

MASSACHUSETTS WATER RESOURCES AUTHORITY

Board of Directors Report

on

Key Indicators of MWRA Performance

Fourth Quarter FY2022

Q1	Q2	Q3	Q4



Frederick A. Laskey, Executive Director
David Coppes, Chief Operating Officer
September 14, 2022

Board of Directors Report on Key Indicators of MWRA Performance

Fourth Quarter FY22

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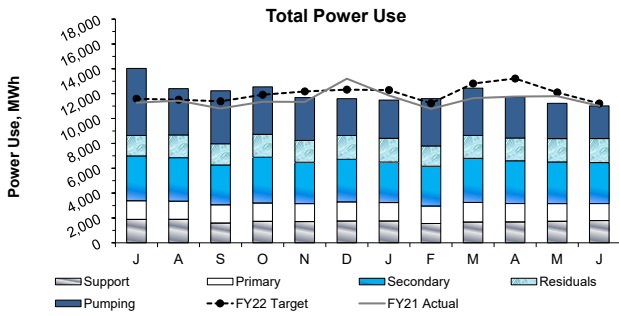
This quarterly report is prepared by MWRA staff to track a variety of MWRA performance measures for routine review by MWRA's board of directors. The content and format of this report is expected to develop as time passes. Information is reported on a preliminary basis as appropriate and available for internal management use and is subject to correction and clarification.

Frederick A. Laskey, Executive Director
David Coppes, Chief Operating Officer
September 14, 2022

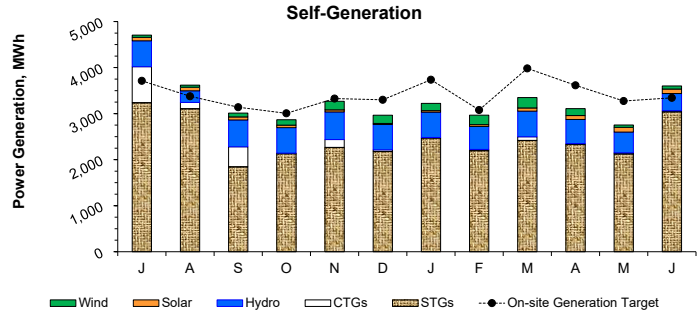
OPERATIONS AND MAINTENANCE

Deer Island Operations

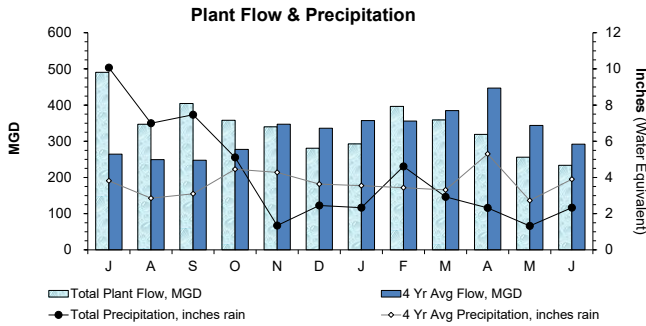
4th Quarter - FY22



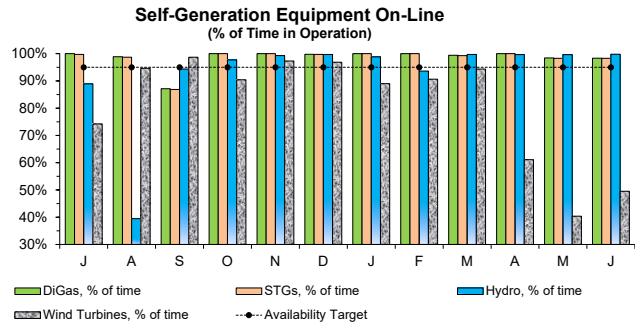
Total power usage in the 4th Quarter was 7.1% below target as plant flow for this period was 25.3% below target with historical data (4 year average) used to generate the electricity model. As a result, power used in nearly all areas and treatment processes was similar to or below target, including power used for raw wastewater pumping, which was 22.2% below target.



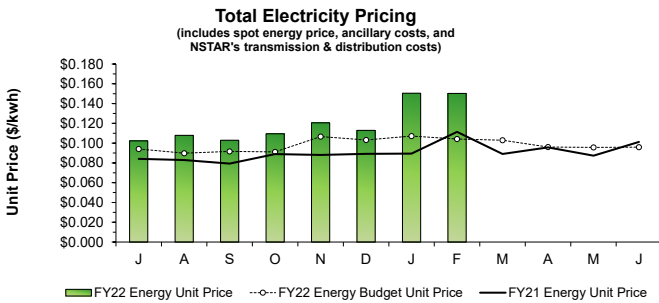
Power generated on-site during the 4th Quarter was within 1.0% of the target. CTGs generation was below target by 91.3% as the budgetary estimate based on actual generation was biased high due to extensive CTG operation in previous years for storms and for cross-harbor power cable outages during maintenance by the utility. The CTGs were operated on June 16 for an ISO-New England summer audit of the Demand Response program, and briefly for routine maintenance/checkout purposes in April and May. STGs generation was on target (+0.7%) as was Hydro Turbine generation (+1.8%). Wind Turbine generation was 38.7% below target, partially due to mechanical issues with Turbine #1 (main shaft bearing failure) which has left the turbine out of service since April 11. Solar Panel generation was 6.0% above target for the 4th Quarter.



Total Plant Flow for the 4th Quarter was 25.3% below target with the budgeted 4 year average plant flow (269.6 MGD actual vs. 360.9 MGD expected) as precipitation was 50.0% below target this quarter (5.97 inches actual vs. 11.93 inches expected).

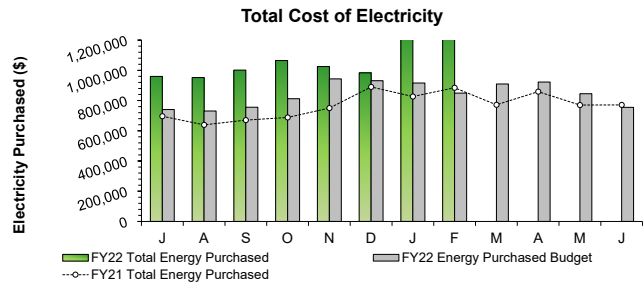


The DiGas System, STGs, and Hydro Turbine availability all exceeded the 95% availability in the 4th Quarter. Wind Turbine availability was 50.3% below target due to mechanical issues with Turbine #1 (main shaft bearing failure) which has left the turbine out of service since April 11.



Under the current energy supply contract, a block portion of DI's energy is a fixed rate and the variable load above the block is purchased in real time. The actual Total Energy Unit Price in February (the most current invoice available) was 44.2% above target with budgetary estimates due to the high real time electricity prices for January and February. The actual Total Energy Unit Prices for March, April, May, and June are not yet available as the complete invoices have not been received. The Total Energy Unit Price includes a fixed block price, spot energy price, transmission & distribution charges, and ancillary charges.

