Massachusetts Water Resources Authority

Five-Year Strategic Business Plan
FY 2021–2025

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WATER RESOURCES AUTHORITY
MASSACHUSETTS

Dear Reader,

I am pleased to release the Massachusetts Water Resources Authority's (MWRA) Five Year Strategic Business Plan for fiscal years (FY) 2021-2025. Consistent with MWRA's prior Business Plans, it provides a management tool for identifying and prioritizing the strategic initiatives critical to MWRA's mission. It also provides transparency for our ratepayers and helps to ensure that these initiatives are carried out within the annual capital budget spending limits adopted by the MWRA Board of Directors.

MWRA continues its commitment to the delivery of safe drinking water and environmentally protective wastewater collection and treatment. Many of our strategic priorities are directly derived from these two organizational obligations. Within the 5 years of this Plan, we will make significant progress in pipeline rehabilitation and replacement of both water and wastewater infrastructure as well as the completion of rehabilitation of the outdated water and wastewater facilities. During this period we will also complete preliminary design and begin final design related to the Metropolitan Tunnel Redundancy Project. This project represents a significant capital investment that continues our commitment to the secure provision of water to Boston and other member communities.

The term of the prior Strategic Business Plan ended in June 2020, approximately four months after the arrival of the Covid-19 pandemic to the MWRA service area. The pandemic has served to speed up an inevitable transition to a more digital business model while continuing to highlight the importance of our physical infrastructure and the staff whose physical presence is required to operate and maintain it. As a result, MWRA has incorporated into this plan bold initiatives that were previously incrementally planned and executed, such as a faster adoption of digital management tools, or previously not anticipated, such as the deployment and outfitting of remote employees working from home and the implications of that development for MWRA's office footprint.

Finally, the timing of this Strategic Business Plan renewal also coincides with MWRA's renewed and enhanced commitment to diversity, equity and inclusion in an acknowledgement of the societal level of discrimination. MWRA recognizes that its role as a public entity places it in a position to be a leader and a role model in making sure we carry out our mission in a manner that moves towards a more equitable and just society. To cement an Authority-wide commitment, the Plan includes a new strategic priority, Diversity, Equity, Inclusion and Workforce Development. This strategic priority includes existing activities already underway by the Authority in this area, as well as new goals and initiatives that underscore a core MWRA tenet that our staff are stronger as a team when we include diverse perspectives, experiences and approaches, which fosters continuous improvement and performance as an Authority.

In sum, the Strategic Business Plan for FY2021-2025 provides the framework for MWRA staff to manage and measure progress towards achieving system priorities. We hope that you find this document helpful.

Sincerely,

Executive Director

Introduction

Massachusetts's Water Resources Authority's (MWRA) Five Year Strategic Business Plan for fiscal years (FY) 2021-2025 provides a management tool for identifying and prioritizing the strategic initiatives critical to MWRA's mission. It ensures staff are all working toward the same goals and objectives in an ever changing environment while allowing staff to track progress and identify new issues as they arise. It also provides transparency for our ratepayers and helps to ensure these initiatives are carried out within the annual capital budget spending limits adopted by the MWRA Board of Directors.

MWRA was established 35 years ago to operate and modernize the failing water and wastewater systems serving approximately 3.1 million people as a wholesaler to 61 cities and towns in eastern Massachusetts. The water and wastewater systems have a combined asset replacement value of approximately $13 billion. While the systems have been significantly upgraded and rehabilitated over the past 35 years, work remains to be done to complete system upgrades and to ensure that facilities are properly maintained on an ongoing basis. This will enable MWRA to meet changing conditions, such as new regulatory requirements and the effects of climate change.

This Business Plan articulates MWRA's goals and initiatives, grouping them by the following strategic priorities:

I. Drinking Water Quality and System Performance
II. Wastewater Management and System Performance
III. Infrastructure Management and Resilience
IV. Finance and Systems Management
V. Diversity, Equity, Inclusion and Workforce Development
VI. Environmental Sustainability

Links throughout this document provide additional context and more detailed information on specific projects, ongoing reporting on routine maintenance initiatives, information on capital budgets and master planning efforts, and compliance with regulatory requirements.

MWRA's partnership with the cities and towns within our service area is critical to ensuring the continued delivery of safe water and the transport of wastewater. MWRA continues to provide financial assistance in the form of grants and loans to assist member communities in maintaining and upgrading their local systems. MWRA employs robust financial management policies, procedures, and systems to ensure both accountability and transparency to our ratepayers and cost effective resource management over the long-term. There are also new initiatives that highlight MWRA's work to ensure that the organization fosters an inclusive workplace and equal opportunities for advancement to the many staff who make it the outstanding organization it is.

The Covid-19 pandemic posed significant unforeseen challenges that required staff to adapt rapidly and develop strategies to complete work with new considerations. Necessity being the mother of invention, changes adopted because of the pandemic have provided opportunities that have been turned into initiatives in this Business Plan. Changes to our practices and planning in response to, and as a result of, the pandemic are included as initiatives scattered throughout the various goals under their related strategic priorities. These new initiatives include, but are not limited to, additions to health and safety protocols, development of new technologies and practices related to working remotely, contributions to research related to the use of wastewater to track to spread and surge of the virus, and incorporation of more robust pandemic planning into the Authority's emergency preparedness and resiliency planning. Covid pandemic inspired initiatives are shaded to identify them.

