shafts would cause an immediate loss of pressure throughout the entire High Service area and would require difficult emergency valve closures, activation of emergency supplies with a boil-water order and lengthy system repairs. The assumption is that tunnels have a useful life of 100 years, but these subsurface structures have not been inspected and their actual condition is unknown because they cannot be shut down for inspection. Facilities at the top of tunnel shafts have been examined and a number of hardening measures are needed for risk reduction at these sites. Completion of distribution system storage projects at Blue Hills and the Spot Pond Storage Facility have assisted in mitigating the effects of local pipe ruptures.

In the event of a failure of the City Tunnel, a limited amount of water could be transferred through the WASM 3 (scheduled for major rehabilitation) and WASM 4 (rehabilitation completed) pipelines and the Sudbury Aqueduct would need to be brought on-line. Extensive use of the Sudbury Aqueduct/Chestnut Hill Emergency Pump Station and open distribution storage at Spot Pond and Chestnut Hill would be required. Supply would be limited and a boil order would be put in place. Failure of the City Tunnel Extension would be similar with reliance on WASM 3 and open storage at Spot Pond.

The redundancy study was undertaken to recommend a phased program which could be implemented over a period of years. The study reviewed currently proposed MWRA pipeline improvement projects and recommendations as to changes in size and/or alignment to contribute to the objective of transmission redundancy within the metropolitan system.

Additional study of the Metropolitan system has focused on the evaluation of new tunnels for providing redundancy. Several tunnel alternatives have been considered and staff presented a recommended plan to the Board of Directors in the fall of 2016. Staff also presented recommended plan to the MWRA water communities in December 2016. The recommended plan which was approved by the Board in February 2017 includes a deep rock tunnel option for both northern and southern components. The northern and southern components are identified below in the Planning, Design and Construction phases.

Subsequent Design, Permitting and Construction phases will follow-up on the recommendations of the study. The Design and Construction costs have been updated based on the recommendations of the study. Long-Term Redundancy is one of the MWRA's largest undertakings in the next decade, and a variety of options are still being evaluated.

### Scope

Sub-phase	Scope	Status
Water Transmission Redundancy Plan (6273)	Evaluation and recommendations of alternatives for long term redundancy.	Completed
Sudbury Aqueduct Pre-MEPA Review & Preliminary Design/EIR (7352)	Study and Pre-MEPA review of the Sudbury Aqueduct as a potential element for providing redundancy in the southern portions of the metropolitan tunnel system. Evaluate alternatives and conduct MEPA review for Sudbury pressurization. Also, includes final design and CA/RI for Rosemary Brook Siphon Buildings repair/stabilization.	Completed
Preliminary Design and MEPA Review (7159)	Preliminary design, geotechnical investigation, permitting and MEPA environmental review of the Northern and Southern Tunnels.	Active
Construction Management (7356)	Constructability review of final documents. Full inspection of all construction activity, as well as provision of construction support services including environmental and safety compliance, claims assistance, contract administration and quality assurance testing.	Future
Final Design/Engineering Services During Construction (7556)	Final Design and Engineering Services During Construction of the Northern and Southern Tunnels, including connecting mains.	Future
Tunnel Construction (7291)	Construction of the Northern and Southern Tunnels.	Future
Tops of Shafts Connecting Mains Surface Construction (7357)	Construction of Connecting Mains between existing facilities and the various tunnel shafts along the Northern and Southern Tunnels.	Future
Tops of Shafts Rehabilitation Design CA/RI (7521) and Construction (7522)	Design CA/RI and Construction to rehabilitate the Tops of Shafts of the existing tunnel system.	Future
Shaft 7 Buildings Design CA/RI and Construction (7558/7559)	Design and construction of a new access building above the Shaft 7 Top of Shaft structure including new electrical service, HVAC equipment, piping corrosion protection, PRV replacement, new flow meters, and structural and access improvements to the facility.	Future
Administration Legal and Public Outreach	Community agreements, land acquisition and possible Owner Controlled Insurance Program for the Northern and Southern Tunnels.	Future

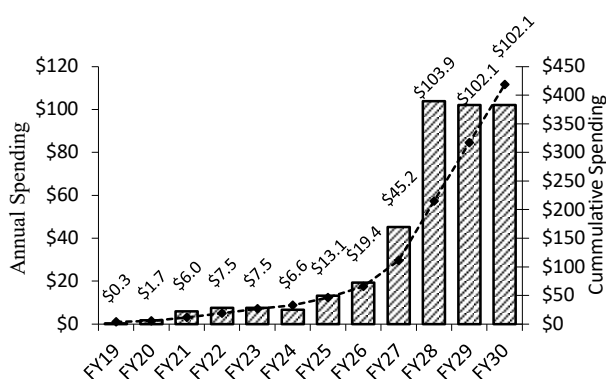


Sub-phase	Scope	Status
Program Support Services (7655)	The Program Support Services consultant firm will provide technical professional resources to the Tunnel Redundancy Department to support program-wide management, risk management, quality management, standardization, contract delivery and contract packaging. The PSS will include independent technical reviews, constructability reviews, critical path schedule evaluations, and cost estimating/opinions.	Active
Technical Assistance	The Technical Assistance contract will provide technical analysis, real estate support, fieldwork and other support to the Tunnel Program to address technical needs in a timely fashion as they arise.	Future

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$1,500,218	\$5,410	\$1,494,807	\$5,985	\$7,500	\$22,939	\$188,228	\$1,285,594

#### Metropolitan Tunnel Redundancy



Project Status 12/20	0.4%	Status as % is approximation based on project budget and expenditures. Program Support Services commenced in April 2019. Preliminary Design and MEPA Review commenced in July 2020.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$1,506,963	\$1,500,218	(\$6,745)	Apr-42	Apr-42	None	\$23,945	\$22,939	(\$1,006)

**Explanation of Changes.**

- Project cost change primarily due to inflation adjustments on unawarded contracts.

Spending changed primarily due to updated schedule for Technical Assistance and updated cash flows for Technical Assistance and Preliminary Design/MEPA Review phases.

**CEB Impacts**

- \$500,000 in FY23 and an additional \$400,000 in FY2 for salaries, benefits, and other expenses associated with the project management of the Metro Tunnel Redundancy and \$250,000 in FY24 for rock storage shed.

## S. 628 Metropolitan Redundancy Interim Improvements

### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Extends current asset life*
- ☑ *Results in a net reduction in operating costs*
- ☑ *Improves system operability and reliability*

**Master Plan Project ☑ 2008 Priority Rating 1 (See Appendix 3)**

*To plan, design and construct the recommended interim redundancy improvements to the existing tunnel system, to protect or needed as back-up in case of failure.*

### Project History and Background

Design and Engineering Services during construction for four construction contracts that will be completed in the near term while the proposed tunnel redundancy project goes through environmental review, design and construction. These construction projects are needed to protect and improve critical facilities related to the existing tunnel system, or are needed as back-up means of supply in the event that one or more elements of the existing tunnel system fail. The construction projects include the Top of Shafts Interim Improvements, Chestnut Hill Emergency Pump Station improvements, WASM/Spot Pond Supply Mains, Shaft 5 Building Improvements, PRV Improvements, and Rehabilitation of WASM 3. The Waltham Water Pipeline Project will provide water to Waltham during shutdown of WASM 3 CP-3.

### Scope

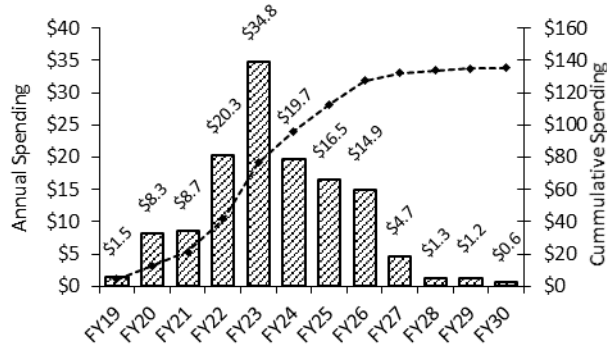
Sub-phase	Scope	Status
CP1 Shafts 6,8,9A (7561), CP2 Shaft 5 (7671) and REI (7702), CP3 Shafts 7,7B,7C,7D (7670) and REI (7703)	This project will provide strengthening of pipe directly connected to the tunnel system, cathodic protection for pipe connections to prevent further corrosion, replacement of nuts on valve connections if found to be at risk .	Active/Future
Chestnut Hill Emergency Pump Station Improvements Design CA/RI (7574), Construction (7562), and REI (7669)	The Chestnut Hill Emergency Pump Station is in need of improvement to piping and pumping systems to reduce surge loads on the suction and discharge piping during emergency operation when the Dorchester Tunnel is out of service. Discharge pressures from the pump station would exceed normal pressures in community pipelines increasing risk of failure during emergency operation. Also, coordination of pump station operation between Chestnut Hill and Newton Street and Hyde Park pump stations is of concern. With CHEPS not operating, grade lines in the Southern High system fall below acceptable levels at high points in the system and Blue Hills tank is unable to be filled. Improvements under this contract include potential pump and motor replacement, pipe reconfiguration, surge controls, possible installation of variable frequency drives on motors to regulate discharge pressures and installation of additional valves to allow isolation of the tunnel without operating old valves that are directly connected to the tunnel.	Active

Sub-phase	Scope	Status
WASM 3 Rehabilitation MEPA/Design CA/RI (6539) and WASM 3 Rehab CP- 1(6544), CP-2 (6543)	MEPA/Design CA/RI and construction of the WASM 3 rehabilitation from the Hultman Aqueduct Branch in Weston to the existing PRV chamber near Section W16 at Medford Square. Construction will include cleaning and cement mortar lining, some sliplining and some pipe replacement.	Active/Future
Low Service PRV Improvements Design & ESDC (7575), Construction Improvements (7563), REI (7674)	The project will allow the Low Service system to be utilized to increase the supply to the Gillis Pump Station in Stoneham to avoid the need to pump out of the Spot Pond Reservoir in an emergency. The Low Service pipelines would be operated at grade lines consistent with WASM 3 grade line to push additional flow to the Gillis Pump Station in an emergency. Some Low Service revenue meters may require pressure reducing valves to lower pressures to communities along the way. In addition, PRV's on WASM 3/4 would also require replacement to maximize the supply to the north.	Active
Shafts 5 Building Improvements Design/CA (7599), Construction (7600), and REI (7673)	Electrical and architectural improvements at Shafts 5 & 9 buildings in Weston and Somerville. Including improvements to dewatering systems inside shafts, Building Code and Hazardous Material Evaluations at each of these sites are being completed under Technical Assistance Task Order prior to design.	Active/Future
Waltham Water Pipeline CA (7692), Construction (7457), and REI (7672)	Construction Administration and Construction/Resident Inspection of 36" diameter pipeline of a length to be determined of a new connection to Waltham from the Northern Extra High Service Area. 7692 Task Order No. 2 Design is underway.	Active/Future
Commonwealth Avenue Pump Station Improvements Design CA/RI (7523) and Construction (7524)	Design, engineering services during construction, resident engineering/inspection services and construction to provide improvements to the Commonwealth Avenue Pump Station. The project includes new pipe connections to the Low Service Pipes and two new pumps (one replacement and one additional) for redundancy. Also, includes Supervisory Control and Data Acquisition (SCADA) controls, and heating, ventilation and air conditioning equipment to replace older equipment.	Active

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$135,356	\$12,611	\$122,745	\$8,677	\$20,347	\$73,621	\$57,147	\$1,750

### Metropolitan Redundancy Interim Improvements



Project Status 12/20	12.1%	Status as % is approximation based on project budget and expenditures. WASM 3 MEPA/Design CA/RI commenced in July 2013. Commonwealth Avenue Pump Station Improvements Design CA/RI was awarded in November 2016 and construction commenced in February 2019. WASM SPSM/PRV Design/CA commenced in July 2018. Chestnut Hill Emergency Pump Station Design/CA commenced in May 2019. WASM 3- CP-1 and CP1 Shafts 6,8,9A were awarded in September 2020.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$180,056	\$135,356	(\$44,700)	Jul-29	Jun-26	(36 mos.)	\$65,860	\$73,621	\$7,761

#### Explanation of Changes

- Project cost change primarily due to award less than budget on CP1 Shafts 6,8,9A contract, elimination of budgets for WASM 3 Rehab CP-3 (combined with CP-1 and CP-2), as well as CP-1 Tops of Shafts REI contract, reduction of scope for Waltham Water Pipeline for Construction Administration services only, updated cost estimates for WASM 3 CP-1 (award amount) and CP-2 as a result of inclusion of CP-3, as well as Waltham Water Pipeline Construction, change orders for Commonwealth Avenue Pump Station Improvements Construction, and inflation adjustments on unawarded contracts.
- Project schedule changed due to updated Weston Aqueduct Supply Mains CP-1, 2 and 3 schedules.
- Project spending changed due to updated projects costs listed above, updated schedules for WASM 3 Rehab CP-1, 2, and 3, Waltham Water Pipeline, and Shafts 5 Improvements. Also, updated cash flows for WASM 3 MEPA/Design/CA/RI, and Chestnut Hill Emergency Pump Station Design/CA and Construction.

#### CEB Impacts

- None identified at this time.

## S. 630 Watershed Division Capital Improvements

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### Project Purpose and Benefit

- Extends current asset life*
- Fulfills regulatory requirement*
- Improves system operability and reliability*
- Continues to improve public health*

*To renovate an aging Quabbin Administration Building complex to address existing code or operational deficiencies, energy efficiency, employee and public access. Also, to comply with regulatory requirements by Massachusetts Department of Environmental Protection related to Quabbin Administration Buildings water and wastewater systems.*

### Project History and Background

DWSP Quabbin/Ware Region facilities support a staff of approximately 80 employees, and provide recreational opportunities and services to more than 500,000 visitors annually to the reservoir.

Construction of the QAB was completed in 1938 and it is not uncommon to find original system controls still operational today (77 years). One of the more pressing needs is the rehabilitation of critically important utilities and support systems that both distribute power and water throughout the facility. Most of these system components are exhibiting signs of deterioration (e.g. wiring, plumbing, heating) and preemptive actions are necessary to avoid catastrophic failures.

The significant investment of capital into the restoration of the facility will also trigger necessary upgrades to satisfy today's more stringent standards for Universal Access, public safety and occupational standards. Example of possible Code induced upgrades may include added environmental safeguards for occupational safety (e.g. ventilation and hazard abatements), installation of fire alarms and expanded fire protection systems, universally accessible access routes to and from the building and special accommodations (e.g. elevator, public restrooms).

Mechanical control systems for the distribution of steam throughout the Complex are very old, antiquated systems that need modernization to ensure continued reliable operation. Many components also fail to satisfy current building code requirements and would require upgrading.

As discussed above in the Quabbin Administration Building Complex: Major Renovations Project, there are many building components that need work. Two issues that need immediate attention are the boiler room wastewater discharges and the leaking water system. In 2013, the Quabbin Administrative Building (QAB) water supply system came under scrutiny by the MA Department of Environmental Protection and the State Plumbing Inspector. DEP is requiring that floor drains located inside of the buildings boiler room be abandoned and that daily well withdrawal levels be brought down to acceptable levels. Also, in 2014 wastewater discharges from the MWRA laboratory inside of the QAB facility were authorized by the DEP under the condition that daily wastewater flows be verified and shown to be within approved limits. The DWSP has initiated monitoring of wastewater flows from the QAB facility and anticipates that future upgrades to the septic system will be needed. In order to satisfy these mandates, significant investments are needed to retrofit existing mechanicals and make significant improvements to the distribution of water and handling of wastewater throughout the building immediately.

These improvements will be needed no matter what form of Quabbin Administration Building renovations are determined to be needed under the larger capital project. These two issues are essentially "fast-track" components on the larger project needed for regulatory compliance. DCR will use professional engineering consultants to complete repair designs.

**Scope**

Sub-phase	Scope	Status
Quabbin Administration Building Rehabilitation Conceptual Design Report, Design/Construction Administration and Construction	Design and Construction for improvements at the Quabbin Administration Building.	Future
River Road Improvements - Wachusett	Improvements to River Road at Wachusett including paving and drainage.	Active
Quabbin Water Supply Construction	Project to supply water to the Quabbin Reservoir buildings. Well permitting is ongoing. Design to follow.	Active
Quabbin Maintenance Garage/Wash Bay/Storage Building Design CA/RI and Construction	Design and installation of a modular building in stockroom area off Blue Meadow Road for large vehicle maintenance, washing, and equipment storage. Includes demolition of old sheds, conversion of underground storage tank to above ground storage tank, paving and security.	Future

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$24,201	\$0	\$24,201	\$685	\$4,339	\$8,114	\$16,087	\$0

Project Status 12/20	0%	Status as % is approximation based on project budget and expenditures. River Road Improvements was awarded in January 2021.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$24,083	\$24,201	\$118	Mar-26	Oct-26	7 mos.	\$9,254	\$8,114	(\$1,140)

**Explanation of Changes**

- Project cost changed primarily due to updated cost estimate for River Road Improvements at Wachusett.
- Schedule changed primarily due to schedule updates for Quabbin Administration Building Rehabilitation Design and Construction, River Road Improvements at Wachusett, Quabbin Water Supply Design and Construction, and Maintenance Garage/Wash Bay/Storage Building Construction.
- Project spending changed due to project cost change listed as well as updated schedules noted above.

**CEB Impacts**

- \$100,000 for lab work in FY25 during the Quabbin Administration Building Rehabilitation.

# S. 618 Peabody Pipeline Project

## Project Purpose and Benefits

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*

*The proposed new pipeline and meter will serve the western side of town that is currently served by the Winona WTP and also provide a redundant connection to the city's water distribution system. The City estimates that their MWRA water supply would increase from 1.1 MGD to 2.5 MGD.*

## Project History and Background

Peabody is a partially supplied MWRA water community. Peabody's drinking water is mainly supplied by the Coolidge and Winona Water Treatment Plants. Raw water from the Ipswich River is pumped to Suntaug Lake and Winona Pond. Water from Winona Pond is treated at the Winona Water Treatment Plant (Winona WTP) and water from Suntaug Lake and Spring pond are treated at the Coolidge Water Treatment Plant (Coolidge WTP). Peabody supplements its drinking water through an existing MWRA connection, Meter 168.

Peabody's Winona WTP, constructed in 1974, has reached the end of its useful life. The city considered an option to purchase more water from the MWRA, however, this option has been cancelled.

## Scope

Sub-phase	Scope	Status
Peabody Pipeline Design/ESDC/REI (6895)	This phase includes the design of an 11,450-linear foot, 24-inch diameter water pipeline that will extend MWRA's Section 109 from the Lynnfield/Saugus town line to the Peabody/Lynnfield line on Route 1.	Completed

## Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$1,448	\$1,448	\$0	\$0	\$0	\$389	\$0	\$0

Project Status 12/20	100%	Status as % is approximation based on project budget and expenditures. Design/ESDC/REI was awarded in May 2017 and was cancelled in September 2019.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$1,448	\$1,448	\$0	Sep-19	Sep-19	None	\$389	\$389	\$0

**Explanation of Changes**

- N/A.

**CEB Impacts**

- None identified at this time.

## S. 677 Valve Replacement

### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Fulfills a regulatory requirement*
- ☑ *Extends current asset life*
- ☑ *Improves system operability and reliability*

*To replace, repair or retrofit approximately 500 blow-off valves and several hundred main line valves within the pipeline distribution system. Blow-off valve retrofits eliminate cross-connections into sewers or drainage piping. Main line valve replacements improve MWRA's ability to respond to emergency situations such as pipe breaks and provide tight shutdown for pipeline construction projects. Faster response reduces negative impacts on customers. Combining the two valve replacement efforts reduces the need for repeat construction at sites and alleviates traffic impacts, re-paving needs, and other site-specific issues.*

### Project History and Background

MWRA owns and operates nearly 300 miles of distribution pipeline which contain approximately 1,578 blow-off valves and 1,713 main line valves. Some blow-off valves are cross-connected into sewers or drainage piping. To ensure there is no chance of contamination, DEP requires retrofitting of the blow-off valves to provide air gaps to ensure that non-potable water cannot reach the potable water lines. In addition, many of the main line valves in the system are significantly beyond their original design life. Many of these are either inoperable or inadequate and require replacement, repair, or retrofitting.

However, significant progress has been made in the last several years in correcting the cross connections at the blow-offs and in replacing defective main line valves and adding new valves to improve operations throughout the system. The valve replacement program continues this process. MWRA utilizes in-house crews and outside contractors to replace several blow-off and main line valves every year, both as part of the Valve Replacement Program and pipeline rehabilitation contracts.

### Scope

Sub-phase	Scope	Status
Design/Phase 1	Design of valve replacements, setting priorities based on the level of urgency or risk associated with each valve and scheduling work on valves that would not otherwise be replaced during upcoming pipeline rehabilitation projects.	Completed
Construction - Phase 1 (5126)	Purchase and installation of 27 blow-off valve retrofits.	Completed
Construction - Phase 2 (6105)	Purchase and installation of 10 blow-off valve retrofits and 10 main line valve replacements.	Completed
Construction - Phase 3 (6278)	Purchase and installation of 10 blow-off valve retrofits and 12 main line valve replacements as well as rehabilitation of two meters.	Completed

Sub-phase	Scope	Status
Construction - Phases 4, 5 & 6 (6345, 6346, 6435)	For each phase, purchase and install blow-off valve retrofits and main line valve replacements and rehabilitation of miscellaneous meters. Phase 4 Contract included 12 main line valves, 10 blow-off retrofits, 2 check valves and the rehabilitation of 2 meters. Phase 5 Contract included 10 blow-off valve retrofits and 13 main line valve replacements. Phase 6 included 4 blow-off valve retrofits, 8 main line valve replacements and 9 globe valves (tank isolation).	Completed
Construction Phases 7, 8 & 9 (6436, 7195, 7236)	For each phase, purchase and install blow-off valve retrofits and main line valve replacements and rehabilitation of miscellaneous meters. Each phase includes approximately 10 blow-off valve retrofits and 10 main line valve replacements.	Completed/Future
Design CA/RI Phases 8 & 9 (7417, 7418)	Design/Contract Administration/Resident Inspection for construction Phases 8 and 9.	Future
Equipment Purchase (6088)	Purchase of approximately 20 main line valves per phase for ten phases for replacement work to be done by in-house staff. Also includes the cost of line stops associated with this work.	Completed

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$22,249	\$12,016	\$10,233	\$0	\$0	\$0	\$6,747	\$3,485

Project Status 12/20	54.0%	Status as % is approximation based on project budget and expenditures. Phases 1-7 are complete.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY19	FY21	Chge.
\$22,279	\$22,249	(\$30)	Jun-29	Jun-29	None	\$0	\$0	\$0

#### Explanation of Changes

- Project cost changed due to inflation adjustments on unawarded contracts.

#### CEB Impacts

- None identified at this time.

## S. 692 Northern High Service – Section 27 Improvements

### Project Purpose and Benefits

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*

To rehabilitate/replace a segment of pipe originally installed in 1898 in Lynn which suffers from poor hydraulic performance and frequent leakage. Rehabilitate/replacement of approximately 7,200 linear feet of pipeline will improve service to the communities north of Lynn.

### Project History and Background

Section 27 is a 12–20 inch diameter cast iron main installed in 1898 that serves the communities north of Lynn. The main has become severely corroded. As a result of this deterioration, various major leaks have occurred since 1966. Because the main runs under major thoroughfares in Lynn, repair of leaks is disruptive and costly. Appropriate corrosion control methods will be employed on the pipeline to minimize corrosion potential in Section 27. During preliminary design, an evaluation determined MWRA should abandon the portion of Section 27 that parallels Section 91 and an adjacent pipeline, Section 35.

### Scope

Sub-phase	Scope	Status
Section 27 Design/CA, Construction and REI (7721, 6333, 7722)	Rehabilitation/replacement of 7,200 linear feet of pipeline to replace severely corroded pipe.	Future

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$1,665	\$124	\$1,541	\$1	\$14	\$28	\$1,514	\$0

Project Status 12/20	7.4%	Status as % is approximation based on project budget and expenditures.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$1,668	\$1,665	(\$3)	Nov-25	Nov-25	None	\$28	\$28	\$0

### Explanation of Changes

- Project cost change due to inflation adjustment on Section 27 Rehab Construction contract.

**CEB Impacts**

- None identified at this time.

## S. 693 Northern High Service - Revere and Malden Pipeline Improvements

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### Project Purpose and Benefits

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*

*To improve the delivery capabilities of major distribution lines serving the Northern High System. The existing pipelines are inadequate and suffer from extensive corrosion and leakage. Replacement, rehabilitation, and/or reinforcement will provide a strong and reliable means to convey water from the City Tunnel Extension to communities in the northern and eastern portions of the Northern High Service Area.*

### Project History and Background

The southeast corner of the Northern High Service Area has experienced pressure deficiencies because of undersized pipes and extensive pipeline corrosion. The corrosion problems have led to numerous leaks and pressure deficiencies which can cause fire-fighting difficulties. These deficiencies particularly affect Malden, Revere, Lynn, Winthrop, Deer Island, East Boston, Saugus, Nahant, Peabody, Marblehead, and Swampscott. To correct these problems, MWRA is implementing a series of pipeline improvements.

This project includes installation of pipeline on Sections 97, 97A and 68 in Revere and Sections 49, 53, 53A and Shaft9A-D in Malden; rehabilitation of Sections 53 and 55 in Revere; and installation of control valves to improve water pressure. All the work for this project, with the exception of the design and construction of Section 53 connections and Section 53A, Section 68 and the Shaft 9A-D Extension is complete. Completion of this construction will improve the pressure and flow of water conveyed to the Northern High Service Area.

A hydraulic study of the distribution system recommended that MWRA install a new pipeline in Revere, beginning at the Everett/Chelsea/Revere border and extending through Revere to the East Boston border. This new pipeline runs parallel with existing pipelines and carries a large portion of the flow formerly carried by the existing system, thereby increasing water pressure and flow to Revere, East Boston, Winthrop, and Deer Island, particularly during periods of high demand. Installation of new control valves was required to regulate water pressure and fill the Winthrop standpipe. The original control valves between Winthrop pipelines and MWRA transmission mains were inadequate. Fluctuations in pressure threatened to rupture the town's pipelines. More efficient valves were required to eliminate the danger. Flow tests performed on Sections 32 and 55 of the existing Revere and Winthrop pipelines revealed that these sections had severe flow problems. The pipelines were only able to carry a fraction of the designed capacity because of internal corrosion. Cleaning and lining the pipelines restored flow capacity.

Section 53 in Malden and Revere was an 18,900-foot long, 30-inch diameter steel pipeline, exceeding 60 years of age. Workers dug four test pits to determine the condition of this pipeline and uncovered 18 holes in the pipe. Investigations into recent failures revealed severe corrosion through the pipe wall in several locations. Replacement of the Malden portion of Section 53 with a new 48-inch diameter pipe has been completed. The Revere portion of Section 53 has been sliplined with 24-inch diameter steel pipe. In addition to feeding into the new 48-inch Saugus/Lynn pipeline, this pipe plays an important role in the supply network for Deer Island. Sections 49 and 49A, old 24-inch pipelines, are used to connect Section 53 to Shaft 9A of the City Tunnel. They are undersized for this purpose and are a severe restriction. A new 3,500-lf, 48-inch diameter pipe (proposed Section 53A) is needed to reinforce Sections 49 and 49A. A 1,000-lf, 20-inch diameter pipe, portion of Section 68, interconnects Section 53 with the new Saugus/Lynn pipeline. This section is undersized and needs to be reinforced with 1,000 lf of new 48-inch diameter pipe to improve hydraulic capacity. Approximately 4,000 lf of Section 14, an existing 30-inch diameter cast-iron pipe installed in 1916, will be cleaned and cement mortar lined to improve

redundancy for Section 84. The Shaft 9A-D Extension will provide a more reliable connector from Shaft 9A of the City Tunnel Extension to the Section 99 pipe that serves as the suction line to the Gillis Pump Station.

### Scope

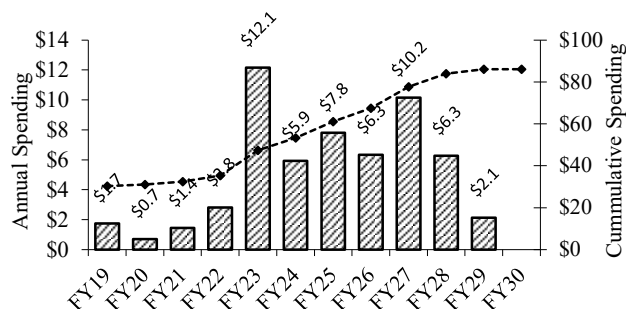
Sub-phase	Scope	Status
Design/CS/RI – Revere/Malden	Design, construction services, and resident inspection for Section 53 in Malden and Sections 97 and 97A in Revere.	Completed
Construction Revere Beach (5186)	Installation of 5,491 linear feet of 36-inch pipeline and 10,111 linear feet of 30-inch pipeline on Section 97, as well as 3,872 linear feet of 24-inch pipeline, and 1,350 linear feet of 20-inch pipeline on Section 97A in the vicinity of Revere Beach Parkway.	Completed
Construction Malden Section 53 (5176)	Installation of 11,907 feet of 48-inch diameter pipeline in Malden on Section 53.	Completed
Construction Linden Square (5238)	Construction and construction administration of a 1,000 linear feet segment of Section 53 in the Linden Square area of Malden. The Massachusetts Highway Dept constructed this section as part of its roadway reconstruction project around Linden Square.	Completed
Construction Revere Section 53 (5177)	Rehabilitation of 4,900 linear feet of 30-inch pipe in Revere on Section 53 and replacement of 1,500 linear feet under Route 1 in Revere.	Completed
Construction Road Restoration	Design, construction administration, and construction of the full road restoration to ensure a stable road surface without cracking on Eastern Avenue in Malden in compliance with the requirements of the Massachusetts Architectural Access Board. The City of Malden will do this work.	Completed
Construction Control Valves (5191)	Installation of control valves needed to regulate water pressure and fill the Winthrop standpipe.	Completed
Construction DI Pipeline Cleaning & Lining (5179)	Design and cleaning and lining of the 2,000 linear feet, 8-inch diameter water supply main to Deer Island.	Completed
Construction – Winthrop C&L (5178)	Rehabilitation of 7,900 linear feet of 16-inch diameter pipe on Section 32 and 20-inch diameter pipe on Section 55 in Revere and Winthrop.	Completed
Section 53 and 99 Improvements Design CA (7485), and REI (7682)	Design /Construction Administration and Resident Inspection for Sections 53 and 99 Improvements.	Active/Future
CP-1 Construction Section 53 Connections (6335)	Construction of 4,500 linear feet of new 48-inch pipe in Malden. These proposed pipelines will eliminate hydraulic restrictions and better integrate Section 53 into the Northern High distribution system.	Future
CP-3 Section 99 Connections Construction (6958)	Construction of approximately 3,000 linear feet of new 60-inch diameter pipeline in Malden connecting the Shaft 9A-D line (60-inch dia.) to Section 99 (72-inch dia.).	Future

Sub-phase	Scope	Status
Section 56 Repl./Saugus River Feasibility Study (7500), Design CA (7454) and Construction (7486), and REI (7681)	Feasibility Study, Design CA and REI, and Construction to replace failed 20/30-inch diameter steel water main crossing of the Saugus River by trenchless methods. Main was installed in 1934 and is out of service. This main provides redundancy to Section 26 which is currently also out of service. 7454 Sect 56 Design CA is currently underway to design a new river crossing using Horizontal Directional Drilling (HDD) and is in the preliminary design phase.	Completed/Active/Future
Section 56 Demolition Construction (7536)	Section 56 Construction Pipe Demolition at General Edwards Bridge.	Completed
Section 14 Pipe Relocation (Malden) (6957)	Abandon 540 lf of existing Section 14 water main in Malden Center and replace with 400 feet of new 36-inch ductile iron water pipe in a new alignment. A 36-inch gate valve will also be installed as well as a blow-off setup.	Completed
CP-2 Section 14 Construction (7699)	Rehabilitation of 4,000 lf of Section 14.	Future
Sections 13 & 48 Rehabilitation Design CA/RI and Construction (7602/7603)	Design and construction of the rehabilitation of Section 13 (7,300 lf of 36-inch cast-iron 1896 vintage pipe) and Section 48 (7,300 lf of 38-inch diameter and 1,400 lf of 30-inch diameter riveted steel 1929 vintage pipe) in Stoneham, Malden and Melrose from the Gate House at Fells Reservoir partially along Highland Avenue to Pleasant Street and Charles Street will improve hydraulics and water quality.	Future

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$86,010	\$31,010	\$55,000	\$1,449	\$2,804	\$18,848	\$36,469	\$2,131

**Northern High Service -  
Revere and Malden Pipeline Improvements**





Project Status 12/20	37.3%	Status as % is approximation based on project budget and expenditures. Revere Beach, Malden Section 53, Revere Section 53 Construction and Linden Square construction are complete. Section 56 Feasibility Study was substantially complete in June 2017. Section 14 Pipe Relocation – Malden was completed in May 2018. Section 56 Pipe Demolition on General Edwards Bridge was substantially completed in May 2019. Section 56 Replacement/Saugus Design/CA commenced in November 2019. Sections 53 and 99 Connections Design/CA commenced in February 2020.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$86,011	\$86,010	(\$1)	Jul-28	Jul-28	None	\$19,062	\$18,848	(\$214)

**Explanation of Changes**

- Spending changed due to updated cash flows for Section 56 Replacement REI, and Sections 53 and 99 Connections Design/CA.

**CEB Impacts**

- None identified at this time.

## S. 702 New Connecting Mains - Shaft 7 to WASM 3

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### Project Purpose and Benefits

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*

*To provide redundancy and improve the reliability of WASM 3 (Weston Aqueduct Supply Main); provide hydraulic looping and redundancy, enable Intermediate High Sections 59 and 60 to be taken off-line for rehabilitation, and improve water quality by reducing the length of unlined cast iron water mains in the MWRA system. Completion of this project will help provide the basis for a strong hydraulic network of piping among WASM 3, WASM 4, and the City Tunnel. The future conversion of Sections 23 and 24 in an emergency to provide a redundant supply to the Intermediate High Service system Section 25 and 59 that serve Belmont and Watertown via the WASM Commonwealth Avenue Pump Station.*

### Project History and Background

WASM 3 is a 56-inch to 60-inch diameter lock-bar steel pipe installed in 1926 and 1927. It is connected to the MetroWest Tunnel and Hultman Branch at the west end and the City Tunnel Extension at its east end. It extends from Weston through Waltham, Belmont, Arlington and Somerville to Medford. Most of its flow comes from the MetroWest Tunnel Shaft W, with peak flow of 57 million gallons per day. A lesser amount enters the main from the City Tunnel Extension Shaft 9. Upon completion of the Hultman Aqueduct and its interconnection to the Weston Aqueduct Terminal Chamber in 1941, WASM 3 became part of the High Service system. There are no connecting mains along the length of this 11-mile pipeline, and no other means available to adequately supply the nine communities it serves. WASM 3 serves communities northwest of Boston and is the sole source of supply to the Northern Extra High Service Area (Bedford, Lexington, Waltham, Arlington, and Winchester) and the Intermediate High Service Area (Belmont, Arlington, and Watertown). It also supplies a portion of the Northern High Service Area (Waltham, Watertown, Belmont, Arlington, Medford, and Somerville), and is a means of supplying the Spot Pond Supply Mains and Reservoir. WASM 3 serves a population of more than 250,000.

A break almost anywhere on this pipeline would result in severe service disruptions in Waltham, Watertown, Belmont, Arlington, Lexington, Bedford, and Winchester. Virtually no water would reach Waltham if a break were to occur at the west end of the pipeline; water normally supplied through the Shaft W connection would be forced through the Shaft 9 connection, increasing flows and reducing hydraulic grade lines in WASM 3, the City Tunnel, and City Tunnel Extension. The lack of redundancy also makes routine cleaning and lining of the 90± year old pipeline impossible. The need for maintenance is indicated by a significant number of leaks, particularly on the most vulnerable west end, which are the result of corrosion pitting through the pipe wall, as well as by the reduced carrying capacity of the line.

Completion of this project will facilitate conveyance of high service water from Shaft 9 of the City Tunnel Extension to WASM 3. This will be accomplished by rehabilitating existing mains between the City Tunnel Extension and WASM 3.

Previously proposed portions of this project have been eliminated or placed on hold until the Long-Term Redundancy study is completed. Specifically, the proposed new 48-inch diameter pipe through Newton and Waltham has been eliminated. The rehabilitation of Sections 23, 24, and 47 will proceed. Also, extension of Section 75 and replacement of Section 25 with a new 20-inch pipe will allow a redundant supply connection to Sections 25 and 59 serving Belmont and Watertown by way of the Commonwealth Avenue Pump Station.

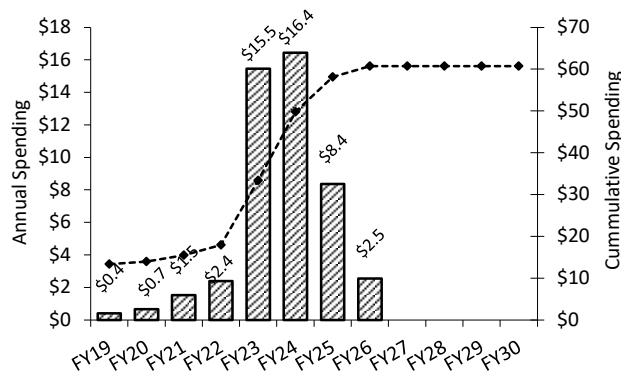
**Scope**

Sub-phase	Scope	Status
Watertown MOU	Payment to the City of Watertown to fund a portion of its Galen Street project to replace an existing 10-inch diameter pipeline with a new 12-inch diameter water main.	Completed
Routing Study (5163)	Identification of alternatives to determine the optimum approach for providing additional strong connections to WASM 3.	Completed
Design/CA/RI-DP1 (6383)	Design, construction administration and resident inspection services for a new 48-inch pipeline to interconnect WASM 3 with WASM 4 (CP-1). This design work was terminated based on the recommendation of the Long Term Redundancy Study.	Completed
Design DP2/4 Meter 120 (6384)	Design services for Section 47 from Meter 120 to WASM4. Construction Administration and Resident Inspection services to be performed by in-house staff.	Completed
CP3 C&L Sections 59 & 60 Construction (6548)	Cleaning and lining of 16,400 linear feet of 20-inch diameter pipe on Sections 59 and 60 (Intermediate High) from Section 25 in Watertown to Meter 121 in Arlington.	Future
Design/CA/RI and Construction Section 23, 24, 47 (6385/6392)	Cleaning and cement mortar lining of 4,500 feet of 36-inch diameter Section 23 and 11,000 feet of 20-inch Section 24 and Section 47; Replacing 3,600 feet of Section 23 water main, and 6,200 feet of Section 24 water main; Replacement of the check valve assembly at existing Revenue Meter 120 to Boston; and Replacement of 2,325 feet of Newton's 20-inch diameter water main in Ward Street, parallel to Sections 23 and 24.	Active/Future
NE Segment CP5 (6394)	Rehabilitation of 15,000 linear feet of 20 and 48-inch diameter pipe for Sections 18, 50, and 51 for the Northeast Segment plus Meter 32 replacement.	Completed
Design/CA for Sections 24, 25, 47, 75, 59 & 60 (6955) and REI (7680)	Design/Construction Administration and Resident Inspection services for replacement of Sections 25, extension of Section 75, and rehabilitation of Sections 24, 47, 59 & 60 pipelines.	Active/Future
Section 25 Replacement Construction CP-2 (6956)	Replacement of existing Section 25 (approximately 4,800 linear feet of existing 16" pipe) with a new 20 or 24-inch diameter pipeline.	Future
Section 75 Extension Construction CP-1 (7484)	Addition of approximately 4,000 feet of new 30-inch diameter pipe to extend Section 75 easterly to Section 24 in Newton, to provide a redundant feed to the Intermediate High Service area supplying Arlington, Belmont and Watertown which also requires replacement of Section 25 under construction Contract 6956, above.	Future

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$60,694	\$13,982	\$446,712	\$1,521	\$2,391	\$20,421	\$27,349	\$0

### New Connecting Mains



Project Status 12/20	23.4%	Status as % is approximation based on project budget and expenditures. Northeast Segment CP-5 construction contract was completed in November 2011. Design of CP3 (Sections 23, 24 & 47) commenced in August 2016. Replacement Section 25, 75, 59 & 60 Design/CA was awarded in December 2018.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$57,572	\$60,694	\$3,122	Dec-25	Jun-25	(6 mos.)	\$26,320	\$20,421	(\$5,899)

#### Explanation of Changes

- Project cost changed primarily due to updated cost estimates for CP-2 - Section 25 Replacement Construction, and CP3 - Clean & Line Sections 59 & 60 Construction.
- Project schedule changed due to acceleration of CP3 - Clean & Line Sections 59 & 60 Construction.
- Spending changed due to updated cost estimates and accelerated schedule listed above.

#### CEB Impacts

- None identified at this time.

## S. 704 Rehabilitation of Other Pump Stations

### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Extends current asset life*
- ☑ *Results in a net reduction in operating costs*
- ☑ *Improves system operability and reliability*

*To rehabilitate five active pump stations (Brattle Court, Reservoir Road, Hyde Park, Belmont, and Spring Street) - each of which is more than 40 years old and is overdue for renewal for safety, reliability, and efficiency reasons. Project includes a future phase to rehabilitate Gillis, Newton Street, Lexington Street, and Commonwealth Ave pump stations.*

### Project History and Background

MWRA's waterworks distribution system includes ten active pump stations. Extensive rehabilitation of the James L. Gillis, Newton Street, Lexington Street, and Commonwealth Avenue pump stations was completed 20 years ago.

The Brattle Court, Reservoir Road, Hyde Park, Belmont, and Spring Street pump stations were built in 1907, 1936, 1937 and 1958, respectively and were overdue for major rehabilitation. The Brattle Court Pump Station serves the towns of Arlington, Lexington, Waltham, and Winchester. The Reservoir Road Pump Station serves Brookline. The Hyde Park Pump Station serves Boston, Milton, Norwood, Canton, Dedham, Westwood and Stoughton. The Belmont Pump Station serves Belmont, Arlington, and Watertown. The Spring Street Pump Station serves Lexington, Bedford, part of Waltham, Belmont, Arlington, and Winchester. Some equipment at each pump station were inoperable, and system demand patterns had shifted during the life of the stations, requiring adjustments to pumping capacity. In addition, station improvements have not kept pace with changes in building and safety codes.

MWRA has divided construction for these five pump stations into two contracts. The first contract (Construction - Interim Automation), based on a fast-track design was completed in February 2001, involved installation of Supervisory Control and Data Acquisition (SCADA) systems at each station. Under the second construction contract, MWRA completed rehabilitation of the five pump stations (Brattle Court, Reservoir Road, Hyde Park, Belmont, and Spring Street). The second construction contract was awarded in October 2006 and was substantially complete in June 2010.

The next phase will be to rehabilitate the Gillis, Newton Street, and Lexington Street pump stations. The Commonwealth Avenue Pump Station rehabilitation is included in Metropolitan Redundancy Interim Improvements project.

### Scope

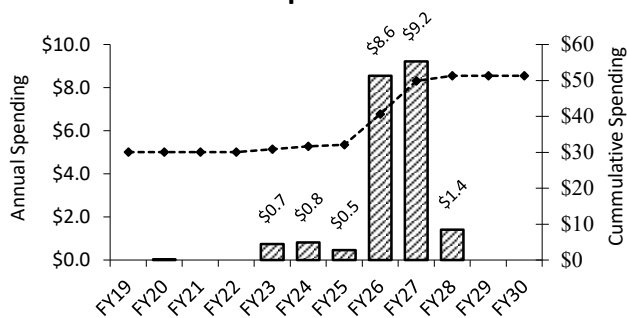
Sub-phase	Scope	Status
Preliminary Design (5153)	Planning and conceptual design including inspection and evaluation of the HVAC systems, buildings, pipes, valves, and other systems at the pump stations; determination of the need for improvements; and preparation of a conceptual design report.	Completed
Design 1/CA/RI (6110)	Design, Construction Administration and Resident Inspection for rehabilitation of five pump stations, including installation of SCADA systems.	Completed
Construction II and C (6304)	Installation of instrumentation at five pump stations to enable remote operation and monitoring.	Completed

Sub-phase	Scope	Status
Rehabilitation of 5 Pump Stations (6375)	Rehabilitation of Brattle Court, Reservoir Road, Hyde Park, Belmont, and Spring Street pump stations, including installation of new mechanical, electrical, instrumentation, and security systems, and building and site refurbishment, and SCADA installation.	Completed
Proprietary Equipment Purchases (6676)	Purchase of proprietary materials for SCADA system for Interim Instrumentation and Control.	Completed
Design 2 CS/RI (6980)	Final Design, construction services, and resident inspection for rehabilitation of five pump stations.	Completed
Technical Assistance	As-Needed Technical Assistance work needed.	Active
Pump Station Rehabilitation Design CA (7526), Construction (7527), and REI (7720)	Rehabilitation of the Gillis, Newton Street, and Lexington Street pump stations. The pumps in these stations are over 20 years old and maintenance of the existing units will be an issue mostly due to availability of replacement parts. More efficient units will be installed based upon age and life of the equipment. Lexington Street is the only pump stations for its respective service area.	Future

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$51,290	\$30,090	\$21,200	\$0	\$0	\$780	\$20,453	\$0

#### Rehab of Other Pump Stations



Project Status 12/20	58.7%	Status as % is approximation based on project budget and expenditures. Construction rehabilitation of 5 pump stations (Brattle Court, Reservoir Road, Hyde Park, Belmont, and Spring Street) was substantially complete in June 2010.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$51,290	\$51,290	\$0	May-27	May-27	None	\$780	\$780	\$0

**Explanation of Changes**

- N/A.

**CEB Impacts**

- None identified at this time.

# S.708 Northern Extra High Service - New Pipelines

## Project Purpose and Benefits

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*

*To provide redundancy in the Northern Extra High (NEH) system and improve hydraulic service and reliability for major portions of the NEH system. Existing lines are undersized and frequently experience pressure problems. Improvements will include construction of two new pipe segments and rehabilitation of existing mains.*

## Project History and Background

The Northern Extra High (NEH) Pressure Zone provides water to Arlington, Bedford (through Lexington), Belmont, Lexington, Waltham, and Winchester. The six communities are supplied an average of 11.55 million gallons per day (mgd) from the MWRA through twelve community meters. Water is pumped to these communities and into storage facilities in Arlington, Lexington, and Waltham by three pumping stations: Spring Street PS, Brattle Court PS, and Lexington Street PS. The pumping stations draw water from the Norumbega Covered Storage Facility via the Weston Aqueduct Supply Main 3 (WASM 3). There are two construction contracts planned to repair and replace WASM 3. The initial contract is currently in construction and the second contract is in design.

In addition, the Town of Burlington has been approved for admission to the MWRA Water System to purchase up to 6.5 mgd via a connection to the Town of Lexington's water system, and will also be supplied via the NEH Pressure Zone.

The NEH Pressure Zone Improvements Project to be performed by MWRA involves installation of up to 23,100 linear feet of new water main, replacement of approximately 8,400 linear feet of existing water main, rehabilitation or replacement of approximately 4,800 linear feet of existing water main, installation of two new community meters, and rehabilitation or replacement of existing community meters. The project will improve redundancy and rehabilitate or replace aging infrastructure in the NEH Pressure Zone. These improvements are necessary to help ensure that new and existing user communities receive services that meet or exceed the obligations of the MWRA.

## Scope

Sub-phase	Scope	Status
NEH Improvements Design/ESDC (7404) and REI (7724)	Design and engineering services during construction and REI Services for CP-1 and CP-2.	Active
CP-1 NEH Improvements (6522)	CP1 includes installation of approximately 5,300 linear feet of new water main in Lexington to connect the MWRA system to the water main being installed as part of Burlington's Phase 2 project. Construction of CP1 will be completed by the time that Burlington's Phase 2 project is complete.	Future
CP-2 NEH Improvements (7725)	CP2 includes installation of up to 11,100 linear feet of new water main in Lexington to interconnect an existing MWRA water main to the new water main installed in CP1 to help improve redundancy. CP2 also includes installation of a new meter for Lexington and replacement of 3,400 linear feet of existing, undersized water main in Arlington.	Future



CP-3 NEH Improvements (7910)	CP3 includes installation of up to 6,700 linear feet of new water main in Lexington to interconnect an existing MWRA water main to the new water main installed in CP2 to help improve redundancy. CP3 also includes replacement of approximately 5,000 linear feet of existing, undersized water main in Arlington, rehabilitation or replacement of approximately 4,800 linear feet of existing water main in Arlington, installation of one new meter for Belmont, and rehabilitation and replacement of existing community water meters for Arlington, Lexington, Belmont, Waltham, and Winchester.	Future
Design/CA/RI and Construction Sections 45, 63, and 83 (5242/6340)	Replacement of approximately 2,600 linear feet of Section 45 with 24-inch diameter pipe extending from the connection point at Meter 47 to Section 82 on Park Street at the Intersection of Paul Revere Road in Arlington; installation of about 2,100 linear feet of new 24-inch pipeline (Section 101), parallel to a portion of Section 83, starting from Meter 182 and proceeding to the intersection of Waltham Street (in Lexington and part of Waltham) and Concord Ave (in Lexington). Also, Rehabilitation of Section 63, consisting of about 3,400 linear feet of 20-inch pipeline connecting Section 63 to Meter 136.	Completed

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$43,839	\$3,632	\$40,207	\$234	\$1,805	\$5,840	\$34,000	\$367

Project Status 12/20	8.3%	Status as % is approximation based on project budget and expenditures. Construction of a portion of Section 45 was completed in September 2001. NEH Improvements Design/ESDC was awarded in January 2021.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$40,180	\$43,839	\$3,659	Nov-27	Nov-27	None	\$2,525	\$5,840	\$3,315

#### Explanation of Changes

- Project cost and spending changed due to project repackaged with updated cost estimates and cash flows for three construction contracts.