Note: Only the actual energy prices are reported. Therefore, the dataset lags by four (4) months due to the timing of invoice receipt and review.



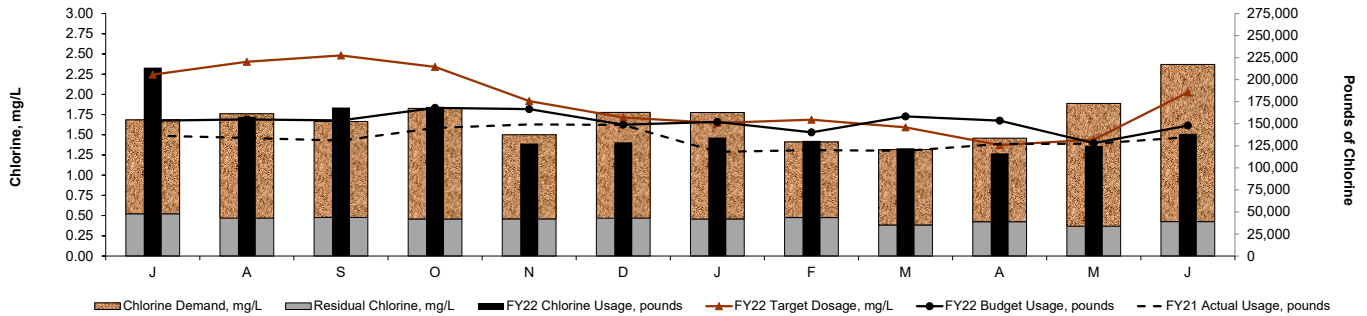
The Electricity cost data for Electricity Purchased for March, April, May, and June are not yet available as the complete invoices have not been received. Year-to-date Total Cost of Electricity is \$1,876,095 (28.1%) higher than budgeted through February as the Total Energy Unit Price was 20.6% higher than target and the Total Electricity Purchased was 6.2% above target.

Note: Only months with complete Electricity Purchased data are reported. Therefore, the dataset lags by four (4) months due to the timing of invoice receipt and review.

Deer Island Operations

4th Quarter - FY22

Deer Island Sodium Hypochlorite Use



The disinfection dosing rate in the 4th Quarter was 18.0% above target with budgetary estimates. However, actual sodium hypochlorite usage in pounds of chlorine was 11.6% lower-than-expected as the average plant flow was 25.3% below target. DITP maintained an average disinfection chlorine residual of 0.41 mg/L this quarter with an average dosing rate of 1.91 mg/L (as chlorine demand was 1.50 mg/L).

The overall disinfection dosing rate (target and actual) is dependent on plant flow, target effluent total chlorine residual levels, effluent quality and NPDES permit levels for fecal coliform.

Secondary Blending Events

Month	Count of Blending Events	Count of Blending Events Due to Rain	Count of Blending Events Due to Non-Rain-Related Events	Secondary, as a Percent of Total Plant Flow	Total Hours Blended During Month
J	7	7	0	95.1%	84.65
A	6	6	0	99.0%	17.42
S	2	2	0	96.4%	35.02
O	4	4	0	99.3%	16.48
N	1	1	0	99.9%	2.41
D	0	0	0	100.0%	0.00
J	1	1	0	99.9%	2.89
F	2	2	0	99.8%	7.50
M	0	0	0	100.0%	0.00
A	1	1	0	99.9%	2.60
M	0	0	0	100.0%	0.00
J	0	0	0	100.0%	0.00
Total	24	24	0	98.9%	168.97

99.95% of all flows were treated at full secondary during the 4th Quarter. There was one (1) secondary blending event on April 19 due to high plant flows from heavy precipitation. This blending event resulted in 2.60 hours of blending and a total of 11.53 MGal of primary-only treated effluent blended with secondary effluent. The Maximum Secondary Capacity during the entire quarter was 700 MGD. Secondary permit limits were met at all times during the 4th Quarter of FY22.

Deer Island Operations & Maintenance Report

Environmental/Pumping:

The plant achieved an instantaneous peak flow rate of 883.2 MGD during the morning of April 19. This peak flow occurred during a storm event that brought 0.56 inches of precipitation to the metropolitan Boston area. Overall, Total Plant Flow in the 4th Quarter was 25.3% below target with the 4 year average plant flow estimate for the quarter.

Recordsetting low monthly influent flows were recorded for May and June as the previous Total Plant Influent, North System Influent, and South System Influent flow records were broken as a result of the current regional drought conditions. These record low flows are shown in the table below and are highlighted in yellow.

May and June Low Plant Flow Records

	Previous May Low Flow Record (since plant startup July 1998)	New May Low Flow Record (set 2022)	Previous June Low Flow Record (since plant startup July 1998)	New June Low Flow Record (set 2022)	All-time Monthly Low Flow Record (since plant startup July 1998)
Total Plant Influent Flow	282.03 MGD (2016)	256.04 MGD	247.35 MGD (2016)	233.59 MGD	204.12 MGD (Sept. 2020)
North System Influent Flow	181.78 MGD (2015)	166.15 MGD	164.84 MGD (2020)	156.20 MGD	138.78 MGD (Sept. 2020)
South System Influent Flow	96.47 MGD (2016)	89.89 MGD	80.05 MGD (2016)	77.43 MGD	62.28 MGD (Sept. 2016)
Precipitation	0.92 inches (1991)	No new record set (1.32 inches)	0.00 inches (1999)	No new record set (2.33 inches)	0.00 inches (June 1999)

Secondary Treatment:

Annual turnaround maintenance was performed on Train #2 in the Cryogenic Oxygen Facility from April 25 to May 6. This two (2) week turnaround maintenance is performed on roughly half of the components and systems in the Cryogenic Oxygen Facility. During this turnaround maintenance, the contractor calibrated all the instrumentation on Cold Box unit #2 as well as, a number of other components of the oxygen plant. The same turnaround maintenance will be completed on Train #1 in the fall (likely in October).

Residuals:

Sludge feed to the digesters in both Modules #1 and #2 was temporarily suspended for several days for each digester, from May 23 to June 24, to allow the contractor to perform routine scheduled maintenance on each digester's overflow line. This maintenance is performed on only one (1) digester at a time until the work was completed in all eight (8) digesters. This routine maintenance is performed annually, typically in late fall, but was delayed by approximately six (6) months due to COVID-19 limitations during a regional peak in the infection rate of the general population.