The Business Plan provides the framework for MWRA staff to manage and measure progress towards achieving system priorities. We hope that you find this document helpful.

Southern Extra High Redundant Pipeline in Dedham

Our Mission

MWRA's mission is the provision of reliable, cost-effective, high quality water and wastewater treatment services, that protects the public health, promotes environmental stewardship, maintains customer confidence and supports a vital economy. Recruiting, developing and retaining a high-performance workforce that reflects our service area and underscores our core principles of diversity, equity and inclusion, enables us to achieve our mission, brings value to our staff and makes us better able to serve the ratepayers

Guiding Principles

1. Public Accountability & Transparency
2. Cost-Effective Services
3. Collaboration With Internal/External Partners
4. System Resilience
5. Environmental Stewardship
6. Workforce Development
7. Diversity, Equity And Inclusion

South Boston Beach

Brief System Overview

MWRA's water system extends from the Quabbin, Ware, and Wachusett watersheds in central Massachusetts to the Boston metropolitan area supplying 200 million gallons per day (MGD) to 51 cities and towns. Assets and facilities include roughly 100 miles of transmission system tunnels and aqueducts, another 284 miles of pipelines, treatment facilities, pump stations, and water storage facilities. The Metro Boston Service Area's water supply, is treated at the John J. Carroll Water Treatment Plant (JCWTP) in Marlborough, using ozone and ultraviolet light to provide disinfection. The Chicopee Valley Aqueduct service area water supply is treated at the William A. Brutsch Water Treatment Facility in Ware, using chlorine and ultraviolet light to provide disinfection of water.

MWRA's Metropolitan Sewerage Service Area system covers 518 square miles in the greater Boston area and serves 43 communities. MWRA's system includes 274 miles of tunnels and interceptors, remote headworks facilities, pump stations and combined sewer overflow (CSO) storage and treatment facilities. The Deer Island Wastewater Treatment Plant has a design average daily flow of 361 million gallons per day (MGD) with a wet weather capacity of 1,270 MGD. MWRA's pelletizing plant ensures beneficial use of the residuals generated at Deer Island. MWRA also operates the Clinton Wastewater Treatment Plant, serving Clinton and Lancaster, which has an average daily flow of 3.01 MGD and a wet weather capacity of 12 MGD.

Ensuring a safe and reliable source of drinking water to our customers, and wastewater discharges that meet all applicable regulations drives both capital and current expense budget costs.

Strategic Business Plan Approach

Six strategic priorities integral to MWRA's mission have been identified for action during 2021-2025. Under each of these priorities, MWRA has identified goals and initiatives to guide action. The Strategic Business Plan allows MWRA to track progress towards meeting the core (routine, on-going) and special (new, one-time or aspirational) initiatives. Core and/or special initiatives are identified for each Business Priority Area.

Key Strategic Priorities

I. **Drinking Water Quality & System Performance**

II. **Wastewater Management & System Performance**

III. **Infrastructure Management & Resilience**

IV. **Finance & Management Systems**

V. **Diversity, Equity, Inclusion & Workforce Development**

VI. **Environmental Sustainability**

Quabbin Reservoir

I. Drinking Water Quality & System Performance

Goal	Initiatives
1. Maintain drinking water quality to protect public health, and continue to ensure that MWRA water meets all applicable regulations. [1]	**Core:** **A.** Optimize operation of water treatment facilities to produce high quality, safe drinking water while maximizing water aesthetics (i.e. taste, clarity, and odor). **B.** Monitor drinking water quality in collaboration with member communities and the Department of Conservation and Recreation (DCR) in order to verify high quality water and provide guidance for operating decisions. **C.** Ensure reliability of data presented in required regulatory compliance reports. **D.** Work cooperatively with DCR on various water quality initiatives including chloride, nutrient, algae and disinfection byproduct precursor monitoring programs. Jointly develop operational response plans for nuisance and harmful algal blooms, algal toxin detections, and taste and odor events. [2] [3] **E.** Continue to encourage DCR to meet its obligations under its Watershed Protection Plan overseen by the Water Supply Protection Trust, and monitor progress toward achieving those obligations. **F.** Operate the reservoir system to optimize both quality and quantity of water available for water supply purposes and to meet statutory and regulatory requirements for downstream releases. **G.** Implement database management systems for handling data, and incorporating web-based technologies for reporting near real time water quality metrics and, provide easy access to data to the MWRA community. **H.** Enhance the security of the water supply and watershed system against accidental or intentional threats and hazards. **I.** Maintain water quality sampling from treatment to throughout the distribution system, including monitoring for emerging contaminants. **Special Initiatives:** **A.** Identify and evaluate the impact of different treatment strategies and scenarios on the mitigation of transportation related contaminants into the source water.