#### CEB Impacts

- None identified at this time.



## S. 712 Cathodic Protection of Distribution Mains

### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Extends current asset life*
- ☑ *Improves system operability and reliability*

*To evaluate the condition of existing cathodic protection systems and determine the feasibility of upgrading or installing cathodic protection systems to protect the system from corrosion.*

### Project History and Background

Within the MWRA water system there are approximately 300 miles of distribution pipe, 10 active pump stations, and 12 distribution storage facilities. A majority of the pipes are made of steel, cast iron and ductile iron and as a result are subject to corrosion due to the environmental conditions in which they reside. In order to maintain pipe integrity, cathodic protection is utilized within the system. Proper cathodic protection decreases the number of pipeline leaks and failures and ensures the integrity of the water distribution system is maintained.

Approximately 68 miles or 24% of MWRA's waterworks pipelines ranging from 24 inches to 60 inches in diameter are made of steel and are particularly subject to corrosion from acidic soils, fluctuating groundwater levels (especially where the groundwater is saline), and stray electrical currents. These steel pipelines are located in 26 of MWRA's 50 water communities.

Cathodic protection reduces deterioration of structural material, thereby increasing pipeline and storage tank life and deferring the need for replacement. Without proper cathodic protection, pipeline leaks and premature pipeline and storage tank failures increase, causing potentially costly property damage and possible loss of service to customers.

Some sections of MWRA's existing steel pipes were originally equipped with cathodic protection systems intended to reduce the effects of corrosion. Other steel pipelines had cathodic protection systems installed sometime after the original pipe installation. Other steel pipelines have been rehabilitated and still other sections of steel pipeline have never received cathodic protection.

### Scope

Sub-phase	Scope	Status
Planning	Evaluation of the condition of the steel pipelines, identification of areas of rapid corrosion due to stray currents, and design and installation of corrosion test stations.	Completed
Cathodic Protection Testing and Evaluation Program (6438)	Test and evaluate 1,019 cathodic protection test stations and 16 rectifiers including: level of protection; functionality of insulation joints; perform repairs; and identify, recommend and test replacement electrodes.	Completed
Cathodic Protection Shafts E & L Construction (6440)	Construction of new cathodic protection systems at Shafts E & L to replace the old systems.	Completed
Cathodic Protection (Shafts N and W) Construction (7610)	Construction to replace the existing cathodic protection systems in order to maintain pipe and steel storage tanks integrity for Shafts N and W.	Future

Sub-phase	Scope	Status
CP-1 Cathodic Protection (Metro System) Design/CA and Construction (7611/7612), and REI (7679) and CP-2 Construction (7715)	Design CA/RI and Construction to replace the existing cathodic protection systems in order to maintain pipe and steel storage tanks integrity for the Metropolitan System.	Future

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$61,683	\$1,160	\$60,523	\$0	\$2,927	\$12,375	\$49,038	\$0

Project Status 12/20	1.9%	Status as % is approximation based on project budget and expenditures. Project Planning phase is complete. Cathodic Protection Testing and Evaluation Program was completed in August 2017. Cathodic Protection Shafts E&L was substantially complete in August 2019.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$63,483	\$61,683	(\$1,800)	Jan-27	Jan-27	None	\$12,066	\$12,375	\$309

#### Explanation of Changes

- Project cost changed primarily due to updated cost estimate for Cathodic Protection Shafts N and W Construction.
- Spending changed due to updated schedules for both Cathodic Protection Shafts N and W Construction, and Metropolitan System Design/CA.

#### CEB Impacts

- None identified at this time.

## S. 713 Spot Pond Supply Mains - Rehabilitation

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### Project Purpose and Benefits

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*

*To improve the condition, carrying capacity, and valve operability of the two long supply mains which extend north from Chestnut Hill to Spot Pond. These cast-iron mains, originally installed in 1899, deliver water to the Northern Low Service System. Improvements involve a combination of replacement, cleaning and lining, and valve replacement depending on specific site conditions and needs. Improving these supply lines will reduce the need to take water from the City Tunnel to augment the Low Service System and improve the quality of water delivered to eight user communities.*

### Project History and Background

The East and West Spot Pond Supply Mains (SPSMs) serve the Northern Low Service Area, including portions of Brighton, East Boston, Charlestown, Chelsea, Malden, Medford, Somerville, and Everett. The lines are also designed to fully supply Cambridge during drought or emergency. The mains have historically supplied Spot Pond and subsequently the James L. Gillis Pump Station (formerly the Spot Pond Pump Station). With the closure of Spot Pond as a water supply source and the construction of the Spot Pond Suction Main (Section 99) as the primary supply to the Gillis Pump Station, the Spot Pond Supply Mains serve as distribution mains to the eight communities and provide emergency backup supply to the Gillis Pump Station. In the event Section 99 is out of service, the station would take suction directly from these mains, rather than from Spot Pond. These mains interconnect with the new Spot Pond Covered Storage and pump station.

The East Spot Pond Supply Main consists of 61,000 linear feet of mostly 48-inch diameter pipe which passes through Brookline, Boston, Cambridge, Somerville, Medford, Malden, Melrose, and Stoneham. The West Spot Pond Supply Main consists of 53,000 linear feet of 48-inch and 60-inch diameter pipe that passes through Brookline, Boston, Cambridge, Somerville, Medford, and Stoneham. Portions of the SPSMs in Brookline, primarily on Beacon Street, were rehabilitated under the Boston Low Service Pipe and Valve Rehabilitation project.

The carrying capacities of the pipes had been significantly reduced as a result of the build-up of rust deposits (tubercules) and other matter along the pipe walls, which also contributed to water quality deterioration in the Low Service System. The ability of the mains to withstand service pressures was drastically reduced in some areas due to exterior corrosion of pipes. In addition, inoperable or poorly operating valves along the mains made isolation and re-routing of flow difficult to implement.

Section 67 is included in this project because it provides a connection between the East and the West SPSM from Section 11 at Porter Square in Cambridge to Section 4 at Union Square in Somerville. Section 67 consists of 6,900 linear feet of 48-inch diameter steel pipe constructed in 1949. Rehabilitation of this main was needed because of the age of the pipe and the critical role of the main in providing flow to the East and West mains during shut downs for maintenance and construction.

Internal lining of these mains to restore capacity and improve structural integrity, will ensure adequate peak and emergency flow to user communities, alleviate water quality deterioration, and provide emergency back-up capacity for the Northern High System and Northern Intermediate High via the Gillis Pump Station. MWRA's reconfiguration of the water distribution system provides for the Spot Pond Supply Mains to be fed from the City Tunnel Extension only during periods of peak demand, thus conserving tunnel supply for High Service use. Supply to the Low Service System will be provided by Weston Aqueduct Supply Mains 1 and 2, which are connected to the new Loring Road covered storage tanks in Weston that have been constructed as part of MWRA's MetroWest Water Supply Tunnel project. A portion of the supply is from WASM 4, which connects to the East and West Spot

Pond Supply Mains at Western Avenue and North Harvard Avenue and on Memorial Drive at Magazine Beach in Cambridge.

Completion of this project will improve pressures to the far reaches of the Northern High Service Area by reducing the demand burden on the City Tunnel Extension. The quality of water delivered to eight communities will improve as a result of the upgrade of 18 miles of deteriorated pipe.

### Scope

Sub-phase	Scope	Status
Preliminary Design and Design/CA/RI (6223)	Preliminary design, design, construction administration, and resident inspection of the rehabilitation or replacement of Sections 3, 4, 5, 6, 7, 9, 10, 11, 12, 67, and portions of Sections 2, 16W, and 57.	Completed
North (Medford/Melrose) Construction-CP1 (6317)	Cleaning and lining of 20,300 feet of 48-inch and 60-inch pipe in Medford, Malden, Melrose, and Stoneham (Sections 7 and 12). Replacement of valves and reconfiguration of blow-off valves to eliminate cross-connections with storm drains or sewers. Elimination of connection with Spot Pond (considered a cross connection with a non-potable water source), and configuration to allow emergency reconnection if needed.	Completed
Middle (Medford/Somerville) Construction – CP2 (6381)	Cleaning and lining of 24,100 feet of the East Spot Pond Main (48-inch pipe) in Somerville and Malden (Sections 4, 5, 6, and 7) including reinforcement at rail and MBTA crossings; cleaning and lining of 14,000 feet of the West Spot Pond Main (48-inch pipe) in Medford and Somerville; and some steel pipe replacement on the Mystic Valley Parkway (800 feet, 60-inch, Section 16W), and Middlesex Fells Parkway (700 feet, 48-inch, Section 5 on land). Cleaning and lining on Somerville Avenue (Section 67, 6,500 feet of 48-inch steel). Replacement of valves throughout the pipelines, including in Medford Square at the interconnections of Sections 12, 16W, and 57.	Completed
South (Cambridge/Boston) CA/RI Construction – CP3 (6382)	Cleaning and lining of 11,700 linear feet of the East Spot Pond Main in Charles River Crossing and Cambridge (48-inch, Sections 3 and 4) including valve replacement, and cleaning and lining of 16,800 linear feet of the West Spot Pond Main in Harvard St., Franklin St., No. Harvard Avenue, and Massachusetts Avenue (48-inch, Sections 9 and 11, Brighton and Cambridge).	Completed
Early Valve Replacement Contract (6475)	Installation of nine main line valves and associated blow-off valves, as well as permanent by-pass piping to meters and air valves. Also includes removal of pipe at three locations for materials strength testing.	Completed
Walnut Street Bridge Truss Construction and Construction Administration (7787/7483)	Section 4 Bridge Truss at Walnut Street spans New Hampshire-Maine Railroad Line is in need of repair, painting and possible replacement. Bridge inspection needs to be done before scope of repairs/painting can be developed. (A portion of CIP 7483 to be used for replacement of rods and inspection of bridge.)	Future
Early Valve Equipment Purchase (6483)	Purchase Order for 12 valves that were installed from 1998-2001 as a precursor to the cleaning and lining contracts.	Completed

Sub-phase	Scope	Status
Section 4 Webster Ave Bridge Pipe Rehabilitation Design and Construction (7334/7335)	Section 4 is a 48-inch diameter cast iron main crossing the Webster Ave Bridge in Somerville that needed to be rehabilitated and was currently out of service due to pipe deflection and leakage. This project returned an isolated pipeline to service to provide redundancy.	Completed

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$66,498	\$65,489	\$1,009	\$3	\$506	\$1,008	\$0	\$0

Project Status 12/20	98.5%	Status as % is approximation based on project budget and expenditures. Construction of CP1 (North), CP2 (Middle), CP3 (South), the Early Valve Replacement Contract and Section 4 Webster Ave Bridge Pipe Replacement are complete.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$66,289	\$66,498	\$209	May-23	May-23	None	\$800	\$1,008	\$208

**Explanation of Changes**

- Project cost and spending changed as a result of updated cost estimate for Walnut Street Bridge Truss.

**CEB Impacts**

- None identified at this time.

## S. 719 Chestnut Hill Connecting Mains

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### Project Purpose and Benefits

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*

*To simplify the complex arrangement of old pipes near the former Chestnut Hill pump stations for safety and operability. Also, create a connection between Shaft 7 of the City Tunnel and the Southern Distribution surface mains to provide redundancy along the Dorchester Tunnel. MWRA is restructuring the piping arrangement through a combination of constructing new pipelines, rehabilitating older pipelines, sliplining, abandoning aqueducts, replacing pressure regulating valves, replacing the emergency pumps at Chestnut Hill, and abandoning pipes and valves which are no longer needed for service.*

### Project History and Background

The City Tunnel divides into two branches at Chestnut Hill: The City Tunnel Extension going north to supply the Northern High, Northern Intermediate High and Northern Extra High Systems, and the Dorchester Tunnel, which goes south to supply the Southern High and Southern Extra High Systems. There are two shafts in the Chestnut Hill area: Shaft 7 on the City Tunnel, located immediately west of the Chestnut Hill Reservoir, and Shaft 7B on the Dorchester Tunnel, located immediately east of the reservoir. At each of these shafts two newer pipes extend to connect to the older pipelines of the Boston Low, Northern Low and Southern High Systems.

Previously, the Southern High System could only be supplied from Shaft 7B. If the Dorchester Tunnel were to be out of service, it would be necessary to activate the Sudbury Reservoir System, transport water from there via the Sudbury Aqueduct (currently on standby) to the Chestnut Hill Reservoir (currently on standby) and utilize the emergency pump station at Chestnut Hill to pump water from the reservoir to the Southern High System. This water would not be of acceptable quality and its use would require a boil order. A new potable water connection has been constructed from the low service pipes to the new emergency pump station.

The older pipes in the area were originally designed to be supplied from the Cochituate and Sudbury Aqueducts, the Chestnut Hill Reservoir, or the Chestnut Hill High Service and Low Service pump stations. None of these facilities are presently in normal use, and a new underground pump station has replaced the Chestnut Hill pump stations. The pipe network is not only old and inordinately complex, but it is not designed to take water from the two tunnel shafts that are the present sources of potable supply. Portions of this pipe network have been rehabilitated and integrated into the present operation of the system. Considerable lengths of pipe with minimal or stagnant flow, which are a source of discolored water, have been abandoned. Some new pipe was added to better connect the two tunnel shafts with the surface pipe network. The interconnections between the potable water system and standby facilities, which are considered non-potable, have been rebuilt to eliminate the possibility of cross-connections during normal operation.

The High and Low Service pump station buildings at Chestnut Hill housed facilities which served four functions: emergency pumping, surge relief for the Boston Low System, level control for the Chestnut Hill Reservoir, and remote hydraulic operation of large valves on and near the site of the High Service pump station. Construction of a new underground pump station provides more reliable emergency pumping capacity and has enabled MWRA to abandon the pump station buildings and return them to the Commonwealth. Surge relief was provided in a new Shaft 7B pressure reduction chamber that also interconnects restructured piping. Gate House No. 2 has also been refurbished to provide supply to the new pump station. New valves have been constructed to replace the old hydraulic valves.



**Scope**

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
Design/CA/RI and Construction – Pump Station Potable Connection (6141/6651)	Construction of potable suction and discharge piping to the emergency pump station, restructuring piping to permit surplusing of Chestnut Hill pump station site, elimination of potential cross connections with non-potable suction and discharge lines, reconstruction of the Shaft 7B PRV Station, upgrade of the Shaft 9A PRV station, rehabilitation of valves at Waban Hill Reservoir, and abandonment of the Ward Street Pumping Station and associated piping. Construction to provide potable low service suction to the new pump station and to restructure piping to permit surplusing of the historic pumping stations site. Completion of upgrades of facilities that also may be used during the Walnut Hill Water Treatment Plant startup at Shaft 7B, Shaft 9, and Ward Street.	Completed
Preliminary Engineering (6301)	Provide preliminary design services for the rehabilitation and upgrade of facilities so that MWRA is able to operate the water system during normal conditions and specific emergency scenarios.	Completed
Design/CA/RI and Construction – Emergency Pump Relocation (6503/6501)	Relocation of the emergency pumping function and other minor facilities from the existing High and Low Service pump station buildings to a new 90-mgd underground pump station constructed adjacent to the Low Service building. The relocation enables MWRA to surplus these historic buildings. The new pump station has the capacity to pump 90-mgd from the Sudbury Aqueduct/Chestnut Hill Reservoir to the Southern High Distribution System.	Completed
Boston Paving (6558)	Payment(s) to the City of Boston for paving work provided.	Completed
BECO Emergency Pump Connection (6623)	Payment to Boston Edison Company for installation of electrical service to meet special requirements.	Completed
Chestnut Hill Final Connections Design ESDC, Construction (6995/6982/7705)	Chapter 30 and Chapter 149 final pipe connections.	Future
Equipment Pre-Purchase (6814)	Valve pre-purchase to support potable connection construction so that the Chestnut Hill Pump Station site could be returned to the Commonwealth of Massachusetts as surplus property.	Completed
Demolition of Garages (6820)	Demolition of garages prior to transfer of property to the Commonwealth, at request of state Department of Capital Asset Management.	Completed
Chestnut Hill Gatehouse No. 1 Repairs (7382)	This project provided structural stability of sub-structure of gatehouse which involved flowable fill and structural support walls.	Completed

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY20</b>	<b>Remaining Balance</b>	<b>FY21</b>	<b>FY22</b>	<b>FY19-23</b>	<b>FY24-28</b>	<b>Beyond FY28</b>
\$38,886	\$18,287	\$20,599	\$0	\$0	\$0	\$20,590	\$9

Project Status 12/20	47.0%	Status as % is approximation based on project budget and expenditures. Chestnut Hill Gatehouse Repairs was substantially complete in April 2018.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$38,945	\$38,886	(\$59)	Dec-27	Dec-27	None	\$0	\$0	\$0

**Explanation of Changes**

- Project cost changed due to inflation adjustments for Chestnut Hill Final Connections work.

**CEB Impacts**

- None identified at this time.

## S. 721 Southern Spine Distribution Mains

### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Extends current asset life*
- ☑ *Improves system operability and reliability*

*To increase carrying capacity and improve valve operability along the large surface mains that run parallel to the Dorchester Tunnel and provide service to the Southern High and Southern Extra High systems. These mains have serious hydraulic deficiencies and many inoperable valves. Hydraulic performance improvements are needed to provide redundancy for the Dorchester Tunnel. Work will include rehabilitation of more than 12 miles of large diameter pipeline.*

### Project History and Background

The Southern Spine Distribution Mains comprise the surface piping which parallels the Dorchester Tunnel. The mains begin in the vicinity of Shaft 7B in Brookline and end at the Blue Hills Reservoir in Quincy. The mains serve the Southern High and Southern Extra High System communities of Boston, Brookline, Milton, Quincy, Norwood, Canton, Stoughton and Dedham-Westwood.

Because of the poor conditions of the valves, MWRA operations staff must frequently close several valves in order to shut down a line. This practice often results in closing more of the system than is otherwise necessary. Several of these pipelines are currently functioning at approximately 50% of their original carrying capacity due to the build-up of rust deposits and other matter along the pipeline walls. In their present condition, these mains could not provide adequate service to users if the Dorchester Tunnel was taken off-line.

Construction of the first two contracts for Section 22 South was completed by June 2005. The contracts for Section 107 Phase 1 and Phase 2 were completed in January 2009 and January 2012, respectively.

### Scope

Sub-phase	Scope	Status
Sections 21,43, 22 Design/CA/RI	Design, construction administration, and resident inspection for five construction contracts in Phase 1, including rehab of 32,000 linear feet of 24- to 48-inch diameter pipes, and installation of 17,000 linear feet of 36- to 48-inch pipes. Rehabilitation to consist of cleaning and cement mortar lining, and replacement of the main line valves, blow-off valves, and appurtenances.	Completed
Section 22 South Construction	Rehabilitation of approximately 10,000 linear feet of 48-inch diameter Section 22 South, and installation of 1,700 linear feet of new pipe.	Completed
Adams Street Bridge	Relocation of a pipeline made necessary by the reconstruction of this bridge by the MBTA.	Completed
Southern High Ext Study (6602)	Study to determine the feasibility of expanding water services to additional communities in the Southern High Service Area. Cost of the study and public participation was fully funded by the Commonwealth of Massachusetts. Completed in May-1999.	Completed
Section 22 Rehab Alternative Analysis/Environmental Permitting (7155)	Section 22 rehabilitation alternatives analysis and environmental permitting.	Active

Sub-phase	Scope	Status
Section 22 Design/ESDC (7120)	Design/ESDC for Section 22 and Section 21.	Future
Section 22 Construction (6844) and REI (7723)	Rehabilitation of 16,000 linear feet of 48-inch diameter Section 22 and 5,000 linear feet of 24-inch diameter Section 21.	Future
Section 20 and 58 Rehabilitation Design (6296) and Construction (6298)	Rehabilitation of approximately 19,000 feet of 36-inch diameter steel and cast iron pipes in Morton Street from Shaft 7C of the Dorchester Tunnel to Washington Street.	Future
Section 107 Phase 1 Construction (6845)	Construction of 4,400 linear feet of new 48-inch diameter pipe from East Milton Square to Furnace Brook Parkway in Milton and Quincy.	Completed
Section 107 Phase 2 Construction (7099)	Replacement of Sections 21 and 43 with 9,200 linear feet of new 48-inch diameter pipe from Dorchester Lower Mills in Boston to East Milton Square, and cleaning and lining of 4,000 feet of existing water mains	Completed
Contract 1 A Construction (6885)	Rehabilitation of 4,400 linear feet of Section 22 South.	Completed

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$90,448	\$37,471	\$52,977	\$814	\$881	\$3,237	\$50,302	\$226

Project Status 12/20	41.9%	Status as % is approximation based on project budget and expenditures. Section 22 Rehabilitation Alternatives Analysis and Environmental Permitting was awarded in July 2019.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$90,585	\$90,448	(\$137)	May-27	May-27	None	\$3,241	\$3,237	(\$4)

#### Explanation of Changes

- Project cost changed due to inflation adjustments for Section 22 Construction and Sections 20 & 58 Design and Construction.

#### CEB Impacts

- None identified at this time.

# S. 722 Northern Intermediate High (NIH) Redundancy and Storage

**Project Purpose and Benefits**

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*

**Master Plan Project  2008 Priority Rating 1 (see Appendix 3)**

*The Northern Intermediate High System lacks both pipeline redundancy and sufficient storage. The intent of this project is to identify and take measures that reduce both the risk and impacts of a pipeline failure within the Northern Intermediate High System.*

**Project History and Background**

This system serves Reading, Stoneham, Wakefield, Wilmington, Winchester, and Woburn with an average daily demand of 9.9 million gallons. The population served is approximately 150,000. The current six million gallon capacity of MWRA’s Bear Hill Tank in Stoneham is both insufficient to meet MWRA’s goal of one day of storage for the service area and is not advantageously placed within the NIH system.

Section 89 is a three mile, four foot diameter Prestressed Concrete Cylinder Pipe (PCCP) transmission main with no redundancy other than the low capacity, century old Section 29 that parallels its route for a short distance. The 10,500 foot length of Section 89 northwest of Spot Pond is constructed of Class IV wire which is of significant concern given experience with catastrophic failures elsewhere in the country. Section 29 was originally constructed in 1901 and measures 6,300 feet in length and 24 inches in diameter. Because of its age and the fact that it is unlined cast-iron pipe, tuberculation has reduced the pipeline carrying capacity to approximately 45% of the original design capacity (C-value: 58). In the event of a shut down in Section 89, Section 29 may not be able to meet the minimum hydraulic needs of the area and additional chlorination to maintain water quality may be required.

**Scope**

Sub-phase	Scope	Status
Concept Plan, ENF, and Mobile Pump Unit	Developed a concept level plan to evaluate options to reduce the risk and the impacts of potential failures in Sections 29 and 89. Measures evaluated included valve improvements, improved community interconnections, pipeline redundancy, targeted emergency response plans, additional storage and other improvements that can be implemented within the NIH system. Concept planning work included environmental review of the recommended plan and specification and purchase of the Mobile Pump Unit.	Completed
Design CA/RI and construction NIH Impr/Gillis PS Impr./Reading-Stoneham Interconnection (7045/7260/7261)	This phase includes the design and construction of short-term measures identified in the conceptual plan including Gillis PS Improvements and the Reading/Stoneham Interconnection.	Completed

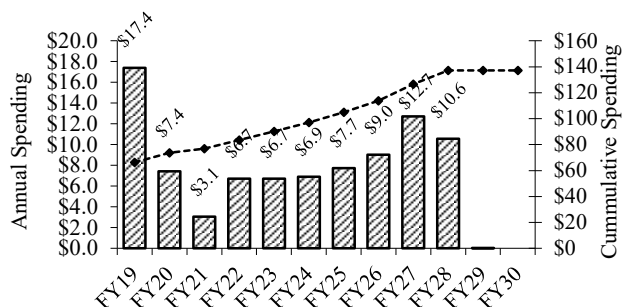
Sub-phase	Scope	Status
Design CA/RI and Construction Section 89/29 Redundancy Phases 1A, 1B, 1C & 2	Contract 6906 includes design and CA/RI for the redundant pipeline Section 110 (approximately 7 miles) consisting of 4 construction contracts. Phase 1 includes Phase 1A West Street Section 110 Woburn/Reading (7066), Phase 1B Section 110 Reading (7471) and Phase 1C Section 110/112 Stoneham and Wakefield (7478). Phase 2 includes Section 110 in Stoneham (7067).	Active/completed
NIH Storage Design & Construction (7311/7068)	The Concept Plan has identified several potential storage locations in the NIH system. This phase includes the design and construction of two 3-MG elevated tanks.	Future
Section 89 Replacement Design/CA (7116), RE/RI Services (7633) and Construction (7117)	Section 89 will be replaced after the redundant pipeline is completed. These phases include design/CA, RE/RI and construction for the replacement of Section 89.	Active/Future

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$137,170	\$73,739	\$63,431	\$3,050	\$6,717	\$41,325	\$46,940	\$10

Project Status 12/20	54.2%	Status as % is approximation based on project budget and expenditures. Section 89/29 Redundancy Design/CA/RI contract was awarded in March 2011. Reading/Stoneham Interconnections was substantially complete in October 2012. Gillis Pump Station Improvements was substantially complete in December 2014. West St Pipeline Reading Construction Phase 1A was substantially complete in May 2015. Phase 1B and Phase 1C were substantially complete in May 2018 and September 2018, respectively. Phase 2 Construction was substantially complete in June 2020.
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### NIH Redundancy & Covered Storage



**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$128,729	\$137,170	\$7,441	Jan-28	Jan-28	None	\$45,574	\$41,325	(\$4,249)

**Explanation of Changes**

- Project cost increased primarily due to updated cost estimates for Section 89 & 29 Replacement Construction and RE/RI Services, change orders for Section 89/29 Redundancy Construction Phase 2, and inflation adjustments for NIH Storage contracts.
- Project spending changed primarily due to updated cost estimate for Section 89 & 29 Replacement Construction and RE/RI Services, change orders for Section 89/29 Redundancy Construction Phase 2, and updated cash flows for Section 89/29 Replacement Design/ESDC .

**CEB Impacts**

- None identified at this time.

# S. 723 Northern Low Service Rehabilitation - Section 8

## Project Purpose and Benefits

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*

*To improve the condition and reliability of unlined cast-iron pipes serving a portion of the Northern Low System. These pipelines, have reduced carrying capacity because of rust build-up, and have experienced leaks at above average rates. Improvements will consist of a combination of replacement, cleaning, lining, and valve repairs. Rehabilitation of Sections 37 and 46 will improve the service to East Boston and will allow the shutdown of Section 8. The construction of Section 97A provides needed redundancy to East Boston via the Northern High System.*

## Project History and Background

Section 8 was installed between 1897 and 1915 and serves Malden, Everett, Chelsea, and East Boston. Section 8 is currently functioning at approximately 45% of its original capacity (C-value: 60) due to the build-up of rust deposits and other matter along the interior pipe wall. Excavations for the installation of new valves along portions of Section 8 have indicated severe external corrosion on the pipe wall, which could affect the structural stability of the pipeline.

Before rehabilitating Section 8, the distribution system supplying East Boston must be strengthened. Sections 37 and 46, located in Chelsea, are 36-inch diameter cast iron pipes. These two pipe sections connect between Section 57, portions of which were previously rehabilitated, and the two Chelsea River crossings to East Boston at Sections 8 and 38. It is anticipated that Sections 37 & 46 will need cleaning and cement mortar lining. Section 97A, a new 16-inch diameter pipe provides redundancy to East Boston via Northern High System. The pipeline connects to existing Meter 99 in East Boston and to the Boston low-pressure system through a new pressure-reducing valve.

## Scope

Sub-phase	Scope	Status
Design/CA, Construction, and REI – Section 8 and 57 (7092/6322/7719)	Cleaning and cement mortar lining of the pipeline interior, replacement of all defective and inoperable valves, and the addition of new valves for 7,500 linear feet of 48-inch pipe on Section 8 in Malden and Everett. Replacement work consists of replacing 9,722 feet of 42-inch pipeline with new 36-inch ductile iron main and replacement of blow-off connections from Second Street in Everett to the Mystic River Bridge in Chelsea.	Future
Rehab Sections 37 and 46 Chelsea, East Boston Design/CA, Construction and REI (7405/6962/7718)	Rehabilitation of approximately 3,550 linear feet of 36-inch cast iron main (Section 37) and approximately 2,500 linear feet of 36-inch cast iron main (Section 46). Both sections are located in Chelsea and are critical to the supply of water to East Boston. Section 38, the 36-inch ductile iron pipeline under the Chelsea River, is assumed to not need rehabilitation.	Future
Section 97A Construction (7021)	Installation of approximately 3,000 linear feet of 20-inch, 16-inch and 12-inch water main and a new pressure-reducing valve. This completed work is part of the Northern High System and adds redundancy to East Boston, including Logan Airport.	Completed



Sub-phase	Scope	Status
Sections 50/57 Water Rehabilitation Design CA/RI (7540) and Construction (7541)	Design, CA/RI and construction of rehabilitation of: 600 feet of 20-inch cast iron Northern High System water pipe; and 2,500 feet of 48-inch steel Northern Low System water pipe and associated valves and structures located in Medford, MA.	Active/Future

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$60,834	\$5,350	\$55,484	\$1,277	\$5,625	\$13,194	\$44,571	\$115

Project Status 12/20	9.2%	Status as % is approximation based on project budget and expenditures. Section 50 & 57 Water Design/ESDC/REI contract commenced in July 2017.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$60,945	\$60,834	(\$111)	Jul-28	Jul-28	None	\$13,194	\$13,194	\$0

#### Explanation of Changes

- Project cost changed due to inflation adjustments on unawarded contracts.

#### CEB Impacts

- None identified at this time.

## S. 727 Southern Extra High Redundancy & Storage

### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Extends current asset life*
- ☑ *Improves system operability and reliability*

**Master Plan Project ☑ 2008 Priority Rating 2 (see Appendix 3)**

*To provide redundancy to the southern extra high mains Section 77 and 88 serving Boston, Canton, Norwood, Stoughton and Dedham-Westwood by construction a redundant pipeline. Also, to increase distribution storage within the service area to improve system operation and reliability.*

### Project History and Background

This project will provide redundancy to Sections 77 and 88 serving Boston, Canton, Norwood, Stoughton, and Dedham-Westwood, through construction of a redundant pipeline. The project will also increase distribution storage within the service area to improve system operation and reliability.

MWRA's Southern Extra High pressure zone serves Canton, Dedham, Norwood, Stoughton, Westwood, portions of Brookline, Milton, Newton, and the Roslindale and West Roxbury sections of Boston. Water is pumped to this pressure zone from the Dorchester tunnel through two pump stations.

The Southern Extra High pressure zone is currently deficient in distribution storage and lacking in redundant distribution pipelines. MWRA maintains two distribution storage tanks (Bellevue Tank 1 and Bellevue Tank 2) totaling 6.2 million gallons of storage for the entire Southern Extra High service area, which is significantly below the goal of one day of storage. Further highlighting the deficiency is the fact that the overflow elevation for the 2.5-million-gallon Bellevue Tank 1 is 25 feet lower than the overflow elevation for the newer 3.7-million-gallon Bellevue Tank 2, limiting its useful capacity.

The five communities in the southern portion of the service area (Canton, Norwood, Dedham, Westwood, and Stoughton) are served by a single MWRA 36-inch diameter transmission main (Section 77), which is five miles long. Canton and Stoughton are served by a branch (Section 88) off of Section 77. Although several of these communities are partially supplied by MWRA, the loss of this single transmission main would result in a rapid loss of service in Norwood and Canton, and water restrictions for Stoughton and Dedham/Westwood.

In addition, the Southern Extra High service area has expanded during the past several years with the addition of the partially-supplied Town of Stoughton and the Dedham-Westwood Water District. This growth has been concentrated to the south while the Bellevue tanks are located at the northern end of the service area. Although several of these communities are partially supplied by MWRA, the Town of Norwood is fully supplied by this line and has no back-up source of supply. There have been several instances when the water supply to Norwood has been interrupted due to valve and/or pipe failures.

### Scope

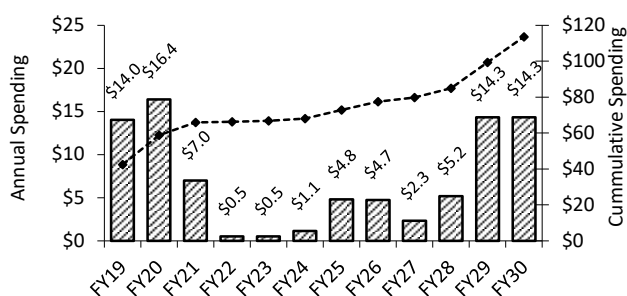
Sub-phase	Scope	Status
Concept Plan (6452)	A study to assess storage, capacity and condition of existing distribution pipes, new pipeline routing options and tank sites were identified.	Completed

Sub-phase	Scope	Status
University Ave Water Main Section 108 (6445)	Initial phase to provide redundant pipeline on University Avenue in Norwood. Project broken out from the larger SEH redundancy and storage projects. This work has been completed.	Completed
Redundancy Pipeline Section 111 Design (6453) & Construction Ph 1 Contracts 1, 2, and 3 (6454, 7504, 7505)	The first phase funds the design and construction of a pipeline from the Bellevue storage tank to East Street in Westwood, which will provide redundancy to Sections 77 & 88.	Active
Storage Design & Construction Phase 2 (6444/7245)	The second phase will provide redundancy to Sections 77 & 88 through design and construction of one (1) 2.5 million gallon distribution storage tank. This tank is needed to provide adequate one day storage to the service area.	Future
Storage Design & Construction Phase 3 Second Tank (7263/7262)	The third phase will provide additional redundancy to Sections 77 & 88 through design and construction of an additional one (1) 2.5 million gallon distribution storage tank. This tank is needed to provide additional one day storage to the service area.	Future
Section 77/88 Design/ESDC, Constr. and REI (7112/7113/7706)	Rehab of Sections 77 & 88 after redundant pipeline is in place.	Future

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$140,915	\$58,833	\$82,082	\$6,974	\$495	\$38,353	\$18,136	\$55,981

#### SEH Redundancy & Storage



Project Status 12/20	45.4%	Status as % is approximation based on project budget and expenditures. Conceptual Design began in February 2007. University Ave Water Main was substantially complete in November 2008. Redundancy/Storage Phase 1 Final Design/CA/RI commenced in February 2014. Redundancy Pipeline Section 111 Construction 1 was substantially complete in September 2018. Redundancy Pipeline Section 111 Construction 2 began in October 2017. Redundancy Pipeline Section 111 Construction 3 was awarded in May 2018.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$141,243	\$140,915	(\$328)	Dec-35	Dec-35	None	\$38,522	\$38,353	(\$169)

**Explanation of Changes**

- Project cost changed primarily due to change orders for Redundancy Pipeline Section 111 Construction 2 and 3, and inflation adjustments on unawarded contracts.
- Project spending changed primarily due to change orders for Redundancy Pipeline Section 111 Construction 2 and 3, and updated cash flows.

**CEB Impacts**

None identified at this time

# 735 Section 80 Rehabilitation

## Project Purpose and Benefits

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*

**Master Plan Project  2009 Priority Rating 3 (see Appendix 3)**

*Rehabilitation of approximately 16,197 feet of pipe along Route 128/95. Section 80 supplies water to Wellesley and Needham. Rehabilitation will improve water quality to these two MWRA communities.*

## Project History and Background

Section 80 is a steel main that runs from Shaft 5 of the City Tunnel in Weston extending through Newton to supply Wellesley and Needham. The main runs along portions of 128/95 and has been exposed to highly corrosive conditions and the cathodic protection system has not been maintained. Complaints from residents in Needham and Wellesley of a tar-like smell in the water indicate deterioration of the pipe liner. Testing indicated phenols levels 10 times above allowable limits. Failure of Section 80 would create huge traffic challenges on this major metro-Boston highway.

## Scope

Sub-phase	Scope	Status
Section 80 Rehabilitation Design/CA (6892), Construction (6891), and REI (7675)	Design and rehabilitation of approximately 16,197 feet of Section 80 along route 128/95.	Future
Section 80 Repair Construction (7532)	Replacement of 200 linear feet of Section 80 that was leaking.	Completed

## Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$15,985	\$1,925	\$14,060	\$0	\$360	\$851	\$13,209	\$0

Project Status 12/20	12.0%	Status as % is approximation based on project budget and expenditures. Section 80 Repair Construction was substantially complete in June 2018.
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## Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$16,024	\$15,985	(\$39)	Jul-26	Jul-26	None	\$858	\$851	(\$7)

**Explanation of Changes**

- Project cost and spending changed primarily due to inflation adjustments on Section 80 Rehabilitation Design/Construction Administration and Construction.

**CEB Impacts**

- None identified at this time.

## S. 753 Central Monitoring System

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### Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Improves system operability and reliability*
- ☑ *Extends current asset life*
- ☑ *Results in a net reduction in operating costs*

*To provide a modern centralized system for monitoring, coordinating, and controlling critical waterworks functions. Many existing MWRA facilities are monitored and operated using obsolete methods and equipment, which can hinder emergency response capabilities and prevent coordinated system operation. Two operations control centers are already operational, and various field facilities have been equipped with telemetry and communications equipment as part of this project.*

### Project History and Background

MWRA has been converting to system-wide remote monitoring and control of essentially all hydraulic and hydroelectric operations. The original instrumentation used to measure operating parameters was incomplete, old, and in poor condition. In many cases necessary instrumentation did not exist. The system also lacked telemetry to provide centralized and immediate information on system performance, and the ability to remotely intervene when malfunctions occurred. Without telemetry, operating decisions had to be delayed until field personnel were dispatched to collect measurements. This was a cumbersome and undesirable mode of operation, particularly in emergency situations.

The lack of flow measurement within the water delivery system also impeded identification of sources of unmetered water. When fully implemented, the central monitoring system will generate instantaneous data on water flow and pressure in 18 subsystems beginning with the supply sources and ending at the delivery points to user communities. The data will assist operations staff in detecting and pinpointing leaks in the system. The response time for leak repair work can then be lessened, resulting in significant savings of water and reduction in potential MWRA liability for public safety and property damage.

The central monitoring project has grown from the initial automation of the Reservoir Road Pump Station to include eight other pump stations. Monitoring and control of water treatment facilities has expanded to include the Interim Corrosion Control Facility in Marlborough, the Cosgrove Disinfection Facility, the Norumbega Temporary Disinfection Facility and the Ware Disinfection Facility. In addition, water quality is monitored at seven locations from two Operations Control Centers. Real time Supervisory Control and Data Acquisition (SCADA) monitoring of Telog data is being established with 150 sites currently active. Operation control centers (OCCs) at the MWRA Chelsea and Clinton facilities provide remote monitoring and control of all the SCADA facilities. Also, as part of its Integrated Water Supply Improvement Program, MWRA built several new and upgraded facilities. These included the Nash Hill Covered Storage facility and the Loring Road Covered Storage facility, Carroll Water Treatment Plant, MetroWest Water Supply Tunnel, and the Norumbega Covered Storage facility. The existing system-wide backbone microwave communications network has been improved to connect these facilities to the waterworks communications system.

## Scope

Sub-phase	Scope	Status
Study	Study to determine the implementation phases.	Completed
Design	Design of the replacement and rehabilitation of 34 existing master meter sites, 22 new master meter sites, 15 western revenue meter sites, 28 reservoir level instrumentation sites, ten pumping stations, eight pressure regulator control sites, four major throttle valve sites, six chemical feed sites, four hydroelectric sites, five weather stations, five sluice gate control sites, one stream gauging station, and other facilities.	Completed
Communications Structures	Installation of two radio towers, five antennas, one satellite dish, and an equipment shelter.	Completed
CS/Start-Up Services	Construction and startup services for the metropolitan Operations Control Center, as well as metering and monitoring construction.	Completed
Equipment Pre-Purchase	Purchase of instrumentation equipment, mechanical equipment, and new master meters.	Completed
Construction 1 – Reservoir Road and Cosgrove Pilots	Purchase and installation of equipment to automate the Reservoir Road Pump Station and an aqueduct monitoring system for use by the Cosgrove Intake and Shaft 4 operators. MWRA staff installed the equipment.	Completed
SCADA Implementation	Purchase of Supervisory Control and Data Acquisition System (SCADA) equipment for monitoring, control and metering sites.	Completed
Microwave Equipment	Purchase of services and equipment necessary to allow MWRA to convert from analog to digital communications to continue to utilize the Commonwealth's Interagency Microwave System.	Completed
Construction – Operations Center	Construction of a 5,000 square feet center including an environmentally controlled computer room, a printer room, a control room, office space, and sanitary facilities in Chestnut Hill.	Completed
System Wide Backbone C.P. Construction– Monitoring & Control Communications Network	Improvement of the existing Waterworks system wide backbone including upgrades of microwave antennas at MDC Hill and Bellevue water tank and provision of new microwave antennas at five facilities.	Completed
Study and Design – Waterworks Monitoring & Control Communications Network	Provision of microwave antennas and radio equipment at twelve facilities.	Completed



Sub-phase	Scope	Status
Microwave Communication for Waterworks Facilities	Furnish and install seventeen microwave antennas (dishes), three 3-legged, 90- to 100-foot towers, one unpowered 80-foot steel monopole, and two prefabricated concrete shelters to house radio equipment with associated racks, cabinets and wiring.	Completed
Quabbin Power, Communication & Security Design CA/RI and Construction	Design and construction of 2.4 miles of power, and communication to Quabbin Aqueduct Shaft 12 and 1,500 feet to the DCR Boat Cove. Also, upgrading 9,000 feet of existing overhead power line from Winsor Power Station to Quabbin Lookout Tower to insure uninterrupted service of the communication network. Increased security will be provided at Shaft 12, Winsor Power Station, CVA Intake, Nash Hill gate house, William A. Brutsch Water Treatment Facility, DCR Boat Cove and Quabbin Administration building. The Verizon communications service needed for the security devices to communicate to the Chelsea Head-end Facility was extended to support this function.	Completed
Waterworks SCADA/PLC Upgrades (CWTP SCADA Upgrades Design Programming RE and Construction, Other Design and Programming Services, Other Construction, and Other Equipment/Hardware)	Replacement of existing SCADA PLC's nearing their end of life with an updated PLC platform. New PLC's further provide enhanced security capabilities, continued vendors support and future reliability. Secondary goals include standardizing PLC logic and HMI graphics, and upgrading aging field instrumentation. During FY17 staff purchased equipment and contracted outside support to replace the obsolete PLC at the Commonwealth Ave. West Pump Station. This work was complete in the spring of 2017. Additional work to upgrade the Brutsch Water Treatment facility chemical feed PLC through CIP purchases and use of In-house staff for design and installation will be complete in 2019. The design work for the CWTP SCADA Improvement is nearing completion and the bidding of the Construction Contract for the replacement of legacy SCADA system is anticipated in the summer 2021. Work continues to replace legacy SCADA hardware at other MWRA facilities through new construction contracts including CAPS West, Wachusett Bastion, Shaft 5, Arlington Tanks etc.	Active/Future

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$42,020	\$22,250	\$19,770	\$1,022	\$6,415	\$15,007	\$6,309	\$0

Project Status 12/20	53.2%	Status as % is approximation based on project budget and expenditures. Quabbin Power Communications & Security Construction was substantially complete in April 2017. CWTP SCADA Design Programming RE was awarded in December 2018.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$42,082	\$42,020	(\$62)	Oct-28	Oct-28	None	\$16,960	\$15,007	(\$1,953)

**Explanation of Changes**

- Project cost and spending changed primarily due to budget reduction for SCADA Implementation as a result of some work being performed in-house.
- Project spending changed primarily due to updated schedule for CWTP SCADA Upgrade Construction.

**CEB Impacts**

- None identified at this time.

## S. 763 Distribution Systems Facilities Mapping

### Project Purpose and Benefits

- Contributes to improved public health*
- Improves system operability and reliability*

*To produce a complete, up-to-date set of appropriate scale maps of all underground waterworks facilities, along with a comprehensive database inventory. Existing maps were outdated and unreliable, complicating emergency response, field repairs, and planning.*

### Project History and Background

In 1995 MWRA did not have an adequate, updated set of maps of all of its underground waterworks facilities. Existing maps did not consistently show current conditions and were often incompatible or contradictory with MWRA databases. Engineering, operations, and emergency response were all affected by this inadequacy. Outdated maps hampered engineering because maps needed to be re-created. Field operations crews could not predict with certainty the results of valve shut-offs during repair efforts. The planning process was impaired because management did not have authoritative, consolidated data to evaluate pipe condition, age, C-Values, materials, and soil conditions. Additionally, the lack of a comprehensive understanding of the relationships between MWRA and local community pipe systems could result in service delays. The former mapping system created the possibility of incorrect actions, and in critical instances could have resulted in exacerbated property damage.

Reliable engineering records do not exist for certain sections of the distribution system. The Records Development sub-phase will create, update and automate record drawings and detail records for high priority areas.

### Scope

Sub-phase	Scope	Status
Planning/Design	Creation of a complete set of 200 to 400 scale maps of the distribution system with an associated verified inventory of size, material, age, and condition of pipes.	Completed
Data Purchase	Purchase of project related data from Boston Edison.	Completed
Records Development (6525)	Automation of MWRA record drawings.	Future
Update of Record Drawings (7489)	Update record drawings and detail record information for selected water pipeline sections using information from detail records, plans, field books, surveys, and valve inventories. Establish procedures for continued updating and maintenance of detail record information.	Future
Water System Hydraulic Model (7613)	Upgrade and calibrate the water system hydraulic model.	Future

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$2,799	\$1,036	\$1,763	\$231	\$269	\$885	\$878	\$0

Project Status 12/20	37.0%	Status as % is approximation based on project budget and expenditures. Water System Hydraulic Model is expected to begin in FY21.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$2,799	\$2,799	\$0	Oct-24	Oct-25	12 mos.	\$1,183	\$885	(\$298)

**Explanation of Changes**

- Project schedule and spending shifted due to updated schedules for the Records Drawings and Development projects.

**CEB Impacts**

- None identified at this time.

## S. 765 Local Water System Assistance Program

### Project Purpose and Benefit

- Contributes to improved public health*
- Provides environmental benefits.*

*To provide loans to facilitate water system improvements in MWRA communities.*

### Project History and Background

The Local Water System Assistance Program is a critical piece of MWRA's Integrated Water Supply Improvement Program. In November 1999, the Board of Directors approved the Phase 1 Local Pipeline Assistance Program, supported through a Tax Exempt Commercial Paper (TECP) program, to make \$25 million available annually in loans to MWRA communities for pipeline relining and replacement in proportion to each community's share of total unlined pipe miles. Communities are required to pay back principal for each loan during a ten-year time period beginning one year after the project funding is approved. MWRA increased the initial total program budget to \$256,796,500 to provide funds for additional water system communities: Stoughton (\$4,480,000), Reading (\$1,916,000), Lynnfield (\$320,000), Dedham/Westwood (\$7,500), and Wilmington (\$73,000). The Phase 1 Local Pipeline Assistance Program concluded at the end of FY13 with a total of \$222.3 million in interest-free loans distributed to member water communities.

An additional \$210 million was added to the FY11 budget for the Phase 2 Local Water System Assistance Program. Community distributions from this program will be made from FY11 through FY23 with repayments scheduled for FY12 through FY33. The \$210 million is split with \$200 million allocated among 42 Metro-Boston/Metro-West communities and \$10 million allocated among three Chicopee Valley Aqueduct (CVA) communities.

The Local Water System Assistance Program was expanded beginning in FY17 to include \$100 million in interest-free loans to communities solely for efforts to fully replace lead service lines. The *Lead Service Line Replacement Loan Program* is budgeted over twenty years, but the pace of spending for the program will depend on the level of participation by communities, the communities' ability to work with individual homeowners, and future regulatory requirements.

In FY18 Local Water System Assistance Program Phase 3 was added in the amount of \$292 million. Community distributions from this program will be made from FY18 through FY30 with repayments scheduled for FY19 through FY40. In FY21, MWRA increased the initial total program budget to \$293,346,800 to provide funds for additional water system communities: Ashland (\$519,400) and Burlington (\$827,400).

### Scope

Sub-phase	Scope	Status
Community Loans	Loans for MWRA water communities to replace and rehabilitate local water pipelines based on each community's share of total unlined pipe miles. These loans will be complete by the end of FY13.	Completed
Community Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.	Active
Local Water System Assistance Program Loans	This is a continuation of the program of providing interest-free loans to water system communities for pipeline replacement, cleaning and lining, water metering and other local water system improvements.	Active
Local Water System Assistance Program	Principal repayment over a ten-year period beginning one year after origination of the loans.	Active

Repayments		
CVA Loans	This is an extension of the Local Water System Assistance program to the CVA communities to provide interest-free loans to water system communities for pipeline replacement, cleaning and lining, water metering and other local water system improvements.	Active
CVA Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.	Active
Lead Service Line Replacement Loans	Replacement of lead service lines budgeted over a twenty year period beginning in FY17.	Active
Lead Service Line Replacement Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.	Active
Local Water System Assistance Phase 3 Loans	This is a continuation of the program (Phase 3) of providing interest-free loans to water system communities for pipeline replacement, cleaning and lining, water metering and other local water system improvements.	Active
Local Water System Assistance Phase 3 Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.	Active
Local Water System Assistance Phase 3 CVA Loans	This is an extension of the Local Water System Assistance program to the CVA communities to provide interest-free loans to water system communities for pipeline replacement, cleaning and lining, water metering and other local water system improvements.	Active
Local Water System Assistance Phase 3 CVA Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.	Active

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget*	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$0	\$165,539	(\$165,539)	\$6,437	\$15,328	\$42,588	\$20,215	(\$203,076)

\*Total Loan Distributions less Loan Repayments.