Deer Island Operations

4th Quarter - FY22

Deer Island Operations & Maintenance Report (continued)

Odor Control Treatment:

The scrubber packing media and mist eliminator replacement project was completed on April 15. The scrubber media and mist eliminator in wet chemical scrubber units #1 through #5 in the East Odor Control (EOC) Facility, units #1 through #4 in the West Odor Control (WOC) Facility, and units #2 and #3 in the Residuals Odor Control (ROC) Facility were replaced by a contractor. Brief odor control shutdowns were necessary to allow maintenance staff to install airflow isolation blanks in the fans to prevent the escape of fugitive emissions while the contractor worked in the scrubber units.

Carbon adsorber (CAD) units #3 in the North Pumping Odor Control (NPOC) Facility, #3 and #4 in the Secondary Odor Control (SOC) Facility, and #2 in the Residuals Odor Control (ROC) Facility were emptied and refilled with new regenerated activated carbon media in May as part of routine maintenance to replace spent activated carbon.

Energy and Thermal Power Plant:

Overall, total power generated on-site accounted for 27.9% of Deer Island's total power use for the 4th Quarter. Renewable power generated on-site (by Solar, Wind, STGs, and Hydro Turbines) accounted for 27.7% of Deer Island's total electrical power use for the quarter.

Wind Turbine #1 began operating intermittently starting on April 9, tripping on a rotor/generator gear ratio alarm. Staff contacted the service contractor who arrived onsite Monday April 11 and determined the turbine had experienced a main shaft rear bearing failure. The turbine will remain out of service until a cause for the failure can be determined. Once the cause is determined, to repair the main shaft rear bearing system will require the removal of the turbine blades, as well as the main shaft and housing.

On May 23, CTG-1A was taken out of service for annual maintenance on all ancillary systems including instrumentation calibrations. The work and testing were completed on schedule and the unit was returned to standby (available for operation) on May 27. During pre-checkout test operation of both CTGs ahead of this scheduled maintenance, staff identified two (2) issues with the backup CTG-2B unit, including a permissive that caused the turbine to become locked out, preventing operation of the turbine, and an intermittent ground fault issue with the 24-VDC system. Both issues were able to be corrected prior to the start of the maintenance on CTG-1A.

The boiler in the Thermal Power Plant (TPP) was taken offline in the late evening of May 31 to allow the steam system to cool sufficiently overnight before the contractor and DITP Maintenance staff could proceed with the annual dump condenser cleaning on June 1 prior to placing the steam system into summer operating mode. Boiler 201 was returned to operation later in the evening, following the dump condenser work, to restore steam production and steam turbine power generation. The TPP began operating the steam system in summer mode starting on June 2 to maximize the energy generation from the steam turbines during the seasonally lower plant heat demand period.

CTG-2B was operated for approximately 2.2 hours on July 16 for an ISO-New England declared Demand Response summer audit event.

CTG-2B successfully completed a required 2-year inspection of the start air tank on June 21 certified by the insurance inspector. This inspection requires the CTG unit to be unavailable for an estimated 12 hours, to allow time to discharge the existing air, open the vessel for inspection and to close up and recharge the air tank after completing the inspection. The start air system is required to operate the CTG. The CTG-1A start air tank is not due for an inspection until later this year in September.

Regulatory:

Emissions compliance testing on the Residuals Odor Control (ROC) treatment system on DITP was conducted by consultants from June 13 to June 14. The ROC treatment system treats combined process air from the gravity thickener and centrifuge process areas. The DITP Air Quality Operating Permit issued by the MA DEP requires that DITP conduct emissions compliance testing for the various emission units once every five (5) years to demonstrate compliance with applicable total reduced sulfur (TRS) and non-methane hydrocarbon (NMHC) emission limits. This testing requires the continuous emissions monitoring of the inlet and outlet of the odor control system over a 24-hour period for TRS at the outlet (stack) of the odor control system and for NMHC at the inlet for each process airflow. Even though it is not required by the operating permit, the inlet was also sampled for target Volatile Organic Compounds (VOCs). All the preliminary test results show that DITP was in compliance. The draft report summarizing the test results is currently being prepared by the consultants.

Other:

The MWRA officially entered into a Memorandum Of Agreement (MOA) with the MBTA in March to reconfigure the DITP public access parking lot to make the bus offload area compliant with the Americans with Disabilities Act (ADA) Standards for Accessible Design. This project to rehabilitate the public access parking lot at the entrance of the island included: making the MBTA bus offload area ADA accessible (with a new sidewalk), which required changing the direction of driving within the lot from counter-clockwise to clockwise to accommodate the new bus offload area; reducing the size of the island in the middle of the lot and reconfiguring the spaces, thus allowing for the addition of 11 parking spaces; and repaving and restriping of the parking lot. The parking lot was closed for construction starting on April 19. Parking on the Tafts Avenue Extension on the main access roadway to the DITP between the fishing pier and Gate 1 at the Thermal Power Plant was made available for public parking from 7am to 9pm during construction. Additional parking was also available in the smaller fishing pier parking lot which opened in 2021. DITP staff were also stationed in the area to provide parking guidance for the public. The MBTA bus was rerouted during this rehabilitation to avoid this drop off point at the entrance of the island. The newly modified parking lot was reopened within the anticipated timeframe, 21 days later, on May 10.

Clinton Operations & Maintenance Report

Dewatering Building

Operations staff washed down gravity thickener # 1, the surface, and the weirs. Operations also dewatered and washed down gravity thickener # 2 in preparation for the contractor to complete repairs on the scum collecting arm. They also cleaned and flushed the gravity thickener scum well. Maintenance staff changed out the 8 inch valve on the suction line before the gravity thickener and also replaced the #1 gravity thickener muffin monster. Maintenance repaired a leak in the polymer pipe and resecured the piping brackets.

Chemical Building

Maintenance staff replaced a 3 inch gate valve and the check valve on sump pump #1. They also replaced a back pressure reducer on the # 2 ferric chloride pump. Maintenance replaced a gasket on the # 2 sodium hypochlorite tank. Maintenance staff and the electrical contractor also installed two(2) electrical outlets at the chlorine contact basin to be used for improving the mixing in this basin.

Aeration Basins

Operations staff cleaned the pH and D.O. probes. Maintenance staff replaced the Aerzen blower #2, checked the oil and ran the mechanical mixers on basins #1, #3, and #5.

Phosphorus Building

Maintenance staff acid washed all three disk filters, cleaned the troughs, and inspected all spray nozzles. Operation staff cleaned both CL17 chlorine analyzers.

Headworks

Plant staff hosed clean Lancaster's Parshall Flume. Maintenance staff cleaned the influent and mechanical bar rack, and greased the upper and lower pin racks. They also installed a new sump pump # 2 in lower grit.