Goal	Initiatives
1. *(continued)*	**B.** Evaluate new water quality monitoring equipment and testing techniques to monitor and maintain high quality water all the way to the ends of the community systems. **C.** Participate with other water utilities nationwide in Water Research Foundation studies, specifically research opportunities pertaining to algae monitoring and mitigation strategies in source water. **D.** Collaborate with CVA communities to modify chlorine dosing strategy to minimize the formation of disinfection byproducts. **E.** Increase water quality monitoring at the Quabbin Reservoir by the installation of a seasonal water quality profiling buoy. Implement routine and automatic data transfers to ensure data are proactively reviewed and managed. **F.** Evaluate data from UCMR4 2018-2020 monitoring and compare against nationwide occurrence data. **G.** Advocate for responsible and reasonable new and revised state and federal drinking water regulations, and provide training and technical support to communities for new regulations.
2. **Continue to effectively report and communicate water quality information to our customers and public officials.**	**Core:** **A.** Distribute the federally required annual water quality report, the Consumer Confidence Report (CCR), to all households. [4] **B.** Maintain and improve water quality and public health information on MWRA's web page, www.MWRA.com, and through widely distributed weekly and monthly reports **Special Initiatives:** **A.** Regularly communicate routine TCR monitoring data to Water Departments and assist with water quality sampling or training, as needed.

Goal	Initiatives
2. *(continued)*	**B.** Continue to strengthen planning and emergency response documents for Boil Water Order (BWO) events. Create, disseminate and train staff on materials that can be used during a BWO event or at a public information call center.
3. **Assist member communities to improve local water distribution systems through ongoing financial, technical and operational support programs to maximize long-term water quality benefits.**	**Core:** **A.** Provide technical and operational support through training, on-call contracts, and targeted assistance, as needed. **B.** Promote and manage MWRA's Local Water System Assistance and Lead Service Line Replacement Programs to help facilitate improvements in local community infrastructure. [5] **Special Initiative:** **A.** Enhance outreach and technical assistance within the existing Lead Service Line Replacement program to support communities as they respond to EPA's revisions to the Lead and Copper Rule. **B.** Develop the capability to evaluate potential changes to corrosion control treatment using a pipe loop system constructed using "harvested" lead service lines.

MetroWest Water Supply Tunnel

Deer Island Wastewater Treatment Plant

II. Wastewater Management & System Performance

Goal	Initiatives
4. Meet or surpass environmental compliance standards at both MWRA treatment facilities and throughout the wastewater collection system. [6]	**Core:** **A.** Continue to carry out the Pretreatment Program to protect receiving water quality, maximize the beneficial reuse of wastewater residuals, and protect workers and MWRA's wastewater treatment plants and receiving waters. [7] [8] **B.** Continue to monitor DITP processes to ensure high quality treated effluent optimizing plant performance to ensure all applicable NPDES permit limits continue to be attained. [9] **C.** Operate the newly installed enhanced phosphorus control systems at the Clinton Wastewater Treatment Plant to ensure compliance with its new NPDES permit.
5. Continue to initiate plans and studies to prepare for regulatory changes, identify opportunities to refine monitoring requirements, and improve effluent quality.	**Core:** **A.** Prepare updated Local Limits Studies for Clinton and Deer Island in accordance with EPA guidelines to confirm appropriate discharge limits from industries. **B.** Continue to review all Ambient Monitoring Plan questions and conduct evaluations to ensure they address MWRA needs and public concerns. [10] **C.** Continue to closely follow developing permit issues such as the impact of changes in bacterial and nutrient water quality standards, effluent loading limits, emerging contaminants and PFAS regulations, stormwater permitting, endangered species designations and phosphorus and PFAS in biosolids. **Special Initiatives:** **A.** Develop strategies to address emerging contaminants, (e.g., PFAS and microplastics) as they are identified and frame an approach to respond to the public's concerns about these contaminants.

Goal	Initiatives
5. *(continued)*	**B.** Assess thresholds for annual nitrogen loading, including evaluating the existing thresholds and the environmental impact of nitrogen, as well as, whether these thresholds developed over 20 years ago are valid or should be modified. **C.** Review new waste treatment technologies as they arise to continuously improve treatment performance and efficiency. **D. Continue to work with researchers investigating the use of wastewater as an indicator of the presence of the Covid-19 virus.**
6. **Move forward with design and construction of major wastewater infrastructure rehabilitation and renewal projects.**	**Core:** **A.** Continue to design and implement facility rehabilitation projects for various pump stations, headworks, CSO facilities and the Deer Island Treatment Plant. [11] **B.** Continue to implement an ongoing program to review, prioritize and accelerate interceptor renewal projects.
7. **Complete all CSO milestones by 2021 and demonstrate that the CSO Plan meets its performance objectives.**	**Core:** **A.** Implement CSO performance assessment through ongoing contract with AECOM that will culminate in a report to DEP/EPA in December 2021 verifying whether the approved long-term CSO control plan goals are attained. **B.** Comply with the CSO Variances for the Alewife Brook/Upper Mystic River Basin and Lower Charles River/Charles Basin issued to MWRA and CSO communities for the period Sept 1, 2019 through Aug. 31, 2024. [12] **Special Initiatives:** **A.** Conduct an evaluation of the CSO treatment processes to determine potential opportunities to better meet permit limits. Confirm or reassess treatment processes as part of CSO facility rehabilitation projects.

Goal	Initiatives
7. *(continued)*	**B.** Implement a subscriber based CSO Public Notification Program. Provide notification of a CSO overflow within 4 hours of the start of the discharge.[12] **C.** Implement near real-time SSO reporting system to provide public information and ensure reporting timeframes meet regulatory requirements.
8. **Assist member communities to improve their wastewater collection systems through ongoing technical, financial, and operational support programs.**	**Core:** **A.** Provide technical and operational support including TV inspections, fieldwork assistance, or other targeted assistance, as needed. **B.** Promote and manage MWRA's Inflow/Infiltration Local Financial Assistance Program to facilitate reduced I/I in local community infrastructure.