Project Distribution Status 12/20	57.4%	Through December 2020, MWRA has distributed \$473.4 million in loans to fund 466 projects in 42 communities under the Local Water System Financial Assistance Program.
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Project Repayment Status 12/20	37.4%	Through December 2020, a total of \$308.4 million has been repaid by member communities receiving interest-free loans under the Local Water System Assistance Program.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$0	\$0	\$0	May-46	May-46	None	\$54,163	\$42,588	(\$11,575)

**Explanation of Changes**

- Spending change is primarily due to updated cash flows for Local Water System Assistance Program repayments for Phase 1, Phase 2, Phase 3, Lead Service and CVA loans.

**CEB Impact**

- The annual interest paid for the Commercial Paper program supporting the Local Water System Assistance Program initiative is \$1.51 million average per year based on the last 5 years of actual spending.

## S. 766 Waterworks Facility Asset Protection

### Project Purpose and Benefits

- Contributes to improved public health*
- Extends current asset life*
- Improves system operability and reliability*

*To protect the investment of MWRA ratepayers by ensuring timely replacement of equipment and systems.*

### Project History and Background

This project was developed to ensure that MWRA maintains ongoing service while optimizing operations in its water facilities. This project in its current form addresses immediate critical facility and equipment issues. This project will eventually include five areas:

1. Equipment replacement (pumps, HVAC equipment, blowers, etc.).
2. Architectural projects (concrete corrosion, etc.).
3. Utilities projects (water, sewer, drainage, electrical wiring, heating system, etc.).
4. Support Projects (process control system upgrades, etc.).
5. Specialty Projects (instrumentation upgrades, fuel storage tanks, etc.).

While the current schedule indicates a completion date of 2023 for construction, the Waterworks Facility Asset Protection project will be ongoing throughout the useful life of the facilities.

### Scope

Sub-phase	Scope	Status
Meter Vault Manhole Retrofits Construction (7479)	Retrofit approximately 195 meter manholes.	Future
Painting for Deer Island Water Storage Tank (7601)	Exterior and interior abrasive blast cleaning and painting for Deer Island Tank. Structural and concrete repairs. Removing, storing, installing and reinstalling components of the microwave communication system. Erection and maintenance for scaffolding and staging including enclosures with protection and ventilation.	Completed
Painting for Bellevue 2 and Turkey Hill Steel Water Storage Tanks (7634)	Exterior and interior abrasive blast cleaning and painting for Bellevue 2 and Turkey Hill Tanks. Structural and concrete repairs and design and erect scaffolding to support the temporary antenna relocation at Turkey Hill. Installation of the interior components of the cathodic protection system.	Completed
Design/CA for Steel Tank Improvements (6832), Construction (7493) REI (7676), Phase 2 Constr. (7727) and REI (7728)	Design and construction to repaint, replace cathodic protection systems and make necessary improvements to 3 steel water storage tanks (Bellevue 1, Park Circle, and Walnut Hill). Design and construction for improvements to the recently painted Bellevue 2, Turkey Hill and Deer Island storage tanks.	Active/Future
Waltham Pipe Bridge Replacement (6910)	Replacement of approximately 100 feet of 30-inch steel pipe over commuter rail tracks in Waltham including a bridge crossing.	Completed



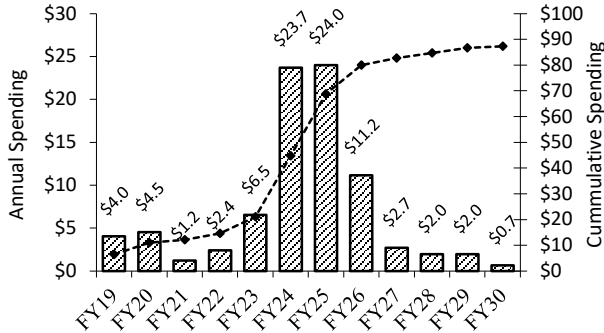
<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
Design and Construction Cosgrove Valve Replacement (7064/7065)	Replacement of isolation sluice gates at Cosgrove Intake to improve reliability for emergency shut down of Cosgrove facility and to isolate new sliding sleeve valves to facilitate preventive maintenance and any future corrective maintenance.	Future
Transformer at Cosgrove Intake Building (7228)	Replacement of a 45 year old main service transformer and load break switch. This transformer supplies power to the Cosgrove Intake Building. If it were to fail, the building would be running on generator power for a significant period of time.	Completed
Fells/Loring Road Covered Storage Tank Rehabilitation Design and Construction (7385/7482)	Rehabilitation of Fells and Loring Road Covered storage facilities commencing in FY19. The valves, sluice gates, and piping should be considered for rehabilitation by this time, as each facility will be more than 20 years old.	Future
Electrical Distribution Upgrades at Southborough (7425)	Upgrade of existing 13.8kV distribution system that supplies the various buildings at Southborough Complex due to on-going service disruptions. Install electrical metering equipment to better manage electrical use in facility. Design nearing completion.	Active
Water Meter Upgrade Replacement and Meter Vault Manhole Retrofit Phase 1 Design (In-House)	Upgrade of 11 Boston water meters. Scope includes Removing fire flow bypasses and increasing venturi tube size at four meters, installing new aboveground cabinets and replacing the venturi tube at five meters, and installing new aboveground cabinets at two meters. Retrofit the manholes of a total of nine of these existing meters. This will provide more accurate and reliable meter data since current meters are beyond their life expectancy.	Future
Meter 3 Upgrade Replacement and Survey (In- House)	Upgrade of venturi tube and installation of new aboveground cabinet at Meter 3. Scope also includes retrofitting the manholes at this meter site. A survey will be conducted at the meter site to confirm detail record measurements and develop new profiles (MWRA PO1184774).	Active
Beacon Street Line Repair Design CA/RI (7474) and Construction (7458)	Repair of 48" water main in Brookline serving Boston Meter 44. This main provides important water supply redundancy to Meter 60 which serves the Longwood Medical Center in Boston. Construction Contract 7458 was awarded with an NTP dated June 23, 2016. Project substantial completion achieved March 31, 2017.	Completed
Cosgrove Construction (7022)/and Gillis PS/Cottage Farm CSO Construction (6888) Flat Roof Replacements	Replacement of the entire flat roofs at Cosgrove, Gillis Pump Station, and Cottage Farm CSO Facility. Designs have been developed with the assistance of Technical Assistance Consulting Services Task Orders. Limited Task Order services are being used to support ESDC services.	Active
New Roofs at Water Pumping Stations Construction (7626) and REI (7628)	Replace pump station roofs at Belmont (membrane), Spring St (membrane), and Lexington St in Belmont, Arlington, Waltham and Brookline. Design is being developed through the Technical Assistance Consulting Services Task Orders.	Future
New Roofs at Gillis, Brattle Court, Newton Street Pumping Stations Design CA (7902), Construction (7901), and REI (7900)	Replace pump station roofs at Gillis, Brattle Ct (slate), and Newton Street (membrane) Pumping Stations.	Future

Sub-phase	Scope	Status
Generator Docking Station (7025) and REI (7024)	To install an electrical switchboard at eleven facilities, 5 - Water and 6 - Wastewater as a means for a quick connection to a towable generator. Generator will be deployed for use as a back-up in the event of prolonged utility failure or failure of the in-house emergency power generator. Construction Contract 7025 was awarded with an NTP on April 23, 2019. REI Contract 7024 awarded at April 17, 2019 BOD meeting.	Completed
Masonry/Structural Repairs Bellevue 1/Arlington Heights Design/ESDC (7711), Construction (7694), and REI (7712)	Repair/Replacement of the structurally impaired concrete/masonry structures at the Bellevue 1 standpipe and the Arlington Heights tank as recommended by the Klienfelder Preliminary Design Report. These preliminary design documents for the repair/replacement shall be utilized for the future preparation of design and construction bid documents for one construction project.	Future
Water Tanks Paint Phase 1 Design/ESDC, Construction, REI Bellevue 2/Deer Island/Turkey Hill (7739, 7740, 7748, 7741)	Rehabilitate Bellevue 2, Deer Island, and Turkey Hill storage facilities including repaint, replace cathodic protection and other improvements.	Future
Water Tanks Paint Phase 2 Design/ESDC, Construction, REI Bellevue 1/Park Circle/Walnut Hill (7742, 7743, 7744)	Rehabilitate Bellevue 1, Park Circle, and Walnut Hill storage facilities including repaint, replace cathodic protection and other improvements.	Future
Cosgrove Tunnel Rehabilitation Design/ESDC (7738)	Repairs need to the Cosgrove Tunnel as a result of an inspection in 2003. This project would be for the design and engineering services during construction for these repairs.	Future
Beacon Street Line Rehabilitation Design/ESDC, Construction, REI (7729, 7730, 7731)	Rehabilitation of the remaining portion of the Beacon Street line near the Chestnut Hill area. No change	Future

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$115,195	\$10,957	\$104,238	\$1,208	\$2,406	\$18,712	\$63,548	\$30,552

### Waterworks Facilities Asset Protection



Project Status 12/20	10.0%	Status as % is approximation based on project budget and expenditures. Transformer Replacement at Cosgrove Intake Building contract was completed in July 2012. Beacon Street Line Repair construction was substantially complete in April 2017. Cosgrove Roof Replacement was substantially complete in September 2019. Gillis PS/Cottage Farm CSO Roof Replacement NTP issued in July 2019. Bellevue Hill II and Turkey Hill Tanks Repainting were substantially complete in October 2019. Generator Docking Station construction was substantially complete in April 2020. Steel Tanks Painting and Improvements Design/ESDC was awarded in November 2020.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$108,639	\$115,195	\$6,556	Jul-41	Jul-41	None	\$22,274	\$18,712	(\$3,562)

#### Explanation of Changes

- Project cost changed due updated cost estimates for Masonry/Structural Repairs Bellevue 1/Arlington Heights Tanks, Steel Tank Improvements Design/CA, (award amount), New Roofs at Water Pumping Stations Design/CA/RI and Construction, and Meter Vault Manhole Retrofits Design which is being performed under technical assistance contract, as well as change orders for Painting of Bellevue 2 & Turkey Hill Steel Water Storage Tanks, Gillis Pump Station/Cottage Farm CSO Roof Replacements and Generator Docking Station.
- Project spending changed primarily due to updated cost estimates and change orders noted above, as well as rescheduling of several projects including Masonry/Structural Repairs Bellevue 1/Arlington Heights and Steel Tank Improvements.

#### CEB Impacts

- None identified at this time.

# Business and Operations Support



## S. 881 Equipment Purchase

### Project Purpose

*To provide critical equipment for improved maintenance and operations at MWRA facilities.*

### Project History and Background

This project includes the purchase of large vehicles, purchase and installation of security equipment at various MWRA facilities, and purchase of an Inductively Coupled Plasma-Mass Spectrometer (ICP-MS) for MWRA's Central Laboratory. The security equipment and installation component of the project includes the design and installation of security systems at MWRA facilities. MWRA is ranking facilities and locations with respect to the critical nature of service delivery, with an emphasis on the waterworks system. This ranking will frame the extent and scheduling of the security improvements for each specific site.

### Scope

Sub-phase	Scope	Status
Security Equipment & Installation	Design and installation of security systems at various MWRA facilities and sites.	Active
ICP-MS Lab Testing Equipment	Purchase of Inductively Coupled Plasma – Mass Spectrometer to replace a 14-year-old instrument and expand the laboratory's high sensitivity metals testing capacity. Equipment was purchased in 2008.	Completed
FY14-18 Major Laboratory Instrumentation	Purchase major laboratory instrumentation, such as high resolution GC-MS or LC-MS to provide for lab testing of newly regulated contaminants.	Completed
FY19-23 Major Laboratory Instrumentation	Purchase major laboratory instrumentation, such as high resolution GC-MS or LC-MS to provide for lab testing of newly regulated contaminants.	Active
<i>Vehicles:</i>		
High Lift Fork Loader (Lull)	Purchase High Lift Fork Loader (Lull) to move equipment and materials at Deer Island.	Completed
Prior Vehicle Purchases	Vehicle purchases including TV Inspection Truck, Two Back Hoes, Vector Truck, Water Service Truck, Bucket Machine, Excavator, Grove Crane, Land Fill Loader, Power Sweeper/Catch Basin Cleaner, Front-End Loader, Two Dump Trucks, Crane, and International Tractor/Trailer.	Completed
Ramp Truck	Purchase of Ramp Truck to support Fleet Services.	Completed
Street Sweeper	Purchase of Street Sweeper to support MWRA facilities and community assistance.	Completed
Contaminant Monitoring Equipment	Contaminant monitoring equipment including radiological monitoring, contaminant monitoring system panel replacement or expansion, and buoys.	Active
FY11-13 Vehicle Purchases	Vehicle purchases planned for FY11-13.	Completed
FY14-18 Vehicle Purchases	Vehicle purchases planned for FY14-18.	Completed

Sub-phase	Scope	Status
FY19-23 Vehicle Purchases	Vehicle purchases planned for FY19-23.	Active
FY24-28 Vehicle Purchases	Vehicle purchases planned for FY24-28.	Future

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$41,337	\$24,011	\$17,325	\$3,083	\$2,162	\$10,323	\$9,157	\$0

Project Status 12/20	59.8%	Status as % is approximation based on project budget and expenditures. Purchase and installation of security equipment is in process and will continue into FY24.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$42,711	\$41,337	(\$1,374)	Jun-28	Jun-28	None	\$9,914	\$10,323	\$409

**Explanation of Changes**

- Project cost and spending changed primarily due to updated cost estimates Contaminant Monitoring Equipment, and Security Equipment and Installation.

**CEB Impacts**

- No impacts identified at this time.

## S.925 Technical Assistance

### **Project Purpose**

*To ensure ready access on an as needed basis, to professional and technical services not available or not cost-effectively provided by in-house staff.*

### **Project History and Background**

Efficient implementation of MWRA's Capital Improvement Program and other projects often requires specialized skills and technical assistance that are not available from in-house staff. This project ensures ready access to a variety of services through a series of task order contracts with pre-set limits. Task orders are used when immediate expertise on projects is required. When a task order is complete, the expense is transferred to the appropriate capital project or Current Expense Budget cost center.

### **Scope**

Sub-phase	Scope
Technical Assistance	MWRA technical assistance contracts include the following: surveying, hazardous materials assessment, and land appraisals.

**Status:** MWRA uses technical assistance contracts in support of various CIP and CEB projects.

### **Expenditure Forecast (in \$000s)**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$1,150	\$0	\$1,125	\$0	\$383	\$766	\$384	\$0

### **Changes in Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$1,125	\$1,150	\$25	Jun-23	Jun-24	12 mos.	\$1,125	\$766	(\$359)

### **Explanation of Changes**

- Project cost changed due to updated cost for Surveying
- Project schedule and spending changed to reflect continuation of contracts for an additional year.

### **CEB Impacts**

- When Technical Assistance contracts are used to support a project in the operating budget, the costs are charged to the Current Expense Budget (CEB).

## S. 933 Capital Maintenance Planning/Development

### Project Purpose

*To optimize the efficiency and effectiveness of MWRA maintenance practices by developing and implementing a strategic maintenance plan for MWRA assets.*

### Project History and Background

MWRA is responsible for rehabilitating, repairing, and maintaining the regional water and sewerage system infrastructure. Since its assumption of the ownership and operations of the water and sewer systems in 1985, MWRA has undertaken an ambitious program of capital improvements to the systems, with estimated expenditures of more than \$8 billion for fiscal years 1986 through 2018.

Given the significant value and critical nature of these assets, system maintenance is of paramount importance. This project helps MWRA optimize maintenance practices by evaluating alternative approaches to equipment, infrastructure and facility maintenance, recommending a maintenance strategy, implementing a pilot program to test the recommended strategy, and developing a plan to implement the recommended strategy throughout MWRA.

The purpose of technical assistance contracts is to make available, on a continuing basis, the services of qualified, professional engineering firms to assist MWRA staff on engineering study and/or design initiatives. The contracts involve the engineering disciplines of architecture, civil, structural, geotechnical, surveying, environmental and sanitary, mechanical and process, fire protection, electrical, control systems, chemical, corrosion and odor control, permitting and security. These agency-wide technical assistance contracts supplement in-house staff on high-priority or unanticipated projects, or provide expertise on short-term assignments requiring specialized disciplines that are not cost effective for MWRA to maintain on an in-house basis and will ensure that adequate resources are available to quickly and comprehensively respond to MWRA's needs, particularly when emergency or unanticipated situations arise.

### Scope

Sub-phase	Scope	Status
Inventory & Evaluation Phases 1 & 2	Development of a comprehensive, strategic maintenance plan for MWRA. (Completed by July 2005).	Completed
As-Needed CS/REI 1 & 2	As-Needed Construction Services/Resident Engineering Inspection Services. Services/Contracts can be used in circumstances when additional Resident Engineers or senior level Resident Engineers with special expertise are required as well as CS/REI services for in-house or as-needed technical assistance design contracts.	Active
As-Needed Design	Contracts for professional design and/or technical assistance services for either wastewater or waterworks system improvement projects to supplement existing engineering resources for specialized and/or complex engineering issues.	Active



**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$26,385	\$17,238	\$9,147	\$4,259	\$3,559	\$12,184	\$0	\$0

Project Status 12/20	68.1%	Status as % is approximation based on project budget and expenditures. All tasks in <i>Inventory &amp; Evaluation Phases 1 &amp; 2</i> are complete. As-Needed Design 7 was substantially completed in July 2012. As-Needed Design 8 was completed in February 2012. As-Needed Contracts 9 and 10 were completed in January and February 2014, respectively. Contract 11 was completed in August 2015. Contracts 12 and 13 were completed in July 2016 and August 2016, respectively. As-Needed Contracts 14 and 15 commenced in June 2016 and were completed in December 2018. Contracts 16 and 17 commenced in June 2018 and contracts 18 and 19 were awarded in October 2020.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$26,385	\$26,385	\$0	Dec-22	Dec-22	None	\$12,184	\$12,184	\$0

**Explanation of Changes**

- N/A.

**CEB Impacts**

- None identified at this time.

## S. 934 MWRA Facilities Management and Planning

### Project Purpose

*To improve MWRA operations by consolidating projects and providing a central point of review and decision making for space planning decisions.*

### Project History and Background

This project consolidated existing MWRA projects (DI Maintenance Facilities and DI CSB Demolition) to provide a central point of review and decision making for space planning decisions across the organization.

The project will cover work to rehabilitate or demolish the old Administration Building on Deer Island as the building has deteriorated and certain structures need to be upgraded to current standards if it is to remain occupied. The project also included funds for demolition of the CSB (Construction Support Building) which was built as a temporary structure and has also deteriorated. The CSB Demolition contract was completed in September 2009.

### Scope

Sub-phase	Scope	Status
Design & Engineering Services	Design and engineering services to support space plan.	Future
Facilities Construction	Construction of modifications to MWRA facilities in accordance with space plan.	Future

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$3,071	\$371	\$2,700	\$0	\$208	\$1,075	\$1,625	\$0

Project Status 12/20	12.1%	Status as % is approximation based on project budget and expenditures. CSB Demolition contract was substantially complete in September 2009. Records Center Shelving and Moving to the interim warehouse/records center was completed in the spring of 2009. Remaining work is to demolish old Administration Building on Deer Island. Some rehabilitation work will need to be done as well.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$3,071	\$3,071	\$0	Aug-24	Aug-24	None	\$1,075	\$1,075	\$0

**Explanation of Changes**

- N/A.

**CEB Impacts**

- None identified at this time.

## S. 935 Alternative Energy Initiatives

### **Project Purpose**

*A comprehensive “green energy” initiative that is expected to bring solar, wind and hydroelectric power either alone or in combination to a number of MWRA facilities*

### **Project History and Background**

This project was originally included under Deer Island in previous budget cycles. Building upon its track record in sustainable resource use – most notably dramatic system-wide reductions in water demand, 100% beneficial reuse of biosolids, self-generation of approximately 25% of Deer’s Island power needs, and maximizing revenue through hydropower – MWRA continues to work aggressively to use its resources efficiently, respond appropriately to climate change, and reduce the environmental impacts of its daily operations. Key initiatives completed to-date include: A comprehensive “green energy” initiative that brought solar, wind and hydroelectric power to a number of MWRA facilities.

### **Scope**

<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
DI Solar Residuals Odor Control (ROC)	Design and construction of 100 kw photovoltaic array. Projected annual output estimated at 105,000 kwh.	Completed
DI Wind	Design and construction of 2 600kw solar wind turbine systems. Projected annual output estimated at 2,300,000 kwh. Project added to include repair/rehabilitation contract.	Completed
DI Solar Maintenance/Warehouse	Design and construction of 180kw photovoltaic array. Projected annual output estimated at over 200,000 kwh. Project funding includes \$735K million from the American Recovery and Reinvestment Act (“ARRA”).	Completed
Future Renewable Energy (7270)	Design and construction for future renewable energy projects throughout the Authority.	Future
DI Solar Power Purchase Agreement (PPA)	Design and construction of 456 kw photovoltaic array through a third party 20 yr Power Purchase Agreement. Projected annual output estimated at 520,000 kwh. Project partially subsidized by \$1.1M from ARRA program. No capital costs to MWRA; pay for electricity generated.	Completed
Loring Road Hydro	Construction of a 200 kW hydropower turbine/generator at Loring Road. Projected annual output estimated at 1,200,000 kwh. Project funding includes \$1.5 million from the ARRA program.	Completed
Energy Adv Con Services	Consultant for comprehensive energy advisory services on throughout the Authority.	Completed
Technical Assistance	Various technical assistance contracts to aid solar, wind, and hydro initiatives.	Completed
Carroll WTP Solar Construction	Installation of photovoltaic cells with generating capacity of 496 kw at Carroll WTP plant. Projected annual output estimated at over 616,000 kwh. Project funding includes \$2.2 million from the ARRA program.	Completed

Charlestown Wind	Design and construction of 1.5 MW wind turbine system. Projected annual output estimated at 3,000,000 kwh. Project funding includes \$4.8 million from the ARRA program.	Completed
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**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$23,684	\$18,184	\$5,500	\$0	\$0	(\$234)	\$5,500	\$0

Project Status 12/20	76.8%	Status as % is approximation based on project budget and expenditures. Carroll Water Treatment Solar and Loring Road Hydro Construction were completed in May 2011. Carroll Water Treatment Plant Solar Construction and Charlestown Wind Project were completed in 2011. DITP Solar PPA was completed in 2011. Hatchery Pipeline & Hydro was substantially complete in September 2017.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$23,700	\$23,684	(\$16)	Dec-24	Dec-24	None	(\$234)	(\$234)	\$0

**Explanation of Changes**

- Project cost changed due to inflation adjustment on Future Renewable Energy contract.

**CEB Impacts**

- None identified at this time.

## Information Technology (IT)

The MIS Department provides MWRA with the secure information processing services necessary to carry out the Authority's mission. Applications in use range from financial to operational, and enhance MWRA's ability to access data and improve internal controls, reporting, and management performance. In addition to computing and telephone systems, the department also provides library and records management services. The MIS department supports more than 1,100 MWRA users, including those at the Charlestown Navy Yard (CNY), Chelsea Facility, Deer Island Wastewater Treatment Plant, Southborough Facility, Carroll Water Treatment Plant, and other remote sites.

In order to provide these services, MIS has structured its capital improvement projects as follows:

**Application Improvement Program** – This program, along with associated projects, continue MWRA's efforts to update and enhance a wide range of applications to improve efficiencies of business processes and effectiveness of the staff while ensuring the availability and integrity of the MWRA's data resources.

**Information Security Program** – This program focuses on the strength, resiliency, and sustainability of MWRA's cyber security practices for its data and computing-related assets. The program also monitors for and protects against penetrations, intrusions, and malicious actions from both internal and external threats. The projects associated with this program continue to assess, implement, and improve MWRA's information security protections, including recommendations to improve each IT system's security profile.

**Information Technology Management Program** -This program improves the organization of MIS and the oversight processes for selecting and implementing IT solutions throughout the MWRA. This program updates the IT Steering Committee to ensure that the business and technology priorities of the MWRA are aligned and are being met.

**Information Technology Improvement Program**-This program assesses and implements consolidated and optimized versions of core IT infrastructure elements to improve and optimize data management practices, including: storage, backup, archive and purge processes, and technologies. These improvements cover the 1,377 desktops, 315 laptops, 60 physical servers, 325 virtual machines, 197 tablets, 263 smartphones, 19 Wide Area Network circuits and associated ancillary equipment, as well as the almost 1.75 petabytes (PB) of data managed and protected by MIS.

## S. 940 Applications Improvements Program

### **Project Purpose**

*To develop, improve, and procure information technology (IT) applications to improve efficiencies of business processes associated with managing the operations, and support divisions.*

### **Project History and Background**

This program will continue the good work started in previous years to update and enhance a wide range of applications to improve efficiencies of business process and effectiveness of the staff performing the processes while ensuring the availability, integrity and confidentiality of the MWRA's data resources. The program will continue to enhance the integration and availability of data to provide a more holistic view of the overall operational status with seamless access to the detailed data.

**Scope** – The table describes the CIP phases and associated projects.

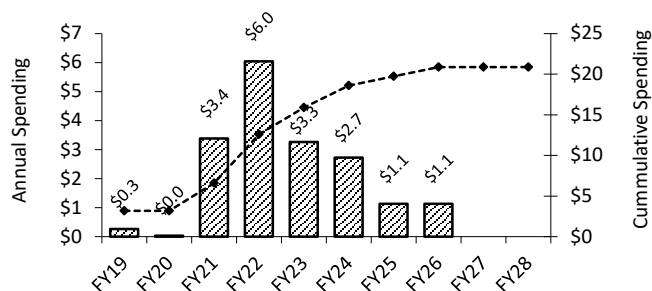
<b>Sub-phase</b>	<b>Scope</b>	<b>Status</b>
GIS Applications & Integration	Expand role of GIS technology for scientific, environmental and engineering applications. This project will assess the current state of the GIS Program and make recommendations for improvements.	Planned FY22
Lawson Upgrade	Upgrade current Infor application system to version 11 and implement these additional application modules: Global Human Resources which will provide the latest enhancements to the Employee Safety, Position Budgeting, Benefits, Employee Relations, Absence and Occupational Health Modules And Work Force Management which will provide a new time entry and tracking system	Active
Pre-Treatment Information Management System (PIMS) Replace or Build	PIMS system is used by the MWRA to monitor the pretreatment program pursuant to MWRA's NPDES permit and EPA regulations. Planned are the PIMS CROMERR implementation, Dental Permitting functionality, and server operating system upgrade to a supported version.	Future
SAP BO Upgrade/ Migration	Upgrade SAP Business Objects Suite to v4.2, including Crystal Reports to v2016. The upgraded Business Objects platform will support existing custom reports and provide data visualization to end-users of various data systems. Nearly 1000 existing Crystal reports will be migrated to the new platform. The upgraded platform will also host existing Oracle Discoverer Reports. Oracle has ended support for Oracle Discoverer product since June 2017.	Completed
Enterprise Content Management	Implement an Authority-wide Content Management Program to address dependence upon paper records, support records management and improve access to information, streamline workflows and replace several department-level solutions.	Active
WQRS Aquarius	Implement functionality improvements to the Water Quality Reporting System.	Active

Sub-phase	Scope	Status
Laboratory Information Management System (LIMS) Upgrade	Upgrade current Laboratory Information Management system to version 7.	Future
	Phase II will leverage lessons learned from Phase I and implement ELN for the Wastewater Labs.	Future
MAXIMO Interface Enhancements	The MWRA utilizes a custom interface to synchronize the Maximo Enterprise Asset Management (EAM) and Infor/Lawson Enterprise Resource Planning (ERP) systems. Enhancements are being done in an effort to build on the existing interface by streamlining process flows, enhancing functionality, and adding data validation for optimal performance and transaction integrity.	Active
Hyperion Pillar	The Hyperion Pillar application, currently used for budgeting, is out dated and no longer supported by Oracle and needs to be replaced with a commercially viable product.	Future
HOML	Harbor outfall monitoring loading application provides a web portal for outside contractors to load Boston Harbor sampling data used to submit NPDES reports to EPA by ENQUAL group	Active
PI (OSI)	Consolidation of the separate DI and FOD PI systems into one.	Future
Maximo (New)	Upgrade current IBM Maximo and ICD to version 7.6.1 (\$200,000- FY23)	Future
Oracle Discoverer Migration (98506-7656)	Migrate Oracle Discoverer reports used by MWRA Enqual to SAP BO	FY22

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY23
\$20,849	\$3,191	\$17,658	\$3,382	\$6,034	\$12,971	\$4,985	\$0

#### Application Improvements Program





Project Status 12/20	15.4%	Status as % is approximation based on project budget and expenditures.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$18,249	\$20,849	\$2,600	Sep-25	Sep-25	None	\$10,971	\$12,971	\$2,000

**Explanation of Changes**

- Project cost and spending changed primarily due to an updated cost estimate for Lawson Upgrade.

**CEB Impacts**

- None identified at this time.

## S. 942 Information Security Program

### Project Purpose

*To ensuring the availability, integrity and confidentiality of the MWRA's data resources through the selection and implementation of information technology solutions associated with cyber security.*

### Project History and Background

This program focuses on the resiliency and sustainability of the MWRA's data security practices. The projects associated with this program established policies, procedures and an information security awareness program for all of the MWRA. This program included the design of both an information security program and electronic security plans in order to provide a more formal, comprehensive IT security framework that is compliant with Federal Standards.

**Scope** – The table describes the CIP phases and associated projects.

Sub-phase	Scope	Status
MSSP	The current Managed Security Service Provider (MSSP) contract ends on 6/30/21.	Active
MSSP	New contract for Managed Security Service Provider (MSSP) and Security infrastructure technology refresh.	Active
ITSM Access Management	Implementation of additional technologies to manage and monitor user access to IT assets and services.	Active
Active Directory	The authentication services application for MWRA systems is Microsoft's Active Directory. The version currently installed is end-of-life and will need to be upgraded over the next year.	Active Completed
XEN Mobile/XEN App/Work Space	Upgrade the existing mobile device, remote access and Share file services.	Completed
Information Security Plan Implementation	Coordinate a system-by-system development of Information Security Plan to apply security controls and standards to each system within MWRA's application portfolio.	Future
IT Security Program (ISP) Development	Formal and informal activities to inform staff (including contractors and business partners) of the information security risks associated with their activities and their responsibilities in complying with MWRA policies and procedures designed to reduce these risks.	Completed
America's Water Infrastructure Act (AWIA) cybersecurity Risk and Resiliency Assessment	Assess the risks and resiliencies that can be identified within the Cyber Security Program's existing protections by a third party. Phase 1 tests all Internet-facing computing devices and services, as well as the internal financially-connected computing devices and services, as required by AWIA. Phase 2 tests all other internal devices and services. Final report after each phase will highlight desired improvements that MWRA will evaluate for implementation, in order to maximize MWRA's cyber security posture for protecting Authority operations and support functions.	Completed

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$7,976	\$1,988	\$5,988	\$103	\$2,485	\$4,568	\$1,700	\$0

Project Status 12/20	24.6%	Status as % is approximation based on project budget and expenditures.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$5,506	\$7,976	\$2,470	Jun-21	Nov-24	41 mos.	\$3,798	\$4,568	\$770

**Explanation of Changes**

- Project cost, schedule, and spending changed due to updated cost and schedule for MSSP/SIEM.

**CEB Impacts**

- None identified at this time.

## S. 944 Information Technology Management Program

### Project Purpose

*To improve the overall efficiencies in how MIS delivers IT services and to more effectively adapt to the changing business needs associated with managing the operational and administrative systems of the Authority.*

### Project History and Background

This program improves the organization of MIS and the oversight processes for selecting and implementing IT solutions throughout the MWRA. This program updates the IT Steering Committee to ensure that the business and technology priorities of the MWRA are aligned and are being met.

**Scope** – The table describes the CIP phases and associated projects.

Sub-phase	Scope	Status
IT Project Management Methodology	Implement a set of procedures, standards, tools and techniques that will improve the predictability of deliverables and cost associated with information technology projects.	Active

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$200	\$0	\$200	\$40	\$160	\$200	\$0	\$0

Project Status 12/20	0.8%	Status as % is approximation based on project budget and expenditures.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$200	\$200	\$0	Nov-21	Nov-21	None	\$200	\$200	\$0

### Explanation of Changes

- N/A.

### CEB Impacts

- None identified at this time.

## S. 946 IT Infrastructure Program

### Project Purpose

*To assess and implement consolidated and optimized versions of equipment and data bases and improve and optimize data management practices.*

### Project History and Background

The MWRA currently owns and operates 1,377 desktops, 315 laptops, 60 physical servers, 325 virtual machines, 197 tablets, 263 smartphones, 19 Wide Area Network circuits and associated ancillary equipment, as well as almost 1.75 petabytes (PB) of data. This program assesses and implements consolidated and optimized versions of core IT infrastructure elements to improve and optimize data management practices, including: storage, backup, archive and purge processes, and technologies.

**Scope** – The table describes the CIP phases and associated projects.

Sub-phase	Scope	Status
IT Infrastructure Upgrades	Server upgrades will be performed in FY18-FY20. These upgrades will use specifications developed for server hardware and software including the ability to implement greater virtualization as well as take advantage of opportunities to standardize operating systems, and hardware, for greater ease of support.	Completed
Cabling	Replacement of older Ethernet and fiber cabling to support PBX replacement.	Active
SAN Storage	Implement recommended IT infrastructure changes that include enhancements to capacity and performance of networking and communications, storage, backups, server consolidation, disaster recovery, and integration approach and tools.	Future
Oracle Database Appliance	Upgrade Oracle Database appliances that will be end-of-life.	Future
Servers Upgrades	Upgrade of existing end-of-life hardware	Completed
Near Field Communications	Implementation of wireless asset management technology.	Future
Exchange Upgrades	Upgrade the current version of Exchange which will reach End of Life in January 2020. Upgrading will ensure continuous support and reliable service.	Completed
Enterprise Data Management	Develop an Authority-wide data architecture that maximizes benefit from data capture and ongoing maintenance. Implement Authority-wide data modeling and management, to standardize data access across multiple systems for a consistent view of the Authority across all business units.	Future
NetScalers	Upgrade the Netscaler hardware on which the XEN Mobile/XEN App/Work Space applications reside.	Future

Sub-Phase	Scope	Status
Telephone System Upgrade	Replace the end-of-life PBX telephone system. The Authority's current hardware cannot be replaced except with refurbished equipment as it is no longer being manufactured. A new system will offer up-to-date technology with features that are not available in the 20 year old system	Active
Core Switches	Upgrade of existing end-of-life hardware.	Future
Edge Switches	Upgrade of existing end-of-life hardware.	Active
Disaster Recovery	Design and implementation of disaster recovery solution.	Future
Instrumentation & Controls IT	Design and implementation of technologies to monitor and manage IT infrastructure and applications.	Future
<b>Future Workplace</b>	<b>Infrastructure changes and enhancements to support the future workplace initiative to provide a single streamlined user experience regardless of location. Support for remote work, shared work and collaboration spaces.</b>	<b>Future</b>

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY20	Remaining Balance	FY21	FY22	FY19-23	FY24-28	Beyond FY28
\$16,630	\$6,335	\$10,294	\$3,001	\$5,220	\$10,754	\$145	\$0

Project Status 12/20	38.1%	Status as % is approximation based on project budget and expenditures.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY19-23 Spending		
FY21	FY22	Chge.	FY21	FY22	Chge.	FY21	FY22	Chge.
\$16,202	\$16,630	\$428	Dec-23	Dec-23	None	\$10,325	\$10,754	\$429

#### Explanation of Changes

- Project cost and spending changed due to addition of new contract for Virtual Desktop Infrastructure and updated actual cost for Exchange Upgrades.

#### CEB Impacts

- None identified at this time.

# APPENDIX 2

## Expenditure Forecast Report with Planned NTP and SC dates

# Understanding the Expenditure Forecast

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Capital expenditure forecasts, also referred to as projected cashflows, are presented in this section of the FY22 Proposed CIP document. Expenditure forecasts are accrual based, i.e., they are estimated based on when services are expected to be rendered. Projects appear in this report in the same order they appear on-line, i.e. organized by capital program area.

The following presents a description of each column in the expenditure forecast tables:

<b>Project and Subphase Names</b>	The first column of the expenditure forecast identifies the organizational hierarchy of the CIP: division area (i.e., Wastewater), followed by the program category (i.e., Interception and Pumping), then individual sub-phases (i.e. Design/CS/RI,) followed by the project name and dollar totals comprising all the sub-phases within that project (i.e. Braintree-Weymouth Relief Facilities). Sub-phases represent both awarded and unawarded contracts.
<b>Contract Number</b>	<p>Following each project name is a string of nine numbers. These numbers are assigned by the Rates and Budget Department and are the number reference for the sub-phase in MWRA's capital budgeting database.</p> <p>The first string is a five-digit number representing the MWRA Lawson Activity Management System sub-phase number. Project budgets and expenditures are tracked by this account number.</p> <p>Following the five-digit sub-phase number is a four-digit number representing the contract reference number in MWRA's contract management system. This reference number is used to access contract information such as the award amount, change order activity, and processed invoices.</p>
<b>Notice to Proceed (NTP) and Substantial Completion (SC)</b>	Project schedules are tracked by two key milestones; Notice to Proceed and Substantial Completion. These milestones indicate the expected start and end dates for contract activity.
<b>Contract Value</b>	The Contract Value represents the budgeted amount for the capital program, divisions, program categories, projects, and sub-phases. For unawarded contracts, the contract amount is based on a cost estimate. For awarded contracts, this amount includes the award amount plus any change orders, amendments, and purchase orders accounted for prior to completing the budget.
<b>Payments through FY20</b>	Payments through FY20 include actual and accrued expenditures since the inception of the contract through the end of FY20.
<b>Remaining Balance</b>	Remaining Balance is calculated by subtracting Payments through FY19 from the Contract Amount. This amount is then spread in the columns to the right, for FY20-23, FY24-28 and Beyond FY28.



**APPENDIX 2**  
**FY22 FIVE-YEAR CIP BY MAJOR PROGRAM CATEGORY**  
**FY22 by Quarters**

CAPITAL IMPROVEMENT PROGRAM													
EXPENDITURE FORECAST FY2019-2023													
(\$000)													
	Total Contract Amount	Project Payments Thr. FY20	Balance as of 6/30/20	FY19	FY20	FY21	QI FY22	QII FY22	QIII FY22	QIV FY22	FY22	FY23	5-Year Total FY19-23
<b>Wastewater System Improvements</b>	3,882,639	2,233,401	1,649,238	74,850	97,234	123,186	47,159	40,297	28,920	28,847	145,222	151,790	592,282
<b>Waterworks System Improvements</b>	4,498,649	2,235,116	2,263,533	65,647	58,054	47,754	21,527	22,255	23,911	27,330	95,022	118,831	385,308
<b>Business &amp; Operations Support</b>	177,133	107,171	69,962	2,408	3,733	13,869	4,604	4,872	5,168	5,568	20,211	12,387	52,608
<b>Total MWRA</b>	8,558,420	4,575,688	3,982,732	142,905	159,021	184,809	73,290	67,424	57,999	61,745	260,455	283,008	1,030,198
<b>Contingency</b>	229,623		229,623			9,199					13,950	17,622	40,771
<b>Total MWRA w/ Contingency</b>	9,017,666	4,575,688	4,441,978	142,905	159,021	194,008	73,290	67,424	57,999	61,745	274,405	300,630	1,070,969

**Massachusetts Water Resources Authority  
Capital Improvement Program  
FY22 Proposed Expenditure Forecast  
\$000s**

Program / Project / Contract	Contract No.	Notice to Proceed	Substantial Completion	Total Contract Amount	Payments through FY20	Remaining Balance	FY21	FY22	FY23	FY19-FY23	FY24-FY28	Beyond FY28
<b>Total MWRA</b>				<b>8,558,422</b>	<b>4,575,691</b>	<b>3,982,736</b>	<b>184,807</b>	<b>260,460</b>	<b>283,005</b>	<b>1,030,195</b>	<b>1,883,522</b>	<b>1,439,883</b>
<b>Wastewater</b>				<b>3,882,638</b>	<b>2,233,399</b>	<b>1,649,240</b>	<b>123,186</b>	<b>145,224</b>	<b>151,788</b>	<b>592,280</b>	<b>1,064,859</b>	<b>233,124</b>
<b>Interception &amp; Pumping</b>				<b>1,240,649</b>	<b>658,652</b>	<b>581,996</b>	<b>50,664</b>	<b>65,884</b>	<b>47,823</b>	<b>220,622</b>	<b>332,940</b>	<b>61,038</b>
<b>102 Quincy Pump Facilities Total</b>		<b>completed project</b>		<b>25,907</b>	<b>25,907</b>	<b>0</b>						
<b>104 Braintree-Weymouth Relief Facilities</b>												
Geotechnical - Marine	10001_5333	Nov-91	Apr-92	443	443	0						
Geotechnical - Land	10044_5332	Nov-91	Mar-92	8	8	0						
Facilities Planning - Phase 1	10045_5311	Oct-81	Dec-90	331	331	0						
EIR - Phase 1	10046_5312	Nov-84	Oct-90	514	514	0						
Design 1/CS/RI	10047_5313	Nov-94	Jun-06	18,882	18,882	0						
Land Acquisition	10048_5314	Mar-97	Jun-10	12,842	12,842	0						
Tunnel Construction/Rescue	10049_5315	Jun-99	Jul-03	83,191	83,191	0						
Intermediate Pump Station-Construction	10050_5316	Dec-00	Apr-05	47,445	47,445	0						
North Weymouth Relief Interceptor	10051_5303	Mar-01	Jun-02	4,705	4,705	0						
HDD Siphon - Construction	10052_5373	Jul-03	May-07	16,357	16,357	0						
B-W Replacement Pump Station	10054_5375	Jan-05	Apr-08	17,728	17,728	0						
Design - Rehab	10055_5308	Sep-88	Dec-89	24	24	0						
Construction - Rehab	10056_5309	Jan-92	Dec-96	255	255	0						
Final EIR/Facility Plan	10057_5324	Apr-91	Aug-93	1,111	1,111	0						
Design 2/CS/RI	10058_5331	Apr-95	Dec-11	14,999	14,999	0						
Rehabilitation of Section 624 - Const.	10060_5310	Jul-10	Dec-10	2,506	2,506	0						
Technical Assistance	10061_5951	Nov-84	Apr-07	144	144	0						
Sedimentation Testing	10251_6016	Sep-94	Apr-96	96	96	0						
Legal	10263_6072	Jul-95	Apr-08	849	849	0						
Public Relations	10264_6073	Jul-95	Apr-07	0	0	0						
Hazardous Waste	10265_6074	Jul-95	Apr-07	8	8	0						
Marine Pipeline - Design	10278_6119	Feb-97	Aug-97	1,100	1,100	0						
Mill Cove Siphon - Construction	10302_6368	Aug-97	Jun-98	2,749	2,749	0						
Community Technical Assistance	10354_6631	Jul-99	Apr-07	1,111	1,111	0						
Geotechnical Consultant	10375_6766	Sep-00	Mar-03	56	56	0						
IPS/RPS Communication System	10378_6792	Dec-02	Apr-08	225	225	0						
Rehabilitation of Section 624 - Design	10452_7193			0	0	0						
Wetlands Replication	10470_7290			26	26	0						
Mill Cove Siphon Sluice Gates - Design	10479_7326	Apr-24	Apr-27	886	0	886					886	
Mill Cove Sluice Gates - Construction	10480_7327	Aug-25	Apr-26	2,250	0	2,250					2,250	
B/W Improvements - Construction	10493_7366	Jul-21	Jul-23	8,000	0	8,000					8,000	
B/W Improve - Design/CS	19567_7435	Dec-18	Dec-23	2,085	686	1,399	277	417	417	1,797	288	
B/W Improvements - REI	19568_7683	Jul-21	Jul-23	600	0	600		275	300	575	25	
<b>104 Braintree-Weymouth Relief Facilities Total</b>				<b>241,526</b>	<b>228,391</b>	<b>13,135</b>	<b>277</b>	<b>692</b>	<b>717</b>	<b>2,372</b>	<b>11,449</b>	
<b>105 New Neponset Valley Relief Sewer Total</b>		<b>completed project</b>		<b>30,301</b>	<b>30,301</b>	<b>0</b>						
<b>106 Wellesley Extension Replacement Sewer Total</b>		<b>completed project</b>		<b>64,359</b>	<b>64,359</b>	<b>0</b>						
<b>107 Framingham Extension Relief Sewer Total</b>		<b>completed project</b>		<b>47,857</b>	<b>47,857</b>	<b>0</b>						

**Massachusetts Water Resources Authority  
Capital Improvement Program  
FY22 Proposed Expenditure Forecast  
\$000s**

Program / Project / Contract	Contract No.	Notice to Proceed	Substantial Completion	Total Contract Amount	Payments through FY20	Remaining Balance	FY21	FY22	FY23	FY19-FY23	FY24-FY28	Beyond FY28
<b>127 Cummingsville Replacement Sewer Total</b>			<b>completed project</b>	<b>8,999</b>	<b>8,999</b>	<b>0</b>						
<b>130 Siphon Structure Rehabilitation</b>												
Planning	10253_6017	Jan-96	Nov-98	938	938	0						
Land Acquisition	10280_6165	Aug-21	Aug-23	50	2	48		25	23	48		
Design/CS/RI	10293_6224	Apr-20	Sep-24	2,855	75	2,780	1,198	1,135	314	2,722	133	
Construction	10294_6225	Apr-22	Sep-23	3,960	0	3,960			750	750	3,210	
Legal	10295_6226	Sep-05	Dec-10	0	0	0						
Planning/Preliminary Design	10296_6227			0	0	0						
Phase 2 Land Acquisition	10600_7684	Dec-24	Dec-26	50	0	50					50	
Phase 2 Design CS/RI	10601_7685	Jul-23	Dec-27	2,855	0	2,855					2,855	
Phase 2 Construction	10602_7686	Jul-25	Dec-26	3,960	0	3,960					3,960	
<b>130 Siphon Structure Rehabilitation Total</b>				<b>14,668</b>	<b>1,015</b>	<b>13,653</b>	<b>1,198</b>	<b>1,160</b>	<b>1,087</b>	<b>3,520</b>	<b>10,208</b>	
<b>131 Upper Neponset Valley Sewer System Total</b>			<b>completed project</b>	<b>54,175</b>	<b>54,175</b>	<b>0</b>						
<b>132 Corrosion &amp; Odor Control</b>												
Planning/Study	10279_6137	Jan-97	Dec-98	587	587	0	0	0	0	0	0	0
Land Acquisition	10323_6549	Aug-02	Jun-05	28	28	0	0	0	0	16	0	0
Public Participation	10324_6550			0	0	0	0	0	0	0	0	0
Legal	10325_6551	Dec-00	Jul-08	2	2	0	0	0	0	0	0	0
Arthur St. Pump Stn & FERS Force Main	10326_6552			0	0	0	0	0	0	0	0	0
Design/CS/RI	10327_6553	Aug-02	Jun-05	1,788	1,788	0	0	0	0	0	0	0
Interim Corrosion Control	10373_6743	Jul-00	Dec-01	621	621	0	0	0	0	0	0	0
FES Tunnel Rehab - Construction	10405_6918			0	0	0	0	0	0	0	0	0
FES/FERS Biofilters - Design	10406_6919	Jul-23	May-26	1,267	0	1,267	0	0	0	0	1,267	0
FES Tunnel Rehab - Design/CS/RI	10453_7196	Jul-18	Jun-21	0	0	0	0	0	0	0	0	0
FES/FERS Biofilters - Construction	10456_7215	Dec-24	Dec-25	2,074	0	2,074	0	0	0	0	2,074	0
System-wide Odor Control - Study	10491_7364	Jan-24	Jan-26	1,000	0	1,000	0	0	0	0	1,000	0
NI Mech & Elect Upg Design/CA	10492_7365	Jul-23	Nov-28	4,800	0	4,800	0	0	0	0	3,960	840
NI System-wide Odor Control - Evaluation	10495_7494	Sep-15	Feb-17	487	487	0	0	0	0	0	0	0
NI Mech & Elect Upg Construct	10496_7495	Nov-25	Nov-27	20,000	0	20,000	0	0	0	0	20,000	0
NI Odor Ctrl & HVAC Des/CA/REI	10497_7517	Mar-17	Nov-23	7,280	3,472	3,808	1,175	1,488	1,036	4,488	109	0
NI Odor Ctrl HVAC Imp Constr Ph 2	10498_7548	Feb-20	Dec-22	58,323	4,740	53,584	19,008	22,927	11,648	58,323	0	0
NI Mech & Elect Upgrades-REI	10580_7635	Nov-25	Nov-27	440	0	440	0	0	0	0	440	0
<b>132 Corrosion &amp; Odor Control Total</b>				<b>98,697</b>	<b>11,725</b>	<b>86,973</b>	<b>20,183</b>	<b>24,415</b>	<b>12,684</b>	<b>62,827</b>	<b>28,850</b>	<b>840</b>
<b>136 West Roxbury Tunnel</b>												
Inspection	10299_6230	Jul-98	Sep-99	344	344	0	0	0	0	0	0	0
Tunnel Easements & Permits	10329_6566	Mar-10	Dec-15	54	54	0	0	0	0	0	0	0
Legal	10330_6567	Apr-00	Mar-10	2	2	0	0	0	0	0	0	0
Land Acquisition	10331_6568	Apr-00	Mar-10	440	440	0	0	0	0	0	0	0
Construction	10332_6569	Jun-01	Jun-02	6,674	6,674	0	0	0	0	0	0	0
Design/CS/RI	10333_6570	Apr-00	Jun-03	1,417	1,417	0	0	0	0	0	0	0
Technical Assistance	10366_6709	Nov-99	Mar-10	8	8	0	0	0	0	0	0	0
Planning & EIR	10377_6789			0	0	0	0	0	0	0	0	0
Tunnel - Design	10400_6897	Feb-09	Jun-11	1,375	1,375	0	0	0	0	0	0	0
Tunnel Inspection	10401_6898	Sep-23	Jun-24	1,000	0	1,000	0	0	0	0	1,000	0
<b>136 West Roxbury Tunnel Total</b>				<b>11,314</b>	<b>10,314</b>	<b>1,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,000</b>	<b>0</b>