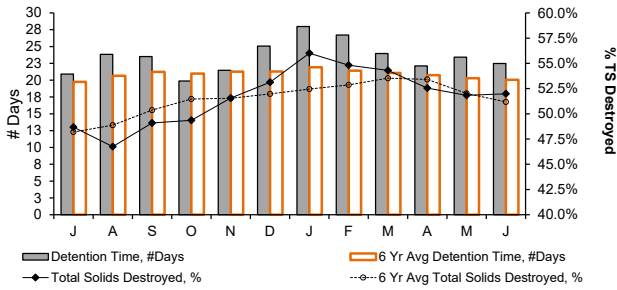
Digester Building

Maintenance staff greased the floating covers and the mixer. They also changed the oil in sludge recirculation pumps #1 and #2 and installed a new circulating pump and motor in the sludge heat exchanger. The Facilities Specialist continued with concrete repair work on the loading dock and the stairs.

Deer Island Operations and Residuals

4th Quarter - FY22

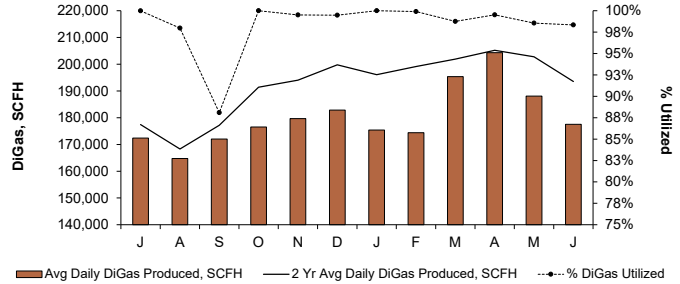
Sludge Detention Time in Digesters and Total Solids Destruction



Total solids (TS) destruction following anaerobic sludge digestion averaged 52.1% during the 4th Quarter, on target (-0.2%) with the 6 year average of 52.2%. Sludge detention time in the digesters was 22.7 days, 11.4% above target. 7.8 digesters were in operation, below target with the 6 year average of 8.0 digesters due to scheduled routine maintenance. Sludge detention time was higher-than-expected as the volume of sludge going to the digesters was lower-than-expected.

Total solids (TS) destruction is dependent on sludge detention time which is determined by primary and secondary solids production, plant flow, and the number of active digesters in operation. Solids destruction is also significantly impacted by changes in the number of digesters and the resulting shifting around of sludge.

Digester Gas Production and % Utilized

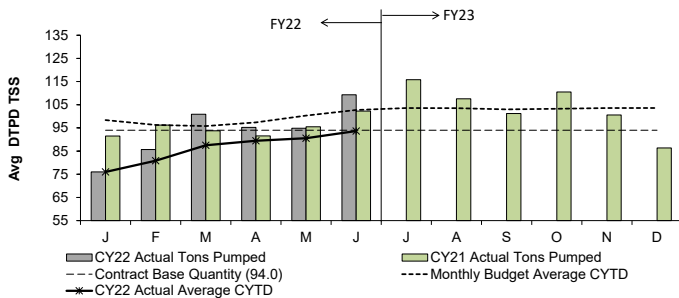


The Avg Daily DiGas Production in the 4th Quarter was 5.2% below the 6 Year Avg Daily DiGas Production. 98.8% of all the DiGas produced in the quarter was utilized at the Thermal Power Plant (TPP).

Residuals Pellet Plant

New England Fertilizer Company (NEFCO) operates the MWRA Biosolids Processing Facility (BPF) in Quincy under contract. MWRA pays a fixed monthly amount for the calendar year to process up to 94.0 DTPD/TSS as an annual average (for the extended contract period of January 1, 2021 through December 31, 2022). The monthly invoice is based on 94.0 DTPD/TSS (Dry Tons Per Day/Total Suspended Solids) times 365 days divided by 12 months. At the end of the year, the actual totals are calculated and additional payments are made on any quantity above the base amount. On average, MWRA processes more than 94.0 DTPD/TSS each year (FY22's budget is 104.0 DTPD/TSS and the preliminary FY23's budget is 103.3 DTPD/TSS).

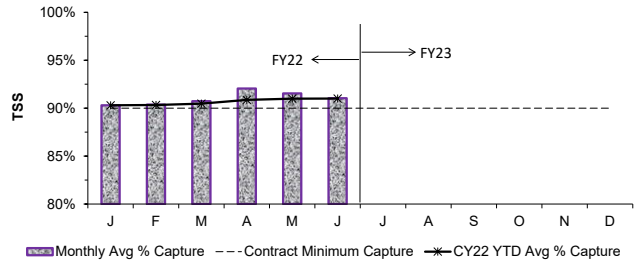
Sludge Pumped From Deer Island



The average quantity of sludge pumped to the Biosolids Processing Facility (BPF) in the 4th Quarter was 99.8 TSS Dry Tons Per Day (DTPD), 9.0% below target with the FY22 budget of 109.6 TSS DTPD for the same period.

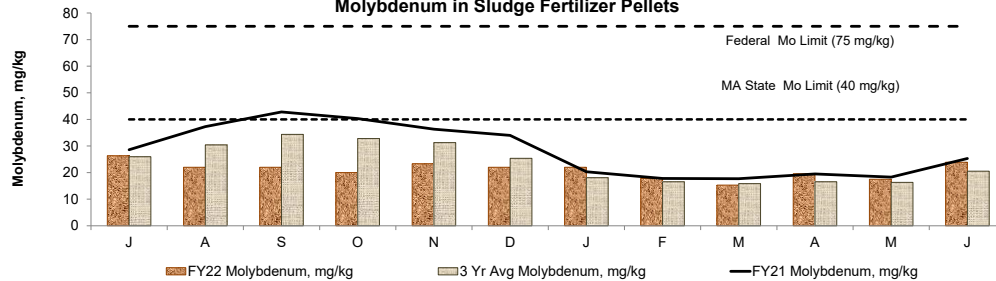
The overall CY22 average quantity of sludge pumped through July is 93.7 DTPD, 8.8% below target compared to the CY22-to-date average budget of 102.7 DTPD for the same time period.

Monthly Average % Capture of Processed Sludge



The contract requires NEFCO to capture at least 90.0% of the solids delivered to the Biosolids Processing Facility. The average capture for the 4th Quarter was 91.54%.