Spot Pond Storage Tank

III. Infrastructure Management & Resilience

Goal	Initiatives
9. **Maintain and enhance water and wastewater system assets over the long term at the lowest possible life cycle cost and acceptable risk, consistent with customer, community, and regulatory support service levels.** [13] [14] [15] [16]	**Core:** **A.** Continue to ensure proper operations and maintenance of the water and wastewater systems and minimize system downtime by performing: • Preventative maintenance • Predictive maintenance • Corrective maintenance on equipment and linear assets • Leak surveys of the water system • Water system valve inspections and exercise • Wastewater pipelines, structures, water storage tanks, and inverted siphons inspections, and cleaning. **B.** Inspect, maintain, and improve the dams, dikes, and other facilities constituting the infrastructure of the watershed system through ongoing maintenance and an adequate multi-year capital improvement program in order to ensure system reliability and limit potential flood hazards. **C.** Deliver services equitably across a diverse service area. **Special Initiatives:** **A.** Continue use of Condition Monitoring for all Water and Wastewater sites. Expand Condition Monitoring techniques to provide earlier indication of asset degradation. **B.** Conduct an updated benchmarking analysis in order to identify gaps and sustain the goal of maximizing asset protection while potentially identifying new best practices in the industry. **C.** Update the wastewater metering system and evaluate new technologies to ensure continued accurate flow accounting and to enhance its usefulness for operational and evaluation purposes. **D.** Continue to research and develop Key Performance Indicators (KPI) to compare our performance internally and against the industry. [13] **E.** Enhance and monitor water pipeline protection to maximize pipeline lifetime.

Goal	Initiatives
9. *(Continued.)*	**F.** Expand integration between the MWRA's Authority-wide Enterprise Asset Management system Maximo with Lawson, Process Information (PI) and Automated Vehicle Location systems to expand the use of Predictive Management tasks increasing functionality, asset tracking and improved work flow to reduce equipment downtime and control budget spikes. Utilize updated MAXIMO to increase opportunities for more paperless work. **G.** Continue to upgrade and improve upon the Supervisory Control and Data Acquisition (SCADA) and Process Information and Controls System (PICS) hardware and software to meet the current industry standard and to address cyber security concerns
10. **Prepare for catastrophic events and malicious acts that could affect the water and wastewater systems.** [17] [18]	**Core:** **A.** Continue to improve and incorporate redundancy and operational flexibility within the water system to ensure uninterrupted service. **B.** Design and implement projects including those that eliminate or mitigate single points of failure within MWRA's water transmission and distribution system. **C.** Continue to train staff on various potential emergency scenarios and participate in broader Massachusetts Emergency Management Agency (MEMA) and other training exercises. **D. Work with Departments throughout MWRA to continue to implement a comprehensive security and emergency preparedness program including an analysis of lessons learned (ongoing) during the Covid-19 State of Emergency.** **Special Initiatives:** **A.** Develop and implement an Information Security Plan to increase the resiliency and sustainability of the MWRA's data security practices.

Goal	Initiatives
10. *(Continued.)*	**B.** Redesign Cyber Security Network perimeter defense in-depth strategy to mitigate the new and evolving threats by taking advantage of next generation technologies. **C.** Develop and implement an updated Physical Security Plan including Crime Prevention Through Design to decrease vulnerabilities and increase capacities so that threats are reduced, thereby reducing risk. **D.** Assess current communication technology and implement communication redundancies where needed within the security network. **E.** Complete the Preliminary Design and Environmental Impact Report for the Metropolitan Tunnel Redundancy Program and initiate final design. **F.** Update MWRA's earthquake preparedness to bring our facilities up to current standards, as they are rehabilitated. **G.** Move forward with Wastewater Facility Emergency Response Planning to identify potential measures to minimize disruptions from failures of facilities, including development of a comprehensive Emergency Response Plan for each facility. **H.** Create and implement a predetermined schedule of review for facility risk assessments. **I.** Participate in Lower Mystic Resiliency Planning as an abutter to the Lower Mystic.

Deer Island Wastewater Treatment Plant Staff

IV. Finance and Management Systems

Goal	Initiatives
11. **Ensure Financial Sustainability, Integrity, and Transparency.**	**Core:** **A.** Continue the long-term strategic budgeting practice to ensure predictable and reasonable sewer and water assessments to our member communities. **B. Continue to implement MWRA's approach to sustainable rate increases while accounting for the pandemic's effects on its communities' revenue.** **C.** Manage debt and investment portfolios to maximize savings/returns in compliance with all applicable rules and regulations. **D.** Continue diversification strategy to insulate against overexposure and promote resiliency to changing market conditions. **E.** Maintain a system of internal controls to best protect the organization's resources. **F.** Continue to employ budget and expense control practices to manage expenses. **G.** Identify and pursue optimization in all aspects of MWRA financial operations. **H.** Continue to conduct strategic energy procurements. **I.** Continue to fund the pension fund at the annual required contribution level and to develop strategies to address the growing other Post-Employment Benefits.
12. **Promote Effective Business Operations and Resource Management.**	**Core:** **A.** Maintain and expand MWRA-wide recycling efforts. **B.** Pursue, and administer any Federal and or State infrastructure, stimulus or Covid related grants. **C. Evaluate office footprint and needs in light of pandemic lessons learned. Make changes where practical.**