**Massachusetts Water Resources Authority**  
**Capital Improvement Program**  
**FY22 Proposed Expenditure Forecast**  
**\$000s**

Program / Project / Contract	Contract No.	Notice to Proceed	Substantial Completion	Total Contract Amount	Payments through FY20	Remaining Balance	FY21	FY22	FY23	FY19-FY23	FY24-FY28	Beyond FY28
<b>137 Wastewater Central Monitoring</b>												
Planning	10301_6232	Jan-98	Jul-99	563	563	0	0	0	0	0	0	0
Design and Integration Services	10319_6532	Jun-02	Jul-10	6,344	6,344	0	0	0	0	0	0	0
Construction 1 (CP1)	10320_6533	Mar-06	Jan-08	7,662	7,662	0	0	0	0	0	0	0
Construction 2 (CP2)	10321_6534	Feb-08	Jul-09	5,139	5,139	0	0	0	0	0	0	0
Technical Assistance	10322_6535	Sep-02	Jul-10	7	7	0	0	0	0	0	0	0
Professional Services 3 (Transport)	10355_6655			0	0	0	0	0	0	0	0	0
Wastewater SCADA/PLC Upgrades	10356_6656			0	0	0	0	0	0	0	0	0
Construction 3 (CP3)	10357_6657			0	0	0	0	0	0	0	0	0
Professional Services 1 - Data Integration	10358_6658			0	0	0	0	0	0	0	0	0
Professional Services-Hydraulic Model	10359_6659			0	0	0	0	0	0	0	0	0
Equipment Prepurchase	10398_6861	Apr-05	Dec-09	65	65	0	0	0	0	0	0	0
Wastewater Redundant Communications	10490_7363	Jul-21	Mar-25	700	0	700	0	187	187	374	326	
Design & Programming Services	10551_7578	Apr-18	Oct-27	3,470	28	3,442	80	160	160	428	3,042	
Construction	10552_7579	Dec-23	Oct-31	1,420	0	1,420	0	0	0	0	1,420	
Equipment/Hardware	10553_7580	Jun-18	Oct-27	2,110	102	2,008	50	100	100	352	1,758	
<b>137 Wastewater Central Monitoring Total</b>				<b>27,480</b>	<b>19,910</b>	<b>7,570</b>	<b>130</b>	<b>447</b>	<b>447</b>	<b>1,154</b>	<b>6,546</b>	
<b>139 South System Relief Project</b>												
Archdale - CS/RI	10309_6419	Nov-98	Aug-99	5	5	0	0	0	0	0	0	0
Archdale - Construction	10310_6420	May-99	Aug-99	211	211	0	0	0	0	0	0	0
Sections 70 & 71 HLS - Evaluation	10318_6519	Sep-98	Oct-99	215	215	0	0	0	0	0	0	0
Outfall 023 - Design	10345_6595	Jun-99	Sep-99	1	1	0	0	0	0	0	0	0
Outfall 023 - Cleaning	10346_6596	Apr-00	Nov-00	1,098	1,098	0	0	0	0	0	0	0
Land Acquisition/Easements	10347_6605	Apr-99	Apr-05	5	5	0	0	0	0	0	0	0
Sections 70 & 71 HLS - Construction	10349_6611	Jun-99	Oct-99	417	417	0	0	0	0	0	0	0
Milton Financial Assistance	10350_6616	Oct-99	Jun-00	1,488	1,488	0	0	0	0	0	0	0
Legal & Permits	10362_6680	Jul-99	Jun-07	0	0	0	0	0	0	0	0	0
Outfall 023 - Structural Improvements	10386_6801	Jan-24	Dec-25	1,500	0	1,500	0	0	0	0	1,500	
Quincy/Braintree Howard St. - Const.	10402_6915			0	0	0	0	0	0	0	0	0
Quincy/Braintree Howard St. - Design	10422_6949			0	0	0	0	0	0	0	0	0
<b>139 South System Relief Project Total</b>				<b>4,940</b>	<b>3,440</b>	<b>1,500</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,500</b>	
<b>141 Wastewater Process Optimization</b>												
Planning	10367_6733	Aug-01	Aug-04	930	930	0	0	0	0	0	0	0
North System Hydraulic Study	10412_6930	Nov-11	Jun-15	561	561	0	0	0	0	(11)	0	0
Somerville Sewer - Design	10413_6931			0	0	0	0	0	0	0	0	0
Somerville Sewer - Construction	10414_6932			0	0	0	0	0	0	0	0	0
Siphon - Planning	10415_6933			0	0	0	0	0	0	0	0	0
Manhole Structure Flood Protec-Design	10416_6934			0	0	0	0	0	0	0	0	0
Manhole Structure Flood Protec-Const.	10417_6935			0	0	0	0	0	0	0	0	0
Hydraulic Modeling Eng Design and Constr	19401_7412	Mar-19	Jun-31	7,442	230	7,212	281	200	0	712	5,154	1,577
<b>141 Wastewater Process Optimization Total</b>				<b>8,933</b>	<b>1,721</b>	<b>7,212</b>	<b>281</b>	<b>200</b>	<b>0</b>	<b>701</b>	<b>5,154</b>	<b>1,577</b>
<b>142 Wastewater Meter System - Equipment Replacement</b>												
Planning / Study / Design	10371_6739	Jul-17	Mar-23	3,858	2,171	1,688	548	684	456	3,272	0	0
Equipment Purchase & Installation	10379_6793	Nov-03	Jun-08	5,138	5,138	0	0	0	0	0	0	0
Meter Power Design/CA	10410_6928	Jul-19	Dec-22	0	0	0	0	0	0	0	0	0
Meter Power Install - Constr	10411_6929	Dec-20	Dec-21	0	0	0	0	0	0	0	0	0
WW Metering Asset Protect/Equip Purch	10451_7191	Dec-20	Dec-30	12,942	529	12,412	1,769	1,517	0	3,816	0	9,126
Meter Modems-Antenna Repl	10590_7639			0	0	0	0	0	0	0	0	0
Meter Power REI	10800_7687			0	0	0	0	0	0	0	0	0

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<b>142 Wastewater Meter System - Equipment Replacement Total</b>				<b>21,938</b>	<b>7,838</b>	<b>14,100</b>	<b>2,317</b>	<b>2,201</b>	<b>456</b>	<b>7,088</b>	<b>0</b>	<b>9,126</b>
<b>143 Regional I/I Management PI Total</b>		<b>completed project</b>		<b>169</b>	<b>169</b>	<b>0</b>						
<b>145 Facility Asset Protection</b>												
Prison Point HVAC Upgrades-Construct.	10380_6795	Dec-10	Dec-13	2,764	2,764	0	0	0	0	0	0	0
Remote Headworks Heating Syst Upgrade	10381_6796	May-05	May-06	1,175	1,175	0	0	0	0	0	0	0
Alewife Brook Pump Stn Rehab - Const.	10382_6797	Jan-16	Apr-19	13,507	13,448	59	59	0	0	3,733	0	0
Rehab of Section 93A Lexington	10383_6798	Jul-03	Apr-04	1,566	1,566	0	0	0	0	0	0	0
Chelsea Creek Upgrades - REI	10387_6802	Nov-16	Feb-21	3,447	2,175	1,271	1,271	0	0	2,582	0	0
Technical Assistance	10392_6829	Jul-02	Mar-22	182	182	0	0	0	0	84	0	0
Sections 80 & 83	10394_6842	Apr-07	Sep-07	365	365	0	0	0	0	0	0	0
Section 160	10395_6843	Jun-07	Dec-08	1,581	1,581	0	0	0	0	0	0	0
Survey	10396_6857	Nov-04	May-05	11	11	0	0	0	0	0	0	0
Permits	10397_6858	May-03	May-25	15	15	0	0	0	0	0	0	0
Remote Headworks Concept Plan	10399_6886	May-08	Sep-09	670	670	0	0	0	0	0	0	0
Construction CB1 Sections 26 & 27	10418_6936	Sep-25	Sep-27	30,000	0	30,000	0	0	0	0	30,000	0
Alewife Brook Pump Stn Rehab - Des/CA	10419_6937	Apr-10	Oct-11	223	223	0	0	0	0	0	0	0
Prison Point HVAC Upgrades - Design	10420_6938	Jan-08	Mar-13	441	441	0	0	0	0	0	0	0
As-needed Design	10421_6942			0	0	0	0	0	0	0	0	0
93 A Force Main Replacement	10423_6987	May-06	Jan-07	462	462	0	0	0	0	0	0	0
Mill Brook Valley Sewer Section 79&92	10424_7004	Jun-04	Mar-05	542	542	0	0	0	0	0	0	0
Hingham Pump Stn Isolation Gate-Const	10427_7033	Sep-11	May-12	125	125	0	0	0	0	0	0	0
Alewife Brook PS Final Design/CA/REI	10428_7034	Mar-12	Feb-20	2,265	2,097	168	168	0	0	630	0	0
Alewife Brook Pump Stn Screens-Const	10429_7035			0	0	0	0	0	0	0	0	0
Caruso PS Improvements - Des/CA/REI	10431_7037	Aug-12	Jun-17	861	861	0	0	0	0	0	0	0
P/P & C/F Washdown Sys Pipe - Design	10433_7039	Jul-11	Mar-13	0	0	0	0	0	0	0	0	0
P/P & C/F Washdown Sys Pipe-Construct	10434_7040	Mar-12	Sep-12	0	0	0	0	0	0	0	0	0
Headworks Renewal - Design&Construct.	10435_7041			0	0	0	0	0	0	0	0	0
Caruso Pump Stn Shaft Replace.-Const.	10438_7044			0	0	0	0	0	0	0	0	0
Land/Easements	10440_7073	Jul-03	Jun-10	155	155	0	0	0	0	51	0	0
Nut Island Headworks Fire Alarm/Wire	10444_7144	Jun-09	Dec-09	285	285	0	0	0	0	0	0	0
Chelsea Creek Headworks Upgrades - Construction	10445_7161	Nov-16	Nov-20	83,408	65,397	18,011	15,755	2,256	0	51,878	0	0
Hayes Pump Station Rehab Design	10446_7162	Nov-20	Nov-25	2,100	0	2,100	260	525	525	1,310	790	0
Inter Ren 1, Reading Ext. - Des/CA/REI	10447_7163	Aug-15	Jun-19	934	934	0	0	0	0	242	0	0
Inter Ren 1, Read Ext. Sew. - Construct.	10448_7164	Aug-17	Dec-18	1,935	1,935	0	0	0	0	962	0	0
Chelsea Creek Upgrades Headworks - Design/CA	10455_7206	Jul-10	Oct-21	10,316	9,592	723	576	147	0	2,955	0	0
Intercep Ren 7-Study/Des/CA	10457_7216	Jun-20	Jan-26	2,559	0	2,559	650	720	720	2,090	469	0
Inter Ren 7-Malden&Melrose-Const	10458_7217	Jan-23	Jan-25	8,100	0	8,100	0	0	0	0	8,100	0
Nut Island Fire Pump Building - Study	10459_7218			0	0	0	0	0	0	0	0	0
NI Mechanical & Electrical Replacements	10460_7219			0	0	0	0	0	0	0	0	0
Squantum Force Main Engrng Analysis	10462_7231	Jan-11	Dec-11	0	0	0	0	0	0	0	0	0
Remote Hdwks & DI Shaft Study	10463_7237	Sep-18	Jun-20	1,023	971	52	52	0	0	1,023	0	0
Melrose Sewer	10464_7248	Feb-10	Feb-11	0	0	0	0	0	0	0	0	0
Melrose Sewer Repayment	10465_7258			0	0	0	0	0	0	0	0	0
Columbus Park&Ward St. HVAC Upgrades	10466_7266			0	0	0	0	0	0	0	0	0
Inter Ren 3, Dor Inter Sewer - Construct	10467_7279	Jul-20	Dec-20	4,747	0	4,747	3,115	1,632	0	4,747	0	0
Construction CB2 Sections 23 & 24	10468_7280	Sep-27	Sep-29	30,000	0	30,000	0	0	0	0	8,400	0
Cottage Farm Fuel System Upgrade	10469_7281	Jun-12	Apr-13	497	497	0	0	0	0	0	0	0
NI Elec & Grit/Sreenings Conveyance-Desi	10477_7312	Mar-11	May-16	1,230	1,230	0	0	0	0	0	0	0
NI Elec & Grit/Sreenings Conveyance-Cons	10478_7313	Jul-13	May-15	5,192	5,192	0	0	0	0	0	0	0
Int Ren 5 NNVS 607-610 Constr	10481_7328	Jul-25	Jul-27	13,200	0	13,200	0	0	0	0	13,200	0

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Interceptor Renewal No. 6 - Chelsea	10482_7329	Aug-26	Aug-28	11,000	0	11,000	0	0	0	0	9,708	
Prison Point/Cottage Farm Pump & GB /ESDC	10483_7330	Feb-14	Dec-16	315	315	0	0	0	0	0	0	
Somer/Marginal Influent Gates Replace	10484_7344	Jul-11	Nov-11	367	367	0	0	0	0	0	0	
PP Dry Weather Flow&Strip Pump Improv	10485_7358	Jul-14	Jun-16	0	0	0	0	0	0	0	0	
Prison Point Rehab - Design/CA/RI	10486_7359	Aug-16	Mar-24	4,300	1,872	2,428	684	684	684	2,525	376	
System Relief & Contingency Planning	10487_7360	Jul-22	Jul-24	500	0	500	0	0	188	188	313	
DeLauri PS Screens & Security Upgrades	10488_7361	Feb-18	Feb-19	1,343	1,343	0	0	0	0	1,150	0	
Caruso Pump Station Impovements - Const.	10489_7362	Mar-16	Jun-17	4,417	4,417	0	0	0	0	0	0	
Hayes Pump Station Rehab Const	10500_7375	Sep-22	Sep-24	10,000	0	10,000	0	0	2,400	2,400	7,600	
Cottage Farm PCB Abatement Construct. 1	10501_7389			0	0	0	0	0	0	0	0	
Cottage Farm PCB Abatement - Design/CA	10502_7392			0	0	0	0	0	0	0	0	
Sect 156 Rehab - Design/Build	10503_7393	Jul-11	Jul-12	2,563	2,563	0	0	0	0	0	0	
Camb Branch Sect 26, 27 Des/ ESDC	10504_7410	Sep-23	Sep-28	6,000	0	6,000	0	0	0	0	5,688	
Sections 4, 5, 6, 186 - Design CA/RI	10505_7421	Jul-23	Jul-29	2,004	0	2,004	0	0	0	0	1,559	
Sections 4, 5, 6, 186 - Construction	10506_7422	Jul-25	Jul-27	7,400	0	7,400	0	0	0	0	7,400	
Sections 4, 5, 6, 186 - Study	10507_7423	Feb-17	May-18	906	906	0	0	0	0	0	0	
Ward St & Colum Pk Headworks Des/CA	10510_7429	Jan-21	Jan-30	22,000	0	22,000	300	2,725	2,725	5,750	14,006	2,244
Ward St Headworks Const	10511_7430	Jul-24	Jul-28	61,108	0	61,108	0	0	0	0	57,400	3,708
Chelsea Screenhouse Upgrades	10512_7431	Aug-15	Sep-16	4,953	4,953	0	0	0	0	0	0	
Columbus Park Headworks Construction	10513_7432			0	0	0	0	0	0	0	0	
PP/Cottage Farm Pump & Gearbox Rebuilds	10515_7452	Oct-13	Nov-15	6,439	6,439	0	0	0	0	0	0	
Prison Point Piping Rehab	10518_7459	Oct-16	Sep-17	462	462	0	0	0	0	262	0	
Prison Point Rehab - Construction	10519_7462	Mar-21	Mar-23	42,460	0	42,460	1,769	21,230	19,461	42,460	0	
Cottage Farm Rehab - Construction	10520_7463	Jul-23	Jul-25	12,736	0	12,736	0	0	0	0	12,736	
Chelsea Screenhouse Upgrades - ESDC/REI	10521_7490	Sep-15	Sep-17	863	863	0	0	0	0	14	0	
Cottage Farm Rehab - Design/CA/REI	10522_7508	Jul-21	Jul-26	2,547	0	2,547	0	418	625	1,043	1,505	
Chelsea Headworks-Caruso Pump Stn. Utili	10523_7510	Jul-16	Jun-20	26	26	0	0	0	0	16	0	
Cambridge Branch 23, 24, 26, 27 - Study	10524_7511	Oct-16	Jan-18	512	512	0	0	0	0	0	0	
Inter. Ren. 3 Dorch. Int Sewer Des CA/RI	10525_7512	Apr-17	May-22	1,558	591	967	337	379	250	1,194	0	
Cambr. Branch Sect 23, 24 Des/ESDC	10526_7513	Sep-25	Sep-30	6,000	0	6,000	0	0	0	0	3,206	2,794
Intercep. Ren. 6 Chelsea - Design CA/REI	10527_7514	Aug-24	Aug-29	2,200	0	2,200	0	0	0	0	1,925	275
Int Ren 5 NNVS 607-610 Des/CA	10528_7515	Sep-23	Sep-28	3,000	0	3,000	0	0	0	0	3,000	
Quin/Hing PS Fuel Stor Upg Const	10529_7534	Jul-17	Mar-18	529	529	0	0	0	0	0	0	
DI Shaft Design/CA	10530_7549	Dec-23	May-27	800	0	800	0	0	0	0	800	
Rem HW Shaft Acc Improv-Constr	10531_7550	Jul-21	Apr-22	2,800	0	2,800	0	2,800	0	2,800	0	
Wiggins Term PS Design	10532_7551			0	0	0	0	0	0	0	0	
Wiggins Term PS Design/Constr	10533_7552	Jul-22	Jul-24	1,767	0	1,767	0	0	640	640	1,127	
Fuel Oil Tank Repl Design	10534_7553			0	0	0	0	0	0	0	0	
Fuel Oil Tank Repl Constr Ph 1	10535_7554	Apr-20	Oct-21	1,453	0	1,453	949	503	0	1,453	0	
Fuel Oil Tank Repl Constr Ph 2	10536_7555	Aug-21	Feb-23	1,450	0	1,450	0	806	644	1,450	0	
Columbus Park HW Construction	10537_7587	Jan-25	Jan-29	61,108	0	61,108	0	0	0	0	49,730	11,378
Ward St & Colum Pk Head-REI	10538_7636	Jul-24	Apr-29	7,161	0	7,161	0	0	0	0	6,265	896
Fuel Oil Tank Repl Constr Ph 3	10539_7637	Mar-22	Jul-23	2,000	0	2,000	0	471	1,412	1,882	118	
Hayes Pump St Rehab REI	10540_7668	Sep-22	Sep-24	500	0	500	0	0	146	146	354	
Somville-Margi CSO Facility Rehab	10545_7688	Jul-23	Jul-25	12,500	0	12,500	0	0	0	0	4,567	7,934
Somville-Margi CSO Facil Reh Des/CA	10546_7689	Jul-21	Jul-26	1,500	0	1,500	0	225	300	525	975	
Intercept Renewal 7 REI	10547_7751	Jan-23	Jan-25	1,300	0	1,300	0	0	270	270	1,030	
Rem HW Sh Acc Imp ESDC/REI	10548_7781	Feb-21	Nov-22	250	0	250	24	143	83	250	0	
Chelsea Creek Hdwks Radio Equip	10550_7785	Mar-21	May-21	100	0	100	100	0	0	100	0	
DeLauri Pump Station Rehab Des	10820_7824	Jul-26	Jul-31	1,500	0	1,500	0	0	0	0	525	975
DeLauri Pump Station Rehab REI	10821_7825	Jul-28	Jul-30	1,000	0	1,000	0	0	0	0	0	1,000
DeLauri Pump Station Rehab	10822_7826	Jul-28	Jul-30	12,500	0	12,500	0	0	0	0	0	12,501

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Hingham Pump Station Rehab Des	10823_7827	Sep-21	Sep-26	900	0	900	0	105	180	285	615	
Hingham Pump Station Rehab REI	10824_7796	Sep-23	Sep-25	600	0	600	0	0	0	0	600	
Hingham Pump Station Rehab	10825_7797	Sep-23	Sep-25	7,500	0	7,500	0	0	0	0	7,500	
Houghs Neck PS Rehab Des	10826_7798	Jul-26	Jul-31	600	0	600	0	0	0	0	210	390
Houghs Neck PS Rehab REI	10827_7799	Jul-28	Jul-30	400	0	400	0	0	0	0	0	400
Houghs Neck Pump Station Rehab	10828_7828	Jul-28	Jul-30	5,000	0	5,000	0	0	0	0	0	5,000
Somerville-Marg CSO Rehab REI	10829_7829	Jul-23	Jul-25	1,000	0	1,000	0	0	0	0	1,000	
Charlestown Pump Station Demo	10830_7803	Mar-21	Mar-23	2,000	0	2,000	83	1,000	917	2,000	0	
Sects 191 & 192 Rehab	54012_7643	Jan-20	Jul-20	1,608	1,482	126	126	0	0	1,608	0	
<b>145 Facility Asset Protection Total</b>				<b>573,688</b>	<b>142,531</b>	<b>431,155</b>	<b>26,278</b>	<b>36,769</b>	<b>32,170</b>	<b>142,698</b>	<b>262,797</b>	<b>49,495</b>
<b>146 D.I. Cross Harbor Tunnel</b>												
DI Cross Harbor Tunnels Inspection	10454_7199	Jul-24	Jun-29	5,000	0	5,000	0	0	0	0	5,000	
<b>146 D.I. Cross Harbor Tunnel Total</b>				<b>5,000</b>	<b>0</b>	<b>5,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5,000</b>	
<b>147 Randolph Trunk Sewer Relief</b>												
Study	10461_7220	Jul-22	Jun-24	698	0	698	0	0	262	262	436	
<b>147 Randolph Trunk Sewer Relie Total</b>				<b>698</b>	<b>0</b>	<b>698</b>	<b>0</b>	<b>0</b>	<b>262</b>	<b>262</b>	<b>436</b>	

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<b>Treatment</b>				<b>1,167,097</b>	<b>325,425</b>	<b>841,671</b>	<b>37,747</b>	<b>53,782</b>	<b>80,132</b>	<b>195,931</b>	<b>596,453</b>	<b>73,505</b>
<b>182 DI Primary and Secondary Treatment Total</b>		<b>completed project</b>		<b>(959)</b>	<b>(959)</b>	<b>0</b>						
<b>200 DI Plant Optimization Total</b>		<b>completed project</b>		<b>33,280</b>	<b>33,280</b>	<b>0</b>						
<b>206 DI Treatment Plant Asset Protection</b>												
DITP Roof Replacements	18045_6196	Jun-10	Jun-11	2,300	2,300	0	0	0	0	0	0	0
Dig/Stor Tk Rehab Const	19161_6240	Jul-23	Jan-27	55,000	0	55,000	0	0	0	0	55,000	0
DISC Application	19162_6241			125	125	0	0	0	0	0	0	0
Pump Packing Replacement	19176_6422	Sep-03	Jun-08	732	732	0	0	0	0	0	0	0
Demineralizer Construction	19177_6423	Jul-00	Dec-00	51	51	0	0	0	0	0	0	0
Equipment Replacement Projection	19182_6478	Jul-18	Jun-23	0	0	0	0	0	0	0	0	0
Odor Control Rehab - Construction	19188_6538	Sep-24	Mar-28	47,000	0	47,000	0	0	0	0	41,851	5,149
Odor Control Rehab - REI	19191_6592	Sep-24	Jun-28	4,625	0	4,625	0	0	0	0	4,149	476
Equipment Condition Monitoring	19193_6594	May-04	Jan-05	1,777	1,777	0	0	0	0	0	0	0
NMPS WTF Valve & Piping - ESDC/REI	19194_6598	Dec-14	Oct-18	1,487	1,487	0	0	0	0	(6)	0	0
Expansion Joint Repair - Design	19204_6668	Apr-99	Oct-04	149	149	0	0	0	0	0	0	0
Expansion Joint Repair - Construct. 1	19205_6669	Aug-02	Nov-03	305	305	0	0	0	0	0	0	0
Expansion Joint Repair - Construct. 2	19217_6704	Aug-12	Feb-14	1,894	1,894	0	0	0	0	0	0	0
Expansion Joint Repair - Construction 3	19218_6705			0	0	0	0	0	0	0	0	0
As-needed Design Phase 6-1	19220_6721	May-09	Oct-12	1,911	1,911	0	0	0	0	0	0	0
As-needed Design Phase 6-2	19221_6722	May-09	Aug-12	1,744	1,744	0	0	0	0	0	0	0
E Seawall Des/ESDC/REI	19222_6723	Oct-20	Jun-26	2,600	0	2,600	220	795	665	1,680	920	0
Eastern Seawall Construction - 1	19223_6724	Oct-22	Jun-25	7,300	0	7,300	0	0	1,233	1,233	6,067	0
Barge Berth Des/ESDC/REI	19224_6725	Apr-23	Aug-28	2,161	0	2,161	0	0	0	0	2,150	0
Barge Berth Rehab Const	19225_6726	Feb-25	Aug-27	11,267	0	11,267	0	0	0	0	11,267	0
Rip-rap Material DITP	19226_6727	Mar-17	Jun-17	227	227	0	0	0	0	0	0	0
Digester Gas Flare No 4-Des/ESDC	19227_6728	Oct-23	Jul-27	952	0	952	0	0	0	0	952	0
Digester Gas Flare No. 4 - Construction	19228_6729	Apr-25	Jul-26	2,221	0	2,221	0	0	0	0	2,221	0
CHP Des/ESDC/REI	19229_6730	Jun-22	Jun-30	5,580	0	5,580	0	0	1,714	1,714	3,371	495
Roof Replacement - Phase I	19230_5464	Mar-09	Mar-10	2,750	2,750	0	0	0	0	0	0	0
Drive Chain Replacement	19231_6742	Oct-01	Jul-03	264	264	0	0	0	0	0	0	0
Busduct Replacement (2+22)	19236_6763	Jan-01	Oct-01	196	196	0	0	0	0	0	0	0
Reline Hypochlorite Tanks 1 & 3	19237_6764	May-07	Nov-07	1,691	1,691	0	0	0	0	0	0	0
CTG Modifications	19238_6765	Mar-01	May-02	482	482	0	0	0	0	0	0	0
Electrical Equipment Upgrade-Const 2	19239_6767	Apr-05	Feb-07	1,913	1,913	0	0	0	0	0	0	0
Document Format Conversion	19241_6791	May-07	Jun-19	68	68	0	0	0	0	0	0	0
Outfall Modification - Inspection	19243_6811	Dec-01	Jul-02	174	174	0	0	0	0	0	0	0
Secondary Clarifier Access	19244_6812	Sep-01	Jul-02	275	275	0	0	0	0	0	0	0
Transformer Replacement	19245_6813			1,703	1,703	0	0	0	0	0	0	0
DSL Pump Replacement - Phase 2	19246_6821	Jan-16	Jul-17	2,672	2,672	0	0	0	0	(1)	0	0
Co-Digestion Design/Build	19247_6822	Aug-26	Feb-28	5,000	0	5,000	0	0	0	0	5,000	0
Co-Dig Constr Pilot	19248_6823			0	0	0	0	0	0	0	0	0
Reline Hypochlorite Tanks 2 & 4	19250_6849	Apr-08	Oct-08	2,242	2,242	0	0	0	0	0	0	0
Chemical Pipe Replacement - Design	19252_6851	Dec-23	Mar-28	1,700	0	1,700	0	0	0	0	1,700	0
Chemical Pipe Replacement - Construction	19253_6852	Mar-25	Mar-27	4,500	0	4,500	0	0	0	0	4,500	0
Sodium Hypo Pipe Replacement - Design	19254_6853			0	0	0	0	0	0	0	0	0
Sodium Hypo Pipe Replacement - Const.	19255_6854			0	0	0	0	0	0	0	0	0
Electrical Equipment Upgrade-Const. 3	19256_6855	Feb-08	Aug-11	15,174	15,174	0	0	0	0	0	0	0
WTF VFD Replacement - Construction	19258_6875	Jun-16	Apr-21	11,957	9,019	2,938	1,802	1,136	0	8,342	0	0



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Heat Loop Pipe Replacement - Constr 1	19259_6876	Mar-05	Dec-05	615	615	0	0	0	0	0	0	0
Secondary Reactor VFDs	19260_6877	May-05	Aug-16	3,232	3,232	0	0	0	0	(1)	0	0
Fish Pier Safety Systems	19263_6880			0	0	0	0	0	0	0	0	0
Grit Air Handler Replacements	19264_6881	Jul-08	Jun-10	2,029	2,029	0	0	0	0	0	0	0
CEMS Equipment Replacement	19265_6882	Nov-05	Mar-06	100	100	0	0	0	0	0	0	0
Heat Loop Pipe Replacement - Const. 2	19266_6883	Dec-06	Feb-08	1,488	1,488	0	0	0	0	0	0	0
PICS Replacement - Construction	19267_6884	Jul-11	Sep-15	1,230	1,230	0	0	0	0	0	0	0
Primary&Second Clarifier Rehab-Const	19268_6899	Feb-09	Feb-12	58,613	58,613	0	0	0	0	0	0	0
Switchgear Relay Replacement - REI	19269_6900			0	0	0	0	0	0	0	0	0
Electrical Equipment Upgrade - Const 4	19270_6901	May-13	May-16	7,831	7,831	0	0	0	0	(40)	0	0
NMPS VFD Replacement - Design/ESDC	19271_6902	Dec-07	Apr-12	1,278	1,278	0	0	0	0	0	0	0
NMPS VFD Replacement - Construction	19272_6903	Dec-11	Mar-16	24,432	24,432	0	0	0	0	0	0	0
Fire Alarm System Replacemen - Design	19273_6904	Dec-15	Aug-25	2,329	882	1,447	167	427	194	952	658	0
CHP Alternatives Study	19274_6963	Apr-19	Apr-21	1,150	414	735	735	0	0	1,149	0	0
Combined Heat & Power - Construction	19275_6964	Oct-24	Oct-28	83,000	0	83,000	0	0	0	0	83,000	0
Primary&Second Clarifier Rehab-Design	19276_6965	Mar-09	Sep-13	1,678	1,678	0	0	0	0	0	0	0
Gravity Thickener Improvements-Const	19277_6966	Apr-10	Jun-12	929	929	0	0	0	0	(4)	0	0
STG System Modifications - Design	19278_6967	Jun-09	Apr-11	(44)	(44)	0	0	0	0	0	0	0
Electrical Equipment Upgrade 3 - REI	19279_6968	Feb-08	Nov-11	1,112	1,112	0	0	0	0	0	0	0
DiGas Line Design	19280_6969			0	0	0	0	0	0	0	0	0
DiGas Line Constr	19281_6970			0	0	0	0	0	0	0	0	0
NMPS Motor Control Center - Design	19282_6971			0	0	0	0	0	0	0	0	0
NMPS Motor Control Center - Constr	19283_6972	Jan-12	Apr-13	914	914	0	0	0	0	0	0	0
STG System Modifications - Construct.	19284_6973	May-10	Apr-11	2,120	2,120	0	0	0	0	0	0	0
Digester Chiller Replacement	19287_7005	Sep-05	May-06	635	635	0	0	0	0	0	0	0
Dystor Tank Membrane Replacement	19288_7006	Sep-04	Oct-05	640	640	0	0	0	0	0	0	0
Fire Alarm System Replacement - Constr	19289_7051	Jun-21	Oct-24	28,750	0	28,750	186	7,786	7,786	15,757	12,993	0
Digester & Storage Tank Rehab Design/ESD	19290_7052	Jun-21	Aug-28	4,055	0	4,055	0	514	686	1,200	2,817	38
Digestr/Storage Tk REI	19291_7053	Jan-23	Jan-28	4,092	0	4,092	0	0	245	245	3,847	0
Thick Primary Sludge Pump Repl-Const	19292_7054	Oct-13	Jun-14	27	27	0	0	0	0	0	0	0
Digester Modules 1 & 2 Pipe Replacem	19293_7055	Aug-11	Aug-14	7,096	7,096	0	0	0	0	0	0	0
Cathodic Protection - Construction	19294_7056	Jul-23	Jul-26	7,055	0	7,055	0	0	0	0	7,055	0
Centrifuge Backdrive Replacement	19295_7057	Feb-13	Mar-15	3,965	3,965	0	0	0	0	0	0	0
Switchgear Replacement - Design	19296_7058			0	0	0	0	0	0	0	0	0
Switchgear Relay Replac Constr	19297_7059	Jul-22	Jul-25	8,000	0	8,000	0	0	4,800	4,800	3,200	0
Power Consultant Recommnd - Design	19298_7060	Jan-06	Jul-09	2,097	2,097	0	0	0	0	0	0	0
Power System Improvements - Construct.	19299_7061	Jan-09	May-17	10,117	10,117	0	0	0	0	0	0	0
NMPS VFD Replacement - REI	19300_7062	Dec-12	Jun-16	740	740	0	0	0	0	0	0	0
Heat Loop Pipe Replacement - Const. 3	19301_7063	Jun-09	Jun-11	11,410	11,410	0	0	0	0	(136)	0	0
Odor Control Rehab - Design/ESDC	19303_7088	Jun-21	Jun-28	5,125	0	5,125	0	533	933	1,467	3,658	0
Sodium Hypo Tank Liner Removal	19304_7089	May-06	Sep-06	196	196	0	0	0	0	0	0	0
As-needed Design Phase 5-1	19305_7090	Aug-07	Aug-09	955	955	0	0	0	0	0	0	0
As-needed Design Phase 5-2	19306_7091	Jul-07	Jul-09	1,056	1,056	0	0	0	0	0	0	0
HVAC Equip Replac REI	19307_7094	Oct-22	Oct-27	3,000	0	3,000	0	0	1,200	1,200	1,800	0
HVAC Equipment Replacement - Des/ESDC	19309_7111	Mar-14	Nov-19	1,424	1,424	0	0	0	0	35	0	0
HVAC Design/ESDC	19310_7110	Mar-21	Mar-28	2,100	0	2,100	0	500	500	1,000	1,100	0
DI As-needed Technical Design	19311_7121	Jul-23	Jun-30	20,250	0	20,250	0	0	0	0	15,000	5,250
Radio Rptr Syst Upgr 1	19312_7122	Oct-18	Nov-20	243	0	243	243	0	0	243	0	0
Digester Sludge Pump Replace - Construct	19313_7123	Oct-09	Dec-14	1,871	1,871	0	0	0	0	78	0	0
Elect Equip Upgrade 5 Const	19314_7124	Dec-24	Dec-27	23,162	0	23,162	0	0	0	0	23,162	0
Misc. VFD Replacements FY19-FY23	19315_7125	Oct-20	Jun-25	4,496	0	4,496	600	500	819	1,919	2,577	0
SSPS VFD Replace Des/ESDC/REI	19316_7126	Jan-21	Jan-29	4,464	0	4,464	940	770	878	2,587	1,877	0

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SSPS VFD Replace Const	19317_7127	Jan-23	Jan-28	26,553	0	26,553	0	0	3,051	3,051	23,502	
NMPS VFD Replace Des/ESDC/REI	19318_7128	Jun-24	Dec-31	4,420	0	4,420	0	0	0	0	2,768	1,652
NMPS VFD Replace Const	19319_7129	Dec-26	Dec-30	35,000	0	35,000	0	0	0	0	6,771	28,229
Elect Equip 5 Des/ESDC/REI	19320_7130	Dec-22	Dec-28	4,308	0	4,308	0	0	287	287	3,857	164
Misc. VFD Replacements FY18	19321_7131	Oct-17	Jun-18	490	490	0	0	0	0	40	0	
DI Swtchgr Repl Des/ESDC/REI	19322_7132	Jul-23	Jul-28	4,500	0	4,500	0	0	0	0	4,459	
DI Switchgear Replacement - Construct.	19323_7133	Jul-25	Jul-27	16,000	0	16,000	0	0	0	0	16,000	
Radio Rptr Syst Upgr 2	19324_7134	Sep-21	Sep-24	2,500	0	2,500	0	0	1,500	1,500	1,000	
DI Dystor Membrane Replacements	19325_7135	Mar-21	Dec-21	4,000	0	4,000	1,000	1,000	0	2,000	0	2,000
DI CTG Rebuilds	19326_7136	Jul-23	Jul-26	8,000	0	8,000	0	0	0	0	8,000	
Centrifuge Replac Des/ESDC/REI	19327_7137	Dec-23	Jun-28	4,160	0	4,160	0	0	0	0	4,122	38
DI Centrifuge Replacements - Construct.	19328_7138	Jun-25	Jun-27	16,640	0	16,640	0	0	0	0	16,640	
Cryogenics Plant Equipment Replace-Desig	19329_7139	Jun-21	Dec-27	3,255	0	3,255	100	195	781	1,077	2,168	11
Cryogenics Plant Equip Replace - Const.	19330_7140	Sep-23	Dec-26	32,500	0	32,500	0	0	0	0	32,500	
Repl Hypo & Bisulfite Tks	19332_7142	Jul-25	Jul-29	20,000	0	20,000	0	0	0	0	12,500	7,500
Gas Protect Systm Replac Ph 1	19333_7167	Sep-19	Oct-21	1,403	551	852	591	261	0	1,403	0	
Personnel Dock Rehab	19334_7168	Feb-17	Oct-17	1,368	1,368	0	0	0	0	(85)	0	
Gas Protect Systm Replac Ph 2	19335_7169	Apr-21	Apr-23	2,500	0	2,500	0	1,250	1,250	2,500	0	
E/W Odor Control Air Handler Replace.	19336_7170	Jun-25	Jun-30	2,000	0	2,000	0	0	0	0	2,000	
PICS FiberLoop Replac	19338_7172	Jun-23	Jun-26	12,462	0	12,462	0	0	0	0	12,462	
NMPS & WTF Butterfly Valve Replace.	19339_7275	Jun-14	Sep-17	17,514	17,514	0	0	0	0	0	0	
Chemical Tank and Digester Pipe	19345_7373	Aug-19	Dec-21	8,660	2,529	6,131	4,288	1,843	0	8,660	0	
Clarif W3H Flush Syst	19346_7374	Jul-12	Jul-13	1,262	1,262	0	0	0	0	0	0	
Clarifier Rehab Phase 2 - Design	19347_7394	Jan-15	May-25	2,675	1,318	1,357	223	414	310	1,086	410	
Clarifier Rehab Phase 2 - Construction	19348_7395	Jan-21	May-25	137,200	0	137,200	14,475	21,775	39,000	75,250	61,950	
Scum Skimmer Replacement	19349_7396	Oct-13	Oct-16	20,394	20,394	0	0	0	0	0	0	
Clarifier Rehab Phase 2 - REI	19351_7397	Jan-21	May-26	3,000	0	3,000	475	700	600	1,775	1,225	
Cryogenics Chillers Replacement	19352_7398	Oct-14	Oct-16	3,218	3,218	0	0	0	0	(1)	0	
As-Needed Design 7-1	19353_7399	Oct-12	Oct-15	1,547	1,547	0	0	0	0	0	0	
As-Needed Design 7-2	19354_7400	Oct-12	Apr-16	1,061	1,061	0	0	0	0	0	0	
TPP Boiler Controls Replacement	19355_7401	Nov-14	Nov-16	1,620	1,620	0	0	0	0	0	0	
Sod. Hypochlorite & Bisulfite Rehab - RE	19356_7413			0	0	0	0	0	0	0	0	
Elect Equip Upgrade 6 Constr	19557_7414	Dec-27	Dec-31	20,000	0	20,000	0	0	0	0	417	19,583
Fuel Pipe Abandonment	19558_7415	Aug-12	Jan-13	230	230	0	0	0	0	0	0	
Electrical Equipment Upgrades 4 - REI	19559_7416	May-14	Oct-16	858	858	0	0	0	0	0	0	
MCC Switchgr Repl Des/ESDC/REI	19560_7419	Jan-17	Feb-25	2,480	765	1,715	514	428	462	1,562	310	
MCC & Switchgr Replace Const	19561_7420	Mar-21	Sep-23	11,200	0	11,200	1,881	4,470	4,849	11,200	0	
Roof Replacement Phase 3	19562_7424	Sep-13	Jul-14	610	610	0	0	0	0	(1)	0	
Fire System Replacement - REI	19563_7426	Jun-21	Feb-25	2,139	0	2,139	298	596	596	1,490	649	
Grav Thick Ctr Col Repl	19564_7427	Jan-13	Jan-14	825	825	0	0	0	0	0	0	
Gravity Thickener Rehab	19565_7428	May-18	Feb-21	19,962	12,256	7,706	6,192	1,514	0	19,555	0	
As-Needed Design 7-3	19566_7434	Oct-12	Apr-16	950	950	0	0	0	0	0	0	
As-Needed Design 8-1	19600_7501	Jul-16	Jul-19	623	623	0	0	0	0	179	0	
As-Needed Design 8-2	19601_7502	Jul-16	Jul-19	794	794	0	0	0	0	411	0	
As-Needed Design 8-3	19602_7503	Jul-16	Mar-21	1,068	862	206	206	0	0	660	0	
Hydroturb Repl Des/ESDC/REI	19603_7570	Jul-23	Jul-30	1,860	0	1,860	0	0	0	0	1,540	320
Hydroturb Repl Const	19604_7571	Jul-25	Jul-29	9,300	0	9,300	0	0	0	0	8,900	400
As-Needed Des 9-1	19605_7644	Jul-19	Jul-22	1,600	178	1,422	426	468	528	1,600	0	
As-Needed Des 9-2	19606_7645	Sep-19	Sep-22	1,600	171	1,429	416	518	495	1,600	0	
As-Needed Des 9-3	19607_7646	Sep-19	Sep-22	1,600	0	1,600	389	518	694	1,600	0	
As-Needed REI-1	19608_7647	Jul-19	Jul-21	0	0	0	0	0	0	0	0	
DITP Roofing Replacement	19609_7734	Jun-21	Dec-22	3,000	0	3,000	0	1,800	1,200	3,000	0	

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HVAC Control System Replacement	19610_7745	Apr-23	Apr-27	20,000	0	20,000	0	0	500	500	19,500	
HVAC Fume Hoods Replacement	19611_7746	Nov-23	Feb-27	17,000	0	17,000	0	0	0	0	17,000	
HVAC Mechanical Equip Replac	19612_7747	Nov-23	Feb-27	20,000	0	20,000	0	0	0	0	20,000	
Hypo & Bisulfite Tks Des/ESDC	19613_7749	Jul-23	Jul-30	3,000	0	3,000	0	0	0	0	2,105	895
Electr Equip Upgr 6 Des/ESDC	19614_7750	Dec-25	Dec-31	4,000	0	4,000	0	0	0	0	2,695	1,305
Co-Digestion Temporary Facilities	26073_7148	Sep-13	Jun-15	434	434	0	0	0	0	0	0	
Chem Tk & Digestr Pipe	40256_7449			0	0	0	0	0	0	0	0	
<b>206 DI Treatment Plant Asset Protection Total</b>				<b>1,100,569</b>	<b>274,835</b>	<b>825,733</b>	<b>36,367</b>	<b>50,711</b>	<b>77,756</b>	<b>187,312</b>	<b>587,342</b>	<b>73,505</b>
<b>210 Clinton Wastewater Treatment Plant</b>												
Clinton Soda Ash Replacement	19302_7075	Nov-07	Aug-08	267	267	0	0	0	0	0	0	
Clinton Permanent Standby Generator	19308_7095	Feb-07	Nov-07	230	230	0	0	0	0	0	0	
Clinton Concr Rpr - Design	19340_7276	Feb-13	Dec-13	63	63	0	0	0	0	0	0	
Clinton Digester Cleaning & Rehab	19341_7277	May-10	Apr-17	3,443	3,443	0	0	0	0	0	0	
Clinton Aeration Efficiency Improvement	19342_7278	Apr-12	Feb-13	1,865	1,865	0	0	0	0	0	0	
Clinton WWTP Rehab Des/ESDC/RE	19343_7371	Dec-21	Jun-26	1,500	0	1,500	0	792	208	1,000	500	
Valves and Pipe Replacement	19344_7372	May-20	Sep-21	477	0	477	300	177	0	477	0	
Phosphorus Reduction - Design/ESDC	19350_7377	Nov-13	Mar-19	1,436	1,436	0	0	0	0	20	0	
Phosphorus Reduction - Construction	19400_7411	Mar-16	Mar-18	7,558	7,558	0	0	0	0	972	0	
Clinton Roofing Rehab	19405_7450	Sep-18	Sep-19	800	800	0	0	0	0	800	0	
Clinton WWTP Rehab Constr	19406_7451	Jun-23	Jun-25	4,361	0	4,361	0	0	0	0	4,361	
NGRID Gas Line	19407_7528	Apr-16	Jun-17	396	396	0	0	0	0	0	0	
Screw Pump Replac Ph 2 Const	19408_7591	Dec-23	Dec-25	3,500	0	3,500	0	0	0	0	3,500	
Digestr Cover Replac	19409_7648	Mar-21	Sep-22	750	0	750	360	240	150	750	0	
Equip Storage Bldg	19410_7693	Jun-21	Oct-22	700	0	700	100	292	308	700	0	
Screw Pump Replacement	19411_7704	Mar-21	Mar-23	2,000	0	2,000	120	960	920	2,000	0	
Clinton Fire Alarm Replacement	19412_7735	Jun-21	Dec-22	900	0	900	0	510	390	900	0	
Clinton SCADA Upgrades	19413_7736	Jan-24	Jan-26	750	0	750	0	0	0	0	750	
Landfill Cel #1 Closure	19414_7754	Dec-20	Feb-22	1,000	0	1,000	500	100	400	1,000	0	
<b>210 Clinton Wastewater Treatment Plant Total</b>				<b>31,996</b>	<b>16,058</b>	<b>15,938</b>	<b>1,380</b>	<b>3,071</b>	<b>2,376</b>	<b>8,619</b>	<b>9,111</b>	
<b>211 Laboratory Services Total</b>			<b>completed project</b>	<b>2,211</b>	<b>2,211</b>	<b>0</b>						

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<b>Residuals</b>				<b>169,504</b>	<b>79,249</b>	<b>90,256</b>	<b>1,470</b>	<b>56</b>	<b>795</b>	<b>16,522</b>	<b>22,209</b>	<b>65,728</b>
<b>261 Residuals Total</b>		<b>completed project</b>		<b>63,810</b>	<b>63,810</b>	<b>0</b>						
<b>271 Residuals Asset Protection</b>												
Residuals Facility Plan / EIR	26069_7143	Jan-22	Jan-25	1,000	0	1,000	0	56	333	389	611	
Residuals Facility Upgrades - Design	26070_7145	May-22	Nov-24	1,157	0	1,157	0	0	462	462	695	
Residuals Facility Upgrades - Constructi	26071_7146	Nov-19	Dec-20	0	0	0	0	0	0	0	0	
Condition Assess/Tech & Reg Review	26072_7147	May-09	Jan-14	832	832	0	0	0	0	0	0	
Residuals Phase 2 - Design	26074_7149	Feb-25	Jul-33	15,000	0	15,000	0	0	0	0	8,986	6,014
Residuals Phase 2 - Construction	26075_7150	Apr-27	Apr-33	71,629	0	71,629	0	0	0	0	11,917	59,714
Sludge Tk & Silo Coating	26076_7151	Sep-17	Sep-18	764	764	0	0	0	0	507	0	
Electr Improvements	26077_7152			0	0	0	0	0	0	0	0	
Resid Elect/Mach/Drum Repl	26078_7153	Jun-19	Dec-20	10,758	10,163	595	595	0	0	10,610	0	
Pellet Piping - Relocate	26079_7173	Aug-19	Dec-20	4,554	3,680	875	875	0	0	4,554	0	
FRSA Pier Rehab - Construction	26080_7174			0	0	0	0	0	0	0	0	
Rail System Rehabilitation - Design	26081_7175			0	0	0	0	0	0	0	0	
Rail System Rehabilitation - Construct.	26082_7176			0	0	0	0	0	0	0	0	
Replace 9 Pellet Storage Silos-Design	26083_7177			0	0	0	0	0	0	0	0	
Replace 9 Pellet Storage Silos-Const.	26084_7178			0	0	0	0	0	0	0	0	
Sludge Conveyor Replacement - Design	26085_7179			0	0	0	0	0	0	0	0	
Sludge Conveyor Replacement - Const.	26086_7180			0	0	0	0	0	0	0	0	
Sludge Storage Tank Rehab - Design	26087_7181			0	0	0	0	0	0	0	0	
Sludge Storage Tank Rehab - Const.	26088_7182			0	0	0	0	0	0	0	0	
Upgrade Pumping System - Design	26089_7183			0	0	0	0	0	0	0	0	
Upgrade Pumping System - Construction	26090_7184			0	0	0	0	0	0	0	0	
Replace 12 Centrifuges - Design	26091_7185			0	0	0	0	0	0	0	0	
Replace 12 Centrifuges - Construction	26092_7186			0	0	0	0	0	0	0	0	
Utility Upgrades - Design	26093_7187			0	0	0	0	0	0	0	0	
Utility Upgrades - Construction	26094_7188			0	0	0	0	0	0	0	0	
Odor Control System Upgrade - Design	26095_7189			0	0	0	0	0	0	0	0	
Odor Control System Upgrade - Const.	26096_7190			0	0	0	0	0	0	0	0	
<b>271 Residuals Asset Protection Total</b>				<b>105,694</b>	<b>15,439</b>	<b>90,256</b>	<b>1,470</b>	<b>56</b>	<b>795</b>	<b>16,522</b>	<b>22,209</b>	<b>65,728</b>