Molybdenum in Sludge Fertilizer Pellets



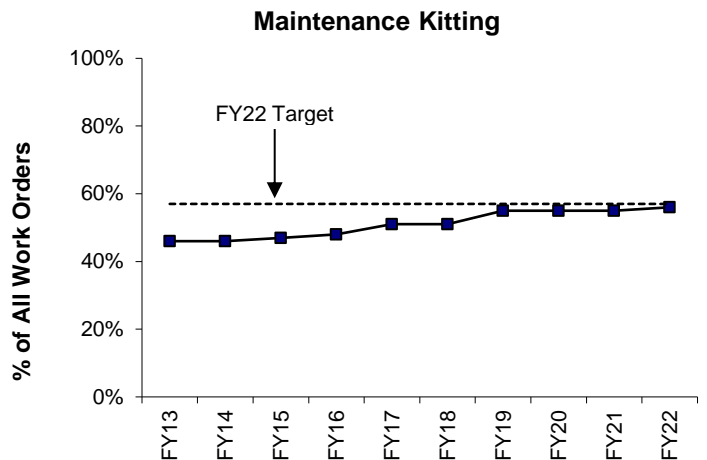
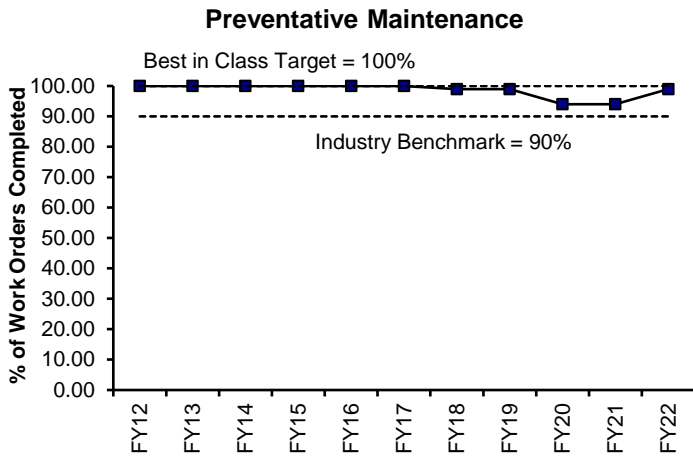
Copper, lead, and molybdenum (Mo) are metals of concern for MWRA as their concentrations in its biosolids have, at times, exceeded regulatory standards for unrestricted use as fertilizer. Molybdenum-based cooling tower water is a significant source of Mo in the sludge fertilizer pellets. The Federal standard for Mo is 75 mg/kg. In 2016, Massachusetts Type I biosolids standard for molybdenum was changed to 40 mg/kg from the previous standard of 25 mg/kg. This has allowed MWRA to sell its pellets in-state for land application whereas the previous limits forced several months' worth of pellets to be shipped out of state. This made it an impractical source of fertilizer for local Massachusetts farms since NEFCO does not distribute product that does not meet the suitability standards.

Overall, the levels have been below the DEP Type 1 limit for all three (3) metals. For Mo, the level in the MWRA sludge fertilizer pellets during the 4th Quarter averaged 20.3 mg/kg, 14% above the 3 year average, 49% below the MA State Limit, and 73% below the Federal Limit.

Deer Island Yearly Maintenance Metrics

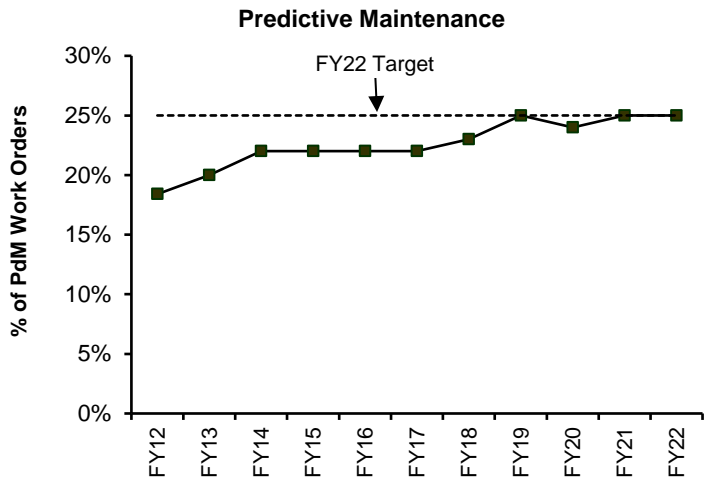
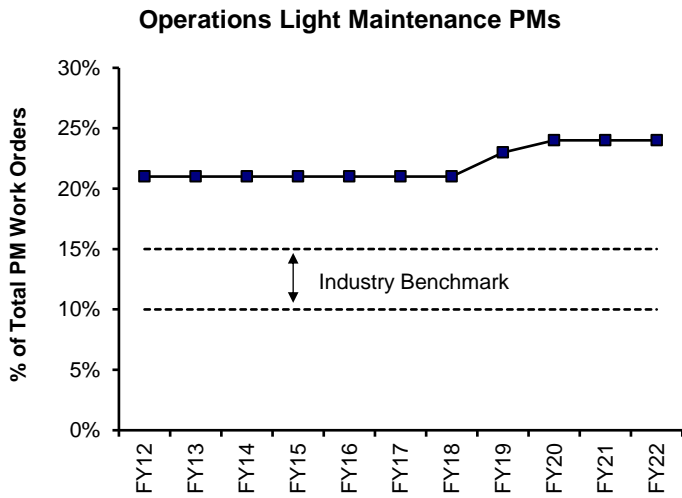
FY22

Proactive and Productivity Measures



The industry benchmark is 90% for Preventative Maintenance (PM) completion. Upon reaching the 90% goal in FY05, the target goal was increased to the "Best in Class" Target of 100% PM completion. Reliability-Centered Maintenance (RCM) and PM optimization efforts have continued since FY01. PM completion rate was 99% in FY22 .

Preventive Maintenance (PM) inventory items were loaded into Maximo to assign spare parts for equipment to PM work orders. DITP reached the PM kitting goal of 100%. In FY12 a new graph was developed to track kitting of all maintenance work orders in an effort to increase wrench time. Staff continues to fine-tune the process to "kit" all maintenance work orders. Kitting is considered a best practice by maintenance and reliability professionals. It entails staging parts necessary to complete maintenance work. Kitting allows maintenance staff to spend more time "turning the wrench" and less time waiting for parts at the stockroom window. Kitting for FY22 was 57%, meeting DITP's goal of 57%.

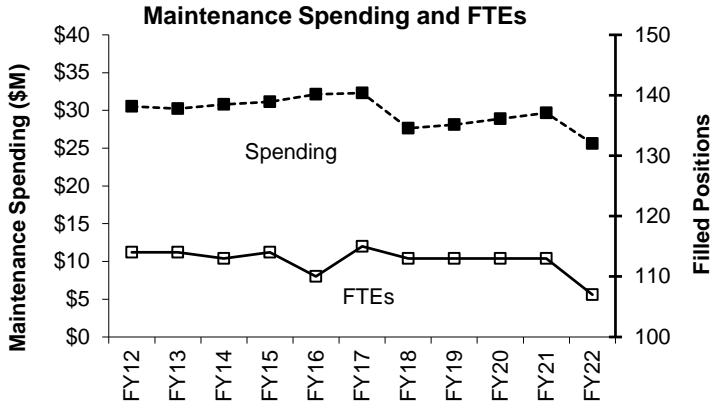


The percentage of preventive maintenance work order hours completed by Operations staff (non maintenance staff) increased from less than 1% in January 2002 to the current level of 24% in FY22. DITP reached the industry benchmark range of 15% in April 2003 and has exceeded the goal through FY22. Operations completes approximately 684 PM work orders per month.