Goal	Initiatives
13. Leverage Information Technology to Improve Organizational Effectiveness.	**Core:** **A.** Deliver secure Information Technology (IT) services and solutions efficiently and effectively. **B.** Provide Information Technology solutions to streamline work processes while ensuring the security and integrity of MWRA data by leveraging the use of existing or emerging technologies. **C.** Obtain feedback from users on satisfaction levels and desired new services and implement changes accordingly. **D.** Maintain current technology hardware, software, and network infrastructure. **E.** Enhance Information Technology workforce capabilities through new certification and license requirements. **Special Initiatives:** **A.** Implement an Application Improvement Program that will continue MWRA's efforts to update and enhance the multitude of applications used in the MWRA to improve efficiencies of business processes, mobile devices, and effectiveness of staff. **B.** Implement an archive and purge system that will provide an automated and integrated solution for archiving electronic content that will allow the Authority to intelligently store, manage and discover email and all critical business information sources, while providing easy and intuitive access for end users. **C.** Execute a Technology Infrastructure Improvement Program that will assess and implement consolidated and optimized versions of MWRA's core IT infrastructure elements and improve data management practices. **D.** Upgrade and enhance MWRA's Enterprise Resource Planning system leveraging out of the box functionality while striving to eliminate customizations and adoption of technology standards.

Goal	Initiatives
13. *(Continued.)*	**E.** Implement Enterprise Content Management for e-Construction, e-Engineering and Records Management. **F.** Implement a unified communication collaboration platform to improve business processes, team communication and collaboration and distributed work force. **G.** Move towards the use of AI and Machine Learning technology to address computational and process problems.

Building 39, Charlestown Navy Yard

V. Diversity, Equity, Inclusion & Workforce Development

Goal	Initiatives
14. Foster and Sustain an Excellent Workforce.	**Core:** **A.** Prioritize Succession Planning in anticipation of critical retirements over the next five years. **B.** Provide effective training necessary for employees to obtain and maintain required licenses and certifications to ensure a highly skilled workforce. **Special Initiatives:** **A.** Continue MWRA's in-house Job Shadowing, career development training programs and explore a pilot program for job rotation of certain titles. **B.** **Continue to improve MWRA's teleworking capabilities and productivity incorporating lessons learned during the Covid-19 pandemic.** **C.** Institute programs with a focus on professional and leadership development. **D.** Expand intern initiative.
15. Foster a diverse and inclusive workplace.	**Core:** **A.** Cultivate a safe work environment for all employees that is free from harassment and encourages respect. **B.** Provide training to all employees on diversity, inclusion, equity, respect, and harassment prevention in the workplace. **C.** Continue MWRA's efforts to develop new recruitment and retention strategies to foster diversity, including traditionally underrepresented categories, people with disabilities, and veterans. **D.** Pursue an inclusive leadership approach that considers innovation and diverse points of view to respond to the evolving needs of the Authority. **Special Initiatives:** **A.** Create and maintain a work group whose mission is to improve diversity, inclusion, equity and respect in the workplace. **B.** Implement workgroup recommendations with measurable goals.

Goal	Initiatives
16. **Ensure a safe and healthful work place for all employees, contractors and visitors free of recognized hazards**	**A.** Continue to identify hazards and assess associated risks. Provide training on programs and procedures to prevent or control incidents and ensure employee safety. **B.** **Continue to review and implement best safety practices during the Covid-19 pandemic to protect the safety of all employees and ensure continuity of critical services.** **C.** Maintain compliance with Massachusetts' Occupational Safety and Health For State Workers regulation (454 CMR 25.00) by meeting the requirements set forth under the Occupational Safety and Health Act (OSHA) of 1970. **D.** Maintain records concerning occupational injuries, illnesses, deaths, and exposure to toxic materials in compliance with regulations.

Working through the COVID-19 pandemic

Charlestown Wind Turbine

VI. Environmental Sustainability

Goal	Initiatives
17. Continue to maximize energy efficiency of MWRA operations, renewable energy production, and revenue generation opportunities using MWRA's energy assets. [19] [20]	**Core:** **A.** Assist the Commonwealth in meeting its Greenhouse Reduction Goals set forth in the Global Warming Solutions Act. **B.** Continue to conduct energy audits at all facilities as needed. **C.** Optimize processes to save energy. **D.** Continue to incorporate cost-effective energy efficiency, non-fossil fuel heating, and renewable energy projects into new construction, rehabilitation projects, and equipment replacement. **E.** Continue to invest in new stand-alone renewable energy projects at MWRA facilities. **F.** Continue to maximize revenue from generation assets, including additional Demand Response opportunities. **G.** Take full advantage of utility energy efficiency rebate opportunities. **Special Initiatives:** **A.** Incorporate employee education on energy efficiency in MWRA training outlets, e.g. tool box talks. **B.** Design new gas turbine combined heat and power equipment to take advantage of the higher power and thermal efficiencies of new equipment, maximizing the production of additional electric power for on-site use at Deer Island as well as cost savings while reducing maintenance spending on aging equipment. **C.** Evaluate and implement where feasible combined heat and power technology in plant operations to improve energy efficiency (e.g. pellet plant, Clinton) **D.** Continue to develop the battery storage projects and work with the utility and its contractor to optimize demand savings. Evaluate opportunities for future battery storage projects.