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<b>CSO</b>				<b>912,522</b>	<b>904,868</b>	<b>7,655</b>	<b>5,220</b>	<b>2,271</b>	<b>72</b>	<b>10,037</b>	<b>89</b>	<b>0</b>
<b>CSO MWRA Managed</b>				<b>433,533</b>	<b>433,533</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>339 North Dorchester Bay Total</b>			<b>completed project</b>	<b>221,509</b>	<b>221,509</b>	<b>0</b>						
<b>347 East Boston Branch Sewer R Total</b>			<b>completed project</b>	<b>85,636</b>	<b>85,636</b>	<b>0</b>						
<b>348 BOS019 Storage Conduit Total</b>			<b>completed project</b>	<b>14,288</b>	<b>14,288</b>	<b>0</b>						
<b>349 Chelsea Trunk Sewer Total</b>			<b>completed project</b>	<b>29,778</b>	<b>29,778</b>	<b>0</b>						
<b>350 Union Park Detention Treatment Facility Total</b>			<b>completed project</b>	<b>49,584</b>	<b>49,584</b>	<b>0</b>						
<b>353 Upgrade Existing CSO Facilities Total</b>			<b>completed project</b>	<b>22,385</b>	<b>22,385</b>	<b>0</b>						
<b>354 Hydraulic Relief Projects Total</b>			<b>completed project</b>	<b>2,295</b>	<b>2,295</b>	<b>0</b>						
<b>355 MWR003 Gate &amp; Siphon Total</b>			<b>completed project</b>	<b>4,425</b>	<b>4,425</b>	<b>0</b>						
<b>357 Charles River CSO Controls Total</b>			<b>completed project</b>	<b>3,633</b>	<b>3,633</b>	<b>0</b>						
<b>CSO Community Managed</b>				<b>423,779</b>	<b>420,016</b>	<b>3,763</b>	<b>3,763</b>	<b>0</b>	<b>0</b>	<b>3,763</b>	<b>0</b>	<b>0</b>
<b>340 Dorchester Bay Sewer Separation (Fox Point) Total</b>			<b>completed project</b>	<b>55,029</b>	<b>55,029</b>	<b>0</b>						
<b>341 Dorchester Bay Sewer Separation (Commercial Point)</b>												
Design	32650_6154	Jun-96	Dec-16	16,410	16,410	0	0	0	0	0	0	
Construction	32665_6248	Apr-99	Dec-16	43,451	43,451	0	0	0	0	0	0	
DOR Int Inflow Remo Constr	32750_7576	Jul-19	Jun-21	3,763	0	3,763	3,763	0	0	3,763		
<b>341 Dorchester Bay Sewer Separation (Commercial Point) Total</b>				<b>63,624</b>	<b>59,861</b>	<b>3,763</b>	<b>3,763</b>	<b>0</b>	<b>0</b>	<b>3,763</b>		
<b>342 Neponset River Sewer Separation Total</b>			<b>completed project</b>	<b>2,492</b>	<b>2,492</b>	<b>0</b>						
<b>343 Constitution Beach Sewer Separation Total</b>			<b>completed project</b>	<b>3,731</b>	<b>3,731</b>	<b>0</b>						
<b>344 Stony Brook Sewer Separati Total</b>			<b>completed project</b>	<b>44,320</b>	<b>44,320</b>	<b>0</b>						
<b>346 Cambridge Sewer Separation Total</b>			<b>completed project</b>	<b>104,552</b>	<b>104,552</b>	<b>0</b>						
<b>351 BWSC Floatables Controls Total</b>			<b>completed project</b>	<b>946</b>	<b>946</b>	<b>0</b>						
<b>352 Cambridge Floatables Control Total</b>			<b>completed project</b>	<b>1,127</b>	<b>1,127</b>	<b>0</b>						
<b>356 Fort Point Channel Sewer Separation Total</b>			<b>completed project</b>	<b>11,507</b>	<b>11,507</b>	<b>0</b>						
<b>358 Morrissey Boulevard Drain Total</b>			<b>completed project</b>	<b>32,181</b>	<b>32,181</b>	<b>0</b>						
<b>359 Reserved Channel Sewer Separation Total</b>			<b>completed project</b>	<b>70,524</b>	<b>70,524</b>	<b>0</b>						

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<b>360 Brookline Sewer Separation Total</b>		<b>completed project</b>		<b>24,715</b>	<b>24,715</b>	<b>0</b>						
<b>361 Bulfinch Triangle Sewer Separation Total</b>		<b>completed project</b>		<b>9,031</b>	<b>9,031</b>	<b>0</b>						
<b>CSO Planning &amp; Support</b>				<b>55,210</b>	<b>51,319</b>	<b>3,892</b>	<b>1,457</b>	<b>2,271</b>	<b>72</b>	<b>6,274</b>	<b>89</b>	<b>0</b>
<b>324 CSO Support</b>												
Technical Assistance	32400_5790	Feb-94	Dec-95	228	228	0	0	0	0	0	0	0
Planning/EIR	32401_5791	Mar-88	Sep-90	10,769	10,769	0	0	0	0	0	0	0
Master Planning	32403_5716	Mar-92	Sep-04	21,763	21,763	0	0	0	0	0	0	0
Technical Assistance - Geotech	32407_5970	Jun-90	Jun-92	61	61	0	0	0	0	0	0	0
Modeling	32409_5795	May-92	Mar-95	300	300	0	0	0	0	0	0	0
SOP Program	32411_5767	Jan-94	May-01	773	773	0	0	0	0	0	0	0
Watershed Planning	32645_6036	Dec-94	Apr-01	877	877	0	0	0	0	0	0	0
Technical Review	32648_6150	Jul-96	Aug-24	585	529	56	13	13	13	39	16	
Land Acquisition/Easement	32658_6169	Jul-96	Aug-24	12,915	12,850	66	15	15	15	51	19	
System Assessment	32691_6372	May-97	Aug-24	255	69	186	44	44	44	132	54	
Som Marginal In-System Storage	32748_7539	Aug-18	Aug-21	1,400	0	1,400	0	1,400	0	1,400	0	
CSO Performance Assessment	32749_7572	Nov-17	Apr-22	5,284	3,100	2,184	1,385	799	0	4,652	0	
Sys Otp Alewife Br/CR Study/PD	32752_7732			0	0	0	0	0	0	0	0	
MWRA205/SOM007/MWR205A Study/PD	32753_7733			0	0	0	0	0	0	0	0	
<b>324 CSO Support Total</b>				<b>55,210</b>	<b>51,319</b>	<b>3,892</b>	<b>1,457</b>	<b>2,271</b>	<b>72</b>	<b>6,274</b>	<b>89</b>	
<b>Other Wastewater</b>				<b>392,866</b>	<b>265,205</b>	<b>127,662</b>	<b>28,085</b>	<b>23,231</b>	<b>22,966</b>	<b>149,168</b>	<b>113,168</b>	<b>32,853</b>
<b>128 I/I Local Financial Assistance</b>												
Community I/I Grants	10232_5300			5,800	5,800	0	0	0	0	0	0	
Community I/I Loans	10233_5393			17,278	17,278	0	0	0	0	0	0	
Community I/I Loan Repayments	10234_5394			(17,278)	(17,278)	0	0	0	0	0	0	
Phase II - Grants	10273_6084	May-93	May-06	10,129	10,129	0	0	0	0	0	0	
Phase II - Loans	10274_6085	May-93	May-06	30,386	30,386	0	0	0	0	0	0	
Phase II - Repayments	10282_6170	May-94	May-11	(30,386)	(30,386)	0	0	0	0	0	0	
Phase III - Grants	10315_6505			16,650	16,650	0	0	0	0	0	0	
Phase III - Loans	10316_6506			20,350	20,350	0	0	0	0	0	0	
Phase III - Repayments	10317_6507			(20,350)	(20,350)	0	0	0	0	0	0	
Public Participation	10348_6609	Feb-99	Jun-02	6	6	0	0	0	0	0	0	
Phase IV - Grants	10368_6736	Nov-99	May-10	18,000	18,000	0	0	0	0	0	0	
Phase IV - Loans	10369_6737	Nov-99	May-10	22,000	22,000	0	0	0	0	0	0	
Phase IV - Repayments	10370_6738	Nov-00	May-15	(22,000)	(22,000)	0	0	0	0	0	0	
Phase V - Grants	10407_6925	Aug-04	May-12	18,000	18,000	0	0	0	0	0	0	
Phase V - Loans	10408_6926	Aug-04	May-12	22,000	22,000	0	0	0	0	0	0	
Phase V - Repayments	10409_6927	Aug-05	May-17	(22,000)	(22,000)	0	0	0	0	0	0	
Phase VI - Grants	10441_7107	Nov-06	Jun-21	18,000	18,000	0	0	0	0	472	0	
Phase VI - Loans	10442_7108	Nov-06	Jun-21	22,000	22,000	0	0	0	0	576	0	
Phase VI - Repayments	10443_7109	Nov-07	Jun-26	(22,000)	(20,925)	(1,075)	(114)	(287)	(271)	(1,926)	(403)	
Phase VII - Grants	10471_7293	Aug-09	Jun-21	18,000	17,501	499	499	0	0	736	0	
Phase VII - Loans	10472_7294	Aug-09	Jun-21	22,000	21,391	609	609	0	0	900	0	
Phase VII - Repayments	10473_7295	Aug-10	Jun-26	(22,000)	(19,727)	(2,273)	(153)	(747)	(578)	(3,864)	(795)	
Phase VIII - Grants	10474_7296	Aug-12	Jun-21	18,000	16,830	1,170	630	540	0	2,389	0	
Phase VIII - Loans	10475_7297	Aug-12	Jun-21	22,000	20,570	1,430	770	660	0	2,920	0	
Phase VIII - Repayments	10476_7298	Aug-13	Jun-26	(22,000)	(16,490)	(5,510)	(95)	(1,403)	(1,283)	(6,926)	(2,729)	

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Phase IX Grants	10560_7464	Jul-14	Jun-21	60,000	43,397	16,603	3,728	3,750	3,000	23,167	6,126	
Phase IX Loans	10561_7465	Jul-14	Jun-21	20,000	14,466	5,534	1,243	1,250	1,000	7,722	2,042	
Phase IX Repayment	10562_7466	Jul-15	Jun-31	(20,000)	(4,441)	(15,559)	(1,713)	(1,757)	(1,527)	(7,205)	(6,685)	(3,878)
Phase X Grants	10563_7467	Jul-16	Jun-25	60,000	27,683	32,318	6,750	7,500	6,000	32,466	12,068	
Phase X Loans	10564_7468	Jul-16	Jun-25	20,000	9,228	10,773	2,250	2,500	2,000	10,822	4,023	
Phase X Repayment	10565_7469	Jul-16	Jun-35	(20,000)	(1,678)	(18,322)	(923)	(1,148)	(1,398)	(4,617)	(8,926)	(5,927)
Phase XI Grants	10566_7620	Aug-18	Aug-24	75,000	28,065	46,935	4,500	6,000	6,000	44,565	30,435	
Phase XI Loans	10567_7621	Aug-18	Aug-24	25,000	9,355	15,645	1,500	2,000	2,000	14,855	10,145	
Phase XI Repayment	10568_7622	Aug-19	Aug-34	(25,000)	(593)	(24,407)	(936)	(1,086)	(1,286)	(3,900)	(9,578)	(11,522)
Phase XII Grants	10569_7623	Aug-19	Aug-25	75,000	8,854	66,146	7,376	4,500	7,500	28,231	45,000	
Phase XII Loans	10570_7624	Aug-19	Aug-25	25,000	2,951	22,049	2,459	1,500	2,500	9,410	15,000	
Phase XII Repayment	10571_7625	Aug-20	Aug-35	(25,000)	(98)	(24,903)	(295)	(541)	(691)	(1,625)	(7,555)	(15,820)
I/I Loans Only	10572_7640	Jul-23	Jun-30	100,000	0	100,000	0	0	0	0	30,000	70,000
I/I Loans Only Repayment	10573_7641	Jul-24	Jun-40	(100,000)	0	(100,000)	0	0	0	0	(5,000)	
<b>128 I/I Local Financial Assistance Total</b>				<b>392,585</b>	<b>264,924</b>	<b>127,662</b>	<b>28,085</b>	<b>23,231</b>	<b>22,966</b>	<b>149,168</b>	<b>113,168</b>	<b>32,853</b>
<b>138 Sewerage System Mapping Upgrades Total</b>			<b>completed project</b>	<b>281</b>	<b>281</b>	<b>0</b>						

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<b>Waterworks</b>				<b>4,498,650</b>	<b>2,235,118</b>	<b>2,263,534</b>	<b>47,753</b>	<b>95,023</b>	<b>118,830</b>	<b>385,306</b>	<b>795,167</b>	<b>1,206,759</b>
<b>Drinking Water Quality Improvements</b>				<b>709,290</b>	<b>652,290</b>	<b>56,999</b>	<b>3,449</b>	<b>6,371</b>	<b>4,097</b>	<b>16,236</b>	<b>14,811</b>	<b>28,271</b>
<b>542 Carroll Water Treatment Plant</b>												
Study 1	53293_5023	Jan-88	Feb-89	444	444	0	0	0	0	0	0	0
Study 2	53294_5024	Jul-90	Mar-94	2,368	2,368	0	0	0	0	0	0	0
EIR / Conceptual Design	53296_5042	Nov-93	Jul-95	5,808	5,808	0	0	0	0	0	0	0
Technical Assistance	53300_5997	Jan-88	Jun-00	101	101	0	0	0	0	27	0	0
Wachusett WTP - Design/CS/RI	53301_5017	Oct-96	Sep-06	46,606	46,606	0	0	0	0	0	0	0
Permit Fees	53304_5157	Jul-93	Nov-19	90	90	0	0	0	0	3	0	0
Cryptosporidium Inactivation Study	53367_6118	Feb-97	May-00	150	150	0	0	0	0	0	0	0
Management Support - Design	53371_6134	Apr-97	Apr-00	1,730	1,730	0	0	0	0	0	0	0
AWWARF Study	53375_6182	Dec-96	Sep-03	650	650	0	0	0	0	0	0	0
Emerg Discharge Reserv Water Mgmt Study	53376_6206	Nov-98	Sep-02	1,454	1,454	0	0	0	0	0	0	0
Wachusett and Cosgrove Intakes - CP1	53377_6207	Jun-00	Jun-03	15,489	15,489	0	0	0	0	0	0	0
Construction Management / RI	53378_6208	Aug-98	Sep-06	31,438	31,438	0	0	0	0	0	0	0
Cosgrove Disinfection - Phase II	53390_6365	Apr-98	May-99	2,169	2,169	0	0	0	0	0	0	0
Cosgrove Disinfection - Phase I	53391_6397	Jul-97	Oct-97	150	150	0	0	0	0	0	0	0
Distribution Water Consultant	53392_6401	Jul-97	Jun-98	3	3	0	0	0	0	0	0	0
Immediate Disinfection - MECO	53393_6406	Jul-97	Jul-97	10	10	0	0	0	0	0	0	0
Booster Disinfection Construction	53394_6432			0	0	0	0	0	0	0	0	0
Corrosion Control - Norumbega	53395_6433			0	0	0	0	0	0	0	0	0
Corrosion Control Norumbega - Constructi	53396_6434			0	0	0	0	0	0	0	0	0
Cosgrove Disinfection Fac. - Underwater	53406_6479	Jan-98	Jun-98	217	217	0	0	0	0	0	0	0
Booster Disinfection - Design	53409_6431			0	0	0	0	0	0	0	0	0
Community Chlorine Analyzers	53410_6485	Apr-98	Jun-98	49	49	0	0	0	0	0	0	0
Wachusett Aqueduct Interim Rehab. - CP2	53412_5522	Dec-00	Oct-02	23,400	23,400	0	0	0	0	0	0	0
Sitework & Storage Tanks - CP3	53413_6488	Mar-99	Nov-02	67,368	67,368	0	0	0	0	0	0	0
Treatment Facilities - CP4	53414_6489	Dec-00	Jul-05	145,761	145,761	0	0	0	0	0	0	0
Late Sitework - CP6	53416_6491	Jul-04	Jan-06	4,088	4,088	0	0	0	0	0	0	0
OCIP	53418_6494	Mar-99	Dec-07	5,107	5,107	0	0	0	0	0	0	0
Professional Services	53419_6495	Sep-98	Oct-05	2,752	2,752	0	0	0	0	0	0	0
Marlboro MOA	53420_6497	Sep-98	Jun-05	5,859	5,859	0	0	0	0	0	0	0
CWTP- MECO	53421_6520	Sep-98	Mar-05	128	128	0	0	0	0	0	0	0
Site Security Services	53425_6613	May-99	Mar-05	1,264	1,264	0	0	0	0	0	0	0
Existing Facilities Modifications - CP7	53426_6650	Aug-15	Feb-22	8,882	7,082	1,800	200	1,600	0	1,952	0	0
CSX Crossing	53427_6670	Aug-01	Dec-01	65	65	0	0	0	0	0	0	0
Wachusett Algae - Design CS/RI	53428_6671	Jul-24	Dec-27	450	0	450	0	0	0	0	450	0
Public Health Research	53432_6691	Jul-00	Jun-07	1,703	1,703	0	0	0	0	0	0	0
Security Equipment	53435_6756	Jun-00	Jun-00	571	571	0	0	0	0	0	0	0
Cosgrove Screens, CP8 - Design	53436_6772	Feb-02	Mar-04	0	0	0	0	0	0	0	0	0
Cosgrove Screens, CP8 - Construction	53437_6773	Aug-03	Aug-04	3,238	3,238	0	0	0	0	0	0	0
Wachusett UV Treatment Facility Study	53438_6774	May-02	Mar-05	0	0	0	0	0	0	0	0	0
Cosgrove Tunnel Inspection	53441_6778			0	0	0	0	0	0	0	0	0
AWWARF - Evaluation Ozone & UV	53443_6815	Jul-01	Jan-04	302	302	0	0	0	0	0	0	0
ComGas Pipeline	53444_6817			0	0	0	0	0	0	0	0	0
Fitout / Construction	53445_6827	Oct-03	Nov-21	713	663	50	0	50	0	165	0	0
Wachusett Algae - Construction	53448_6889	Feb-25	Dec-26	1,800	0	1,800	0	0	0	0	1,800	0
CWTP UV Validation	53449_6922			0	0	0	0	0	0	0	0	0
CWTP Ultraviolet Disinfect.-Des/ESDC/REI	53450_6923	Jul-08	Apr-15	4,351	4,351	0	0	0	0	0	0	0



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CWTP Ultraviolet Disinfection - Construc	53451_6924	Apr-11	Feb-14	31,057	31,057	0	0	0	0	0	0	0
As-needed Technical Assistance #1	53452_6939	Jan-06	Jun-08	491	491	0	0	0	0	0	0	0
Existing Facilities Modif., CP7 - Design	53453_6951	Jul-05	Apr-15	965	965	0	0	0	0	0	0	0
As-needed Technical Assistance	53455_6989	Jan-06	Jun-08	702	702	0	0	0	0	0	0	0
Ancillary Modifications - Construct. 1	53456_7084	Jul-06	Jun-08	160	160	0	0	0	0	0	0	0
Ancillary Modifications - Construction	53457_7085	Jan-09	Jul-21	6,663	5,256	1,407	1,407	0	0	1,765	0	0
Ancillary Modifications - Design 3	53458_7192	Mar-08	Sep-10	299	299	0	0	0	0	0	0	0
Ancillary Modifications - Design 4	53459_7208	Mar-08	Sep-10	527	527	0	0	0	0	0	0	0
Technical Assistance 5	53464_7315	Sep-10	Mar-13	255	255	0	0	0	0	0	0	0
Technical Assistance 6	53465_7316	Sep-10	Mar-13	408	408	0	0	0	0	0	0	0
CWTP Storage Tank Roof Drainage System	53470_7376	Jan-24	Nov-26	7,000	0	7,000	0	0	0	0	7,000	0
Technical Assistance 7	75530_7406	Jun-13	Nov-15	594	594	0	0	0	0	0	0	0
Technical Assistance 8	75531_7407	Jan-16	Jun-18	419	419	0	0	0	0	(9)	0	0
CWTP - Asset Protection	75546_7455			0	0	0	0	0	0	0	0	0
Technical Assistance 9	75601_7543	Jul-18	Dec-20	682	331	351	351	0	0	682	0	0
Technical Assistance 10	75602_7544	Jul-18	Dec-20	855	472	382	382	0	0	855	0	0
Technical Assistance 11	75603_7713	Jan-21	Dec-22	750	0	750	95	375	280	750	0	0
Technical Assistance 12	75604_7714	Jan-21	Dec-22	750	0	750	95	375	280	750	0	0
<b>542 Carroll Water Treatment Plant Total</b>				<b>439,305</b>	<b>424,564</b>	<b>14,740</b>	<b>2,530</b>	<b>2,400</b>	<b>560</b>	<b>6,940</b>	<b>9,250</b>	
<b>543 Quabbin Water Treatment Plant Total</b>			<b>completed project</b>	<b>19,973</b>	<b>19,973</b>	<b>0</b>						
<b>544 Norumbega Covered Storage Facility Total</b>			<b>completed project</b>	<b>106,675</b>	<b>106,675</b>	<b>0</b>						
<b>545 Blue Hills Covered Storage Total</b>			<b>completed project</b>	<b>40,083</b>	<b>40,083</b>	<b>0</b>						
<b>550 Spot Pond Storage Facility Total</b>			<b>completed project</b>	<b>60,126</b>	<b>60,126</b>	<b>0</b>						
<b>555 CWTP Asset Protection</b>												
CWTP Control Rm Fire Supp Sys	54000_7592	Jul-24	Jul-25	325	0	325	0	0	0	0	325	0
CWTP Asset Protection Study	54001_7593	Oct-22	Oct-23	465	0	465	0	0	365	365	100	0
LOX Yard Redundancy	54002_7594	Jul-22	Jul-23	670	0	670	0	0	670	670	0	0
CWTP Water Pump VFD Repl	54003_7595	Oct-22	Oct-23	186	0	186	0	0	140	140	46	0
OZONE Generator Re-Build	54004_7596	Jul-22	Oct-23	930	0	930	0	0	880	880	50	0
CWTP Chem Sys Pipe Pumps Repl	54005_7597	Dec-21	Dec-23	2,200	0	2,200	0	352	1,056	1,408	792	0
Soda Ash & Ammonia Equip Repl	54006_7598	Mar-21	Apr-22	2,700	0	2,700	200	2,500	0	2,700	0	0
HVAC Equipment Repl	54007_7605	Sep-19	Jan-23	1,100	426	674	(16)	0	171	581	519	0
Water Pump Replacement	54008_7606	Jul-27	Jul-30	2,000	0	2,000	0	0	0	0	486	1,514
OZONE Generator Replacement	54009_7607	Oct-27	Oct-30	20,000	0	20,000	0	0	0	0	3,243	16,757
UV Reactor Replacement	54010_7608	Oct-32	Oct-34	10,000	0	10,000	0	0	0	0	0	10,000
CWTP Emerg Gen #1 Repl	54011_7642	Feb-19	May-20	441	443	(2)	(2)	0	0	441	0	0
Corr Control Pipe Loop Study	54013_7737	Jun-21	Jun-22	500	0	500	0	400	100	500	0	0
CWTP Parapet Wall Repairs	54014_7755	Jan-21	Oct-21	415	0	415	237	178	0	415	0	0
CWTP UV Romms Dehumidification	54015_7790	Oct-21	Oct-22	655	0	655	0	500	155	655	0	0
Marborough Emerg Connection	54016_7791	Mar-21	Sep-21	541	0	541	500	41	0	541	0	0
<b>555 CWTP Asset Protection Total</b>				<b>43,128</b>	<b>869</b>	<b>42,259</b>	<b>919</b>	<b>3,971</b>	<b>3,537</b>	<b>9,296</b>	<b>5,561</b>	<b>28,271</b>

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<b>Transmission</b>				<b>2,569,155</b>	<b>847,959</b>	<b>1,721,196</b>	<b>20,085</b>	<b>39,656</b>	<b>52,675</b>	<b>135,177</b>	<b>320,091</b>	<b>1,288,688</b>
<b>597 Winsor Station Pipeline</b>												
Preliminary Permit, Study & Licensing	60032_6276	Nov-97	Jun-99	39	39	0	0	0	0	0	0	0
Quabbin Aqueduct TV Inspection	60033_6277	Jul-23	Oct-24	3,456	0	3,456	0	0	0	0	3,456	0
Construction for Hydro	60044_6526			0	0	0	0	0	0	0	0	0
Hatchery Pipeline - Design/ESDC/RI	60077_7017	Aug-13	Mar-19	909	909	0	0	0	0	131	0	0
Quabbin Aqueduct & WPS Upg. Design/CA/RI	60087_7114	Feb-10	Aug-15	838	838	0	0	0	0	0	0	0
Quabbin Aqueduct WPS-Const	60088_7115	Jan-24	Jan-26	20,597	0	20,597	0	0	0	0	20,597	0
Shaft 12 Isolation Gates Const	60095_7197	Jan-24	Jan-26	17,641	0	17,641	0	0	0	0	17,641	0
Shaft 2 Construction	60096_7198	Feb-21	Feb-22	1,100	0	1,100	183	917	0	1,100	0	0
Winsor Station Chapman Valve Repai	60101_7212	Feb-09	Nov-09	416	416	0	0	0	0	0	0	0
Purchase of Sleeve Valves	60105_7234	Jul-08	May-09	368	368	0	0	0	0	0	0	0
Hatchery Pipeline - Construction	60106_7235	Mar-16	Sep-17	2,568	2,568	0	0	0	0	58	0	0
Quabb Aqu WPS Final Design/CA/RI	60140_7460	Jan-24	Jan-29	4,350	0	4,350	0	0	0	0	3,698	653
Shaft 12 Isolation Gates Des CA/RI	60141_7509	Mar-17	Dec-18	799	799	0	0	0	0	15	0	0
Quab Aqued Bldgs Rehab Des CA/RI	60142_7537			0	0	0	0	0	0	0	0	0
Quab Aqued Bldgs Rehab Constr	60143_7538			0	0	0	0	0	0	0	0	0
<b>597 Winsor Station Pipeline Total</b>				<b>53,081</b>	<b>5,937</b>	<b>47,144</b>	<b>183</b>	<b>917</b>	<b>0</b>	<b>1,304</b>	<b>45,392</b>	<b>653</b>
<b>601 Sluice Gate Rehabilitation Total</b>		<b>completed project</b>		<b>9,157</b>	<b>9,157</b>	<b>0</b>						
<b>604 MetroWest Tunnel</b>												
Study	59794_5043	Jun-84	Oct-89	415	415	0	0	0	0	0	0	0
Design/EIR - Tunnel/ESDC	59795_5044	Apr-92	Mar-07	37,939	37,939	0	0	0	0	0	0	0
Sudbury Pipe Bridge - Construction	59796_5048	Nov-91	Jun-92	296	296	0	0	0	0	0	0	0
West Tunnel Segment - CP1	59798_6054	Apr-97	Apr-03	147,774	147,774	0	0	0	0	0	0	0
Construction Management/Resident Inspec	59799_5284	May-95	Apr-04	39,428	39,428	0	0	0	0	0	0	0
Technical Assistance	59804_5976	Jun-84	Jun-98	131	131	0	0	0	0	0	0	0
Land Acquisition	59805_5139	Oct-95	Jul-13	6,259	6,259	0	0	0	0	0	0	0
Hultman Study	59806_5141	Apr-95	Mar-05	1,864	1,864	0	0	0	0	0	0	0
DEP Permit Fees	60012_6037	Oct-94	Sep-14	58	56	2	0	0	0	0	0	2
Middle Tunnel Segment - CP2	60013_6055	Jun-96	Apr-03	245,809	245,809	0	0	0	0	0	0	0
MHD Salt Sheds - CP5	60014_6056	Sep-96	Jun-97	1,314	1,314	0	0	0	0	0	0	0
Shaft 5A - CP3	60015_6059	Aug-97	Aug-98	5,816	5,816	0	0	0	0	0	0	0
Local Supply Contingency - Design/CA/RI	60017_6063	May-96	Oct-99	859	859	0	0	0	0	0	0	0
Community Technical Assistance	60018_6067	Jun-95	Apr-99	297	297	0	0	0	0	0	0	0
Professional Services	60020_6117	Nov-95	Dec-03	731	731	0	0	0	0	0	0	0
OCIP	60021_6122	Jun-96	May-06	26,022	26,022	0	0	0	0	0	0	0
Hultman Leak Repair	60022_6128	Aug-96	May-97	307	307	0	0	0	0	0	0	0
Framingham MOU	60023_6129	May-96	Dec-03	2,444	2,444	0	0	0	0	0	0	0
Local Supply Contingency - Construction	60024_6130	Jun-97	Dec-03	4,298	4,298	0	0	0	0	0	0	0
Local Supply Contingency - Legal/Easemen	60025_6131	Apr-97	Jun-02	9	9	0	0	0	0	0	0	0
Hultman Repair Bands	60026_6140	Aug-96	Dec-96	28	28	0	0	0	0	0	0	0
Loring Road Storage Tanks - CP-8	60029_6203	Sep-97	Nov-00	41,368	41,368	0	0	0	0	0	0	0
Testing & Disinfection - CP7	60030_6204	Jan-03	Oct-03	3,612	3,612	0	0	0	0	0	0	0
Upper Hultman Rehab - CP6B	60031_6205	Apr-12	Jun-13	5,849	5,849	0	0	0	0	0	0	0
Southboro MOA	60038_6366	May-97	Jun-03	255	255	0	0	0	0	0	0	0
Weston MOA	60039_6367	Apr-96	Oct-04	1,006	1,006	0	0	0	0	0	0	0
East Tunnel Segment - CP3A	60040_6374	Nov-98	Sep-02	56,263	56,263	0	0	0	0	0	0	0
Hultman Investigation and Repair	60042_6430	Jun-99	Nov-00	1,604	1,604	0	0	0	0	0	0	0

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Hultman Repair Bands 98-99	60043_6492	Apr-99	Jun-99	116	116	0	0	0	0	0	0	0
Wayland MOA	60053_6762	Jun-00	Dec-02	35	35	0	0	0	0	0	0	0
Equipment Prepurchase	60054_6777	Jun-05	Mar-06	198	198	0	0	0	0	0	0	0
Hultman Rehab - CP9	60058_6856	Nov-05	Dec-06	3,257	3,257	0	0	0	0	0	0	0
Interim Disinfection	60059_6872	Jan-03	Oct-05	1,245	1,245	0	0	0	0	0	0	0
Hultman Interconnect - Final Design/CA/R	60066_6911	Sep-05	Sep-14	5,732	5,732	0	0	0	0	0	0	0
Valve Chamber Modificat. - Design CA/RI	60072_6950			0	0	0	0	0	0	0	0	0
Lower Hultman Rehab -CP6A	60073_6975	Sep-09	May-13	52,289	52,289	0	0	0	0	0	0	0
Hultman Interconnection - RI Services	60083_7082	Jan-10	Jan-15	1,870	1,870	0	0	0	0	0	0	0
CP6 Easements	60085_7105	Jan-08	Apr-14	33	33	0	0	0	0	0	0	0
CP6A Demolition	60086_7106	Sep-08	Jan-09	57	57	0	0	0	0	0	0	0
Valve Chamber & Storage Tank Improve Des	60109_7283	Jul-23	Mar-28	600	0	600	0	0	0	0	600	0
Shaft 5 Electrical Upgrade	60128_7367			0	0	0	0	0	0	0	0	0
Shaft 5A/5 Surf Pip Cathodic Prot Des CA	60129_7368			0	0	0	0	0	0	0	0	0
Valve Chmbr & Stor Tank Access Impr Cons	60160_7476	Mar-25	Mar-27	2,400	0	2,400	0	0	0	0	2,400	0
Shaft 5A/5 Surface Piping Cathodic Prote	60161_7477	Nov-16	Jun-17	142	142	0	0	0	0	0	0	0
Hultman Leak Shaft 5A	60162_7507	Mar-16	May-16	153	153	0	0	0	0	0	0	0
Valve Chamber Modifications - Constructi	75525_7388			0	0	0	0	0	0	0	0	0
<b>604 MetroWest Tunnel Total</b>				<b>700,182</b>	<b>697,180</b>	<b>3,002</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3,002</b>	
<b>615 Chicopee Valley Aqueduct Redundancy Total</b>			<b>completed project</b>	<b>8,667</b>	<b>8,667</b>	<b>0</b>						
<b>616 Quabbin Transmission System</b>												
Facilities Inspection	60055_6828	Oct-05	Oct-07	1,005	1,005	0	0	0	0	0	0	0
Oakdale High Line Repl. Constr	60068_6940	Mar-22	Sep-22	465	0	465	0	165	300	465	0	0
Oakdale Valves Facility - Phase 2 Constr	60069_6941			0	0	0	0	0	0	0	0	0
Equipment Pre-purchase	60075_7007	Feb-05	Jun-08	534	534	0	0	0	0	0	0	0
Oakdale Phase 1A Electrical - Design	60103_7229	Oct-09	Jul-14	776	776	0	0	0	0	0	0	0
Oakdale Phase 1A Electrical - Constructi	60104_7230	Apr-12	Jul-13	2,260	2,260	0	0	0	0	0	0	0
Ware River Intake Valve Replacement - De	60108_7282	Sep-22	Sep-27	300	0	300	0	0	50	50	250	0
CVA Motorized Screens Replacement - Des	60112_7332			0	0	0	0	0	0	0	0	0
Rehab Wach Bastion Des	60113_7333	Feb-20	Nov-24	768	99	670	181	205	205	690	78	0
Rehabilitate Oakdale Turbine	60135_7378	May-26	Jan-27	1,000	0	1,000	0	0	0	0	1,000	0
Wach Dam LGH Interim Pipe Rep	60136_7379	Oct-19	Jun-20	410	410	0	0	0	0	410	0	0
Wach LGH Pipe Replacement Constr	60137_7380	Jan-21	Jul-22	4,111	0	4,111	1,000	1,500	1,611	4,111	0	0
Ware Rver Intake Vlve Rep Const	60138_7487	Sep-22	Sep-24	900	0	900	0	0	150	150	750	0
CVA Motorized Screens Replacement-Const	60139_7488	Jan-17	Aug-17	1,210	1,210	0	0	0	0	0	0	0
Oakdale Turbine Rehab Des	60201_7545	May-25	Jun-29	200	0	200	0	0	0	0	175	25
Wach Bastion Rehab Constr	60225_7697	Aug-21	Nov-22	2,000	0	2,000	0	400	1,500	1,900	100	0
Wach LGH Bld Boiler & Lead Reh	60226_7698	Mar-21	Dec-21	724	0	724	0	724	0	724	0	0
Wach Bastion Rehab REI	60227_7716	Dec-21	Jul-23	350	0	350	0	140	160	300	50	0
Wach LGH Pipe Repl REI	60228_7717	Jan-21	Jul-22	488	0	488	150	288	50	488	0	0
Wach LGH Bld Rehab REI	60229_7726	Jan-22	Jan-23	250	0	250	0	104	146	250	0	0
Wach Dam Bridge Crane Removal	60230_7780	Jan-21	Apr-21	375	0	375	375	0	0	375	0	0
Wach LGH Windows & Doors	60231_7788	Mar-21	Feb-22	300	0	300	0	300	0	300	0	0
Wach LGH Roof & Repointing	60232_7789	Nov-21	Aug-22	350	0	350	0	250	100	350	0	0
Oakdale Valves - Phase 1 Construction	75491_6690	Oct-05	Jun-06	1,811	1,811	0	0	0	0	0	0	0
Oakdale Valves - Phase 1 Study & Design	75496_6831	Apr-04	Jun-07	1,070	1,070	0	0	0	0	0	0	0
<b>616 Quabbin Transmission System Total</b>				<b>21,657</b>	<b>9,175</b>	<b>12,483</b>	<b>1,706</b>	<b>4,076</b>	<b>4,272</b>	<b>10,563</b>	<b>2,403</b>	<b>25</b>

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<b>617 Sudbury/Weston Aqueduct Repairs</b>												
Sudbury Aqueduct Inspection	60056_6838	Aug-05	Oct-06	370	370	0	0	0	0	0	0	0
Technical Assistance	60057_6839	Sep-09	Dec-11	25	25	0	0	0	0	0	0	0
Weston Aqueduct Inspection	60070_6947			0	0	0	0	0	0	0	0	0
Weston Aqueduct Flow Control Valve	60071_6948			0	0	0	0	0	0	0	0	0
Sudbury Short-Term Repairs	60076_7016	Jul-23	Jun-24	600	0	600	0	0	0	0	600	
Sudbury Short-Term Repairs - Phase 2	60110_7317	Jul-23	Jul-24	2,098	0	2,098	0	0	0	0	2,098	
Weston Aqueduct Sluice Gates - Const	60130_7369	Sep-20	May-21	1,946	0	1,946	1,546	400	0	1,946	0	
Rosemary Brook Building Repair	60150_7472	Mar-16	May-18	1,749	1,749	0	0	0	0	386	0	
Eval. of Farm Pond Bldgs-Waban Arches	60151_7473	Jul-16	Jul-18	218	218	0	0	0	0	9	0	
Weston Aqueduct Sluice Gates - Design	60152_7491			0	0	0	0	0	0	0	0	
Waban Arch-Rehab Design/CA/RI	60153_7616	Oct-23	Oct-28	300	0	300	0	0	0	0	288	12
Waban Arch-Rehab Constructon	60154_7617	Oct-25	Oct-27	1,200	0	1,200	0	0	0	0	1,200	
Farm Prd Init Chmbr&GteHes Des	60155_7618	Oct-24	Oct-29	400	0	400	0	0	0	0	305	95
Farm Prd Init Chmbr&GteHes Con	60156_7619	Oct-26	Oct-28	2,000	0	2,000	0	0	0	0	1,440	560
Weston Aqued GH Rehab	60157_7700	Jan-24	Jan-25	1,324	0	1,324	0	0	0	0	1,324	
Hazardous Material Sudbury Aqueduct	75486_6617	Apr-99	May-05	265	265	0	0	0	0	0	0	
<b>617 Sudbury/Weston Aqueduct Repairs Total</b>				<b>12,495</b>	<b>2,627</b>	<b>9,868</b>	<b>1,546</b>	<b>400</b>	<b>0</b>	<b>2,341</b>	<b>7,255</b>	<b>667</b>
<b>620 Wachusett Reservoir Spillway Improvements Total</b>												
		completed project		<b>9,289</b>	<b>9,289</b>	<b>0</b>						
<b>621 Watershed Land</b>												
Land Acquisition	60081_7069	Apr-06	Jun-23	29,000	26,029	2,971	971	1,000	1,000	6,154		
<b>621 Watershed Land Total</b>				<b>29,000</b>	<b>26,029</b>	<b>2,971</b>	<b>971</b>	<b>1,000</b>	<b>1,000</b>	<b>6,154</b>		
<b>622 Cosgrove Tunnel Redundancy</b>												
Cosgrove Tunnel Alternative Study	60082_7071			0	0	0	0	0	0	0	0	
Wachusett Aqueduct PS - Design/ESDC/RI	60090_7156	Feb-12	May-20	8,106	8,106	0	0	0	0	1,624		
Wachusett Aqueduct Pump Station - Const.	60091_7157	Mar-16	Feb-19	50,507	50,507	0	0	0	0	4,976		
Permits/Easements	60124_7354	Aug-15	Jun-21	15	6	9	9	0	0	9		
<b>622 Cosgrove Tunnel Redundancy Total</b>				<b>58,628</b>	<b>58,619</b>	<b>9</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>6,609</b>		
<b>623 Dam Projects</b>												
Dam Safety Modificat. & Repairs - Constr	60094_7194	Aug-11	Sep-12	2,055	2,055	0	0	0	0	0	0	
Dam Safety Modificat. & Repairs Des/ESDC	60100_7211	Sep-09	Jun-14	1,061	1,061	0	0	0	0	0	0	
Brigham Pond Dam Repairs	60111_7331			0	0	0	0	0	0	0	0	
Dam Permits	60118_7346	Jul-18	Dec-21	1	0	1	1	0	0	1	0	
Quinapoxed Rem Dam - Des/ESDC	60119_7347	Nov-19	Dec-23	425	41	385	212	64	63	380	45	
Quinapoxet Dam Removal - Construction	60120_7348	Oct-21	Mar-23	1,300	0	1,300	0	433	867	1,300	0	
Dam Safety Modificat. & Repairs - Constr	60121_7349			0	0	0	0	0	0	0	0	
Goodnough Dike Drainage Improvements	60131_7370			0	0	0	0	0	0	0	0	
Sudbury/Foss Dam Des CA/RI	60190_7614	Mar-19	Sep-23	481	102	379	111	96	92	401	80	
Sudbury/Foss Dam Const	60191_7615	Oct-21	Sep-23	1,800	0	1,800	0	450	900	1,350	450	
Quinapoxet Rem Dam REI	60192_7690	Oct-21	Mar-23	100	0	100	0	33	67	100	0	
<b>623 Dam Projects Total</b>				<b>7,223</b>	<b>3,259</b>	<b>3,965</b>	<b>324</b>	<b>1,076</b>	<b>1,989</b>	<b>3,532</b>	<b>575</b>	
<b>625 Metropolitan Tunnel Redundancy</b>												
Water Transmission Redundancy Plan	60035_6273	Oct-08	Sep-11	1,397	1,397	0	0	0	0	0	0	
Prelm Des & MEPA Review	60092_7159	Jul-20	Jan-24	15,693	0	15,693	4,085	5,400	4,900	14,385	1,308	
WASM 3 Sliplining	60093_7160			0	0	0	0	0	0	0	0	
Tunnel Construction	60107_7291	Jan-27	Jan-40	1,041,641	0	1,041,641	0	0	0	0	98,741	942,900
Sudbury Aqueduct - MEPA Review	60122_7352	Oct-12	Jun-17	2,073	2,073	0	0	0	0	13	0	

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Chestnut Hill Final Connection - Const.	60123_7353			0	0	0	0	0	0	0	0	0
WASM 3 Rehab	60125_7355			0	0	0	0	0	0	0	0	0
Construction Management	60126_7356	Jan-26	Jan-40	124,019	0	124,019	0	0	0	0	18,896	105,123
Tops of Shafts Surface Construction	60127_7357	Jan-34	Jan-40	44,021	0	44,021	0	0	0	0	0	44,021
Admin Legal & Public Outreach	60170_7516	Jan-24	Jan-40	140,113	0	140,113	0	0	0	0	37,100	103,013
CHEPS Emerg Generator	60171_7518			0	0	0	0	0	0	0	0	0
Top of Shaft Rehab Design/CA/RI	60172_7521	Apr-38	Apr-43	1,337	0	1,337	0	0	0	0	0	1,337
Top of Shaft Rehab Construction	60173_7522	Apr-40	Apr-42	5,593	0	5,593	0	0	0	0	0	5,593
Final Design/ESDC	60174_7556	Jul-24	Jan-40	95,081	0	95,081	0	0	0	0	19,106	75,975
Technical Assistance	60175_7557	Jan-23	Dec-26	4,121	0	4,121	0	0	400	400	3,721	0
Shaft 7 Building Design CA/RI	60176_7558	Apr-38	Apr-43	1,175	0	1,175	0	0	0	0	0	1,175
Shaft 7 Buildings Construction	60177_7559	Apr-40	Apr-42	6,456	0	6,456	0	0	0	0	0	6,456
Program Support Services	60178_7655	Apr-19	Mar-28	17,498	1,941	15,557	1,900	2,100	2,200	8,141	9,357	0
<b>625 Metropolitan Tunnel Redundancy Total</b>				<b>1,500,218</b>	<b>5,411</b>	<b>1,494,807</b>	<b>5,985</b>	<b>7,500</b>	<b>7,500</b>	<b>22,939</b>	<b>188,229</b>	<b>1,285,593</b>
<b>628 Metropolitan Redundancy Interim Improvements</b>												
Tops of Shaft Des/CA/RI	60200_7560			0	0	0	0	0	0	0	0	0
CP1 Shafts 6, 8, 9A	60202_7561	Oct-20	Apr-22	2,392	0	2,392	959	1,432	0	2,392	0	0
CHEPS Impr Construction	60203_7562	Jul-21	Jul-23	13,514	0	13,514	0	4,865	6,487	11,352	2,162	0
WASM/SPSM West PRV Constr	60204_7563	Mar-21	Dec-22	7,095	0	7,095	322	3,869	2,904	7,095	0	0
CHEPS Emrg Generator Constr	60205_7566			0	0	0	0	0	0	0	0	0
Easements/Permits	60206_7573	Apr-19	Jun-27	300	1	299	50	50	50	151	149	0
CHEPS Design/CA	60207_7574	Apr-19	Oct-24	2,074	293	1,781	322	400	400	1,415	659	0
WASM/SPSM PRV Des/CA	60208_7575	Jul-18	Jul-23	2,849	969	1,880	503	552	637	2,660	189	0
Shaft 5 Impr. Des/CA	60209_7599	Dec-21	Jan-25	750	0	750	0	107	321	428	322	0
Shaft 5 Impr. Constr.	60210_7600	Dec-22	Jan-24	3,000	0	3,000	0	0	857	857	2,143	0
Tops of Shaft Inter Impro Costr 2	60211_7638			0	0	0	0	0	0	0	0	0
CHEPS Improvements REI	60212_7669	Jul-21	Jul-23	572	0	572	0	205	274	479	93	0
CP3 Shafts 7, 7B, 7C, 7D	60213_7670	Apr-22	Apr-23	2,500	0	2,500	0	0	2,307	2,307	193	0
CP2 Shafts 5, 9	60214_7671	Oct-21	Oct-22	2,500	0	2,500	0	833	1,667	2,500	0	0
Waltham Water Pipeline REI	60215_7672	Feb-22	Jun-23	1,040	0	1,040	0	122	734	856	184	0
Shaft 5 Impr REI	60216_7673	Dec-22	Jan-24	286	0	286	0	0	82	82	204	0
WASM/SPSM REI	60217_7674	Mar-21	Dec-22	995	0	995	45	543	407	995	0	0
CP1 Tops of Shafts REI	60219_7696			0	0	0	0	0	0	0	0	0
CP2 Tops of Shafts REI	60220_7702	Oct-21	Oct-22	250	0	250	0	115	135	250	0	0
CP3 Tops of Shafts REI	60221_7703	Apr-22	Apr-23	250	0	250	0	0	230	230	20	0
WASM 3 - MEPA/Design/CA/RI	68166_6539	Jul-13	Jun-27	15,513	3,432	12,080	1,017	1,316	1,350	5,101	6,647	1,750
WASM 3 Rehab CP-2	68170_6543	Jan-24	Jun-26	33,810	0	33,810	0	0	0	0	33,810	0
WASM 3 CP-1	68171_6544	Oct-20	Aug-24	19,488	0	19,488	2,598	5,196	5,196	12,990	6,498	0
WASM 3 Rehab CP-3	68172_6545			0	0	0	0	0	0	0	0	0
Waltham Water Pipeline Const	68333_7457	Feb-22	Jun-23	13,781	0	13,781	0	444	9,727	10,171	3,610	0
Waltham Water Pipeline CA	68334_7547	Feb-22	Jun-23	1,500	0	1,500	0	176	1,059	1,235	265	0
Comm Ave PS Redund-Des/CA/RI	75580_7523	Jan-17	Apr-22	3,054	2,167	887	764	123	0	2,231	0	0
Comm Ave PS Impr Constr	75581_7524	Feb-19	Mar-21	7,844	5,747	2,096	2,096	0	0	7,844	0	0
<b>628 Metropolitan Redundancy Interim Improvements Total</b>				<b>135,357</b>	<b>12,609</b>	<b>122,746</b>	<b>8,676</b>	<b>20,348</b>	<b>34,824</b>	<b>73,621</b>	<b>57,148</b>	<b>1,750</b>