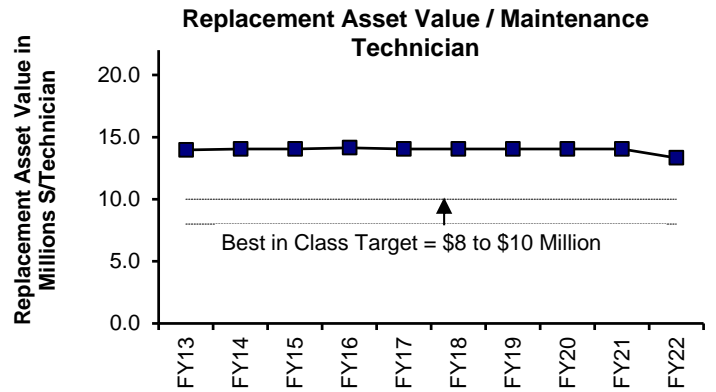
Predictive maintenance has steadily increased from 2% in FY03 to 25% in FY22, DITP's met the FY25 goal of 25%. This percentage in predictive maintenance was achieved through the expanded use of lubrication, vibration, thermography, and acoustic ultrasonic testing techniques. The Condition Monitoring Group continually reviews and investigates new opportunities and initiatives to expand condition monitoring testing and analysis.

Deer Island Yearly Maintenance Metrics FY22

Overall Maintenance Program Measures

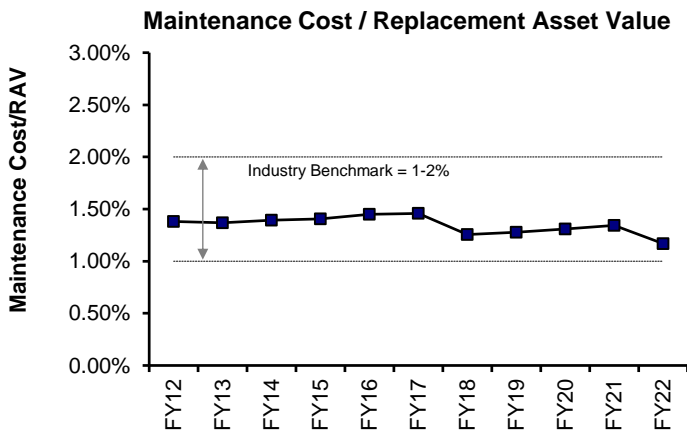


DITP's Maintenance staff is currently at 107 FTE's. Maintenance staff levels ended at 107 due to retirements and hiring challenges for trades personnel. Maintenance has worked to meet our goals through implementation of numerous maintenance efficiencies including: Operations performing light maintenance, cross-functional training and flexibility, and Reliable-Centered Maintenance. This year's Maintenance spending decreased for materials and services.

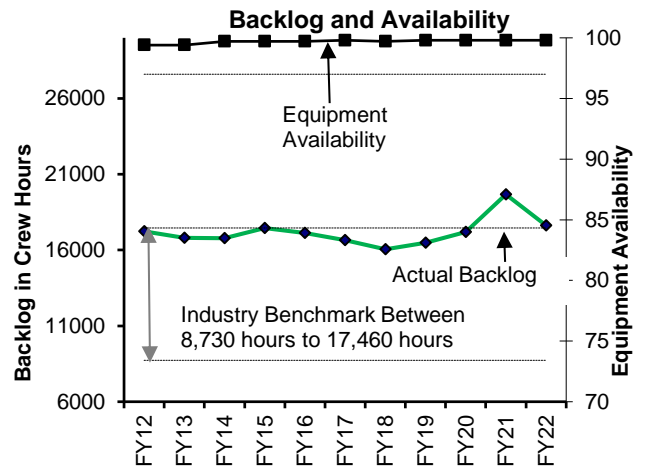


DITP adopted a "best in class" target of \$8-\$10 Million/Technician for maintenance staffing. DITP remains above this Best in Class. However, as the plant ages and additional equipment replacements are expected, DITP management will reassess staffing as needed.

The Maintenance Spending graph shows actual annual maintenance spending and CIP asset replacements (equipment costs only). Maintenance staff continues to evaluate plant assets and requirements for replacement of obsolete equipment to ensure the plant operates at maximum efficiency. In FY22, overall spending decreased slightly from FY21 due to a reduction in CIP Spending. Maintenance Projects in FY22: SSPS VFD Replacements, Gravity Thickener Rehabilitation, Gravity Thickener Overflow Piping Replacement, Gas Protection System Replacements, Installation of two W3 Strainers, and Installation of LED Emergency Lights throughout DITP.



The industry benchmark for annual maintenance spending is between 1% to 2% of replacement asset value, currently DITP is at 1.17%. The plant's replacement asset value is calculated at approximately \$2.6 billion dollars. DITP's current maintenance spending is within the industry benchmark. Overall maintenance spending has decreased slightly from last year. DITP Maintenance CEB spending is \$22.9 million. CIP spending was \$2.6 million (equipment costs only), down \$2.4 million from the previous year. CIP/CEB Spending totaled \$25.6 million in FY22.



Industry benchmark for Equipment Availability is 97%. Deer Island has exceeded this benchmark over for the last ten years. In FY22 the availability was 99.8%. The high percentage in Equipment Availability during FY22 is due to redundancy of equipment and effective/efficient maintenance practices.

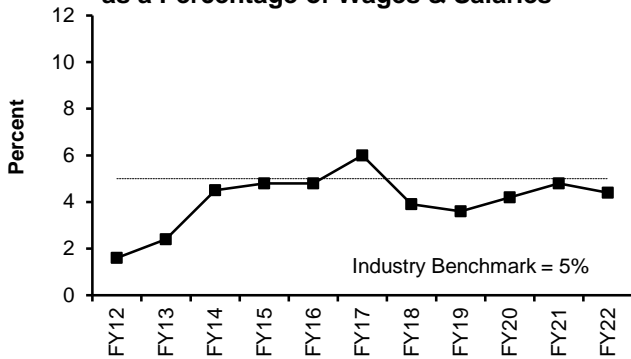
Industry Benchmark for Backlog is between 8,730 to 17,460 hours for maintenance based on current staffing, the total average backlog for FY22 was 17,649 hours, which is slightly above industry benchmark. DITP Maintenance has made significant progress in decreasing our backlog.