Goal	Initiatives
17. *(Continued)*	**E.** Explore community solar opportunities that will stimulate large-scale remote solar installations and save money on our electric bills. **F.** Expand our fleet of electric vehicles and charging stations. **G.** Explore a new MWRA-wide building/plant information management system that includes a comprehensive energy management system.
18. **Continue to monitor climate change research and move forward with plans to reduce impacts of projected sea level rise and storm surge events on MWRA infrastructure.**	**Core:** **A.** Continue to incorporate design modifications into facility renovations and maintenance activities to address sea level rise and storm surge. **B.** Plan and install flood protection barriers at water and wastewater sites which fall below expected elevations of flood waters under condition of a FEMA 100 year storm plus 2 ½ feet to minimize damage and still provide service. **Special Initiatives:** **A.** Work with State and regional organizations and academic institutions to identify how MWRA's existing long-term environmental data sets can be used to help assess and project impacts of climate change.
19. **Advance reasonable water system expansion.**	**Core:** **A.** Continue to provide assistance to communities seeking admission to the MWRA's water system or seeking emergency withdrawals. **B.** Work with prospective communities to inform them of the benefits of admission. **Special Initiatives:** **A.** Work with MWRA's Advisory Board on legislative initiatives to pursue funding for connection assistance for new communities connecting to the water system.

Goal	Initiatives
20. Continue to recognize the environmental, cultural, historical, and recreational importance of the watershed lands, the aqueduct system, and the unique location on Boston Harbor of the Deer Island Treatment Plant and Nut Island Headworks, to the citizens of the Commonwealth.	**Core:** **A.** Continue to work cooperatively with DCR and cities and towns to ensure that these lands are available for appropriate public access. **B.** Continue to work with cities and towns to implement the Public Access Initiative on the Wachusett, Weston, Sudbury, and Cochituate Aqueducts. [21] **C.** Continue to provide public access to Boston Harbor at Deer and Nut Islands, while ensuring appropriate security for MWRA's operations. [22]

Glossary

Ambient Monitoring Plan: MWRA monitors water quality at the outfall location in Massachusetts Bay where treated sewage, or effluent, is discharged. This sampling program is termed "ambient monitoring", because sampling is focused on the ambient, or surrounding waters at the outfall, as well as more distant locations. The program is detailed in the Ambient Monitoring Plan which is overseen by state and federal regulators, as well as by the Outfall Monitoring Science Advisory Panel

Asset Management: Defined by the EPA as "managing infrastructure capital assets to minimize the total cost of owning and operating them, while delivering the service levels customers desire."

Benchmarking: The process of comparing one's business processes and performance metrics to industry bests or best practices from other companies. One example of an industry metric MWRA uses to benchmark its performance is the American Water Works Association's "Distribution Systems Operations and Management Standard".

Co-digestion: For the purpose of MWRA discussions, Co-digestion has been focused on the potential addition of organic food waste to the digesters at DITP to address the state ban on the disposal of commercial and industrial food wastes in landfills by taking advantage of excess digester capacity to increase self-generation.

Combined Heat and Power: CHP, also known as cogeneration, is the simultaneous production of electricity and heat from a single fuel source. Fuels can include fuel oil, natural gas or biogas from anaerobic digestion as generated/used by Deer Island

Combined Sewer Overflow: Combined sewer systems are sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Most of the time, combined sewer systems transport all of their wastewater to a sewage treatment plant, where it is treated and then discharged to a water body. During periods of heavy rainfall or snowmelt, however, the wastewater volume in a combined sewer system can exceed the capacity of the sewer system or treatment plant. For this reason, combined sewer systems are designed to overflow occasionally and discharge excess wastewater directly to nearby streams, rivers, or other water bodies, with some treatment.

Community Confidence Report (CCR): The Community Confidence Report is MWRA's annual report on drinking water test results which describes how we treat, test and deliver tap water to the homes and businesses in our service area. The MWRA and local water departments test up to 500 samples each week, and test for over 120 contaminants each year. This report is required under the federal Safe Drinking Water Act.

Condition Monitoring: Condition monitoring technologies based on vibration, acoustic ultrasonic, infrared thermography, electrical testing, and oil analysis are used to proactively track and trend equipment operating condition. By closely monitoring equipment health, catastrophic failures can be avoided, *repairs can be made*, and asset life can be extended. Component failure can be approximated, replacement parts ordered and replacements scheduled prior to failure and/or total loss of equipment availability.

Headworks: MWRA has four headworks whose function is to screen sand, gravel, and large objects out of the sewage prior to it reaching the sewage treatment plant.

Inflow and Infiltration: Inflow is surface water that enters the wastewater system from yard, roof and footing drains, from cross-connections with storm drains, downspouts, and through holes in manhole covers. Inflow occurs as a result of storm events such as rainfall, snowfall, springs or snow melt. Infiltration is groundwater, or groundwater that is influenced by surface or sea water, which enters sewer pipes (interceptors, collectors, manholes (MH), or side sewers) through holes, breaks, joint failures, and other openings.

Glossary

Local Limits Study: Local limits are standards that are set by the local Publicly Owned Treatment Works (POTW) that establish the concentration of pollutants that may be discharged into the sewer system by industry. Local limits supplement, and in some cases, strengthen Federal Standards. As required under the EPA's Pretreatment Regulations, 40 CFR Part 403, POTWs such as the MWRA's Deer Island are required to conduct periodic analysis of the existing local discharge limits to ensure that they are adequate to prevent pollutants from entering the treatment system that will interfere with the operation of the treatment plant, degrade the quality of biosolids, or pass untreated through the treatment plant to contaminate the receiving water.