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<b>630 Watershed Division Capital Improvements</b>												
Quabbin Admin Bldg Rehab Des CA/RI	60300_7564	Oct-22	Oct-27	2,800	0	2,800	0	0	343	343	2,457	
Quabbin Admin Bldg Rehab Constr	60301_7565	Oct-24	Oct-26	12,000	0	12,000	0	0	0	0	12,000	
QAB Concept Des Report	60302_7569	Jun-21	Jun-22	250	0	250	0	250	0	250	0	
Maint Gar/Wash Bay/Stor Bldg Constr	60303_7577	Dec-21	Dec-23	3,900	0	3,900	0	1,000	1,900	2,900	1,000	
Maint Gar/WB/SB Des/CA/RI	60304_7677	Dec-20	Dec-24	1,000	0	1,000	200	323	322	845	155	
River Rd Improv-Wachusett	60305_7701	Feb-21	Feb-22	3,151	0	3,151	485	2,666	0	3,151	0	
Quabbin Water Supply Des/CA/RI	60306_7752	Jun-21	Dec-23	250	0	250	0	100	100	200	50	
Quabbin Water Supply Constr	60307_7753	Dec-22	Dec-23	850	0	850	0	0	425	425	425	
New Salem Building Constr	60308_7911	Jul-21	Jul-23	0	0	0	0	0	0	0	0	
<b>630 Watershed Division Capital Improvements Total</b>				<b>24,201</b>	<b>0</b>	<b>24,201</b>	<b>685</b>	<b>4,339</b>	<b>3,090</b>	<b>8,114</b>	<b>16,087</b>	
<b>Distribution And Pumping</b>				<b>1,052,705</b>	<b>527,597</b>	<b>525,111</b>	<b>15,322</b>	<b>24,578</b>	<b>53,568</b>	<b>156,703</b>	<b>369,317</b>	<b>62,326</b>
<b>618 Peabody Pipeline Project Total</b>					<b>completed project</b>	<b>1,448</b>	<b>1,448</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>389</b>	
<b>677 Valve Replacement</b>												
Construction 1	67559_5126	Nov-95	Nov-96	718	718	0	0	0	0	0	0	
Technical Assistance	67560_5124	Oct-95	May-10	125	125	0	0	0	0	0	0	
Equipment Purchase	68005_6088	Oct-95	Jun-18	1,112	1,112	0	0	0	0	0	0	
Construction 2	68012_6105	Nov-97	Jul-99	1,357	1,357	0	0	0	0	0	0	
Construction 3	68039_6278	Feb-00	Aug-01	1,338	1,338	0	0	0	0	0	0	
Construction 4	68079_6345	May-02	Oct-03	1,540	1,540	0	0	0	0	0	0	
Construction 5	68080_6346	Mar-04	Jul-05	1,389	1,389	0	0	0	0	0	0	
Construction 6	68126_6435	May-07	Dec-08	1,572	1,572	0	0	0	0	0	0	
Construction 7	68127_6436	Apr-11	Apr-13	2,859	2,859	0	0	0	0	0	0	
Permits	68239_6859	Jan-02	Jun-29	3	3	0	0	0	0	0	0	
Easements	68240_6860	Jan-02	Jun-29	6	6	0	0	0	0	0	0	
Construction 8	68300_7195	Jan-26	Jun-28	4,264	0	4,264	0	0	0	0	3,873	391
Construction 9	68307_7236	Jun-27	Jun-29	4,264	0	4,264	0	0	0	0	1,606	2,658
Phase 8 - Design/CA/RI	68330_7417	Jan-24	Jun-30	853	0	853	0	0	0	0	733	120
Phase 9 - Design/CA/RI	68331_7418	Jun-25	Jun-30	853	0	853	0	0	0	0	535	318
Phase 1 - Design	INHSE_DES1			0	0	0	0	0	0	0	0	
<b>677 Valve Replacement Total</b>				<b>22,253</b>	<b>12,019</b>	<b>10,234</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6,747</b>	<b>3,487</b>
<b>678 Boston Low Service - Pipe &amp; Valve Rehabilitation Total</b>					<b>completed project</b>	<b>23,691</b>	<b>23,691</b>	<b>0</b>				
<b>683 Heath Hill Road Pipe Replacement Total</b>					<b>completed project</b>	<b>19,357</b>	<b>19,357</b>	<b>0</b>				
<b>689 James L. Gillis Pump Station Total</b>					<b>completed project</b>	<b>33,419</b>	<b>33,419</b>	<b>0</b>				
<b>692 Norhern High Service (NHS) - Section 27 Improvements</b>												
Section 27 - Construction	67769_6333	Mar-24	Nov-25	1,275	27	1,249	0	0	0	0	1,249	
Easements	68192_6589	Jun-16	Jun-22	23	0	23	0	11	11	23	0	
Technical Assistance	68211_6712	Oct-99	Jun-22	64	60	5	1	2	1	5	0	
Surveying	68229_6809	Jun-01	Mar-17	37	37	0	0	0	0	0	0	
Sec 27 Rehab - Des/CA	68390_7721	Mar-23	Nov-26	150	0	150	0	0	0	0	150	
Sec 27 Rehab - REI	68391_7722	Mar-24	Nov-25	115	0	115	0	0	0	0	115	
<b>692 Norhern High Service (NHS) - Section 27 Improvements Total</b>				<b>1,664</b>	<b>124</b>	<b>1,542</b>	<b>1</b>	<b>13</b>	<b>12</b>	<b>28</b>	<b>1,514</b>	

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<b>693 NHS - Revere &amp; Malden Pipeline Improvements</b>												
Revere & Malden - Design/CS/RI	67780_5185	May-88	Sep-94	1,786	1,786	0	0	0	0	0	0	0
Revere Beach - Construction	67781_5186	Aug-92	Oct-94	6,314	6,314	0	0	0	0	0	0	0
Malden Section 53 - Construction	67782_5176	Apr-92	Sep-94	10,026	10,026	0	0	0	0	0	0	0
Revere Section 53 - Construction	67784_5177	Sep-08	Aug-09	2,938	2,938	0	0	0	0	0	0	0
Control Valves - Construction	67785_5191	Jun-88	Aug-89	949	949	0	0	0	0	0	0	0
DI Pipeline Cleaning & Lining - Construc	67786_5179	Jun-90	Sep-90	158	158	0	0	0	0	0	0	0
Winthrop Cleaning & Lining - Constructio	67787_5178	Jun-90	Aug-90	575	575	0	0	0	0	0	0	0
CP-1 Section 53 Conn-Constr	67790_6335	Jan-23	Jun-25	9,650	0	9,650	0	0	1,922	1,922	7,728	0
Technical Assistance	67791_5986	Jul-06	Mar-18	246	246	0	0	0	0	0	0	0
Linden Square - Construction	67792_5238	Apr-91	Nov-91	1,849	1,849	0	0	0	0	0	0	0
Linden Square - Construction Admin.	67793_5239	Apr-91	Nov-91	125	125	0	0	0	0	0	0	0
Road Restoration - Design/CA/RI	67996_6033	Nov-94	Dec-95	77	77	0	0	0	0	0	0	0
Road Restoration - Construction	67997_6034	Jul-95	Jun-96	1,714	1,714	0	0	0	0	0	0	0
Malden Section 53 - Landscaping	68020_6113	Apr-96	Jun-96	20	20	0	0	0	0	0	0	0
Sidewalk Restoration	68033_6183	Sep-96	Oct-96	54	54	0	0	0	0	0	0	0
Revere Section 53 - Easements	68078_6334	Sep-02	Jul-09	0	0	0	0	0	0	0	0	0
Sect 14 Water Pip Relocate (Malden)	68257_6957	Jul-17	May-18	1,554	1,554	0	0	0	0	52	0	0
CP-3 Section 99 Conn-Constr	68258_6958	Jan-25	Jun-27	8,500	0	8,500	0	0	0	0	8,500	0
Easements	68265_6978	Jul-06	Dec-20	30	0	30	30	0	0	30	0	0
Permits	68280_7049	Apr-05	Mar-22	5	2	3	1	1	0	3	0	0
Section 53 Connections - Design CA/RI	75526_7402			0	0	0	0	0	0	0	0	0
Shaft 9A-D Design/CA/RI	75527_7403	Mar-20	Nov-24	0	0	0	0	0	0	0	0	0
Sect 56 Replacement/Saugus Des CA	75545_7454	Nov-19	Feb-24	3,346	514	2,832	771	630	756	2,671	675	0
Sect 53 and 99 Conn-Des CA	75548_7485	Feb-20	Jul-29	4,985	102	4,884	646	572	572	1,892	2,860	233
Section 56 Replacement- Construction	75549_7486	Feb-22	Feb-23	9,750	0	9,750	0	1,500	8,250	9,750	0	0
Section 56 Replacement Feasibility Study	75565_7500	Dec-15	Jun-17	225	225	0	0	0	0	0	0	0
Sect 53 Feasibility Study	75568_7520			0	0	0	0	0	0	0	0	0
Sec 56 Pipe Demo Des CA/RI	75569_7535			0	0	0	0	0	0	0	0	0
Sec 56 Pipe Demo Constr	75570_7536	Oct-18	May-19	1,781	1,781	0	0	0	0	1,781	0	0
Sect 13&48 Rehab Design /CA/RI	75571_7602	Jul-24	Jul-29	2,150	0	2,150	0	0	0	0	1,972	178
Sect 13&48 Rehab Constr	75572_7603	Jul-26	Jul-28	10,750	0	10,750	0	0	0	0	9,030	1,720
Sect 56 Replace REI	75573_7681	Feb-22	Feb-24	520	0	520	0	100	300	400	120	0
Sect 14, 53 & 99 Const REI	75574_7682	Jan-23	Jun-27	3,131	0	3,131	0	0	347	347	2,784	0
CP2 Section 14 Constr	75577_7699	Jan-25	Jun-27	2,800	0	2,800	0	0	0	0	2,800	0
Sections 53A & 68 - Design/CS/RI	INHSE_DE53			0	0	0	0	0	0	0	0	0
DI Pipeline Cleaning & Lining - Design	INHSE_PIPE			0	0	0	0	0	0	0	0	0
Revere Section 53 - Design	INHSE_SC53			0	0	0	0	0	0	0	0	0
Control Valves - Design	INHSE_VALV			0	0	0	0	0	0	0	0	0
Winthrop Cleaning & Lining - Design	INHSE_WINT			0	0	0	0	0	0	0	0	0
<b>693 NHS - Revere &amp; Malden Pipeline Improvements Total</b>				<b>86,008</b>	<b>31,009</b>	<b>55,000</b>	<b>1,448</b>	<b>2,803</b>	<b>12,147</b>	<b>18,848</b>	<b>36,469</b>	<b>2,131</b>
<b>702 New Connecting Mains - Shaft 7 to WASM 3</b>												
Routing Study	67846_5163	Aug-94	Nov-96	397	397	0	0	0	0	0	0	0
Watertown MOU	68035_6199	Jun-94	Sep-97	167	167	0	0	0	0	0	0	0
CP1- Design/CA/RI	68110_6383	Sep-98	Jul-11	3,533	3,533	0	0	0	0	0	0	0
Des/CA/RI DP2/4 Meter 120	68111_6384	Aug-02	Oct-08	1,278	1,278	0	0	0	0	0	0	0
CP3 (Sect 23,24,47)-Final Des/CA/RI	68112_6385	Jul-16	Jun-22	3,507	1,897	1,610	536	1,061	13	1,898	0	0
CP1 A&B - Easements	68114_6387			17	17	0	0	0	0	0	0	0
CP3 - Easements	68115_6388	Jan-18	Dec-18	28	0	28	28	0	0	28	0	0
CP5 - Easements	68117_6390	Dec-06	Jan-11	22	22	0	0	0	0	0	0	0
Revised North Segment, CP1A, New 48	68118_6391			0	0	0	0	0	0	0	0	0

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CP3-Sect 23,24,47, Rehab	68119_6392	Jul-22	Dec-24	14,700	0	14,700	0	0	5,690	5,690	9,010	
CP5 - Northeast Segment	68121_6394	Aug-09	Nov-11	5,903	5,903	0	0	0	0	0	0	
CP3 - Clean & Line Sections 59&60 - Cons	68174_6548	Jan-23	Jun-25	11,500	0	11,500	0	0	2,769	2,769	8,731	
CP2 -Easements	68175_6547	May-17	May-25	33	0	33	14	0	6	20	13	
Belmont & Watertown MOA	68242_6863	Sep-02	Apr-06	0	0	0	0	0	0	0	0	
CP1B - N. Segment C&L Watertown Section	68243_6864			0	0	0	0	0	0	0	0	
Repl Sect 25, 75, 59 & B60 Des CA	68255_6955	Jan-19	Jun-26	6,452	769	5,683	943	1,130	800	3,641	2,810	
Replace of Sect 25 - Const CP-2	68256_6956	Apr-22	Apr-24	5,255	0	5,255	0	0	2,649	2,649	2,606	
Sections 59 & 60 - Design/CA/RI	68286_7086			0	0	0	0	0	0	0	0	
Section 75 Extension - Design CA/RI	68315_7284			0	0	0	0	0	0	0	0	
Section 75 Extension - Const CP-1	68350_7484	Apr-22	Apr-24	4,185	0	4,185	0	200	2,125	2,325	1,860	
Sect 25, 75, 59, & 60 REI	68351_7680	Apr-22	Dec-25	3,718	0	3,718	0	0	1,400	1,400	2,318	
<b>702 New Connecting Mains - Shaft 7 to WASM 3 Total</b>				<b>60,695</b>	<b>13,983</b>	<b>46,712</b>	<b>1,521</b>	<b>2,391</b>	<b>15,452</b>	<b>20,420</b>	<b>27,348</b>	
<b>704 Rehabilitation of Other Pump Stations</b>												
Preliminary Design	67885_5153	Aug-94	Mar-96	351	351	0	0	0	0	0	0	
Design/CS/RI	68017_6110	May-97	Nov-04	2,546	2,546	0	0	0	0	0	0	
Construction II & C	68072_6304	Jan-00	Feb-01	639	639	0	0	0	0	0	0	
Rehab of 5 Pump Stations	68102_6375	Oct-06	Jun-10	21,848	21,848	0	0	0	0	0	0	
Technical Assistance	68178_6556	Jul-99	May-27	33	33	0	0	0	0	33	0	
Legal	68179_6557	Jul-99	Jan-10	6	6	0	0	0	0	0	0	
Proprietary Equipment Purchases	68204_6676	Jun-99	Jan-10	158	158	0	0	0	0	0	0	
Design 2 CS/RI	68266_6980	Dec-04	Jun-11	4,510	4,510	0	0	0	0	0	0	
Pump Station Rehabilitation	75522_7383			0	0	0	0	0	0	0	0	
Pump Station Rehab-Evaluation	75582_7525	Nov-19	Nov-21	0	0	0	0	0	0	0	0	
PS Rehab-Des/CA	75583_7526	May-22	May-28	3,940	0	3,940	0	0	747	747	3,193	
Pump Station Rehab-Constr	75584_7527	May-25	May-27	15,760	0	15,760	0	0	0	0	15,760	
Pump Station Rehab-REI	75585_7720	May-25	May-27	1,500	0	1,500	0	0	0	0	1,500	
<b>704 Rehab of Other Pump Stns Total</b>				<b>51,291</b>	<b>30,091</b>	<b>21,200</b>	<b>0</b>	<b>0</b>	<b>747</b>	<b>780</b>	<b>20,453</b>	
<b>706 NHS - Connecting Mains from Section 91 Total</b>			<b>completed project</b>	<b>2,360</b>	<b>2,360</b>	<b>0</b>						
<b>708 Northern Extra High Service (NEH) - New Pipelines</b>												
Design/CA/RI	67970_5242	Sep-94	Jun-01	588	588	0	0	0	0	0	0	
Appraisal &Easements	67971_6339	Sep-94	Jun-01	0	0	0	0	0	0	0	0	
Construction	67972_6340	Aug-99	Sep-01	3,032	3,032	0	0	0	0	0	0	
Regulatory Compliance	68010_6099	Nov-95	Oct-00	0	0	0	0	0	0	0	0	
CP-1 NEH Improvements	68162_6522	Apr-22	Nov-22	4,400	0	4,400	0	400	2,000	2,400	2,000	
Public Participation	68176_6554	Jul-15	Dec-20	5	0	5	2	3	0	5	0	
Legal	68177_6555	Jul-15	Dec-20	5	0	5	3	2	0	5	0	
Section 83 Drop Hole Repairs	68208_6692			0	0	0	0	0	0	0	0	
Technical Assistance	68210_6707	Nov-10	Dec-20	18	8	10	10	0	0	10	0	
PLC Equipment Purchases	68215_6749	Dec-99	Dec-00	4	4	0	0	0	0	0	0	
Permits	68281_7050	Nov-10	Dec-20	5	0	5	5	0	0	5	0	
NEH Improvements Design ESDC	75528_7404	Feb-21	Nov-28	8,082	0	8,082	215	1,200	1,200	2,615	5,200	267
NEH Improvements REI	75595_7724	Apr-22	Nov-27	2,600	0	2,600	0	200	600	800	1,700	100
CP-2 NEH Improvements	75596_7725	Oct-23	Oct-25	12,400	0	12,400	0	0	0	0	12,400	
CP-3 NEH Improvements	75680_7910	Apr-24	Nov-27	12,700	0	12,700	0	0	0	0	12,700	
Sections 34-36 & 45 - Design	INHSE_SC34			0	0	0	0	0	0	0	0	
<b>708 Northern Extra High Service (NEH) - New Pipelines Total</b>				<b>43,839</b>	<b>3,632</b>	<b>40,207</b>	<b>235</b>	<b>1,805</b>	<b>3,800</b>	<b>5,840</b>	<b>34,000</b>	<b>367</b>



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<b>712 Cathodic Protection of Distribution Mains</b>												
Planning Phase I	68002_6058	Apr-95	Dec-97	108	108	0	0	0	0	0	0	0
Test Station Installation 1	68128_6437			0	0	0	0	0	0	0	0	0
Cathodic Protection Testing Eval. Progra	68129_6438	Aug-15	Aug-17	129	129	0	0	0	0	0	0	0
Cath Prot Sh E&L CA	68130_6439	Apr-19	Sep-22	0	0	0	0	0	0	0	0	0
Cathodic Prot Shafts E&L	68131_6440	Jan-19	Aug-19	891	891	0	0	0	0	891	0	0
Test Station Installation 5	68132_6441			0	0	0	0	0	0	0	0	0
Technical Assistance	68216_6751	Jan-00	May-09	33	33	0	0	0	0	0	0	0
Cath Prot West Des/CA	68380_7609			0	0	0	0	0	0	0	0	0
Cath Prot Shafts N&W	68381_7610	Jun-21	Aug-23	2,500	0	2,500	0	941	1,559	2,500	0	0
Cath Prot Metro System Des/CA	68382_7611	Jul-21	Jul-28	9,207	0	9,207	0	1,986	1,986	3,971	5,236	0
CP1 Cath Prot Metro Syst Const	68383_7612	Jan-23	Jan-25	23,550	0	23,550	0	0	4,906	4,906	18,644	0
Cath Prot West REI	68384_7678			0	0	0	0	0	0	0	0	0
Cath Prot Metro REI	68385_7679	Jan-23	Jan-27	1,716	0	1,716	0	0	107	107	1,609	0
CP2 Cath Prot Metro Syst Const	68386_7715	Jan-25	Jan-27	23,550	0	23,550	0	0	0	0	23,550	0
<b>712 Cathodic Protection of Distribution Mains Total</b>				<b>61,684</b>	<b>1,161</b>	<b>60,523</b>	<b>0</b>	<b>2,927</b>	<b>8,558</b>	<b>12,375</b>	<b>49,039</b>	
<b>713 Spot Pond Supply Mains Rehabilitation</b>												
Sec 4 Webster Ave Bridge Pipe Rehab - De	60114_7334	Oct-13	Mar-17	642	642	0	0	0	0	0	0	0
Sec 4 Webster Ave Bridge Pipe Rehab - Co	60115_7335	May-15	Dec-16	3,792	3,792	0	0	0	0	0	0	0
Section 50 Pipe Rehab - Design/ESDC/RI	60116_7336			0	0	0	0	0	0	0	0	0
Section 50 Pipe Rehab - Construction	60117_7337			0	0	0	0	0	0	0	0	0
Walnut St Bridge Truss-Const	60145_7483	Nov-20	Apr-21	206	0	206	0	6	200	206	0	0
Walnut St Bridge Truss Repair	60146_7787	Oct-21	May-23	800	0	800	0	500	300	800	0	0
Preliminary Design & Design/CA/RI	68038_6223	Sep-98	Oct-08	10,869	10,869	0	0	0	0	0	0	0
Easements & Paving - CP1	68059_6316	May-00	Mar-02	143	143	0	0	0	0	0	0	0
North (Medford/Melrose)	68060_6317	May-00	Jan-02	6,597	6,597	0	0	0	0	0	0	0
Easements - CP2	68106_6379	May-02	Jun-06	50	50	0	0	0	0	0	0	0
Easements - CP3	68107_6380	Apr-04	Nov-07	80	80	0	0	0	0	0	0	0
Middle (Medford/Somerville)	68108_6381	Jun-02	Jul-06	22,177	22,177	0	0	0	0	0	0	0
South (Cambridge/Boston)	68109_6382	Oct-04	Apr-08	17,590	17,590	0	0	0	0	0	0	0
Early Valve Replacement Contract	68150_6475	Sep-98	Jan-00	2,387	2,387	0	0	0	0	0	0	0
Easements - CP4	68151_6476	Sep-06	May-09	1	1	0	0	0	0	0	0	0
Early Valve Equipment Purchase	68153_6483	May-98	Nov-01	161	161	0	0	0	0	0	0	0
Walnut St Bridge Truss-Design	68209_6697			0	0	0	0	0	0	0	0	0
Section 66 & OMM30, CP-5 - Construction	68223_6782			0	0	0	0	0	0	0	0	0
Section 66 & OMM30 - Plan/Design/CA/RI	68224_6783			0	0	0	0	0	0	0	0	0
Easements - CP5	68225_6784	Jul-14	Jun-20	77	74	3	3	0	0	3	0	0
Sewer Design/CA/RI & Section 57 Design	68226_6785			0	0	0	0	0	0	0	0	0
Riverside Ave Sewer Repair & Section 57	68227_6786			0	0	0	0	0	0	0	0	0
CA/RI - CP3	68274_7003	Sep-04	Apr-09	925	925	0	0	0	0	0	0	0
<b>713 Spot Pond Supply Mains Rehabilitation Total</b>				<b>66,497</b>	<b>65,488</b>	<b>1,009</b>	<b>3</b>	<b>506</b>	<b>500</b>	<b>1,009</b>		
<b>714 Southern Extra High Sections 41 &amp; 42 Total</b>			<b>completed project</b>	<b>3,657</b>	<b>3,657</b>	<b>0</b>						

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<b>719 Chestnut Hill Connecting Mains</b>												
Pump Stn. Potable Connect.-Design/CA/RI	68026_6141	Mar-00	Dec-04	1,360	1,360	0	0	0	0	0	0	0
Preliminary Engineering	68051_6301	Jan-05	Apr-06	457	457	0	0	0	0	0	0	0
Shaft 7 Building - Design & Construct.	68052_6302			0	0	0	0	0	0	0	0	0
Easements	68053_6303	Apr-03	Dec-07	81	81	0	0	0	0	0	0	0
Emergency Pump Relocation - Const.	68155_6501	Feb-99	Mar-01	6,502	6,502	0	0	0	0	0	0	0
Emergency Pump Relocation - Design/CA/RI	68157_6503	May-98	May-01	1,121	1,121	0	0	0	0	0	0	0
Boston Paving	68180_6558	Jul-99	Dec-07	133	133	0	0	0	0	0	0	0
Public Participation	68181_6559	Jul-99	Jun-08	0	0	0	0	0	0	0	0	0
Legal	68182_6560	Jul-99	Jun-08	1	1	0	0	0	0	0	0	0
BECo Emergency Pump Construction	68199_6623	Sep-99	Jun-00	431	431	0	0	0	0	0	0	0
Pump Station Potable Connection - Const	68203_6651	Apr-02	Dec-03	7,132	7,132	0	0	0	0	0	0	0
Shaft 7 & Meter 120 - Design/CA/RI	68218_6770			0	0	0	0	0	0	0	0	0
Equipment Pre-purchase	68230_6814	Apr-01	Oct-01	154	154	0	0	0	0	0	0	0
Demolition of Garages	68231_6820	Feb-02	May-02	72	72	0	0	0	0	0	0	0
Utilities	68244_6869	Jun-02	Aug-02	44	44	0	0	0	0	0	0	0
CH Final Conn Construction	68267_6982	Jul-25	Dec-27	15,881	0	15,881	0	0	0	0	15,881	
CH Final Conn Des ESDC	68268_6995	Jul-23	Dec-28	3,171	0	3,171	0	0	0	0	3,162	9
Chestnut Hill Gatehouse # 1 Rep Constr	75521_7382	Nov-17	Apr-18	800	800	0	0	0	0	0	0	
CH Final Connectons REI	75591_7705	Jul-25	Dec-27	1,546	0	1,546	0	0	0	0	1,546	
<b>719 Chestnut Hill Connecting Mains Total</b>				<b>38,886</b>	<b>18,288</b>	<b>20,598</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20,589</b>	<b>9</b>
<b>720 Warren Cottage Line Rehabilitation Total</b>		<b>completed project</b>		<b>1,204</b>	<b>1,204</b>	<b>0</b>						
<b>721 Southern Spine Distribution Mains</b>												
Sections 21, 43 & 22 - Design	68083_6290	Sep-00	May-13	7,115	7,115	0	0	0	0	0	0	0
Sections 21, 43 & 22 - Easements	68084_6291	Mar-02	May-12	107	107	0	0	0	0	0	0	0
Section 22 South - Construction	68085_6292	Jul-03	Jun-05	4,993	4,993	0	0	0	0	0	0	0
Section 19 - Design	68086_6293			0	0	0	0	0	0	0	0	0
Section 19 - Easements	68087_6294			0	0	0	0	0	0	0	0	0
Section 19 - Construction	68088_6295			0	0	0	0	0	0	0	0	0
Sections 20 & 58 - Design	68089_6296	Jun-23	May-28	4,108	0	4,108	0	0	0	0	3,882	226
Sections 20 & 58 - Easements	68090_6297	Sep-21	Sep-25	35	0	35	0	0	10	10	25	
Sections 20 & 58 - Construction	68091_6298	Sep-25	May-27	19,331	0	19,331	0	0	0	0	19,331	
Adams Street Bridge	68122_6396	Jul-98	Dec-99	154	154	0	0	0	0	0	0	0
Southern High Public Participation	68193_6601	Oct-98	May-99	15	15	0	0	0	0	0	0	0
Southern High Extension Study	68194_6602	Sep-98	May-99	242	242	0	0	0	0	0	0	0
Boston Paving	68228_6787			3	3	0	0	0	0	0	0	0
Section 22 - Construction	68235_6844	Apr-25	Apr-27	23,592	0	23,592	0	0	0	0	23,592	
Section 107 Phase 1 - Construction	68236_6845	Jul-07	Jan-09	6,184	6,184	0	0	0	0	0	0	0
Legal	68237_6846	May-04	May-27	5	2	3	0	0	1	2	2	
Technical Assistance	68238_6847	Feb-04	Oct-05	28	28	0	0	0	0	0	0	0
MHD Neponset River Bridge	68246_6871			0	0	0	0	0	0	0	0	0
Contract 1A - Construction	68247_6885	Nov-03	Jun-05	2,859	2,859	0	0	0	0	0	0	0
Section 107 Phase 2 - Construction	68290_7099	Jan-10	Jan-12	14,847	14,847	0	0	0	0	0	0	0
Milton Pressure Regulator Valve	68291_7104	Jun-06	Nov-06	135	135	0	0	0	0	0	0	0
Section 22 - Design/ESDC	68298_7120	Oct-22	Apr-28	2,325	0	2,325	0	0	355	355	1,970	
Sect 22 Rehab Alt Anal&Env Perm	68299_7155	Sep-19	Sep-22	2,870	788	2,082	814	881	388	2,870	0	
Section 22 REI	68415_7723	Apr-25	Apr-27	1,500	0	1,500	0	0	0	0	1,500	
<b>721 Southern Spine Distribution Mains Total</b>				<b>90,448</b>	<b>37,472</b>	<b>52,976</b>	<b>814</b>	<b>881</b>	<b>754</b>	<b>3,237</b>	<b>50,302</b>	<b>226</b>

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<b>722 Northern Intermediate High (NIH) Redundancy &amp; Storage</b>												
Concept Plan	53454_6954	Feb-06	Aug-10	797	797	0	0	0	0	0	0	0
Easements	68093_6306	Jul-17	Jun-20	469	469	0	0	0	0	40	0	0
Section 89 & 29 Redundancy - Design	68252_6906	Mar-11	Dec-20	6,791	6,188	603	603	0	0	1,620	0	0
Purchase Mobile Pump Unit	68276_7026	Jul-09	Jan-10	291	291	0	0	0	0	0	0	0
Short Term Improvements - Design/CA/RI	68277_7045	Sep-09	May-15	821	821	0	0	0	0	0	0	0
Permits	68278_7047	Jan-10	Dec-18	5	1	4	1	1	1	4	1	1
Technical Assistance	68279_7048	Jan-10	Dec-18	18	0	18	6	6	3	15	3	0
West St Pipe Reading Construct. Phase1A	68282_7066	Jun-14	May-15	1,910	1,910	0	0	0	0	0	0	0
Section 89 & 29 Redun Const. Phase 2	68283_7067	Sep-17	Jun-20	25,262	24,942	320	320	0	0	19,806	0	0
NIH Storage - Construction	68284_7068	Jan-26	Jan-28	24,030	0	24,030	0	0	0	0	24,030	0
Section 89 & 29 Repl Des/ESDC	68294_7116	Apr-18	Dec-23	3,949	2,169	1,779	529	350	350	3,254	550	0
Section 89 & 29 Repl - Constr	68295_7117	Jan-21	Dec-25	28,900	0	28,900	1,445	5,780	5,780	13,005	15,895	0
NIH Gillis Redundancy - Design	68296_7118			0	0	0	0	0	0	0	0	0
NIH Gillis Redundancy - Construction	68297_7119			0	0	0	0	0	0	0	0	0
Gillis Pump Station Improvements	68309_7260	Jul-13	Dec-14	2,093	2,093	0	0	0	0	(86)	0	0
Reading/Stoneham Interconnections	68310_7261	Aug-11	Oct-12	3,467	3,467	0	0	0	0	0	0	0
NIH Storage - Design	68316_7311	Jan-24	Jan-29	4,876	0	4,876	0	0	0	0	4,866	10
Section 89&29 Redundancy Phase 1B Const.	68317_7471	Jan-16	May-18	12,375	12,375	0	0	0	0	127	0	0
Section 89&29 Redundancy Phase 1C Const	68318_7478	Jan-17	Sep-18	18,280	18,280	0	0	0	0	2,235	0	0
Reading Reimbursement	68319_7590	Jun-17	Sep-17	(62)	(62)	0	0	0	0	0	0	0
Sect 89 & 29 Repl RE/RI Svcs	68320_7633	Jan-21	Dec-25	2,900	0	2,900	145	580	580	1,305	1,595	0
Section 29A - Design/CS/RI	INHSE_DSCS			0	0	0	0	0	0	0	0	0
<b>722 Northern Intermediate High (NIH) Redundancy &amp; Storage Total</b>				<b>137,172</b>	<b>73,741</b>	<b>63,430</b>	<b>3,049</b>	<b>6,717</b>	<b>6,714</b>	<b>41,325</b>	<b>46,940</b>	<b>10</b>
<b>723 Northern Low Service Rehabilitation - Section 8</b>												
Easements	68094_6321	Jul-15	Jul-27	80	0	80	14	17	10	41	39	0
Section 8 & 57 Construction	68095_6322	Jul-26	Jul-28	30,994	0	30,994	0	0	0	0	30,994	0
Rehab Sects. 37 & 46 Chelsea/EB Constr.	68262_6962	Jul-25	Jun-27	3,200	0	3,200	0	0	0	0	3,200	0
Permits	68263_6977	Jul-05	Jul-27	299	285	14	2	3	2	6	8	0
Technical Assistance	68264_6979	Jul-05	Jul-17	44	44	0	0	0	0	0	0	0
Section 97A - Construction	68275_7021	Oct-08	Oct-09	1,992	1,992	0	0	0	0	0	0	0
Sec 8&57 Des/CA	68287_7092	Jul-23	Jul-29	6,199	0	6,199	0	0	0	0	6,084	115
Rehab Sec 37&46 Chel/Bos - Design/CA/RI	75529_7405	Jul-23	Jun-28	1,046	0	1,046	0	0	0	0	1,046	0
Sec 50 & 57 Water & 21/20/19 Sew Des/ESD	75610_7540	Jul-17	May-22	5,980	3,029	2,951	1,261	1,006	685	5,347	0	0
Sec 50 & 57 Water Rehab	75611_7541	Jul-21	Jul-23	8,000	0	8,000	0	4,600	3,200	7,800	200	0
Sec 50 Pipe Rehab Const	75612_7546			0	0	0	0	0	0	0	0	0
Rehab Sec 37&46 Chel/Bos REI	75613_7718	Jul-25	Jul-27	1,500	0	1,500	0	0	0	0	1,500	0
Sec 8&57 REI	75614_7719	Jul-26	Jul-28	1,500	0	1,500	0	0	0	0	1,500	0
Section 8 - Design	INHSE_DES8			0	0	0	0	0	0	0	0	0
Section 57 - Design	INHSE_SC57			0	0	0	0	0	0	0	0	0
<b>723 Northern Low Service Rehabilitation - Section 8 Total</b>				<b>60,834</b>	<b>5,350</b>	<b>55,484</b>	<b>1,277</b>	<b>5,626</b>	<b>3,897</b>	<b>13,194</b>	<b>44,571</b>	<b>115</b>
<b>725 Hydraulic Model Update Total</b>			<b>completed project</b>	<b>598</b>	<b>598</b>	<b>0</b>						

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<b>727 Southern Extra High (SEH) Redundancy &amp; Storage</b>												
Concept Plan/Prelim. Design/Env. Review	53397_6452	Feb-07	Feb-14	633	633	0	0	0	0	0	0	
Redundancy Pipeline Ph 1 Des/CA/RI	53398_6453	Feb-14	Aug-21	7,677	6,461	1,217	793	424	0	3,074	0	
Redundancy Pipeline Section III Ph 1-Con	53399_6454	Jul-16	Sep-18	12,567	12,567	0	0	0	0	159	0	
Redundancy/Storage Ph 2 Final Des/CA/RI	68135_6444	Jan-26	Dec-31	7,825	0	7,825	0	0	0	0	4,237	3,588
University Avenue Water Main	68136_6445	Mar-08	Nov-08	6,137	6,137	0	0	0	0	0	0	
Sec 77 & 88 Rehab/Des/ESDIC	68292_7112	Jul-22	Jun-26	1,729	0	1,729	0	0	416	416	1,313	
Sections 77 & 88 Rehab - Construction	68293_7113	Jul-24	Jul-26	7,438	0	7,438	0	0	0	0	7,438	
Short Term Improvements - Design/CA/RI	68302_7223			0	0	0	0	0	0	0	0	
Short Term Improvements - Construction	68303_7224			0	0	0	0	0	0	0	0	
Technical Assistance	68304_7225	Aug-08	Jun-27	0	0	0	0	0	0	0	0	
Easements/Agreements	68305_7226	Jul-14	Jul-27	300	12	288	33	21	30	84	204	
Permits/Utilities	68306_7227	Aug-08	Jul-27	300	16	284	50	50	50	160	134	
Redundancy/Storage Phase 2 - Construct.	68308_7245	Jan-28	Dec-30	39,123	0	39,123	0	0	0	0	3,264	35,859
Phase 3, 2nd Tank - Construction	68311_7262	Jan-33	Dec-35	13,778	0	13,778	0	0	0	0	0	13,778
Phase 3, 2nd Tank - Design	68312_7263	Jan-31	Dec-36	2,756	0	2,756	0	0	0	0	0	2,756
Phase 3, Pump Station - Construction	68313_7264			0	0	0	0	0	0	0	0	
Phase 3, Pump Station - Design	68314_7265			0	0	0	0	0	0	0	0	
Redundancy Pipeline Sect 111 - Constr 2	68555_7504	Oct-17	Feb-20	18,894	18,224	670	670	0	0	14,248	0	
Redundancy Pipeline Sect 111 - Constr 3	68556_7505	Aug-18	May-21	20,212	14,784	5,428	5,428	0	0	20,212	0	
Sects 77 & 88 REI	68557_7706	Jun-23	Jun-25	1,546	0	1,546	0	0	0	0	1,546	
<b>727 Southern Extra High (SEH) Redundancy &amp; Storage Total</b>				<b>140,915</b>	<b>58,834</b>	<b>82,082</b>	<b>6,974</b>	<b>495</b>	<b>496</b>	<b>38,353</b>	<b>18,136</b>	<b>55,981</b>
<b>730 Weston Aqueduct Supply Mains</b>												
Newton Water Mains - Construction	59774_5034	Apr-95	Oct-96	669	669	0	0	0	0	0	0	
Technical Assistance	59776_5975	Mar-95	Oct-18	186	186	0	0	0	0	0	0	
WASM 4 - Design/CA/RI	67865_5147	Mar-95	Sep-07	5,978	5,978	0	0	0	0	0	0	
WASMs 1 & 2 - Design/CA/RI	68027_6142	Jun-97	Jul-06	5,060	5,060	0	0	0	0	0	0	
Appraisal / Easement	68030_6174	Mar-95	Oct-18	449	449	0	0	0	0	0	0	
WASM 1, 2 & 4 - Auburndale	68031_6175	Jun-97	Nov-98	4,001	4,001	0	0	0	0	0	0	
Meter 103 - Construction	68032_6176	Oct-96	Jul-98	61	61	0	0	0	0	0	0	
WASMs 1 & 2 - Newton	68041_6280	Mar-00	Jun-02	9,219	9,219	0	0	0	0	0	0	
WASMs 1 & 2 - Boston	68042_6281	Feb-03	Jun-05	7,039	7,039	0	0	0	0	0	0	
WASMs 2 & 4 - Newton	68069_6312	Apr-98	Mar-01	8,282	8,282	0	0	0	0	0	0	
WASM 4 - Allston & Western Ave. Sewer	68070_6313	Feb-02	Dec-04	17,331	17,331	0	0	0	0	0	0	
MDC Bridge Crossing - Const	68071_6314			0	0	0	0	0	0	0	0	
Sect 36/W5/Waltham Conn. - Design/CA/RI	68167_6540	Jan-11	May-17	2,011	2,011	0	0	0	0	0	0	
Design/CA/RI-Phs C/3	68168_6541			0	0	0	0	0	0	0	0	
Design/CA/RI-Phs D/3	68169_6542			0	0	0	0	0	0	0	0	
Section 28, Arlington - CP1	68173_6546	Aug-09	Feb-11	2,304	2,304	0	0	0	0	0	0	
Survey	68245_6870	Dec-01	Oct-25	89	89	0	0	0	0	0	0	
Arlington Pipe Work	68269_6996	Dec-09	May-10	401	401	0	0	0	0	0	0	
WASM3 Section 12 Replacement - Constr.	68272_7000	Oct-04	Sep-05	2,114	2,114	0	0	0	0	0	0	
WASM3 Section 12 Replacement - Design	68273_7001	May-04	Aug-06	265	265	0	0	0	0	0	0	
Section 28 - Design/CA/RI	68285_7083	Oct-06	Apr-11	867	867	0	0	0	0	0	0	
Watertown Sect Rehab	68301_7222	May-13	Dec-13	2,818	2,764	54	0	54	0	54	0	
Section 36/W11/S 9-A11 Valve	68332_7448	Nov-14	Dec-16	11,314	11,314	0	0	0	0	0	0	
Design 2	INHSE_DES2			0	0	0	0	0	0	0	0	
<b>730 Weston Aqueduct Supply Mains Total</b>				<b>80,458</b>	<b>80,404</b>	<b>54</b>	<b>0</b>	<b>54</b>	<b>0</b>	<b>54</b>		
<b>731 Lynnfield Pipeline Total</b>			<b>completed project</b>	<b>5,625</b>	<b>5,625</b>	<b>0</b>						

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<b>732 Walnut St. &amp; Fisher Hill Pipeline Rehabilitation Total</b>		<b>completed project</b>		<b>2,717</b>	<b>2,717</b>	<b>0</b>						
<b>735 Section 80 Rehabilitation</b>												
Water Supply Contingency	68248_6890			0	0	0	0	0	0	0	0	
Section 80 Rehab Construction	68249_6891	Jul-23	Jul-26	10,710	0	10,710	0	0	0		10,710	
Section 80 Rehab Design/CA	68250_6892	Jul-21	Jul-27	2,490	0	2,490	0	359	490	849	1,641	
Section 80 Replacement Constr	68410_7532	Dec-16	Jun-18	1,908	1,908	0	0	0	0	0	0	
Permits	68411_7533	Oct-16	Jun-24	27	17	10	0	1	1	2	8	
Section 80 Rehab REI	68412_7675	Jul-23	Jul-26	850	0	850	0	0	0	0	850	
<b>735 Section 80 Rehabilitation Total</b>				<b>15,985</b>	<b>1,925</b>	<b>14,060</b>	<b>0</b>	<b>360</b>	<b>491</b>	<b>851</b>	<b>13,209</b>	
<b>Other Waterworks</b>				<b>167,500</b>	<b>207,272</b>	<b>(39,772)</b>	<b>8,897</b>	<b>24,418</b>	<b>8,490</b>	<b>77,190</b>	<b>90,948</b>	<b>(172,526)</b>
<b>753 Central Monitoring System</b>												
Study	75300_5025	Mar-84	Sep-86	190	190	0	0	0	0	0	0	
Design	75301_5026	Oct-87	Jan-92	2,651	2,651	0	0	0	0	0	0	
Equipment Prepurchase	75302_5027	Oct-87	Dec-93	2,162	2,162	0	0	0	0	0	0	
SCADA Implementation	75303_5028	Aug-96	Mar-17	2,035	2,035	0	0	0	0	0	0	
Communications Structures	75304_5160	Nov-92	May-93	161	161	0	0	0	0	0	0	
Construction & Start-up Services	75305_5173	Jul-92	Aug-98	352	352	0	0	0	0	0	0	
Construction 1	75306_5171	Nov-97	Nov-98	209	209	0	0	0	0	0	0	
Operations Center - Construction	75308_5849	Sep-92	Jun-94	1,499	1,499	0	0	0	0	0	0	
Technical Assistance	75309_5987	Jul-92	Dec-97	386	386	0	0	0	0	0	0	
Waterworks SCADA/PLC Upgrades	75310_5218	Oct-16	Oct-31	189	189	0	0	0	0	0	0	
Microwave Equipment	75474_6125	Mar-96	Dec-01	782	782	0	0	0	0	0	0	
Permits Monitoring & Control Comm Net	75487_6652	Dec-99		0	0	0	0	0	0	0	0	
Microwave Comm System-Wide Backbone	75488_6653	Sep-01	Jun-02	1,694	1,694	0	0	0	0	0	0	
Monitoring & Control - Study & Design	75489_6654	Dec-99	Sep-04	1,808	1,808	0	0	0	0	0	0	
Microwave Communic for Waterworks Fac.	75494_6816	Sep-02	Jul-04	1,957	1,957	0	0	0	0	0	0	
Ludlow Communications	75495_6825	Sep-01	Oct-01	41	41	0	0	0	0	0	0	
Quabbin Power, Comm. & Security - Constr	75512_7338	Feb-16	Apr-17	3,512	3,512	0	0	0	0	0	0	
Quabbin Power, Comm. & Security - Design	75540_7461	Sep-14	Sep-18	799	799	0	0	0	0	(15)	0	
Utility Fees and Permits	75541_7475	Jul-14	Dec-17	268	268	0	0	0	0	4	0	
CWTP SCADA Upgrd Design Prog RE	75630_7581	Jan-19	Oct-23	4,652	1,556	3,096	1,022	1,383	691	4,652	0	
CWTP SCADA Upgrade Construction	75631_7582	Apr-21	Oct-23	13,000	0	13,000	0	5,032	5,032	10,065	2,935	
Other Design and Prmg Srvcs	75632_7583	Jul-22	Oct-28	2,880	0	2,880	0	0	240	240	2,640	
Other Construction	75633_7584	Dec-22	Oct-28	0	0	0	0	0	0	0	0	
Other Equipment/Hardware	75634_7585	Dec-22	Oct-28	794	0	794	0	0	61	61	733	
Operations Center - Design	INHSE_OPER			0	0	0	0	0	0	0	0	
<b>753 Central Monitoring System Total</b>				<b>42,021</b>	<b>22,251</b>	<b>19,770</b>	<b>1,022</b>	<b>6,415</b>	<b>6,024</b>	<b>15,007</b>	<b>6,308</b>	
<b>763 Distribution Systems Facilities Mapping</b>												
Planning and Design	75458_5162	Feb-95	Dec-98	936	936	0	0	0	0	0	0	
Data Purchase	75476_6152	Nov-95	Aug-96	100	100	0	0	0	0	0	0	
Records Development	75484_6525	Oct-23	Oct-25	763	0	763	0	0	0	0	763	
Update of Record Drawings	75600_7489	Jul-22	Jul-23	500	0	500	0	0	385	385	115	
Water System Hydraulic Model	75650_7613	Mar-21	Mar-23	500	0	500	231	269	0	500	0	
<b>763 Distribution Systems Facilities Mapping Total</b>				<b>2,799</b>	<b>1,036</b>	<b>1,763</b>	<b>231</b>	<b>269</b>	<b>385</b>	<b>885</b>	<b>878</b>	
<b>764 Local Water Infrastructure Rehabilitation Total</b>		<b>completed project</b>		<b>7,488</b>	<b>7,488</b>	<b>0</b>						

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<b>765 Local Water Pipeline Improvement Program</b>												
Community Loans	75485_6608	Aug-00	Jun-13	222,318	222,318	0	0	0	0	0	0	0
Community Repayment	75493_6759	Aug-01	Jun-23	(222,318)	(211,889)	(10,428)	(3,706)	(2,600)	(4,122)	(22,226)	0	0
Local Water System Assistance Loans	75513_7339	Aug-10	Jun-20	200,000	171,072	28,928	11,200	17,728	0	59,869	0	0
Local Water System Assistance Repayment	75514_7340	Aug-11	Jun-30	(200,000)	(68,576)	(131,424)	(17,100)	(17,600)	(17,900)	(78,760)	(60,283)	(18,540)
CVA Loans	75515_7350	Nov-10	Jun-20	10,000	5,573	4,427	1,148	1,000	2,279	4,427	0	0
CVA Repayments	75516_7351	Nov-11	Jun-30	(10,000)	(2,251)	(7,749)	(605)	(700)	(700)	(2,925)	(3,788)	(1,957)
Lead Service Line Replace Loans	75517_7529	Aug-16	May-36	100,000	16,717	83,283	5,000	5,000	5,000	22,738	25,000	43,283
Lead Service Line Replace Repayment	75518_7530	Aug-17	May-46	(100,000)	(1,995)	(98,005)	(1,700)	(2,200)	(2,700)	(7,995)	(20,313)	(71,092)
LWSAP Phase 3 Distributions	75620_7567	Aug-17	May-26	278,000	36,784	241,216	16,000	20,000	20,000	85,571	150,000	35,216
LWSAP Phase 3 Repayments	75621_7568	Aug-18	May-36	(278,000)	(2,613)	(275,387)	(3,700)	(5,300)	(7,200)	(18,813)	(76,400)	(182,787)
LWSAP Phase 3 CVA Loans	75622_7588	Aug-17	May-26	14,000	500	13,500	0	0	1,000	1,000	8,000	4,500
LWSAP Phase 3 CVA Repayments	75623_7589	Aug-18	Aug-36	(14,000)	(100)	(13,900)	(100)	0	(100)	(300)	(2,000)	(11,700)
<b>765 Local Water Pipeline Improvement Program Total</b>				<b>0</b>	<b>165,540</b>	<b>(165,539)</b>	<b>6,437</b>	<b>15,328</b>	<b>(4,443)</b>	<b>42,586</b>	<b>20,216</b>	<b>(203,077)</b>
<b>766 Waterworks Facility Asset Protection</b>												
Meter Vault Manhole Retrofits - Design	75490_6689			0	0	0	0	0	0	0	0	0
Steel Tank Impr Design/CA	75497_6832	Dec-20	Sep-25	2,779	0	2,779	232	695	695	1,622	1,157	0
Walnut Hill Tank - Construction	75498_6833			0	0	0	0	0	0	0	0	0
Gillis PS/CF Roof Repl	75500_6888	Jul-19	Jul-20	562	420	141	141	0	0	562	0	0
Waltham Bridge Pipe Replacement	75501_6910	Mar-04	Sep-04	238	238	0	0	0	0	0	0	0
Permits and Legal Fees	75502_6920	Mar-04	Jun-18	16	11	5	1	2	2	5	0	0
Technical Assistance	75503_6921			9	9	0	0	0	0	9	0	0
As-needed Design	75504_6943			0	0	0	0	0	0	0	0	0
Cosgrove Intake Roof Repl	75505_7022	Nov-18	Sep-19	1,011	745	266	266	0	0	1,011	0	0
Cosgrove Turbine Isolation - Design	75506_7023			0	0	0	0	0	0	0	0	0
Generator Docking Station REI	75507_7024	Jul-19	May-20	209	164	45	45	0	0	209	0	0
Generator Docking Station	75508_7025	Apr-19	Apr-20	1,037	1,029	8	8	0	0	1,037	0	0
Cosgrove Valve Replacement - Constructio	75509_7064	Jul-24	Jul-25	2,115	0	2,115	0	0	0	0	2,115	0
Cosgrove Valve Replacement - Design	75510_7065	Jul-23	Dec-25	243	0	243	0	0	0	0	243	0
Transformer at Cosgrove Intake Building	75511_7228	Jun-11	Jul-12	299	299	0	0	0	0	0	0	0
Shaft 9 Rehab - Design CA/RI	75520_7381			0	0	0	0	0	0	0	0	0
Elevated Water Storage Tank Repaint Desi	75523_7384			0	0	0	0	0	0	0	0	0
Fells/Loring RD Tank Des/CA/RI	75524_7385	Jul-22	Jul-27	1,000	0	1,000	0	0	184	184	816	0
Electrical Distrib. Upgrades at Southbor	75535_7425	Jul-22	Jan-23	1,200	0	1,200	0	0	1,200	1,200	0	0
Water Met/Vault Manhole CP-1	75536_7453	Dec-22	Dec-24	3,000	0	3,000	0	0	480	480	2,520	0
Beacon Street Line Repair - Construction	75537_7458	Jun-16	Apr-17	1,441	1,441	0	0	0	0	0	0	0
Beacon Street Line Repair - Design/CA/RI	75538_7474	Nov-14	Dec-17	394	394	0	0	0	0	0	0	0
Meter Vault Manhole Retrofits - Construc	75550_7479	Jul-24	Mar-26	1,769	0	1,769	0	0	0	0	1,769	0
Shaft 9 Rehab - Construction	75551_7492			0	0	0	0	0	0	0	0	0
Covered Storage Tank Rehab - Constructio	75553_7482	Jul-24	Jul-26	4,000	0	4,000	0	0	0	0	4,000	0
Wat Met/Vlt Mhole Des/CA Ph1	75554_7542	Dec-20	Dec-25	1,000	0	1,000	72	218	218	508	492	0
Painting DI Water Tank	75555_7601	Mar-19	Nov-19	2,440	2,440	0	0	0	0	2,440	0	0
New Roofs at Water PS Constr	75556_7626	Mar-21	Mar-22	546	0	546	42	504	0	546	0	0
New Roofs at Water PS REI	75558_7628	Mar-21	Mar-22	300	0	300	23	277	0	300	0	0
Paint Bellevue II TH Tanks	75559_7634	Aug-18	Sep-19	4,144	3,767	377	377	0	0	4,144	0	0
Steel Tanks Impr REI	75560_7676	Jan-23	Jul-24	1,125	0	1,125	0	0	188	188	937	0
Masonry/Struct Repairs Bell 1/Arl Hghts	75575_7694	Jun-23	Dec-25	9,988	0	9,988	0	0	0	0	9,988	0
Water Meter/Vault Mhle PH1 REI	75652_7707	Dec-22	Dec-24	1,500	0	1,500	0	0	240	240	1,260	0
Water Meter/Vault Mhle PH2 Design	75653_7708	May-21	May-26	1,000	0	1,000	0	211	230	441	559	0
Water Meter/Vault Mhle CP-2 Constr	75654_7709	May-23	May-25	3,000	0	3,000	0	0	0	0	3,000	0
Water Meter/Vault Mhle Ph2 REI	75655_7710	May-23	May-25	1,500	0	1,500	0	0	0	0	1,500	0