Deer Island Yearly Maintenance Metrics

FY22

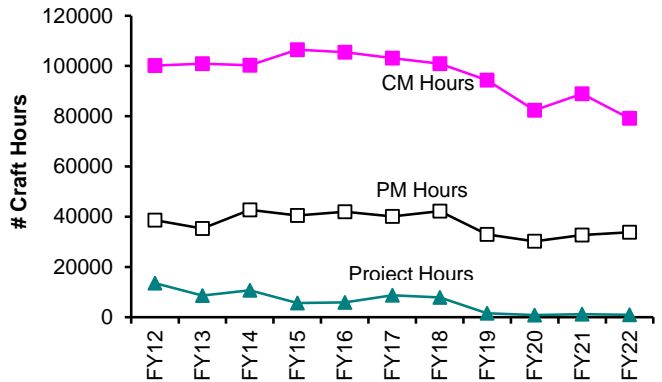
Overall Maintenance Program Measures (cont.)

Overtime (excluding Storm Coverage) as a Percentage of Wages & Salaries



Management continues its effort to keep overtime below the industry benchmark. DITP maintenance overtime was 4.4% for FY22. Management has taken steps to reduce overtime spending by limiting overtime to repair critical equipment and systems only. DITP has been under the Industry Benchmark every year except FY17, due to the increase in overtime for the Eversource Cable Outage.

Craft Hours



This years significant decrease in Corrective Maintenance (CM) hours was due to staffing issues (retirements and hiring challenges for trades personnel

Preventative and Project work orders roughly stayed the same.

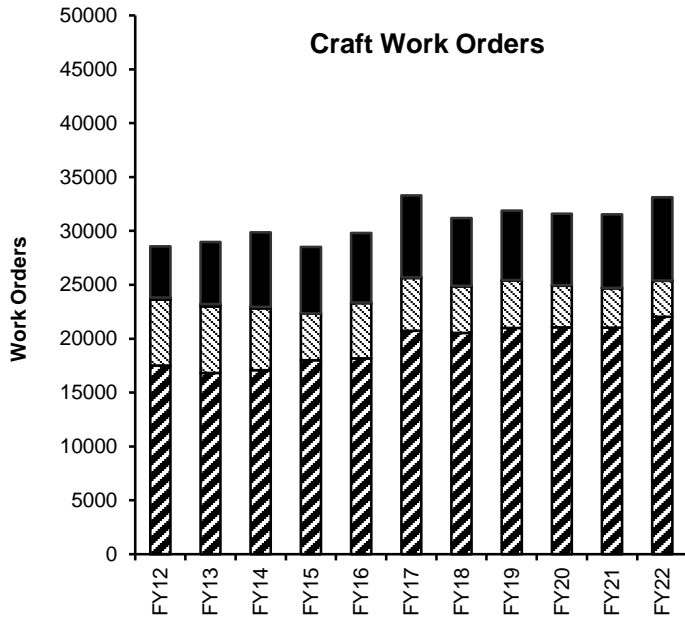
Continued optimization of the Preventive Maintenance (PM) program through the transfer of some light maintenance tasks from Maintenance to Operations staff (24% of PM work orders in FY22), elimination of duplicate work orders, combining some PM's, increasing PM frequency due to equipment history.

This years significant decrease in Corrective Maintenance (CM) hours was due to staff focused on critical work orders only to ensure all required equipment was available.

Maintenance did complete some significant maintenance work in FY22: Overhauled Centrifuge #10, Repaired Dewatering Line, Repair of Winthrop Terminal Facility RWW Pump #5, Disinfection W3L Valve Installation, Fabrication of RSL Shafts/Access Hatches, Installation of Vapor Coil Bundle for CJ:LOX.TK/LVAP-1, Rebuild of Admin/Lab Chiller #3, Waste Gas Burner Flare #2 Manifold Pipe Repair and DITP Parking Lot Upgrade, Installation of two W3 Strainers, and Installation of LED Emergency Lights throughout DITP.

During FY22, the overall number of work orders increased .4% from the previous year. The increase is due to aging equipment replacements, with increased preventative schedules. The Planning department is continuously modifying PM, PdM, and CM Job Plans to ensure maintenance is being performed efficiently and effectively, while ensuring reliability and availability of DITP's Assets.

Craft Work Orders



- Predictive Maintenance
- Project
- Preventive Maintenance
- Emergency Maintenance
- ▨ Corrective Maintenance

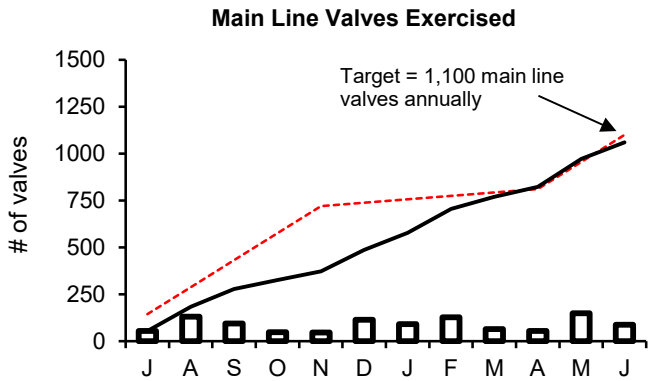
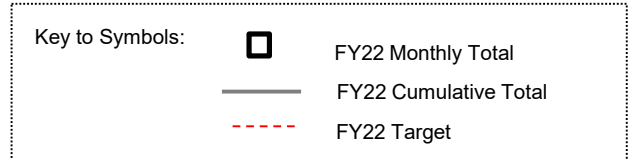
Water Distribution System Valves

Quarter 4 - FY22

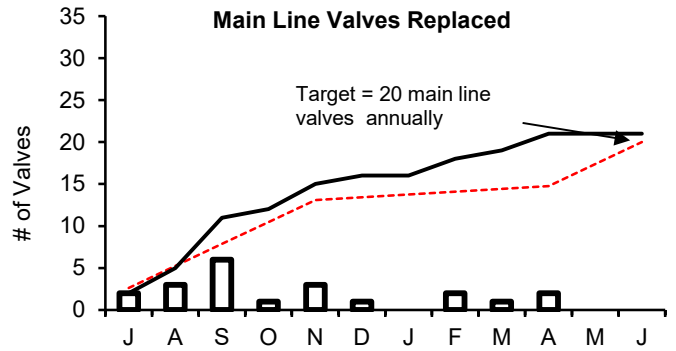
Background

Valves are exercised, rehabilitated, or replaced in order to improve their operating condition. This work occurs year round. Valve replacements occur in roadway locations during the normal construction season, and in off-road locations during the winter season. Valve exercising can occur year round but is often displaced during the construction season. This is due to the fact that a large number of construction contracts involving rehabilitation, replacement, or new installation of water lines, requires valve staff to operate valves and assist with disinfection, dechlorination, pressure-testing, and final acceptance. Valve exercising can also be impacted due to limited redundancy in the water system; valve exercising cannot be performed in areas where there is only one source of water to the community meters or flow disruptions will occur.