Local Water Assistance Program: MWRA's Local Water System Assistance Program (LWSAP) provides interest-free loans to member water communities to perform water system improvement projects. The program's goal is to improve local water system pipeline conditions to help maintain high water quality from MWRA's treatment plant through local pipelines to customers' taps. Community loans will be repaid to MWRA over a 10-year period. Currently, loan funds are approved for distribution from fiscal year 2011 through fiscal year 2020.

MWRA Advisory Board: The MWRA Advisory Board was created by the Massachusetts Legislature to represent the interests of MWRA service area communities in the 1984 Enabling Act [23] that established the MWRA. Its members include the chief elected official and a designee from each of the 60 cities and towns, a member of the Metropolitan Area Planning Council, and six gubernatorial appointees representing various interests. The Advisory Board reviews and comments on MWRA capital and current expense budgets, as well as MWRA practices and policies. For more information on the MWRA's Advisory Board [24]

MWRA Board of Directors: MWRA is governed by an 11-member Board of Directors who are appointed by the Governor or directly or indirectly by elected officials in MWRA customer communities. The make-up of the MWRA Board of Directors was established in the MWRA enabling act, [25] (Chapter 372 of the Acts of 1984), and amended in August, 2010. [26] For more information on MWRA's Board of Directors. [27]

NPDES Permit: The National Pollutant Discharge Elimination System Permit Program, administered by the U.S. Environmental Protection Agency, controls water pollution by regulating point sources that discharge pollutants into waters of the United States. All wastewater treatment plants that discharge effluent to Waters of the United States, have an NPDES permit to ensure that their discharges meet all environmental regulatory requirements.

Orange Notebook: A quarterly report outlining MWRA's performance on key indicators.

Predictive Maintenance: Predictive maintenance are techniques used to determine the condition of assets. Some techniques include vibration, acoustic ultrasonic, ultrasonic thickness and oil analysis. The predictive maintenance results in proactive maintenance activities such as alignments, oil changes or filtering, or balancing rotating equipment that prevent failures and extend equipment life. These predictive maintenance activities are schedules based upon the type of equipment, frequency of use and service conditions.

Pretreatment Program: As defined in Federal Regulations 40 CFR 403.3, "pretreatment" means the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. To reduce toxic discharges at their source, MWRA's Toxic Reduction and Control Department administers MWRA's Industrial Pretreatment Program under the Federal Clean Water Act. [28] TRAC regulates industrial dischargers in accordance with its Sewer Rules and Regulations (360 CMR 10.00) [29] and works with industries to encourage voluntary reductions in their toxic chemical use.

Glossary

Process Control: An engineering function (as well as a staff unit) devoted to aiding operations in establishing control limits, monitoring performance and ensuring compliance with treatment plant goals and objectives.

Reliability Centered Maintenance: Reliability Centered Maintenance, or RCM, rigorously reviews systems' design, operating context, current maintenance strategies and identifies safety and design improvements. By reviewing systems in their specific operating context, staff's maintenance efforts can be focused where the greatest value is added. Often, the result is a Preventive Maintenance Program that is less costly and more effective in maintaining system availability and long-term asset protection.

Residuals: The solids that are left behind after the wastewater has been treated at a wastewater treatment plant, such as MWRA's Deer Island Plant, are called the residuals.

Supervisory Control and Data Acquisition (SCADA): These systems provide a means of monitoring and controlling facilities and equipment from a remote, centralized location, as well as providing a continuous record of facility operations.

Index of Links

1 **The Water System**
http://www.mwra.com/04water/html/wat.htm

2 **Watershed Protection**
http://www.mwra.state.ma.us/04water/html/watshed.htm

3 **Water Supply Protection Trust**
http://www.mass.gov/eea/agencies/dcr/water-res-protection/watershed-mgmt/water-supply-protection-trust.html

4 **Annual Drinking Water Test Results**
http://www.mwra.com/water/html/awqr.htm

5 **Local Water System Assistance Program (LWSAP) For Member Communities**
http://www.mwra.com/comsupport/lwsap/lwsapprogram.html

6 **MWRA's Technical Reports**
https://www.mwra.com/harbor/enquad/trlist.html

7 **(Discharge) Regulations**
http://www.mwra.com/03sewer/html/trac.htm#regulations

8 **Pretreatment Program and Federal Clean Water Act**
http://www.mwra.com/03sewer/html/trac.htm#pretreatment

9 **NPDES Permit**
http://www.mwra.state.ma.us/harbor/html/npdes.htm

10 **Ambient Monitoring Plan**
http://www.mwra.state.ma.us/harbor/html/ambient.htm

11 **Combined Sewer Overflows (CSOs)**
http://www.mwra.state.ma.us/03sewer/html/sewcso.htm

12 **Operations & Maintenance**
http://www.mwra.com/harbor/html/operations.htm

13 **Orange Notebook**
http://www.mwra.com/quarterly/orangenotebook/orangenotebook.htm

14 **Wastewater System Master Plan**
https://www.mwra.com/publications/masterplan/2018/mp-wastewater.pdf