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Masonry/Struct Rep Des/ESDC	75656_7711	May-21	Dec-26	1,635	0	1,635	0	304	332	636	999	
Masonry/Structural Repairs REI	75657_7712	Jun-23	Dec-25	1,875	0	1,875	0	0	605	605	1,270	
Steel Tank Improv Constr Ph2	75658_7727	Sep-23	Sep-24	2,600	0	2,600	0	0	0	0	2,600	
Steel Tank Improv REI Ph2	75659_7728	Sep-23	Sep-24	750	0	750	0	0	0	0	750	
Beacon St Line Des/ESDC	75660_7729	Jun-21	Jun-26	900	0	900	0	195	234	429	471	
Beacon St Line Constr	75661_7730	Jun-23	Jun-25	6,900	0	6,900	0	0	0	0	6,900	
Beacon St Line REI	75662_7731	Jun-23	Jun-25	1,500	0	1,500	0	0	0	0	1,500	
Cosgrove Tunnel Rehab Des/ESDC	75663_7738	Jul-24	Jul-29	10,000	0	10,000	0	0	0	0	7,376	2,624
Paint Ph1 Des/ESDC Bell2/DI/TH	75664_7739	Jul-34	Jul-39	752	0	752	0	0	0	0	0	752
Paint Ph1 Constr Bell2/TH	75665_7740	Jul-36	Jul-38	4,083	0	4,083	0	0	0	0	0	4,083
Paint Tanks Ph1 REI	75666_7741	Jul-36	Jul-38	1,546	0	1,546	0	0	0	0	0	1,546
Paint Ph2 Des/ESDC Bel1/PC/WH	75667_7742	Jul-37	Jul-42	3,299	0	3,299	0	0	0	0	0	3,299
Paint Ph 2 Const Bell 1/PC/WH	75668_7743	Jul-39	Jul-41	14,021	0	14,021	0	0	0	0	0	14,021
Paint Tanks Ph 2 REI	75669_7744	Jul-39	Jul-41	1,546	0	1,546	0	0	0	0	0	1,546
Water Tank Paint Ph1 DI Constr	75670_7748	Jul-36	Jul-38	2,680	0	2,680	0	0	0	0	0	2,680
Roofs Gillis/Bratt/Newt REI	75676_7900	Jul-24	Jul-25	300	0	300	0	0	0	0	300	
Roofs Gillis/Bratt/Newt Constr	75677_7901	Jul-24	Jul-25	1,500	0	1,500	0	0	0	0	1,500	
Roofs Gillis/Bratt/Newt Des/CA	75678_7902	Jul-22	Jul-25	100	0	100	0	0	26	26	74	
Steel Tank/Impr Constr	77552_7493	Jan-23	Jul-24	11,340	0	11,340	0	0	1,890	1,890	9,450	
<b>766 Waterworks Facility Asset ProtectionTotal</b>				<b>115,192</b>	<b>10,957</b>	<b>104,234</b>	<b>1,207</b>	<b>2,406</b>	<b>6,524</b>	<b>18,712</b>	<b>63,546</b>	<b>30,551</b>
<b>Business &amp; Operations Support</b>				<b>177,134</b>	<b>107,174</b>	<b>69,962</b>	<b>13,868</b>	<b>20,213</b>	<b>12,387</b>	<b>52,609</b>	<b>23,496</b>	<b>0</b>
<b>881 Equipment Purchase</b>												
Unplated Mobile Equipment	88106_7531	Mar-16	Jun-16	0	0	0	0	0	0	0	0	
Contaminant Monitoring Equip	88108_7631	Sep-21	Jun-25	1,646	0	1,646	152	96	480	728	918	
TV Inspection Truck	92367_6732	Jul-00	Mar-01	0	0	0	0	0	0	0	0	
Security Equipment & Installation	92374_6760	Jan-01	Jun-24	12,198	9,323	2,875	804	1,023	706	2,749	342	
ICP-MS Lab Testing Equipment	92379_6808	Oct-08	Dec-08	117	117	0	0	0	0	0	0	
Back Hoe	92381_6866	Apr-03	Jun-04	0	0	0	0	0	0	0	0	
Vactor Truck	92382_6867	Apr-03	Jun-03	0	0	0	0	0	0	0	0	
Water Service Truck	92383_6907	Apr-04	Jun-04	0	0	0	0	0	0	0	0	
Bucket Machine	92384_6944	Oct-04	Dec-04	0	0	0	0	0	0	0	0	
Excavator	92385_6945	Apr-07	Jun-07	0	0	0	0	0	0	0	0	
Grove Crane	92386_6946	May-05	Aug-05	0	0	0	0	0	0	0	0	
Land Fill Loader	92388_6981	May-05	Aug-05	0	0	0	0	0	0	0	0	
PowerSweeper/Catch Basin	92392_6986	Apr-04	Jun-04	0	0	0	0	0	0	0	0	
Back Hoe (WRA385)	92394_6990	Jan-08	Mar-08	0	0	0	0	0	0	0	0	
Closed-Circuit TV Inspection Truck	92395_7027			0	0	0	0	0	0	0	0	
Front-End Loader	92396_7028	Jul-05	Mar-06	0	0	0	0	0	0	0	0	
Dump Truck WRA-558	92397_7029	Apr-09	Jun-09	0	0	0	0	0	0	0	0	
Dump Truck (WRA 522)	92398_7030	Jan-09	Mar-09	0	0	0	0	0	0	0	0	
Crane (WRA-185)	92400_7074	Apr-06	Jun-06	0	0	0	0	0	0	0	0	
Future Vehicle Purchases	92409_7232			0	0	0	0	0	0	0	0	
High Lift Fork Loader (Lull)	92411_7239	Oct-10	Dec-10	121	121	0	0	0	0	0	0	
Ford Ramp Truck	92416_7246	Apr-10	Jun-10	122	122	0	0	0	0	0	0	
Street Sweeper	92417_7247	Jul-09	Sep-09	182	182	0	0	0	0	0	0	
International Tractor Trailer	98449_7301	Jan-09	Mar-09	0	0	0	0	0	0	0	0	
Prior Vehicle Purchases	98454_7306	Jul-00	Jun-10	2,415	2,415	0	0	0	0	0	0	
FY11-13 Vehicle Purchases	98455_7307	Jul-09	Jun-13	2,361	2,361	0	0	0	0	0	0	
FY14-18 Vehicle Purchases	98456_7308	Jul-13	Jun-18	6,671	6,671	0	0	0	0	0	0	

**Massachusetts Water Resources Authority  
Capital Improvement Program  
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\$000s**

Program / Project / Contract	Contract No.	Notice to Proceed	Substantial Completion	Total Contract Amount	Payments through FY20	Remaining Balance	FY21	FY22	FY23	FY19-FY23	FY24-FY28	Beyond FY28
FY19-23 Vehicle Purchases	98457_7309	Jul-18	Jun-23	6,068	1,939	4,129	1,724	855	1,550	6,068	0	
FY14-18 Major Lab Instrumentation	98458_7310	Jun-16	Jun-18	639	639	0	0	0	0	0	0	
Front-End Loader	98467_7325	Oct-10	Dec-10	121	121	0	0	0	0	0	0	
FY19-23 Major Lab Instrumentation	98495_7632	Jul-18	Jun-23	1,000	0	1,000	403	188	188	778	222	
FY24-28 Vehicle Purchases	98497_7695	Jul-23	Jun-28	7,675	0	7,675	0	0	0	0	7,675	
<b>881 Equipment Purchase Total</b>				<b>41,336</b>	<b>24,011</b>	<b>17,325</b>	<b>3,083</b>	<b>2,162</b>	<b>2,924</b>	<b>10,323</b>	<b>9,157</b>	
<b>925 Technical Assistance</b>												
Mechanical	30000_MECH			0	0	0	0	0	0	0	0	
Instrument Control	33000_INST			0	0	0	0	0	0	0	0	
Wetland/Permitting	44000_WETP			0	0	0	0	0	0	0	0	
Material Testing	50000_MATT			0	0	0	0	0	0	0	0	
Land Appraisal	77000_LAND			100	0	100	0	33	33	66	34	
Surveying	80000_SURV			150	0	150	0	50	50	100	50	
Hazardous Material	90000_HAZM			900	0	900	0	300	300	600	300	
<b>925 Technical Assistance Total</b>				<b>1,150</b>	<b>0</b>	<b>1,150</b>	<b>0</b>	<b>383</b>	<b>383</b>	<b>766</b>	<b>384</b>	
<b>930 MWRA Facility - Chelsea Total</b>		<b>completed project</b>		<b>9,813</b>	<b>9,813</b>	<b>0</b>						
<b>931 Business Systems Plan Total</b>		<b>completed project</b>		<b>24,563</b>	<b>24,563</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(1)</b>		
<b>932 Environmental Remediation Total</b>		<b>completed project</b>		<b>1,478</b>	<b>1,478</b>	<b>0</b>						
<b>933 Capital Maintenance Planning &amp; Development</b>												
Inventory & Evaluation - 1 & 2	19175_6421	Apr-00	Jul-05	2,579	2,579	0	0	0	0	0	0	
Facilities Asset Management - Phase 3	19192_6593			0	0	0	0	0	0	0	0	
As-Needed Design Contract 1	92387_6976	Mar-05	Sep-07	313	313	0	0	0	0	0	0	
As-Needed Design Contract 2	92393_6988	Mar-05	Sep-07	318	318	0	0	0	0	0	0	
As-Needed Design Contract 5	92399_7070	Sep-08	Mar-11	558	558	0	0	0	0	0	0	
As-Needed Design Contract 3	92402_7101	Aug-07	Feb-10	579	579	0	0	0	0	0	0	
As-Needed Design Contract 4	92403_7102	Aug-07	Aug-09	247	247	0	0	0	0	0	0	
As-Needed Design Contract 6	92413_7242	Aug-08	Aug-10	704	704	0	0	0	0	0	0	
As-Needed Design Contract 7	92414_7243	Jan-10	Jul-12	980	980	0	0	0	0	0	0	
As-Needed Design Contract 8	92415_7244	Feb-10	Jun-13	1,044	1,044	0	0	0	0	0	0	
As-Needed CS/REI Contract 1	94491_7629	Sep-18	Sep-21	1,500	133	1,367	831	536	0	1,500		
As-Needed CS/REI Contract 2	94492_7630	Sep-18	Sep-21	1,500	0	1,500	1,000	500	0	1,500		
As-Needed Design Contract 9	98470_7390	Jul-11	Jan-14	1,610	1,610	0	0	0	0	0	0	
As-Needed Design Contract 10	98471_7391	Aug-11	Feb-14	1,868	1,868	0	0	0	0	0	0	
As-Needed Design Contract 11	98473_7436	Feb-14	Aug-15	432	432	0	0	0	0	0	0	
As-Needed Design Contract 12	98474_7437	Jan-14	Jul-16	722	722	0	0	0	0	0	0	
As-Needed Design Contract 13	98485_7456	Feb-14	Aug-16	683	683	0	0	0	0	0	0	
As-Needed Borings	98486_7470	Jul-14	Jun-18	0	0	0	0	0	0	0	0	
As-Needed Design Contract 14	98487_7496	Jun-16	Dec-18	921	921	0	0	0	0	0	242	
As-Needed Design Contract 15	98488_7497	Jun-16	Dec-18	1,207	1,207	0	0	0	0	0	321	
As-Needed Design Contract 16	98489_7498	Jun-18	Dec-20	2,432	1,360	1,072	1,072	0	0	2,432		
As-Needed Design Contract 17	98490_7604	Jun-18	Dec-21	1,940	983	957	559	398	0	1,940		
As-Needed Design Contract 18	98493_7691	Dec-20	Dec-22	2,125	0	2,125	354	1,063	708	2,125		
As-Needed Design Contract 19	98494_7692	Nov-20	Nov-22	2,125	0	2,125	443	1,063	620	2,125		
<b>933 Capital Maintenance Planning &amp; Development Total</b>				<b>26,387</b>	<b>17,241</b>	<b>9,146</b>	<b>4,259</b>	<b>3,560</b>	<b>1,328</b>	<b>12,185</b>		



**Massachusetts Water Resources Authority  
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\$000s**

Program / Project / Contract	Contract No.	Notice to Proceed	Substantial Completion	Total Contract Amount	Payments through FY20	Remaining Balance	FY21	FY22	FY23	FY19-FY23	FY24-FY28	Beyond FY28
<b>934 MWRA Facilities Management</b>												
Design/Engineering Services	92389_6983	May-21	Aug-25	700	0	700	0	208	227	435	265	
Facilities Construction	92390_6984	Aug-22	Aug-24	2,371	371	2,000	0	0	640	640	1,360	
Facilities Fitout	92391_6985			0	0	0	0	0	0	0	0	
CSB Roof Replacement	92401_7098			0	0	0	0	0	0	0	0	
<b>934 MWRA Facilities Management Total</b>				<b>3,071</b>	<b>371</b>	<b>2,700</b>	<b>0</b>	<b>208</b>	<b>867</b>	<b>1,075</b>	<b>1,625</b>	
<b>935 Alternative Energy Initiatives</b>												
Deer Island Solar	19285_6974	Sep-07	May-08	904	904	0	0	0	0	0	0	
DI Solar - Grant	92427_6974A	Nov-07	Dec-08	0	0	0	0	0	0	0	0	
DI Wind	92428_6974C	Nov-08	Apr-10	4,063	4,063	0	0	0	0	0	0	
DI Wind - Grant	92429_6974D	Nov-08	Dec-10	0	0	0	0	0	0	0	0	
Future Renewable Energy Projects	92430_7270	Oct-23	Dec-24	5,500	0	5,500	0	0	0	0	5,500	
Future DI Wind Grant	92431_7271	Sep-13	Aug-14	0	0	0	0	0	0	0	0	
Loring Road Hydro - Design	92432_6974E	Mar-08	Sep-09	2	2	0	0	0	0	0	0	
Loring Road Hydro-Grant - Design	92433_7273	Jan-09	Feb-11	0	0	0	0	0	0	0	0	
Loring Road Hydro-Grant - Construct.	92433_7273A	Jan-09	Feb-11	0	0	0	0	0	0	0	0	
Technical Assistance - Solar	92439_7274	May-09	Nov-12	124	124	0	0	0	0	0	0	
Energy Advisory Consultant Services	92440_6974B	Jun-08	Jun-10	46	46	0	0	0	0	0	0	
Wind Power Feasibility Study	92441_OP67	Mar-07	Jun-10	346	346	0	0	0	0	0	0	
DI Photovoltaic System Phase 1 - Const.	92442_7292	Sep-09	Mar-10	1,119	1,119	0	0	0	0	0	0	
Technical Assistance-Energy Efficiency	92443_7274A	May-09	Nov-13	463	463	0	0	0	0	0	0	
Technical Assistance - Solar II	92444_7274B	May-09	Nov-12	348	348	0	0	0	0	0	0	
Tech Assistance - Emerging Technology	92445_7274C	May-09	Dec-13	101	101	0	0	0	0	0	0	
Technical Assistance - Wind	92446_7274D	May-09	May-13	460	460	0	0	0	0	0	0	
Shaft E Hydro In-Conduit Des/ESDC	98447_7299	May-14	Jun-15	0	0	0	0	0	0	0	0	
Shaft E Hydro In-Conduit Constr	98448_7300	Oct-14	Jun-15	0	0	0	0	0	0	0	0	
Charlestown Wind - Construction	98450_7302	Feb-10	Oct-11	4,891	4,891	0	0	0	0	(234)	0	
Charlestown Wind - Grant	98451_7303	Feb-10	Mar-11	0	0	0	0	0	0	0	0	
John J. Carroll WTP Solar-Construction	98452_7304	Jan-10	Aug-11	2,367	2,367	0	0	0	0	0	0	
Renewable Energy TA-Wind & Solar	98453_7305	Sep-16	Sep-19	0	0	0	0	0	0	0	0	
Loring Road Hydro - Construction	98459_6974F	Jan-10	May-11	1,882	1,882	0	0	0	0	0	0	
John J. Carroll WTP Solar - Stimulus	98460_7318	Feb-10	Mar-11	0	0	0	0	0	0	0	0	
Delauri Pump Station Wind - Construct.	98461_7319	Feb-10	Mar-11	0	0	0	0	0	0	0	0	
DI Photovoltaic System Phase 1- Stimulus	98462_7320	Sep-09	Mar-10	0	0	0	0	0	0	0	0	
DI Wind Phase II Construction	98463_7321			37	37	0	0	0	0	0	0	
DI Wind Phase II - Stimulus	98464_7322	Nov-11	May-13	0	0	0	0	0	0	0	0	
Fish Hatchery Pipeline Hydro	98465_7323	Mar-16	Sep-17	1,030	1,030	0	0	0	0	0	0	
Norumbega Solar - Stimulus	98466_7324			0	0	0	0	0	0	0	0	
Loring Road Hydro-Construct - Stimulus	98468_7341	Jan-10	Apr-11	0	0	0	0	0	0	0	0	
<b>935 Alternative Energy Initiatives Total</b>				<b>23,683</b>	<b>18,183</b>	<b>5,500</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(234)</b>	<b>5,500</b>	

**Massachusetts Water Resources Authority  
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\$000s**

Program / Project / Contract	Contract No.	Notice to Proceed	Substantial Completion	Total Contract Amount	Payments through FY20	Remaining Balance	FY21	FY22	FY23	FY19-FY23	FY24-FY28	Beyond FY28
<b>940 Application Improvement Program</b>												
GIS Applications & Integration	92420_7251	Jan-14	Jun-23	350	22	328	0	178	150	328	0	
Lawson Upgrade	92435_7286	Jul-20	Dec-23	7,600	0	7,600	2,015	2,000	2,000	6,015	1,585	
Maximo Upgrade	92436_7287	Jul-15	Jun-19	2,520	2,504	16	16	0	0	86	0	
PIMS Replace or Build	92437_7288	Jul-23	Sep-25	3,400	0	3,400	0	0	0	0	3,400	
SAP BO Migration	92469_7386	Jun-16	Dec-21	481	166	315	115	200	0	400	0	
Enterprise Content Mgmt	98475_7438	Nov-20	Jun-23	3,000	0	3,000	750	1,500	750	3,000	0	
WQRS Aquarius	98478_7441	Jan-19	Jun-21	325	144	181	181	0	0	325	0	
LIMS Upgrade	98484_7447	Mar-15	Jun-23	654	354	300	0	150	150	300	0	
MAXIMO Interface Enhancements	98500_7649	Mar-21	Sep-22	655	0	655	155	500	0	655	0	
MAXIMO Upgrade	98501_7650	Dec-21	Jun-22	560	0	560	0	560	0	560	0	
AP Invoice Automation	98502_7651	Apr-23	Jun-23	0	0	0	0	0	0	0	0	
Hyperion	98503_7652	Sep-21	Jun-23	350	0	350	0	188	162	350	0	
HOML	98504_7653	Feb-21	Apr-21	150	0	150	150	0	0	150	0	
Archiving & Data Mgmt	98506_7656	Jul-21	Dec-21	545	0	545	0	545	0	545	0	
PI (OSI)	98606_7666	Jan-22	Dec-22	258	0	258	0	213	45	258	0	
<b>940 Application Improvement Program Total</b>				<b>20,848</b>	<b>3,190</b>	<b>17,658</b>	<b>3,382</b>	<b>6,034</b>	<b>3,257</b>	<b>12,972</b>	<b>4,985</b>	
<b>942 Information Security Program (ISP)</b>												
IT Security Infrastructure - Equipment	92434_7285	Sep-11	Jun-14	501	501	0	0	0	0	0	0	
MSSP	92500_7499	Jun-16	Jun-21	1,050	1,047	4	4	0	0	189	0	
ITSM Access Management	92501_7657	Jul-21	Jun-22	325	0	325	0	325	0	325	0	
MSSP/SIEM	92502_7658	Nov-21	Nov-24	5,200	0	5,200	0	1,800	1,700	3,500	1,700	
Active Directory	92503_7659	Jan-20	Sep-20	195	95	99	99	0	0	195	0	
XenMobile/XenApp WorxSpace	98476_7439	Apr-14	Mar-20	27	27	0	0	0	0	0	0	
Inform Security Plan Implem	98477_7440	Oct-21	Jun-22	360	0	360	0	360	0	360	0	
IT Security Program (ISP) Development	98483_7446	May-13	Jun-14	318	318	0	0	0	0	0	0	
<b>942 Information Security Program (ISP) Total</b>				<b>7,976</b>	<b>1,988</b>	<b>5,988</b>	<b>103</b>	<b>2,485</b>	<b>1,700</b>	<b>4,569</b>	<b>1,700</b>	
<b>944 Information Technology Management Program</b>												
Implement IT Task Force	92412_7240			0	0	0	0	0	0	0	0	
Service Delivery & Best Practices	92421_7252	Jul-19	Jun-20	0	0	0	0	0	0	0	0	
Reorganize MIS Department	92422_7253			0	0	0	0	0	0	0	0	
IT Project Management Methodology	98472_7408	Apr-19	Nov-21	200	0	200	40	160	0	200	0	
Change Management	98479_7442			0	0	0	0	0	0	0	0	
<b>944 Information Technology Management Program Total</b>				<b>200</b>	<b>0</b>	<b>200</b>	<b>40</b>	<b>160</b>	<b>0</b>	<b>200</b>	<b>0</b>	

**Massachusetts Water Resources Authority  
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\$000s**

Program / Project / Contract	Contract No.	Notice to Proceed	Substantial Completion	Total Contract Amount	Payments through FY20	Remaining Balance	FY21	FY22	FY23	FY19-FY23	FY24-FY28	Beyond FY28
<b>946 IT Infrastructure Program</b>												
IT System Architecture	92404_7200	Sep-12	Oct-15	1,009	1,009	0	0	0	0	0	0	0
Cabling	92405_7201	Mar-11	Jan-22	5,066	1,066	4,001	1,333	2,001	667	4,001	0	0
Sans Storage	92406_7203	Jul-13	Jun-22	2,059	1,041	1,018	0	1,018	0	1,018	0	0
Oracle Database Appliance	92407_7204	Jul-13	Oct-22	761	581	180	0	0	180	180	0	0
Servers	92408_7205	Oct-13	Mar-23	1,165	792	373	118	118	137	860	0	0
Near Field Communications	98480_7443	Jul-23	Dec-23	790	646	145	0	0	0	7	145	0
Exchange Upgrades	98481_7444	Jun-16	Jun-20	118	118	0	0	0	0	110	0	0
Enterprise Data Management	98482_7445	Jan-14	Dec-21	2,121	1,083	1,038	0	692	346	1,038	0	0
NetScalers	98505_7654	Jun-20	Jun-21	100	0	100	100	0	0	100	0	0
Telephone System Upgrade	98600_7660	Mar-21	Dec-21	447	0	447	0	149	298	447	0	0
Core Switches	98601_7661	Jul-20	Sep-20	500	0	500	500	0	0	500	0	0
Edge Switches	98602_7662	Jul-20	Dec-20	700	0	700	700	0	0	700	0	0
Disaster Recovery	98603_7663	May-21	Sep-21	983	0	983	250	733	0	983	0	0
Instrumentation & Controls IT	98604_7664	Sep-21	Mar-22	310	0	310	0	310	0	310	0	0
Virtual Desktop Infrastructure	98608_7802	Jul-21	Jun-23	500	0	500	0	200	300	500	0	0
<b>946 IT Infrastructure Program Total</b>				<b>16,629</b>	<b>6,336</b>	<b>10,295</b>	<b>3,001</b>	<b>5,221</b>	<b>1,928</b>	<b>10,754</b>	<b>145</b>	

# APPENDIX 3

## New Capital Projects Added During the FY22 CIP

**Appendix 3**  
**New Capital Projects Added to the FY22 Proposed CIP**

Program	Project	Subphase	Contract Number	Total Contract Amount	NTP	SC	FY21	FY22	FY23	FY19-23	Beyond FY23	Total Expenditures
Interception and Pumping	Facility Asset Protection	Charlestown Pump Station Demolition	7803	\$ 2,000,000	Mar-21	Mar-23	\$ 83,333	\$ 1,000,000	\$ 916,667	\$ 2,000,000	\$ -	\$ 2,000,000
Drinking Water Quality Improvements	Carroll Water Treatment Plant Asset Protection	Marlborough Emergency Water Connection	7791	\$ 541,000	Mar-21	Sep-21	\$ 500,000	\$ 41,000	\$ -	\$ 541,000	\$ -	\$ 541,000
Business & Operations Support	IT Infrastructure Improvements	Virtual Desktop Infrastructure	7802	\$ 500,000	Jul-21	Jun-23	\$ -	\$ 200,000	\$ 300,000	\$ 500,000	\$ -	\$ 500,000
<b>SUMMARY:</b>												
<b>Total Wastewater Projects</b>				\$ 2,000,000			\$ 83,333	\$ 1,000,000	\$ 916,667	\$ 2,000,000	\$ -	\$ 2,000,000
<b>Total Waterworks Projects</b>				\$ 541,000			\$ 500,000	\$ 41,000	\$ -	\$ 541,000	\$ -	\$ 541,000
<b>Business &amp; Operations Support</b>				\$ 500,000			\$ -	\$ 200,000	\$ 300,000	\$ 500,000	\$ -	\$ 500,000
<b>Total Projects</b>				\$ 3,041,000			\$ 583,333	\$ 1,241,000	\$ 1,216,667	\$ 3,041,000	\$ -	\$ 3,041,000

# APPENDIX 4

## Overview of the FY22 Proposed CIP and Changes from the FY21 Final CIP

**ATTACHMENT B**  
**Overview of the FY22 Proposed CIP and Changes from the Final FY21 CIP**

Program and Project	FY21 Final			
	Total Budget Amount	FY19-23	FY24-28	Beyond 28
<b>Total MWRA</b>	<b>8,537,295</b>	<b>1,055,235</b>	<b>1,859,106</b>	<b>1,349,195</b>
<b>Wastewater</b>	<b>3,834,479</b>	<b>601,117</b>	<b>1,044,733</b>	<b>127,310</b>
<b>Interception &amp; Pumping</b>	<b>1,238,479</b>	<b>221,249</b>	<b>356,386</b>	<b>58,444</b>
102 Quincy Pump Facilities	25,907	-	-	-
104 Braintree-Weymouth Relief Facilities	241,415	1,797	11,913	-
105 New Neponset Valley Relief Sewer	30,300	-	-	-
106 Wellesley Extension Replacement Sewer	64,359	-	-	-
107 Framingham Extension Relief Sewer	47,856	-	-	-
127 Cummingsville Replacement Sewer	8,999	-	-	-
130 Siphon Structure Rehabilitation	14,668	3,520	10,208	-
131 Upper Neponset Valley Sewer	54,174	-	-	-
132 Corrosion & Odor Control	97,949	62,051	28,878	840
136 West Roxbury Tunnel	11,314	-	1,000	-
137 Wastewater Central Monitoring	27,482	1,226	6,474	-
139 South System Relief Project	4,939	-	1,500	-
141 Wastewater Process Optimization	8,933	701	5,154	1,577
142 Wastewater Meter System-Equipment	21,938	7,391	-	8,823
143 Regional I/I Management Planning	169	-	-	-
145 Facility Asset Protection	572,379	144,301	285,823	47,204
146 D.I. Cross Harbor Tunnel Inspection	5,000	-	5,000	-
147 Randolph Trunk Sewer Relief	698	262	436	-
<b>Treatment</b>	<b>1,121,329</b>	<b>201,050</b>	<b>550,032</b>	<b>69,089</b>
182 DI Primary and Secondary	(958)	-	-	-
200 DI Plant Optimization	33,279	-	-	-
206 DI Treatment Plant Asset Protection	1,055,309	192,954	540,906	69,090
210 Clinton Wastewater Treat Plant	31,487	8,096	9,126	-
211 Laboratory Services	2,212	-	-	-
<b>Residuals</b>	<b>169,281</b>	<b>16,760</b>	<b>30,935</b>	<b>56,540</b>
261 Residuals	63,811	-	-	-
271 Residuals Asset Protection	105,470	16,760	30,935	56,540

Total Budget Amount	FY22 Proposed		
	FY19-23	FY24-28	Beyond 28
<b>8,558,426</b>	<b>1,030,197</b>	<b>1,883,525</b>	<b>1,370,942</b>
<b>3,882,640</b>	<b>592,281</b>	<b>1,064,859</b>	<b>164,179</b>
<b>1,240,648</b>	<b>220,623</b>	<b>332,939</b>	<b>84,685</b>
25,907	-	-	-
241,526	2,372	11,449	-
30,300	-	-	-
64,359	-	-	-
47,856	-	-	-
8,999	-	-	-
14,668	3,520	10,208	-
54,174	-	-	-
98,697	62,828	28,850	840
11,314	-	1,000	-
27,482	1,154	6,546	-
4,939	-	1,500	-
8,933	701	5,154	1,577
21,938	7,087	-	9,126
169	-	-	-
573,689	142,699	262,796	73,142
5,000	-	5,000	-
698	262	436	-
<b>1,167,097</b>	<b>195,929</b>	<b>596,454</b>	<b>73,555</b>
(958)	-	-	-
33,279	-	-	-
1,100,570	187,311	587,343	73,556
31,994	8,618	9,111	-
2,212	-	-	-
<b>169,505</b>	<b>16,522</b>	<b>22,209</b>	<b>65,728</b>
63,811	-	-	-
105,694	16,522	22,209	65,728

Total Budget Amount	Change from Final FY21		
	FY19-23	FY24-28	Beyond 28
<b>21,129</b>	<b>(25,039)</b>	<b>24,420</b>	<b>21,744</b>
<b>48,161</b>	<b>(8,836)</b>	<b>20,126</b>	<b>36,869</b>
<b>2,169</b>	<b>(626)</b>	<b>(23,447)</b>	<b>26,241</b>
-	-	-	-
111	575	(464)	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
748	777	(28)	-
-	-	-	-
-	(72)	72	-
-	-	-	-
-	-	-	-
-	(304)	-	303
-	-	-	-
1,310	(1,602)	(23,027)	25,938
-	-	-	-
-	-	-	-
<b>45,768</b>	<b>(5,121)</b>	<b>46,422</b>	<b>4,466</b>
-	-	-	-
-	-	-	-
45,261	(5,643)	46,437	4,466
507	522	(15)	-
-	-	-	-
<b>224</b>	<b>(238)</b>	<b>(8,726)</b>	<b>9,188</b>
-	-	-	-
224	(238)	(8,726)	9,188

**ATTACHMENT B**  
**Overview of the FY22 Proposed CIP and Changes from the Final FY21 CIP**

Program and Project	FY21 Final				FY22 Proposed				Change from Final FY21			
	Total Budget Amount	FY19-23	FY24-28	Beyond 28	Total Budget Amount	FY19-23	FY24-28	Beyond 28	Total Budget Amount	FY19-23	FY24-28	Beyond 28
<b>CSO</b>	<b>912,524</b>	<b>10,041</b>	<b>85</b>	<b>-</b>	<b>912,524</b>	<b>10,037</b>	<b>89</b>	<b>-</b>	<b>-</b>	<b>(4)</b>	<b>4</b>	<b>-</b>
340 Dorchester Bay Sewer Separation (Fox Point)	55,029	-	-	-	55,029	-	-	-	-	-	-	-
341 Dorchester Bay Sewer Separation (Commercial Point)	63,625	3,763	-	-	63,625	3,763	-	-	-	-	-	-
342 Neponset River Sewer Separation	2,492	-	-	-	2,492	-	-	-	-	-	-	-
343 Constitution Beach Sewer Separation	3,731	-	-	-	3,731	-	-	-	-	-	-	-
344 Stony Brook Sewer Separation	44,319	-	-	-	44,319	-	-	-	-	-	-	-
346 Cambridge Sewer Separation	104,552	-	-	-	104,552	-	-	-	-	-	-	-
351 BWSC Floatables Controls	946	-	-	-	946	-	-	-	-	-	-	-
352 Cambridge Floatables Control	1,127	-	-	-	1,127	-	-	-	-	-	-	-
356 Fort Point Channel Sewer Separation	11,507	-	-	-	11,507	-	-	-	-	-	-	-
358 Morrissey Boulevard Drain	32,181	-	-	-	32,181	-	-	-	-	-	-	-
359 Reserved Channel Sewer Separation	70,524	-	-	-	70,524	-	-	-	-	-	-	-
360 Brookline Sewer Separation	24,715	-	-	-	24,715	-	-	-	-	-	-	-
361 Bulfinch Triangle Sewer Separation	9,032	-	-	-	9,032	-	-	-	-	-	-	-
339 North Dorchester Bay	221,510	-	-	-	221,510	-	-	-	-	-	-	-
347 East Boston Branch Sewer Relief	85,637	-	-	-	85,637	-	-	-	-	-	-	-
348 BOS019 Storage Conduit	14,288	-	-	-	14,288	-	-	-	-	-	-	-
349 Chelsea Trunk Sewer	29,779	-	-	-	29,779	-	-	-	-	-	-	-
350 Union Park Detention Treatment Facility	49,583	-	-	-	49,583	-	-	-	-	-	-	-
353 Upgrade Existing CSO Facilities	22,385	-	-	-	22,385	-	-	-	-	-	-	-
354 Hydraulic Relief Projects	2,295	-	-	-	2,295	-	-	-	-	-	-	-
355 MWR003 Gate & Siphon	4,424	-	-	-	4,424	-	-	-	-	-	-	-
357 Charles River CSO Controls	3,633	-	-	-	3,633	-	-	-	-	-	-	-
324 CSO Support	55,210	6,279	86	-	55,210	6,275	90	-	-	(4)	4	-
<b>Other Wastewater</b>	<b>392,866</b>	<b>152,017</b>	<b>107,295</b>	<b>(56,763)</b>	<b>392,866</b>	<b>149,170</b>	<b>113,168</b>	<b>(59,789)</b>	<b>-</b>	<b>(2,847)</b>	<b>5,873</b>	<b>(3,026)</b>
128 I/I Local Financial Assistance	392,585	152,017	107,295	(56,763)	392,585	149,170	113,168	(59,789)	-	(2,847)	5,873	(3,026)
138 Sewerage System Mapping Upgrade	281	-	-	-	281	-	-	-	-	-	-	-
<b>Total Waterworks</b>	<b>4,529,816</b>	<b>404,762</b>	<b>791,760</b>	<b>1,221,888</b>	<b>4,498,651</b>	<b>385,310</b>	<b>795,170</b>	<b>1,206,763</b>	<b>(31,165)</b>	<b>(19,452)</b>	<b>3,410</b>	<b>(15,125)</b>
<b>Drinking Water Quality</b>	<b>708,071</b>	<b>16,377</b>	<b>13,450</b>	<b>28,271</b>	<b>709,291</b>	<b>16,237</b>	<b>14,811</b>	<b>28,271</b>	<b>1,220</b>	<b>(140)</b>	<b>1,361</b>	<b>-</b>
542 Carroll Water Treatment Plant	438,652	6,285	9,250	-	439,307	6,941	9,250	-	655	656	-	-
543 Quabbin Water Treatment Plant	19,973	-	-	-	19,973	-	-	-	-	-	-	-
544 Norumbega Covered Storage	106,674	-	-	-	106,674	-	-	-	-	-	-	-
545 Blue Hills Covered Storage	40,083	-	-	-	40,083	-	-	-	-	-	-	-
550 Spot Pond Storage Facility	60,126	-	-	-	60,126	-	-	-	-	-	-	-
555 CWTP Asset Protection	42,563	10,092	4,200	28,271	43,128	9,296	5,561	28,271	565	(796)	1,361	-



**ATTACHMENT B**  
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Program and Project	FY21 Final				FY22 Proposed				Change from Final FY21			
	Total Budget Amount	FY19-23	FY24-28	Beyond 28	Total Budget Amount	FY19-23	FY24-28	Beyond 28	Total Budget Amount	FY19-23	FY24-28	Beyond 28
<b>Transmission</b>	<b>2,620,959</b>	<b>130,394</b>	<b>365,315</b>	<b>1,300,055</b>	<b>2,569,157</b>	<b>135,180</b>	<b>320,090</b>	<b>1,288,691</b>	<b>(51,802)</b>	<b>4,786</b>	<b>(45,225)</b>	<b>(11,364)</b>
597 Winsor Station Pipeline	53,203	1,304	45,513	653	53,081	1,304	45,391	653	(122)	-	(122)	-
601 Sluice Gate Rehabilitation	9,158	-	-	-	9,158	-	-	-	-	-	-	-
604 MetroWest Tunnel	700,184	-	3,002	-	700,184	-	3,002	-	-	-	-	-
615 Chicopee Valley Aqueduct Redundancy	8,666	-	-	-	8,666	-	-	-	-	-	-	-
616 Quabbin Transmission System	22,246	11,099	2,455	25	21,658	10,563	2,403	25	(588)	(536)	(52)	-
617 Sudbury/Weston Aqueduct Repairs	12,496	2,341	7,257	667	12,495	2,341	7,255	667	(1)	-	(2)	-
620 Wachusett Reservoir Spillway Improvement	9,287	-	-	-	9,287	-	-	-	-	-	-	-
621 Watershed Land	29,000	6,154	-	-	29,000	6,154	-	-	-	-	-	-
622 Cosgrove/Wachusett Redundancy	58,592	6,574	-	-	58,628	6,610	-	-	36	36	-	-
623 Dam Projects	7,023	3,861	46	-	7,223	3,532	575	-	200	(329)	529	-
625 Metro Tunnel Redundancy	1,506,963	23,945	197,424	1,282,137	1,500,218	22,939	188,228	1,285,594	(6,745)	(1,006)	(9,196)	3,457
628 Metro Redundancy Interim Improvement	180,056	65,860	94,787	16,571	135,356	73,621	57,147	1,750	(44,700)	7,761	(37,640)	(14,821)
630 Watershed Division Capital Improvement	24,083	9,254	14,829	-	24,201	8,114	16,087	-	118	(1,140)	1,258	-
<b>Distribution &amp; Pumping</b>	<b>1,039,778</b>	<b>163,412</b>	<b>349,731</b>	<b>62,281</b>	<b>1,052,701</b>	<b>156,702</b>	<b>369,319</b>	<b>62,324</b>	<b>12,923</b>	<b>(6,710)</b>	<b>19,588</b>	<b>43</b>
618 Peabody Pipeline	1,448	389	-	-	1,448	389	-	-	-	-	-	-
677 Valve Replacement	22,279	-	6,747	3,515	22,249	-	6,747	3,485	(30)	-	-	(30)
678 Boston Low Service-Pipe & Valve Rehabilitation	23,691	-	-	-	23,691	-	-	-	-	-	-	-
683 Heath Hill Road Pipe Replacement	19,358	-	-	-	19,358	-	-	-	-	-	-	-
689 James L. Gillis Pump Station Rehabilitation	33,419	-	-	-	33,419	-	-	-	-	-	-	-
692 NHS - Section 27 Improvements	1,668	28	1,517	-	1,665	28	1,514	-	(3)	-	(3)	-
693 NHS - Revere & Malden Pipeline Improvement	86,011	19,062	36,349	2,039	86,010	18,848	36,469	2,131	(1)	(214)	120	92
702 New Connect Mains-Shaft 7 to WASM 3	57,572	26,320	18,327	-	60,694	20,421	27,349	-	3,122	(5,899)	9,022	-
704 Rehabilitation of Other Pump Stations	51,290	780	20,453	-	51,290	780	20,453	-	-	-	-	-
706 NHS-Connecting Mains from Section 91	2,360	-	-	-	2,360	-	-	-	-	-	-	-
708 Northern Extra High Service New Pipelines	40,180	2,525	33,850	173	43,839	5,840	34,000	367	3,659	3,315	150	194
712 Cathodic Protection Of Distrubution Mains	63,483	12,066	51,148	-	61,683	12,375	49,038	-	(1,800)	309	(2,110)	-
713 Spot Pond Supply Mains Rehabilitation	66,289	800	-	-	66,498	1,008	-	-	209	208	-	-
714 Southern Extra High Sections 41 & 42	3,657	-	-	-	3,657	-	-	-	-	-	-	-
719 Chestnut Hill Connecting Mains	38,945	-	20,648	11	38,886	-	20,590	9	(59)	-	(58)	(2)
720 Warren Cottage Line Rehabilitation	1,205	-	-	-	1,205	-	-	-	-	-	-	-
721 South Spine Distribution Mains	90,585	3,241	50,423	238	90,448	3,237	50,302	226	(137)	(4)	(121)	(12)
722 NIH Redundancy & Storage	128,729	45,574	34,250	10	137,170	41,325	46,940	10	8,441	(4,249)	12,690	-
723 Northern Low Service Rehabilitation Section 8	60,945	13,194	44,664	133	60,834	13,194	44,571	115	(111)	-	(93)	(18)
724 Northern High Service - Pipeline Rehabilitation	-	-	-	-	-	-	-	-	-	-	-	-
725 Hydraulic Model Update	598	-	-	-	598	-	-	-	-	-	-	-
727 Southern Extra High Redundancy & Storage	141,243	38,522	18,114	56,162	140,915	38,353	18,136	55,981	(328)	(169)	22	(181)
730 Weston Aqueduct Supply Mains	80,457	54	-	-	80,457	54	-	-	-	-	-	-
731 Lynnfield Pipeline	5,626	-	-	-	5,626	-	-	-	-	-	-	-
732 Walnut St. & Fisher Hill Pipeline Rehabilitation	2,717	-	-	-	2,717	-	-	-	-	-	-	-

**ATTACHMENT B**  
**Overview of the FY22 Proposed CIP and Changes from the Final FY21 CIP**

Program and Project	FY21 Final				FY22 Proposed				Change from Final FY21			
	Total Budget Amount	FY19-23	FY24-28	Beyond 28	Total Budget Amount	FY19-23	FY24-28	Beyond 28	Total Budget Amount	FY19-23	FY24-28	Beyond 28
733 NHS Pipeline Rehabilitation 13-18 & 48	-	-	-	-	-	-	-	-	-	-	-	-
734 Southern Extra High Pipelines-Sections 30, 39,40, & 44	-	-	-	-	-	-	-	-	-	-	-	-
735 Section 80 Rehabilitation	16,024	858	13,240	-	15,985	851	13,209	-	(39)	(7)	(31)	-
<b>Other</b>	<b>161,008</b>	<b>94,579</b>	<b>63,264</b>	<b>(168,721)</b>	<b>167,502</b>	<b>77,191</b>	<b>90,950</b>	<b>(172,525)</b>	<b>6,494</b>	<b>(17,388)</b>	<b>27,686</b>	<b>(3,804)</b>
753 Central Monitoring System	42,082	16,960	4,418	-	42,020	15,007	6,309	-	(62)	(1,953)	1,891	-
763 Distribution Systems Facilities Mapping	2,799	1,183	580	-	2,799	885	878	-	-	(298)	298	-
764 Local water infrastructure rehabilitation Assistance	7,488	-	-	-	7,488	-	-	-	-	-	-	-
765 Local Water Pipeline Improvement Loan Program	-	54,163	4,819	(199,255)	-	42,588	20,215	(203,077)	-	(11,575)	15,396	(3,822)
766 Waterworks Facility Asset Protection	108,639	22,274	53,447	30,534	115,195	18,712	63,548	30,552	6,556	(3,562)	10,101	18
<b>Business &amp; Operations Support</b>	<b>173,000</b>	<b>49,356</b>	<b>22,613</b>	<b>-</b>	<b>177,135</b>	<b>52,606</b>	<b>23,496</b>	<b>-</b>	<b>4,133</b>	<b>3,249</b>	<b>884</b>	<b>-</b>
881 Equipment Purchase	42,711	9,914	10,940	-	41,337	10,323	9,157	-	(1,374)	409	(1,783)	-
925 Technical Assistance	1,125	1,125	-	-	1,150	766	384	-	25	(359)	384	-
930 MWRA Facility - Chelsea	9,812	-	-	-	9,812	-	-	-	-	-	-	-
931 Business Systems Plan	24,562	(1)	-	-	24,562	(1)	-	-	-	-	-	-
932 Environmental Remediation	1,479	-	-	-	1,479	-	-	-	-	-	-	-
933 Capital Maintenance Planning	26,385	12,184	-	-	26,385	12,184	-	-	-	-	-	-
934 MWRA Facilities Management	3,071	1,075	1,625	-	3,071	1,075	1,625	-	-	-	-	-
935 Alternative Energy Initiatives	23,700	(234)	5,516	-	23,684	(234)	5,500	-	(16)	-	(16)	-
940 Applicat Improv Program	18,249	10,971	4,385	-	20,849	12,971	4,985	-	2,600	2,000	600	-
942 Info Security Program ISP	5,506	3,798	-	-	7,976	4,568	1,700	-	2,470	770	1,700	-
944 Info Tech Mgmt Program	200	200	-	-	200	200	-	-	-	-	-	-
946 IT Infrastructure Program	16,202	10,325	146	-	16,630	10,754	145	-	428	429	(1)	-

# APPENDIX 5

## Master Plan/CIP Status

**Appendix 5  
Master Plan/CIP Status**

Listing of Master Plan Projects	Original MP Rating	CIP Year	Rating when added to CIP	NTP	SC	Total Contract Amount	FY19-23	Beyond FY23	Comment
<b>FY22 Proposed Budget Cycle</b>									
<b>No Projects from Master Plan Added to Budget this Cycle</b>									
<b>FY21 Budget Cycle</b>									
<b>S.206 DITP Asset Protection</b>									
DITP Roofing Replacement	3	FY21	3	Jan-21	Jun-22	2,000,000	2,000,000	0	
<b>210 Clinton Wastewater Treat Plant</b>									
Clinton SCADA Upgrades	3	FY21	3	Jan-24	Jan-26	750,000	0	750,000	
Clinton Fire Alarm Replacement	3	FY21	3	Jan-21	Jul-22	900,000	900,000	0	
<b>S.542 Carroll Water Treatment Plant</b>									
Corrosion Control Pipe Loop Study	3	FY21	3	Mar-21	Mar-22	500,000	500,000	0	
Technical Assistance 11	3	FY21	3	Jan-21	Dec-22	750,000	750,000	0	
Technical Assistance 12	3	FY21	3	Jan-21	Dec-22	750,000	750,000	0	
<b>FY21 Master Plan Totals - 5 projects</b>						<b>\$5,650,000</b>	<b>\$4,900,000</b>	<b>\$750,000</b>	
<b>FY20 Budget Cycle</b>									
<b>S.145 I&amp;P Asset Protection</b>									
Section 191 & 192 Charles River Valley Sewer	3	FY20	3	May-19	Oct-19	500,000	500,000	0	
Pump Stations & CSO Facility Rehab Design/CA/REI	3	FY20	3	Nov-21	Nov-31	7,500,000	650,000	6,850,000	
Pump Stations & CSO Facility Rehab Construction	3	FY20	3	Nov-23	Nov-30	37,500,000	0	37,500,000	
<b>S.555 Carroll Water Treatment Plant Asset Protection</b>									
CWTP Emergency Generator #1 Replacement (Electric Portion)	3	FY20	2	Jan-19	Aug-19	750,000	750,000	0	
<b>FY20 Master Plan Totals - 4 projects</b>						<b>\$46,250,000</b>	<b>\$1,900,000</b>	<b>\$44,350,000</b>	
<b>FY19 Budget Cycle</b>									
<b>S.206 Deer Island Asset Protection</b>									
Hydroturbine Replacements Design/ESDC/REI	3	FY19	3	Sep-18	Jun-24	2,000,000	1,720,253	279,747	
Hydroturbine Replacements Construction	3	FY19	3	Jun-20	Jun-23	10,000,000	8,611,111	1,388,889	
Bidirectional Radio Repeater System Upgrade	2	FY19	2	Apr-18	Oct-19	3,000,000	3,000,000		
<b>S.128 I/ Local Financial Assistance</b>									
Phases 11 & 12	3	FY19	3	Aug-18	Aug-25	90,000,000	63,700,000	26,300,000	
<b>S. 542 Carroll Water Treatment Plant</b>									
HVAC Equipment Replacement	2	FY19	2	Jul-19	May-22	2,300,000		2,300,000	
CWTP Chemical Pipe System Pipe, Pumps and Tank Replacement	2	FY19	2	Jul-27	Jun-29	4,000,000		4,000,000	
CWTP Water Pump Replacement	2	FY19	2	Jul-27	Jul-30	2,000,000		2,000,000	
Ozone Generator Replacement	2	FY19	2	Oct-27	Oct-30	20,000,000		20,000,000	
Ultra Violet Reactor Replacement	2	FY19	2	Oct-32	Oct-34	10,000,000		10,000,000	
<b>S. 623 Dam Projects</b>									
Sudbury/Foss Dam Impr/Wach North Dike Overtopping Protection Design CA/RI	2	FY19	2	Oct-24	Oct-29	210,000	302,960		
Sudbury/Foss Dam Improvements/Wachusett North Dike Overtopping Protection Construction	2	FY19	2	Oct-26	Oct-28	1,600,000	1,693,325		
<b>S.617 Sudbury/Weston Aqueduct Repairs</b>									
Farm Pond Inlet Chamber and Gate House - Rehabilitation Design CA/RI	3	FY19	3	Oct-24	Oct-29	400,000		400,000	
Farm Pond Inlet Chamber and Gate House - Rehabilitation Construction	3	FY19	3	Oct-26	Oct-28	2,000,000		2,000,000	
Waban Arches Rehabilitation Design CA/RI	3	FY19	3	Oct-23	Oct-28	300,000		300,000	
Waban Arches Rehabilitation Construction	3	FY19	3	Oct-25	Oct-27	1,200,000		1,200,000	
<b>S.621 Watershed Land</b>									
Watershed Land Acquisition	3	FY19	3	Apr-06	Jun-23	5,000,000		5,000,000	
<b>S.693 NHS Revere &amp; Malden Pipeline</b>									
Sections 13 & 48 Rehabilitation Design CA/RI	3	FY19	3	Jul-24	Jul-29	2,150,000		2,150,000	
Sections 13 & 48 Rehabilitation Construction	3	FY19	3	Jul-26	Jul-28	10,750,000		10,750,000	
<b>S.712 Cathodic Protection Distribution Mains</b>									
Cathodic Protection Western System Design/CA/RI	3	FY19	2	Jul-19	Jun-23	930,000	909,000	21,000	Condition determined to be worse than when Master Plan Priority Ratings assigned.
Cathodic Protection Western System Construction	3	FY19	2	Jul-21	Jun-23	4,300,000	3,762,000	538,000	Condition determined to be worse than when Master Plan Priority Ratings assigned.
Cathodic Protection Metropolitan System Design/CA/RI	3	FY19	2	Jul-20	Jun-26	9,900,000	4,602,000	5,298,000	Condition determined to be worse than when Master Plan Priority Ratings assigned.
Cathodic Protection Metropolitan System Construction	3	FY19	2	Jul-22	Jun-26	47,100,000	8,831,000	38,269,000	Condition determined to be worse than when Master Plan Priority Ratings assigned.
<b>S.763 Distribution Systems Facilities Mapping</b>									
Water System Hydraulic Model	4	FY19	4	Jul-19	Jun-20	500,000	500,000		
<b>FY19 Master Plan Totals - 17 projects</b>						<b>\$229,640,000</b>	<b>\$97,631,649</b>	<b>\$132,194,636</b>	

## **Master Plan Priority Ratings - Wastewater**

### **Priority One**

### **Critical/Emergency**

Risk moderate to high/Consequence very high

*Projects which:*

Resolve emergencies or critical threats to public health or worker health and safety

Prevent imminent failure of the system and significant loss of service

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### **Priority Two**

### **Essential Projects**

Risk variable/Consequences high

*Projects which are essential to:*

Critical facility assessment

Fix existing reliability or capacity problems during dry weather flow conditions

Reduce sanitary sewer overflows from the MWRA system

Address facilities in poor condition where the ability to provide uninterrupted service or adequate flow is compromised.

