



FISCAL YEAR 2019

Capital Improvement Program



MASSACHUSETTS WATER RESOURCES AUTHORITY

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August 2018

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 Capital Improvement Program (CIP) for Fiscal Year 2019 and the FY19-23 Cap spending as approved by the MWRA's Board of Directors at its June 20, 2018 meeting. The FY19 CIP represents an update to the FY18 CIP approved by the Board in June 2017 and includes the latest projected spending estimates and project schedules.

Spending during the FY19-23 time framed is planned to be \$1.1 billion, including local community spending of \$123.2 million for the I/I loan and grant program and \$32.4 million for the water pipeline loan program. The FY19 Final CIP projects \$179.2 million in spending for FY19 of which \$93.8 million supports Wastewater Systems Improvements, \$77.1 million supports Wastewater System Improvements and \$8.3 million is for Business and Operations Support.

Asset Protection accounts for the largest share of capital expenditures for the FY19-23 period. The FY19 Final CIP includes \$751.1 million for asset protection initiatives, representing 71% of total MWRA spending in this timeframe. The Water System Redundancy spending for totals \$213.7 million during the same period, accounting for over 20% of total spending.

The FY19 CIP reaffirms MWRA's commitment to the community financial assistance programs on both the water and wastewater side. The Infiltration/Inflow program was increased by \$300 million in the FY19 budget.

A copy of the FY19 Final CIP is available on-line at www.mwra.com. Questions or comments on this document should be directed to the MWRA Budget Department at (617)788-2268.

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

Sincerely,

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 2017

Management

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

Advisory Board

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

Service Area

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

FY19 Operating Budget (\$ in millions)

Direct Expenses	\$239.6
Indirect Expenses	\$ 46.0
<u>Capital Finance</u>	<u>\$482.4</u>
Total Operating Budget	\$767.9
Revenues*	\$767.9

*96.2% 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: \$8.3 billion since 1984
- Total Current Indebtedness \$5.1 billion
- FY19 CIP Budget: \$179.2 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
- 12 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*

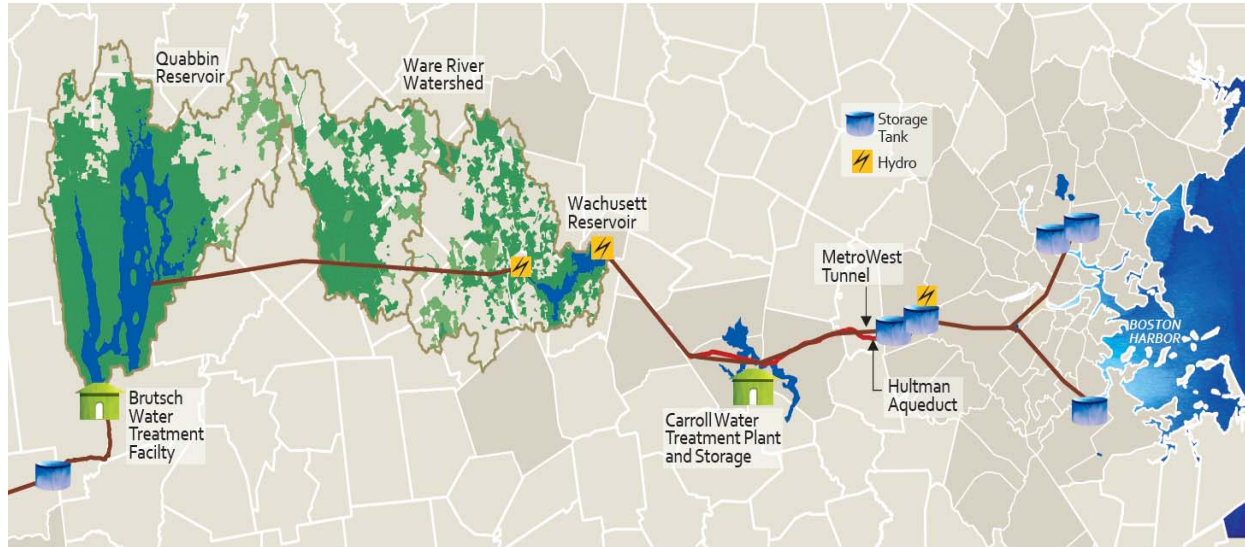
Wastewater System

- 240 miles of sewer pipelines and cross-harbor tunnels
- 11 pump stations
- 1 screening facility
- 4 CSO treatment/storage facilities
- 2 wastewater treatment plants
 - Deer Island Treatment Plant
 - Clinton Advanced Wastewater Treatment Plant
- 5 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 28% of MWRA's energy requirement was self-generated from renewable sources (biomass, hydro, wind, & solar assets) in FY18.

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.

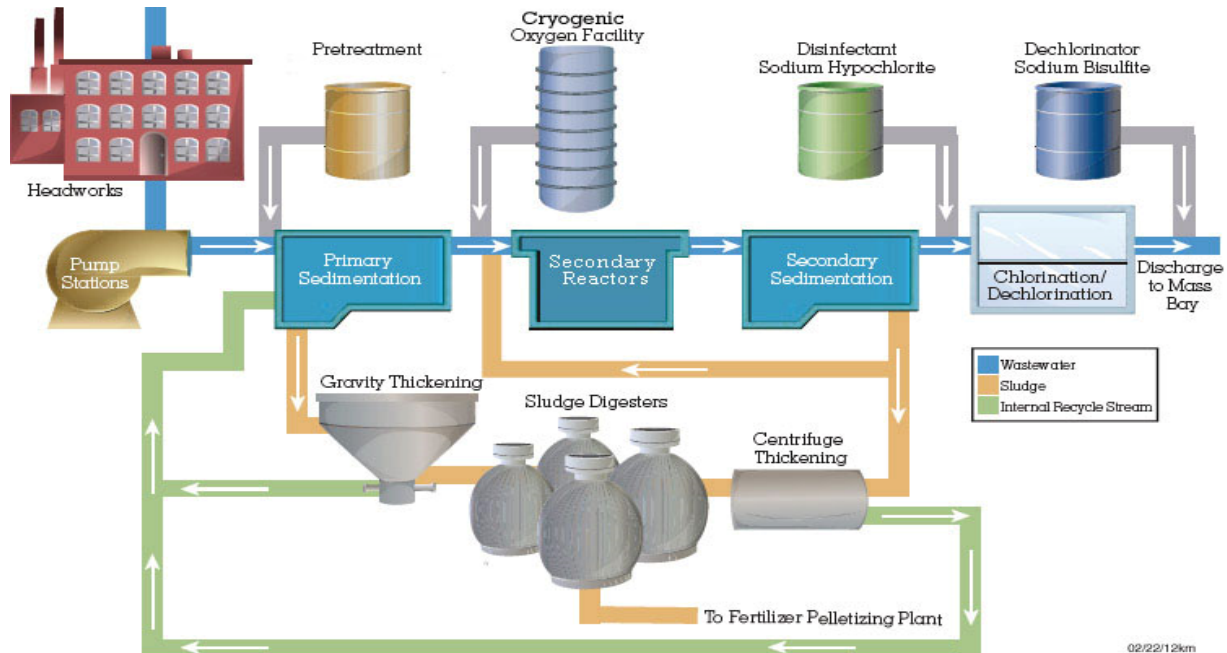
Water for most MWRA communities is treated at the Carroll Water Treatment Plant in Marlborough, Massachusetts. Water from the Quabbin and Wachusett Reservoirs enters the plant through the Cosgrove or Wachusett Aqueduct. The treated water leaves the plant through the MetroWest Water Supply Tunnel and 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.

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