15 **Water System Master Plan**
https://www.mwra.com/publications/masterplan/2018/mp-water.pdf

16 **CIP ProgramProposed Fiscal Year**
https://www.mwra.com/finance/cip.htm

Index of Links

17 Wastewater System Master Plan
https://www.mwra.com/publications/masterplan/2018/mp-wastewater.pdf

18 Capital Improvement Program (CIP)
http://www.mwra.state.ma.us/finance/cip.htm

19 Orange Notebook
http://www.mwra.com/quarterly/orangenotebook/orangenotebook.htm

20 MWRA Renewable Energy Program
http://www.mwra.state.ma.us/05energy/2011/102611-renewableslides/slides.html

21 Policy on Using MWRA Aqueduct Lands for Trails
http:/www.mwra.com/projects/access/aqueducts/aqueducts.html

22 Deer Island Public Access Area
http://www.mwra.com/03sewer/html/sewdi_access.htm

23 1984 Enabling Act
https://archives.lib.state.ma.us/handle/2452/6873

24 MWRA Advisory Board
http://www.mwraadvisoryboard.com/

25 1984 Chapter 0372
http://archives.lib.state.ma.us/handle/2452/6873

26 Acts 2010 Chapter 274
http://www.malegislature.gov/Laws/SessionLaws/Acts/2010/Chapter274

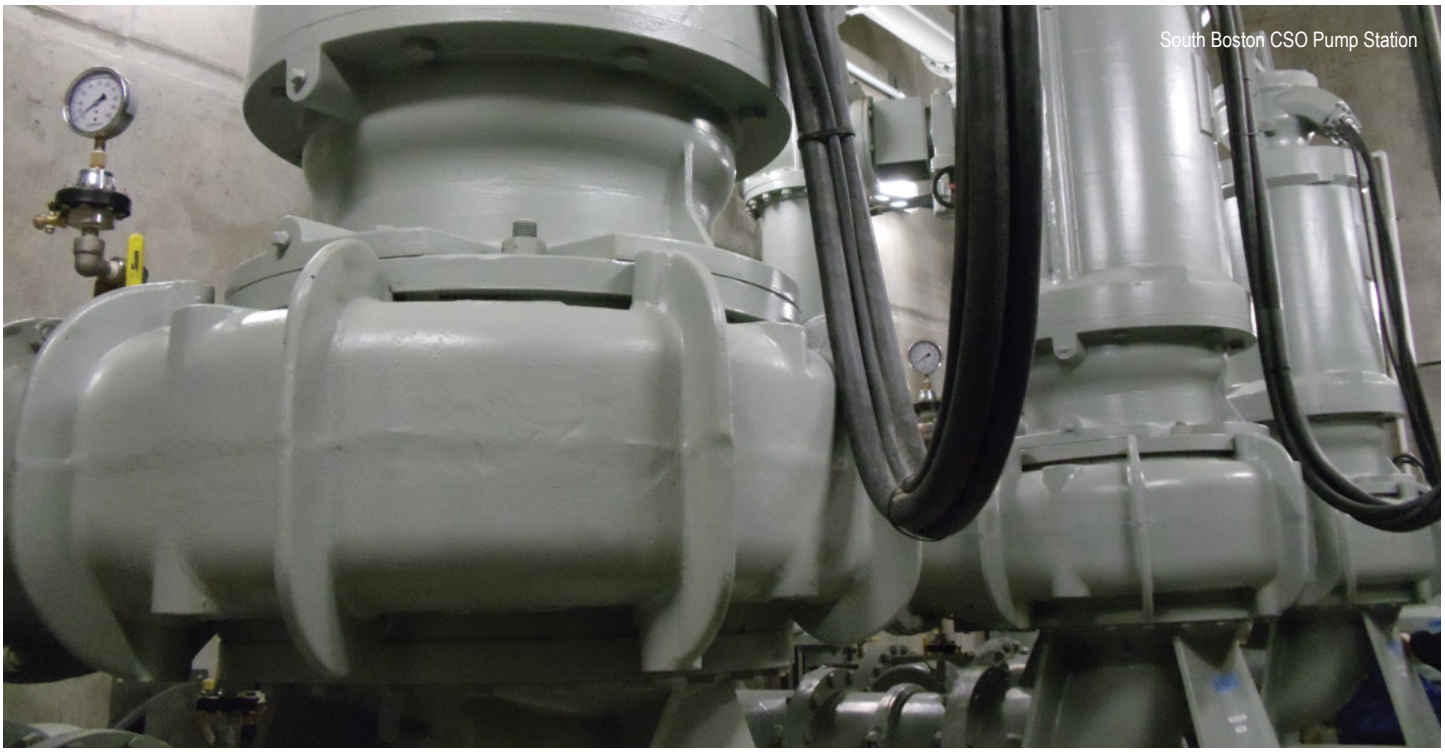
27 MWRA Board of Directors
http://www.mwra.state.ma.us/02org/html/boardofdirectors.htm

28 Pretreatment Program and Federal Clean Water Act
http://www.mwra.com/03sewer/html/ppnfcwa.htm

29 360 CMR 10.000
http://www.mwra.com/trac/regulations/2009/360-cmr-10.pdf

Ultraviolet disinfection units at the John J. Carroll Water Treatment Plant

Massachusetts Water Resources Authority | 100 First Ave. Boston, Massachusetts 02129 | (617) 242-6000


South Boston CSO Pump Station