Upgrade or maintain emergency backup facilities in poor condition

Meet minimum hydraulic performance requirements and service needs

Implement MWRA's approved CSO control plan

Maintain wastewater effluent and residuals quality

To comply with mandated legal, regulatory or statutory requirements

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### **Priority Three**

### **Necessary Projects**

Risk moderate to high/Consequence moderate to low

*Projects which are necessary to:*

Improve public health and worker safety

Restore the system's infrastructure where it is seriously deteriorated

Improve hydraulic performance

Significantly improve the effectiveness, efficiency, or reliability of system operations and service delivery including where appropriate, the ability to monitor the system

Maintain consumer confidence

To comply with other legal, regulatory or statutory requirements

---

**Priority Four**

**Important Projects**

Risk moderate/Consequences low

*Projects which are important to:*

Maintain the integrity of the system's infrastructure

Produce significant cost savings or revenue gains for MWRA

Monitor system needs and plan appropriate longer-term responses

Provide acceptable working conditions at field sites and at maintenance support facilities

Implement the regional I/I plan

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**Priority Five**

**Desirable Projects**

Risk/Consequence both low

*Projects which are desirable because they would:*

Yield worthwhile cost savings, revenue gains, or efficiency improvements for MWRA

Protect the long term value and usefulness of system assets

Solve future problems and conditions which are expected to arise in the latter half of the planning period

Be beneficial towards the improved operation of a local system

## **Master Plan Priority Ratings - Water**

### **Priority One**

### **Critical/Emergency**

Risk moderate to high/Consequence very high

*Projects which:*

Resolve emergencies or critical threats to public health or worker health and safety

Prevent imminent failure of the system and significant loss of service

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### **Priority Two**

### **Essential Projects**

Risk variable/Consequences high

*Projects which are essential to:*

Critical facility assessment

Fix existing reliability problems related to “single points of failure”

Upgrade or maintain emergency back-up facilities in operational condition

Address facilities in poor condition where the ability to provide uninterrupted service, sanitary protections or adequate flow is compromised.

Meet minimum hydraulic performance requirements and service needs including adequate distribution storage in areas with a critical shortfall of storage

To comply with mandated legal, regulatory or statutory requirements

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### **Priority Three**

### **Necessary Projects**

Risk moderate to high/Consequences moderate to low

*Projects which are necessary to:*

Improve public health and worker safety

Restore the system’s infrastructure where it is seriously deteriorated

Significantly improve the effectiveness, efficiency, or reliability of system operations and service delivery including where appropriate, the ability to monitor the system

Preserve water quality during distribution

Maintain consumer confidence

To comply with other legal, regulatory or statutory requirements

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**Priority Four**

**Important Projects**

Risk moderate/Consequence low

*Projects which are important to:*

Maintain the integrity of the system's infrastructure

Improve hydraulic performance or add distribution storage

Produce significant cost savings or revenue gains for MWRA

Monitor system needs and plan appropriate longer-term responses

Provide acceptable working conditions at field sites and at maintenance support facilities

Maintain efforts to manage system demands

Provide broader environmental benefits

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**Priority Five**

**Desirable Projects**

Risk/Consequence both low

*Projects which are desirable because they would:*

Yield worthwhile cost savings, revenue gains, or efficiency improvements for MWRA

Protect the long term value and usefulness of system assets

Solve future problems and conditions which are expected to arise in the latter half of the planning period

Be beneficial towards the improved operation of a local system



# APPENDIX 6

## Municipality and Project Reference by Municipality

**APPENDIX 6  
PROJECT/MUNICIPALITY(S)**

Project	Number/ Project	Community(s) Served
104	Braintree-Weymouth Relief Facilities	Braintree, Hingham, Holbrook, Randolph, Weymouth, Quincy
128	Infiltration/Inflow Local Financial Assistance Program	All Wastewater Communities
130	Siphon Structure Rehabilitation	All Wastewater Communities
131	Upper Neponset Valley Sewer System	Dedham, Boston, Brookline, Newton
132	Corrosion and Odor Control Study	All Wastewater Communities
136	West Roxbury Tunnel	Ashland, Framingham, Natick, Wellesley, Dedham, Boston, Brookline, Newton, Needham, and
137	Wastewater Central Monitoring	All Wastewater Communities
139	South System Relief Project	Boston, Milton
141	Wastewater Process Optimization	All Wastewater Communities
142	Wastewater Metering System Equipment Replacement	All Wastewater Communities
145	Interception & Pumping Facility Asset Protection	All Wastewater Communities
146	D.I. Cross Harbor Tunnel	All Wastewater Communities
147	Randolph Trunk Sewer Relief	Braintree & Randolph
206	Deer Island Treatment Plant Asset Protection	All Wastewater Communities
210	Clinton Wastewater Treatment Plant	Clinton
211	Laboratory Services	All MWRA Communities
271	Residuals Asset Protection	All Wastewater Communities
324	CSO Support	Boston, Cambridge, Chelsea, Revere, Somerville
339	North Dorchester Bay & Reserve Channel Conduits/CSO	Boston
340	South Dorchester Bay Sewer Separation (Fox Point)	Boston
341	South Dorchester Bay Sewer Separation (Commercial Pt.)	Boston
346	Cambridge CAM002-004 Sewer Separation	Cambridge
347	East Boston Branch Sewer Relief	Boston, Chelsea, Everett
355	MWR003 Gate and Siphon	Boston, Cambridge
356	Fort Point Channel Sewer Separation	Boston
357	Charles River CSO Controls	Boston, Brookline, Cambridge
358	Morrissey Boulevard Drain	Boston
359	Reserved Channel Sewer Separation	Boston
360	Brookline Sewer Separation	Brookline
361	Bulfinch Triangle Sewer Separation	Boston
542	Carroll Water Treatment Plant	All Water Customers (except Chicopee, Wilbraham, South Hadley Fire District #1, Worcester, Clinton, and Leominster)
543	Quabbin Water Treatment Plant	South Hadley, Chicopee, Wilbraham
545	Blue Hills Covered Storage	Boston, Canton, Milton, Norwood, Quincy, Brookline, Dedham, Westwood, Stoughton
550	Low Service Storage Near Spot Pond	Cambridge, Charlestown, Chelsea, East Boston, Everett, Malden, Medford, Somerville
555	Carroll Water Treatment Plant Asset Protection	All Water Customers (except Chicopee, Wilbraham, South Hadley Fire District #1, Worcester, Clinton, and Leominster)
597	Winsor Dam Hydroelectric	All Water Communities
604	MetroWest Tunnel	All Water Communities (except South Hadley Fire District #1, Chicopee, Wilbraham, Worcester, Clinton, and Leominster)
616	Quabbin Transmission System	Chicopee, South Hadley, Wilbraham
617	Sudbury/Weston Aqueduct Repairs	All Water Communities (except South Hadley Fire District #1, Chicopee, Wilbraham, Worcester, Clinton, and Leominster)
618	Peabody Pipeline Project	Peabody
621	Watershed Land	All Water Communities
622	Cosgrove Tunnel Redundancy	All Water Customers (except Chicopee, Wilbraham, South Hadley Fire District #1, Worcester, Clinton, and Leominster)
623	Dam Projects	All Water Communities
625	Metro Tunnel Redundancy	All Water Customers (except Chicopee, Wilbraham, South Hadley Fire District #1, Worcester, Clinton, and Leominster)
628	Metro Redundancy Interim Improvements	All Water Customers (except Chicopee, Wilbraham, South Hadley Fire District #1, Worcester, Clinton, and Leominster)
630	Watershed Division Capital Improvements	All Water Communities
677	Valve Replacement	All Water Communities
692	Northern High Service Section 27 Improvements	Lynn, Marblehead, Nahant, Swampscott
693	Northern High Service Pipe Improvements - Revere/Malden	Boston, Lynn, Malden, Marblehead, Nahant, Peabody, Reading, Revere, Saugus, Winthrop, Wakefield, Melrose, Lynnfield, Swampscott, Stoneham, Medford
702	New Connecting Mains - Shaft 7 to WASM 3	Arlington, Bedford, Belmont, Boston, Lexington, Medford, Newton, Somerville, Waltham, Watertown, Winchester
704	Rehabilitation of Other Pump Stations	Arlington, Bedford, Belmont, Boston, Brookline, Canton, Lexington, Milton, Norwood, Waltham, Watertown, Winchester
708	Northern Extra High Service - New Pipelines	Arlington, Bedford, Lexington, Waltham
712	Cathodic Protection of Distribution Mains	All Water Communities
713	Spot Pond Supply Mains Rehabilitation	Arlington, Boston, Cambridge, Chelsea, Everett, Malden, Medford, Somerville
719	Chestnut Hill Connecting Mains	Boston, Brookline, Newton
721	Southern Spine Distribution Mains	Boston, Brookline, Canton, Milton, Norwood, Quincy, Dedham, Westwood, Stoughton

**APPENDIX 6  
PROJECT/MUNICIPALITY(S)**

<b>Project</b>	<b>Number/ Project</b>	<b>Community(s) Served</b>
722	NIH Redundancy & Covered Storage	Reading, Stoneham, Wakefield, Winchester, Woburn
723	Northern Low Service Rehab. - Sections 8	Chelsea, Boston, Everett
727	SEH Redundancy & Storage	Boston, Brookline, Canton, Milton, Norwood, Dedham, Westwood, Stoughton
730	Weston Aqueduct Supply Mains	Weston, Newton, Boston, Watertown, Cambridge, Waltham, Belmont, Arlington, Somerville
731	Lynnfield Pipeline	Lynnfield, Saugus
735	Section 80 Rehabilitation	Wellesley and Needham
753	Central Monitoring System	All Water Communities
763	Distribution Systems Facilities Mapping	All Water Communities
765	Local Water Pipeline Imp. Loan Program	All Water Communities
766	Waterworks Facility Asset Protection	All Water Communities
881	Centralized Equipment Purchase	All MWRA Customers
925	Technical Assistance	All MWRA Customers
931	Business Systems Plan	All MWRA Customers
932	Environmental Remediation	All MWRA Customers
933	Capital Maintenance Planning/Development	All MWRA Customers
934	MWRA Facilities Management	All MWRA Customers
935	Alternative Energy Initiatives	All MWRA Customers
940	Application Improvement Program	All MWRA Customers
942	Information Security Program ISP	All MWRA Customers
944	Information Technology Management Program	All MWRA Customers
946	IT Infrastructure Program	All MWRA Customers

**APPENDIX 6  
MUNICIPALITY/PROJECT(S)**

<b>Municipality Project Number/Project</b>	<b>Municipality Project Number/Project</b>
<b>All MWRA COMMUNITIES</b>	<b>Ashland</b>
211 Laboratory Services	136 West Roxbury Tunnel
881 Equipment Purchase	
925 Technical Assistance	<b>Bedford</b>
931 Business Systems Plan	702 New Connecting Mains - Shaft 7 to WASM 3
932 Environmental Remediation	704 Rehabilitation of Other Pump Stations
933 Capital Maintenance Planning/Development	708 Northern Extra High Service - New Pipelines
934 MWRA Facilities Management	
935 Alternative Energy Initiatives	<b>Belmont</b>
940 Application Improvement Program	702 New Connecting Mains - Shaft 7 to WASM 3
942 Information Security Program ISP	704 Rehabilitation of Other Pump Stations
944 Information Technology Management Program	730 Weston Aqueduct Supply Mains
946 IT Infrastructure Program	
<b>ALL WASTEWATER COMMUNITIES</b>	<b>Boston</b>
128 Infiltration/Inflow Local Financial Assistance Program	131 Upper Neponset Valley Sewer System
130 Siphon Structure Rehabilitation	136 West Roxbury Tunnel
132 Corrosion & Odor Control Study	139 South System Relief Project
137 Wastewater Central Monitoring	324 CSO Support
141 Wastewater Process Optimization	339 North Dorchester Bay & Reserve Channel Conduits/CSO
142 Wastewater Metering System Equipment Replacement	340 South Dorchester Bay Sewer Separation (Fox Point)
145 Interception & Pumping Facilities Asset Protection	341 South Dorchester Bay Sewer Separation (Commercial Pt.)
146 D.I. Cross Harbor Tunnel	347 East Boston Branch Sewer Relief
147 Randolph Trunk Sewer Relief	355 MWR003 Gate and Siphon
206 Deer Island Treatment Plant Asset Protection	356 Fort Point Channel Sewer Separation
271 Residuals Asset Protection	357 Charles River CSO Controlls
	358 Morrissey Boulevard Drain
	359 Reserved Channel Sewer Separation
	361 Bulfinch Triangle Sewer Separation
<b>ALL WATER COMMUNITIES</b>	545 Blue Hills Covered Storage
597 Winsor Dam Hydroelectric	550 Spot Pond Covered Storage
621 Watershed Land	693 Northern High Service Pipe Improvements - Revere/Malden
623 Dam Projects	702 New Connecting Mains - Shaft 7 to WASM 3
630 Watershed Division Capital Improvements	704 Rehabilitation of Other Pump Stations
677 Valve Replacement	713 Spot Pond Supply Mains Rehabilitation
712 Cathodic Protection of Distribution Mains	719 Chestnut Hill Connecting Mains
753 Central Monitoring System	721 Southern Spine Distribution Mains
763 Distribution Systems Facilities Mapping	723 Northern Low Service Rehab. - Sections 8 & 57
765 Local Water Pipeline Improvement Loan Program	727 SEH Redundancy & Storage
766 Watertown Facility Asset Protection	730 Weston Aqueduct Supply Mains
<b>ALL WATER COMMUNITIES (except South Hadley, Chicopee, Wibraham, Worcester, Clinton, and Leominster)</b>	<b>Braintree</b>
542 Carroll Water Treatment Plant	104 Braintree-Weymouth Relief Facilities
544 Norumbega Covered Storage	
555 Carroll Water Treatment Asset Protection	
604 MetroWest Tunnel	147 Randolph Trunk Sewer Relief
622 Cosgrove Tunnel Redundancy	
625 Metro Tunnel Redundancy	
628 Metro Redundancy Interim Improvements	
<b>Arlington</b>	
702 New Connecting Mains - Shaft 7 to WASM 3	
704 Rehabilitation of Other Pump Stations	
708 Northern Extra High Service - New Pipelines	
713 Spot Pond Supply Mains Rehabilitation	
730 Weston Aqueduct Supply Mains	

**APPENDIX 6  
MUNICIPALITY/PROJECT(s)**

<b>Municipality Project Number/Project</b>	<b>Municipality Project Number/Project</b>
<b>Brookline</b>	<b>Chicopee</b>
131 Upper Neponset Valley Sewer System	543 Quabbin Water Treatment Plant
136 West Roxbury Tunnel	615 Chicopee Valley Aqueduct Redundancy
357 Charles River CSO Controls	616 Quabbin Transmission System
360 Brookline Sewer Separation	753 Central Monitoring System
704 Rehabilitation of Other Pump Stations	
719 Chestnut Hill Connecting Mains	<b>Clinton</b>
721 Southern Spine Distribution Mains	210 Clinton Wastewater Treatment Plant
727 SEH Redundancy & Storage	
<b>Burlington</b>	<b>Dedham</b>
127 Cummingsville Replacement Sewer	131 Upper Neponset Valley Sewer System
	136 West Roxbury Tunnel
	727 SEH Redundancy & Storage
<b>Cambridge</b>	<b>Dover</b>
324 CSO Support	136 West Roxbury Tunnel
346 Cambridge CAM002-004 Sewer Separation	
355 MWR003 Gate and Siphon	<b>Everett</b>
357 Charles River CSO Controls	347 East Boston Branch Sewer Relief
550 Spot Pond Covered Storage	550 Spot Pond Covered Storage
713 Spot Pond Supply Mains Rehabilitation	713 Spot Pond Supply Mains Rehabilitation
730 Weston Aqueduct Supply Mains	723 Northern Low Service Rehab. - Sections 8 & 57
<b>Canton</b>	<b>Framingham</b>
545 Blue Hills Covered Storage	136 West Roxbury Tunnel
704 Rehabilitation of Other Pump Stations	617 Sudbury/Weston Aqueduct
714 Southern Extra High - Sections 41, 42, and 74	
721 Southern Spine Distribution Mains	<b>Hingham</b>
727 SEH Redundancy & Storage	104 Braintree-Weymouth Relief Facilities
<b>Chelsea</b>	<b>Holbrook</b>
324 CSO Support	104 Braintree-Weymouth Relief Facilities
347 East Boston Branch Sewer Relief	617 Sudbury/Weston Aqueduct
550 Spot Pond Covered Storage	
713 Spot Pond Supply Mains Rehabilitation	<b>Lexington</b>
723 Northern Low Service Rehab. - Sections 8 & 57	702 New Connecting Mains - Shaft 7 to WASM 3
	704 Rehabilitation of Other Pump Stations
<b>Lynn</b>	<b>Nahant</b>
692 Northern High Service Section 27 Improvements	692 Northern High Service Section 27
693 Northern High Service Pipe Improvements - Revere/Malden	693 Northern High Service Pipe Improvements - Revere/Malden
<b>Lynnfield</b>	<b>Natick</b>
731 Lynnfield Pipeline	136 West Roxbury Tunnel
693 Northern High Service Pipe Improvements - Revere/Malden	617 Sudbury/Weston Aqueduct Repairs
<b>Malden</b>	<b>Needham</b>
550 Spot Pond Covered Storage	136 West Roxbury Tunnel
693 Northern High Service Pipe Improvements - Revere/Malden	735 Section 80 Rehabilitation
713 Spot Pond Supply Mains Rehabilitation	

**APPENDIX 6  
MUNICIPALITY/PROJECT(S)**

<b>Municipality Project Number/Project</b>	<b>Municipality Project Number/Project</b>
<b>Marblehead</b>	<b>Newton</b>
692 Northern High Service Section 27	136 West Roxbury Tunnel
693 Northern High Service Pipe Improvements - Revere/Malden	702 New Connecting Mains - Shaft 7 to WASM 3
	719 Chestnut Hill Connecting Mains
<b>Medford</b>	730 Weston Aqueduct Supply Mains
547 Fells Covered Storage	<b>Norwood</b>
550 Spot Pond Covered Storage	545 Blue Hills Covered Storage
702 New Connecting Mains - Shaft 7 to WASM 3	704 Rehabilitation of Other Pump Stations
713 Spot Pond Supply Mains Rehabilitation	714 Southern Extra High - Sections 41 and 42
693 Northern High Service Pipe Improvements - Revere/Malden	721 Southern Spine Distribution Mains
<b>Melrose</b>	727 SEH Redundancy & Storage
693 Northern High Service Pipe Improvements - Revere/Malden	
<b>Milton</b>	<b>Peabody</b>
545 Blue Hills Covered Storage	618 Peabody Pipeline Project
704 Rehabilitation of Other Pump Stations	693 Northern High Service Pipe Improvements - Revere/Malden
721 Southern Spine Distribution Mains	722 NIH Redundancy & Storage
727 SEH Redundancy & Storage	
<b>Quincy</b>	<b>Wilbraham</b>
104 Braintree-Weymouth Relief Facilities	543 Quabbin Water Treatment Plant
545 Blue Hills Covered Storage	616 Quabbin Transmission System
721 Southern Spine Distribution Mains	753 Central Monitoring System
147 Randolph Trunk Sewer Relief	
<b>Reading</b>	<b>Wakefield</b>
722 NIH Redundancy & Covered Storage	722 NIH Redundancy & Covered Storage
693 Northern High Service Pipe Improvements - Revere/Malden	693 Northern High Service Pipe Improvements - Revere/Malden
<b>Revere</b>	<b>Waltham</b>
349 Chelsea Trunk Sewer	702 New Connecting Mains - Shaft 7 to WASM 3
693 Northern High Service Pipe Improvements - Revere/Malden	704 Rehabilitation of Other Pump Stations
	708 Northern Extra High Service - New Pipelines
<b>Saugus</b>	730 Weston Aqueduct Supply Mains
693 Northern High Service Pipe Improvements - Revere/Malden	<b>Watertown</b>
731 Lynnfield Pipeline	702 New Connecting Mains - Shaft 7 to WASM 3
	704 Rehabilitation of Other Pump Stations
	<b>Wellesley</b>
	136 West Roxbury Tunnel
	617 Sudbury/Weston Aqueduct Repairs
	735 Section 80 Rehabilitation

**APPENDIX 6  
MUNICIPALITY/PROJECT(S)**

<b>Municipality Project Number/Project</b>	<b>Municipality Project Number/Project</b>
<p><b>Somerville</b></p> <p>550 Spot Pond Covered Storage</p> <p>702 New Connecting Mains - Shaft 7 to WASM 3</p> <p>713 Spot Pond Supply Mains Rehabilitation</p> <p>730 Weston Aqueduct Supply Mains</p> <p><b>South Hadley</b></p> <p>543 Quabbin Water Treatment Plant</p> <p>616 Quabbin Transmission System</p> <p>753 Central Monitoring System</p> <p><b>Stoneham</b></p> <p>722 NIH Redundancy &amp; Covered Storage</p> <p>693 Northern High Service Pipe Improvements - Revere/Malden</p> <p><b>Stoughton</b></p> <p>714 Southern Extra High - Sections 41, 42, and 74</p> <p>721 Southern Spine Distribution Mains</p> <p>727 SEH Redundancy &amp; Storage</p> <p><b>Sudbury</b></p> <p>617 Sudbury/Weston Aqueduct Repairs</p> <p><b>Swampscott</b></p> <p>692 Northern High Service Section 27</p> <p>693 Northern High Service Pipe Improvements - Revere/Malden</p>	<p><b>West Roxbury</b></p> <p>131 Upper Neponset Valley Relief Sewer</p> <p>727 SEH Redundancy &amp; Storage</p> <p><b>Weston</b></p> <p>617 Sudbury/Weston Aqueduct Repairs</p> <p>730 Weston Aqueduct Supply Mains</p> <p><b>Westwood</b></p> <p>721 Southern Spine Distribution Mains</p> <p>727 SEH Redundancy &amp; Storage</p> <p>104 Braintree-Weymouth Relief Facilities</p> <p><b>Winchester</b></p> <p>702 New Connecting Mains - Shaft 7 to WASM 3</p> <p>704 Rehabilitation of Other Pump Stations</p> <p>722 NIH Redundancy &amp; Covered Storage</p> <p><b>Winthrop</b></p> <p>693 Northern High Service Pipe Improvements - Revere/Malden</p> <p><b>Woburn</b></p> <p>722 NIH Redundancy &amp; Storage</p>

# APPENDIX 7

## MWRA Completed Projects



## Appendix 7

### MWRA Completed Projects (as of December 31, 2020)

Project	Total Cost (\$000)	Completion Date	Summary
<b>Wastewater</b>	\$5,274,621		
<b>Waterworks</b>	\$1,848,900		
<b>Business and Operations Support</b>	\$67,174		
<b>MWRA Total</b>	\$7,190,695		

**Bolded** items represent projects added since the last document.

*Italicized* items represent a change in value to a closed project due to a determination that past retainage values no longer represent a liability to the Authority.

<b>Wastewater System Improvements</b>			
Boston Harbor Project	\$3,512,332	Nov-01	BHP constructed to minimize the pollution of Boston Harbor. The new Deer Island Primary and Secondary Treatment Facilities are the largest components of the Project to comply with the requirements of the federal Clean Water Act and to improve the harbor for
S.101 Wastewater Metering System Upgrade	\$7,516	Dec-93	Construction of system to provide accurate flow data.
S.102 Quincy Pump Facilities	\$25,907	Sep-03	Constructed 3 new pump station and rehabbed force mains to ensure continuous pumping to treatment facilities.
S.103 Hingham Pump Station	\$3,027	Apr-92	Elimination of untreated sewage discharges.
S.104 Braintree-Weymouth Relief Facilities	\$228,674	Jun-10	Project reduces overflows into Weymouth Fore River during wet weather events.
S.105 New Neponset Valley Relief Sewer	\$30,300	Jul-96	Relief facilities to correct structural and hydraulic deficiencies in the New Neponset Valley Interceptor Sewer System.
S.106 Wellesley Extension Replacement Sewer	\$64,359	Jan-96	Construction of a replacement sewer and rehabilitation of sections of existing sewer lines to alleviate capacity restraints, improve the water quality of the Charles River, protect aquifers, and reduce back-ups in Needham and Dedham.
S.107 Framingham Extension Relief Sewer	\$47,856	Sep-04	Installation of a new force main and gravity sewer and construction of a new pump station.
S.108 Alewife Brook Pkwy Pump St Rehab	\$1,465	May-95	Replacement of equipment, construction of building addition and wet well modifications.
S.110 East Boston Pump Facilities	\$48,234	Jan-93	Constructed to eliminate sewage back-ups.
S.112 Charlestown Pump Station Replacement	\$32,533	Apr-93	New 93 mgd pump station to increase pumping efficiency and eliminate overflows to the Mystic River.
S.115 Reading Pump Station Replacement and Extension Relief Sewer	\$412	Sep-87	Elimination of surcharges, reduction in staff requirements, and correction of safety hazards.

### Appendix 7

S.118 Bell Isle Siphon Rehabilitation	\$79	Apr-89	Reduction of salt water infiltration and increase in system capacity.
S.127 Cummingsville Replacement Sewer	\$8,999	Jul-08	Replacement and rehabilitation of existing sewers to provide additional capacity for upstream communities.
S.129 North Metropolitan Trunk Sewer	\$11,997	Mar-99	Rehabilitation of a 19,700 linear-foot 100-year old sewer line.
S.131 Upper Neponset Valley Sewer System	\$54,175	Mar-08	Project anticipated to eliminate interceptor backups during wet weather events.
S.136 West Roxbury Tunnel	\$10,314	Jun-11	Investigate and rehabilitate West Roxbury Tunnel Sewer.
S.138 Sewerage System Mapping	\$281	Apr-04	Updated and new GIS maps of sewer system.
S.143 Regional I/I Management Planning	\$169	Jun-03	Reduction in infiltration and inflow water entering the MWRA system.
S.178 Deer Island Pump and Power Station Upgrade	\$32,952	Feb-91	Constructed to prevent sewage surcharges and overflows in the upstream sewer system by improving flows to Deer Island Tunnel System and Plant.
S.179 Deer Island Remote Headworks Improvements	\$26,081	Jul-99	Facility rehabilitation restored headworks capacity.
S.180 D.I. Sedimentation Tank System Improvements	\$1,684	Jul-89	Restoration of operating efficiency by replacing 80 inlet sluice gates and baffles, rehabilitation of control building and other improvements.
S.181 D.I. Intermediate Upgrade	\$9,474	Jun-92	Upgrade of the old Deer Island treatment plant.
S.184 Nut Island Immediate Upgrade	\$1,206	Dec-86	Upgrade or replacement of equipment, including switch gear, sludge cross collectors and replacement of electric distribution substation to accommodate increased flows to Deer Island Treatment Plant.
S.185 Clinton Wastewater Treatment Plant	\$36,747	Sep-92	Upgrade existing plant to improve water quality and met standards by rehabbing and new equipment.
S.187 Deer Island Sludge Thickeners Rebuilding	\$114	Sep-88	Ensuring efficient operation of Deer Island treatment plant digesters.
S.189 DI Dual Fuel Engine	\$281	Jan-06	Overhaul of five diesel engines.
S.190 Deer Island Electrical Equipment Upgrade	\$28	Mar-88	Restoration of system operating efficiency.
S.191 DI Chlorination Facility Rehab	\$4	Mar-89	Provision of effective disinfection operation and safe working environment.

### Appendix 7

S.194 Nut Island Intermediate Upgrade	\$1,507	Dec-92	Improvements to ensure effective operation of the Nut Island treatment plant.
S.196 Other Wastewater	\$92	Apr-90	Removal of hazardous materials from wastewater facilities and creation of on-going safety management programs.
S.197 Deer Island Treatment Plant Outfall Repair	\$1,300	Sep-97	Repair of effluent discharge Outfall 002.
S.198 Boston Harbor Performance Certification	\$1,275	Dec-02	Certification required for continuous federal grant and loan programs during construction.
S.200 DI Plant Optimization	\$33,427	Sep-08	Capital investment to optimize the operation of the Deer Island Treatment Plant. Remaining initiatives rolled into DI Plant Asset Protection.
S.211 Laboratory Services	\$2,212	Feb-12	Upgrade and restore the Central Laboratory
S.261 Residuals	\$172,056	Dec-01	Phase 1 Feb - 92 - construction of the Residuals Treatment Facility at ore River Staging Area (FRSA). Termination of the sludge discharge to Boston Harbor. Phase 2 Dec-01 - To expand the residuals processing plate at the FRSA in Quincy to provide the capacity to process the sludge quantities produced by Deer Island.
S.325 Fox Point CSO Facility	\$152	Apr-89	Elimination of untreated sewage discharges.
S.326 Commercial Point CSO Facility	\$7,117	Feb-91	Improvements to water quality by reducing wet weather overflows via construction of a screening and disinfection facility.
S.327 Southwest Corridor CSO	-\$6	Fall 86	Elimination of combined sewer overflows.
S.330 St. Mary's Street CSO Modifications	\$17	Feb-87	Identification of solution for storm water detention.
S.332 Somerville Marginal CSO Rehabilitation	\$98	Feb-89	Elimination of inadequately treated sewage discharges.
S.335 Moon Island	\$1		
S.338 Cottage Farm CSO Ventilation System Repairs	\$133	Sep-94	Rehabilitation of HVAC duct work.
S.339 North Dorchester Bay	\$221,510	May-11	Eliminate CSO discharges and provide a high level of storm water control.
S.340 South Dorchester Bay Sewer Separation (Fox Pt.)	\$55,029	Nov-06	Eliminate CSO discharges to South Dorchester Bay
341 Dorch Bay Sew Separ (Commercial Point)	\$59,862	Dec-16	Eliminate CSO discharges to South Dorchester Bay

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S.342 Neponset River Sewer Separation	\$2,492	Aug-02	Elimination of CSO discharges to the Neponset River.
S.343 Constitution Beach Sewer Separation	\$3,731	Apr-02	Elimination of CSO discharges at the Constitution Beach CSO Facility.
S.344 Stony Brook Sewer Separation	\$44,319	Sep-06	Minimize CSO discharges to the Stony Brook conduit and the Back Bay Fens.
346 Cambridge Sewer Separation	\$104,552	Jun-17	Minimize CSO discharges to the Alewife Brook and upgrading connections to MWRA interceptors.
S.347 East Boston Branch Sewer Relief	\$85,638	Jul-10	To increase hydraulic capacity and provide long-term structural integrity to MWRA's East Boston Branch Sewer.
S.348 BOS019 Storage Conduit	\$14,288	Mar-07	To reduce CSO activations and annual volume to the Little Mystic Channel.
S.349 Chelsea Trunk Sewer	\$29,779	Jun-02	To control CSO discharges at outfalls CHE002, CHE003, CHE004, and CHE008.
S.350 Union Park Detention Treatment Facility	\$49,583	Jun-07	To reduce the frequency and impacts of CSO discharges from outfall BOS070.
S.351 BWSC Floatables Controls	\$946	Mar-02	Limit the discharge of floatable materials from 5 BWSC combined sewer outfalls.
S.352 Cambridge Floatables Controls	\$1,127	Dec-08	Limit the discharge of floatable materials from Cambridge CSO outfalls.
S.353 Upgrade Existing CSO Facilities	\$22,385	Aug-01	Minimize CSO impacts to the Lower Charles River, Upper Inner Harbor, Mystic/Chelsea Confluence, and South Dorchester Bay by upgrading 5 CSO treatment facilities.
S.354 Hydraulic Relief Projects	\$2,295	Aug-00	Elimination of hydraulic restrictions between local and MWRA Systems.
S.355 MWR003 Gates & Siphon	\$4,424	Oct-15	Minimize discharges to Alewife Brook as part of the MWRA's Alewife Brook CSO control plan.
S.356 Fort Point Channel Sewer Separation	\$11,507	Dec-10	To minimize CSO discharges to Fort Point Channel by separating combined sewer systems tributary and implementing system optimization measures.
S.357 Charles River CSO Controls	\$3,633	Oct-11	Implement wastewater system optimization measures, including structural and operational improvements.
S.358 Morrissey Boulevard Drain	\$32,181	Jun-09	Reroute storm water from BOS087 area
359 ReservedChannel Sewer Separation	\$70,524	Dec-15	To minimize SCO discharges to the Reserved Channel by separating combined sewer systems in the area of South Boston.
S.360 Brookline Sewer Separation	\$24,715	Jul-13	Minimize discharges to Charles River by separating combined sewer systems in several areas.
S.361 Bulfinch Triangle Sewer Separation	\$9,032	Jul-10	Minimize discharges to Charles River by separating combined sewer systems in several areas.
S.402 Comprehensive Safety Action Project	\$891	Nov-90	Correction of safety hazards at MWRA facilities and establishment ongoing safety management program.

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S.403 Sewerage Division Management Services	\$1,930	Dec-86	Provision of engineering design and construction advice.
S.924 Harbor Environmental Studies	\$1,666	Jun-92	Collection and study of harbor water quality data.
<b>Sub-Total Wastewater System Improvements</b>	<b>\$5,274,621</b>		

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<b>Waterworks System Improvements</b>			
S.533 Local Sources of Supply	\$2,112	Jul-95	Provision of assistance to communities to promote effective protection of existing local water supply sources and encourage development of additional local sources where feasible.
S.535 Reservoir Risk Assessment	\$647	Jun-92	Development of maps and data to determine at risk areas.
S.537 Drinking Water Quality Improvement Wachusett	\$8,330	Oct-95	To comply with Safe Drinking Water Act to strengthen quality standards for water supply from Wachusett.
S.538 Sudbury Reservoir Treatment Plant Study and EIR	\$447	Sep-92	Evaluation of alternative uses of the Sudbury Reservoir.
S.539 Drinking Water Quality Improvement Quabbin	\$307	Nov-98	To comply with Safe Drinking Water Act to strengthen quality standards for water supply from Quabbin.
S.541 Watershed Protection	\$8,500	Dec-03	To develop watershed protection measures for the MWRA/MDC reservoir system.
S.542 Carroll Water Treatment Plant	\$424,688	Jun-05	To provide high quality drinking water to MWRA communities and to ensure water meets the standards established by the federal Safe Drinking Water Act.
S.543 Quabbin Water Treatment Plant	\$19,973	Oct-14	To improve the quality of drinking water to the three Chicopee Valley Aqueduct communities.
S.544 Norumbega Covered Storage	\$106,674	Jun-08	Construction of a covered 115 million gallon reinforced concrete storage tank to meet the drinking water quality standards mandated by the federal Safe Drinking Water Act.
S.545 Blue Hills Covered Storage	\$40,083	Apr-10	To ensure sufficient distribution storage for MWRA's Southern High Service Area.
S.547 Fells Covered Storage	\$18,004	Jun-00	Covered storage for Northern High Service System.
S.548 Nash Hill Covered Storage	\$14,296	Jul-99	To improve the quality of drinking water to the three Chicopee Valley Aqueduct communities.
S. 550 Spot Pond Storage Facility	\$60,126	Dec-15	Storage facility required to meet state and federal drinking water guidelines and provides 1 day's water demand.
S.598 Wachusett Reservoir By-pass Tunnel	\$15	Jan-89	Evaluation of the option of constructing a tunnel by-pass.
S.599 Dam Control Valve Replacement	\$1,763	Jul-98	Valve replacement at Sudbury Reservoir in Southborough and Wachusett Dam.
S.600 Oakdale Power Station Generator Repair	\$893	Sep-91	Repair of substation metering and transformer systems.

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S.601 Sluice Gate Rehab	\$9,158	Jun-05	Installation of motorized gates and 12 facilities rehabilitated.
S.602 Hultman – Weston Aqueduct Transfer for Hydropower	\$593	May-89	Production of approximately 3,700,000 kW hours per year of electricity.
S.603 Transmission Maintenance Facility	\$5,025	May-93	Construction of new waterworks maintenance facility in Southborough.
S.604 MetroWest Tunnel	\$697,254	Jun-03	To provide transmission redundancy for the Hultman Aqueduct ensuring reliable water delivery and providing sufficient hydraulic capacity to support the new Carroll Water Treatment Plant and covered storage distribution facilities.
S.605 Echo Bridge Rehabilitation	\$356	Sep-92	Repair and cleaning of bridge façade and construction of new surface topping.
S.606 Norumbega Chlorination Facility	\$10	Mar-89	Provision of a new water disinfection facility.
S.607 Weston Reservoir Chlorination Facility	\$2,539	Jun-93	Replacement of obsolete facility with new 4,000 sq. ft.. chlorination and ammonia feed facility.
S.615 Chicopee Valley Aqueduct. Redundancy	\$8,666	Apr-08	To provide redundancy for water service for the three communities supplied by the Chicopee Valley Aqueduct (CVA) in case of a CVA failure or shutdown.
S.620 Wachusett Reservoir Spillway Improvement	\$9,287	Jul-10	Provide the necessary improvements to the Wachusett Reservoir Dam.
622 Cosgrove/Wachusett Redundancy	\$58,619	<i>Feb-19</i>	<i>Design and construction of an emergency pump station to pump water from the Wachusett Aqueduct to the Carroll Water Treatment Plant.</i>
S.675 Water Distribution Master Plan	\$1,178	Mar-93	Development of data base and recommendations for master plan.
S.676 Water Meter Modernization	\$12,482	Jun-90	Rehab of 139 revenue meters
S.678 Boston Low Service Pipe & Valve Rehab	\$23,691	Sep-03	Improve the condition and operability of the pipelines serving the Boston Low Service System.
S.679 Nonantum Road Pipe Rehabilitation	\$2,153	Mar-97	Rehabilitation and/or replacement of deteriorated pipeline.
S.680 Orient Heights Booster Pump Station	\$3	Sep-90	Construction of a booster pump station to increase pressure throughout the Orient Height distribution system.

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S.681 Southern Service Improvements	\$14,450	Oct-99	Reliability and capability improvements to pipelines and pump stations serving the Southern service area.
S.683 Heath Hill Road Pipe Replacement	\$19,358	Oct-07	Repair and improve pipelines and valves in Southern High and Southern Extra High Service areas.
S.684 Commonwealth Ave Pump Station	\$8,503	Dec-99	Modernize and improve station serving a major portion of Newton.
S.685 Ward Street Pump Station	\$24	Aug-89	Evaluation of the feasibility of pump station rehabilitation.
S.686 Dudley Road Pump Station	\$55	Jun-91	Evaluation of the feasibility of pump station rehabilitation.
S.687 Lexington St Pump Station Rehabilitation	\$3,985	Jun-99	Installation of larger capacity pumping units, backup power generation, and various electrical upgrades.
S.688 Northern Intermediate High Pipelines	\$973	Nov-88	Increase in pipe capacity and pressure.
S.689 James L. Gillis Pump Station Rehab	\$33,138	May-02	To improve and modernize pumping facilities.
S.690 Northern Low Service Pipeline Replacement	\$714	Aug-99	Repair of Section 16W with replacement and pipe slip lining methods.
S.691 Northern High Service Improvements - Lynn Pipeline	\$17,271	Jun-99	Installation of a new primary supply line for the northeast section of the Northern High Service System.
S.701 Northern Extra High Service – Bedford Pipeline	\$71	Jan-92	Development of a plan to supply water to Bedford.
S.706 Northern High Service - Construction Mains from Section 91	\$2,360	Jun-02	To integrate the new Section 91 pipeline with the existing grid network, improving service pressures and reliability to community meters.
713 Spot Pond Supply Mains Rehabilitation	\$65,489	Dec-16	To improve the condition of carrying capacity and valve operability on the two long supply mains from Chestnut Hill to Spot Pond.



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S.714 Southern Extra High Sections 41 & 42	\$3,657	Dec-00	To increase hydraulic capacity of the mains that carry water to the Bellevue Tanks.
S.715 Newton Service Improvements	\$5,762	Nov-99	New supply to Newton's Oak Hill Tank replacing an antiquated pump station and providing some system redundancy in the area.
S.716 Water Main Relocation in Chelsea River	\$10,648	Nov-00	Relocation of the Section 8 water main over the Chelsea River.
S.720 Warren Cottage Line Rehabilitation	\$1,205	Dec-02	To improve the carrying capacity and internal condition of the Warren Cottage Line.
S.725 Hydraulic Model Update	\$598	Jun-07	To modernize MWRA hydraulic and water quality modeling capabilities.
730 Weston Aqueduct Supply Mains	\$80,403	Dec-16	To improve the condition of carrying capacity of these major supply lines and the quality of the water supplied to the low, High, Intermediate, and Extra High pressure zones.
S.731 Lynnfield Pipeline	\$5,626	Dec-12	Replace undersized water main to meet Lynnfield's high water demand
S.732 Walnut St. & Fisher Hill Pipeline Rehab.	\$2,716	Mar-09	Improve water quality and hydraulic capacity of the pipeline serving City of Boston.
S.754 Domestic Device Retrofit	\$9,928	Dec-93	Installation of water saving devices to reduce demand.
S.755 Leak Detection Survey	\$751	Aug-90	Provision of data on the magnitude and location of water leaks.
S.756 Asbestos Abatement	\$562	Aug-90	Elimination of asbestos in MWRA facilities.
S.757 PCB Abatement	\$432	Aug-91	Replacement of equipment with unacceptable levels of PCB concentrations.
S.758 Rehabilitation of Existing Facilities	\$14,173	Nov-02	Upgrade various facilities in need of significant capital improvement.
S.759 Municipal Toilet Replacement	\$127	Dec-90	Reduction in water consumption.
S.760 Chestnut Hill Pump Station REH	\$559	Oct-94	Rehab of pump station.
S.764 Local Water Infrastructure Rehabilitation Assistance Program	\$7,488	Jun-04	To provide financial support to MWRA waterworks communities to replace, rehabilitate, and maintain their waterworks system infrastructures.
<b>Sub-Total Water System Improvements</b>	<b>\$1,848,900</b>		

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<b>Business &amp; Operations Support</b>			
S.901 Charlestown Headquarters	\$4,548	Jun-91	Provision of office equipment at MWRA headquarters.
S.921 Management Information Service	\$21,423	Dec-92	Enhancement to information systems to support more effective management of MWRA business activities.
S.922 Fore River Preservation	\$4,946	Nov-97	Modify FRSA for on-going construction and operational support.
S.929 Affirmative Action	\$403	Mar-91	Evaluation of minority participation in the MWRA procurement process.
S.930 MWRA Facility - Chelsea	\$9,813	Mar-08	To improve MWRA operations by consolidating facilities.
S.931 Business System Planning	\$24,563	Jun-11	Develop, improve, and procure management information systems.
S.932 Environmental Remediation	\$1,479	Oct-10	Implement remedial programs necessary to protect the environment and to ensure compliance with the Clean State Initiative.
<b>Sub-Total Business &amp; Operations Support</b>	<b>\$67,174</b>		

# APPENDIX 8

## Expected Useful Life of Capital Projects

## APPENDIX 8

### EXPECTED USEFUL LIFE OF CAPITAL PROJECTS

The estimated useful life of the MWRA's capital projects are summarized below:

Type of Capital Improvement	Estimated Useful Life (in years)
Buildings (includes all substantial above ground structures or enclosures)	40
Mechanical Equipment (includes pumps, chains, fans, HVAC, valves, etc.)	20
Electrical Equipment (motors, generators, motor control centers, lighting, conduit, etc)	20
Control Systems (computers, SCADA, PLCs, programming, etc)	10
Water Pipes	50 – 75
Water Pipe appurtenances (blow offs, air valves)	40
Sewer Pipes – gravity	50
Sewer Pipes – pressure	50
Sewer Pipe appurtenances (manholes, chambers)	50
Tunnels – Water	100
Tunnels – Wastewater	100
Tunnel appurtenances (shafts, control valves)	40
Distribution Reservoirs – above ground	40
Distribution Reservoirs – below ground	75 -100
Dams and Dam improvements	100
Motor Vehicles	10 – 15
Furniture and Fixtures	5 – 15
Leasehold Improvements	Period of lease
Study	5
Design – if constructed	20
Design – if not used	5
Inflow/Infiltration - Repair	20
Inflow/Infiltration - Replacement	50
Covered Storage	50