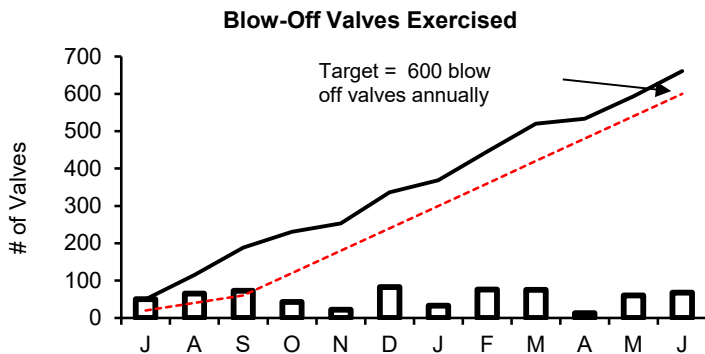
Type of Valve	Inventory #	Operable Percentage	
		FY22 to Date	FY22 Targets
Main Line Valves	2,159	97.1%	95%
Blow-Off Valves	1,317	98.6%	95%
Air Release Valves	1,380	95.8%	95%
Control Valves	49	100.0%	95%



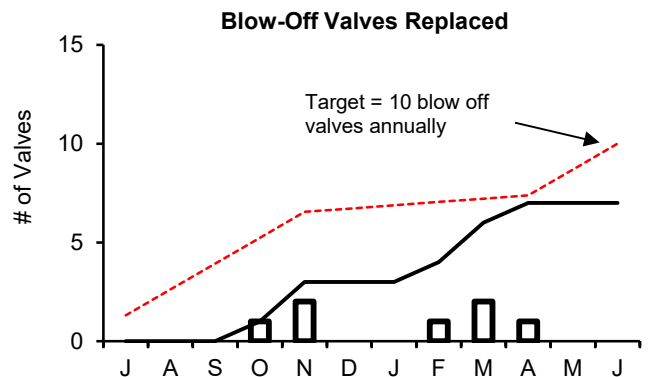
During the 4th Quarter of FY22, 291 main line valves were exercised. The total exercised for the fiscal year to date is 1,060.



During the 4th Quarter of FY22, there were two main line valves replaced. The total replaced for the fiscal year to date is 21.



During the 4th Quarter of FY22, 141 blow off valves were exercised. The total exercised for the fiscal year to date is 661.



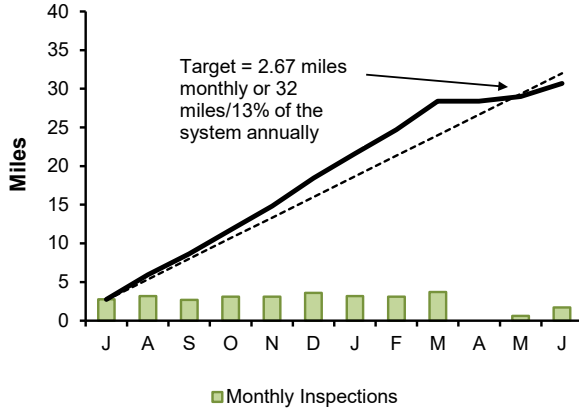
During the 4th Quarter of FY22, there was one blow off valve replaced. The total replaced for the fiscal year to date is seven. Below target due to isolation & permit issues and staff vacancies.

Wastewater Pipeline and Structure Inspections and Maintenance

ONB 4th Quarter FY22

Inspections

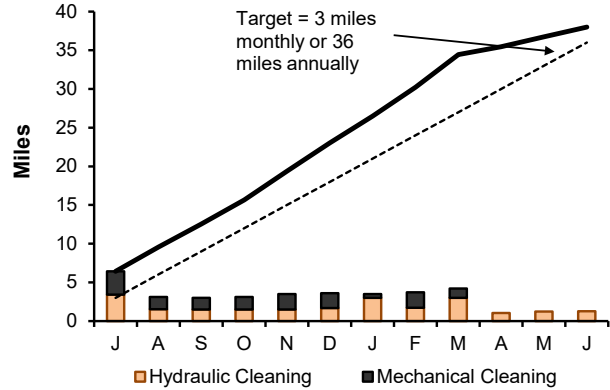
Pipeline Inspections



Staff internally inspected 2.30 miles of MWRA sewer pipe during this quarter. The year to date total is 30.69 miles. No Community Assistance was provided.

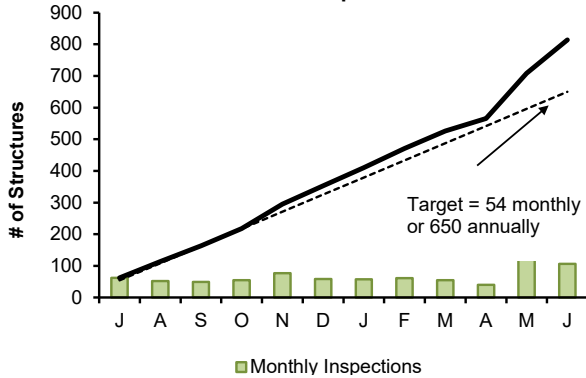
Maintenance

Pipeline Cleaning



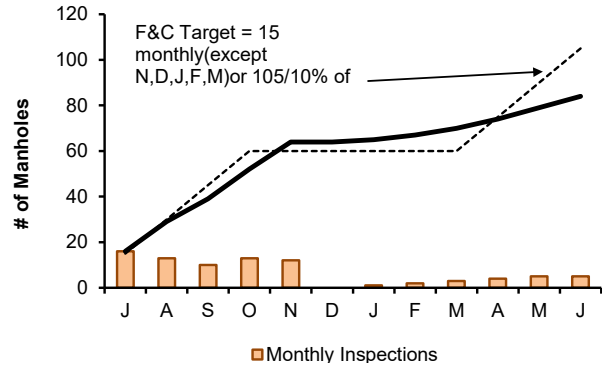
Staff cleaned 3.56 miles of MWRA sewer pipe, and removed 35 yards of grit. The year to date total is 38.00 miles. No Community Assistance was provided.

Structure Inspections



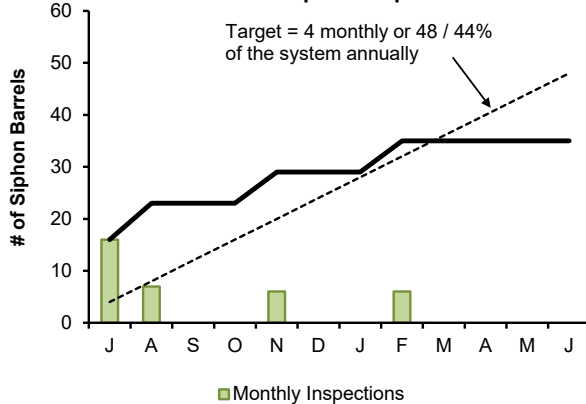
Staff inspected the 36 CSO structures and performed 252 other additional manhole/structure inspections during this quarter. The year to date total is 814 inspections.

Manhole Rehabilitation



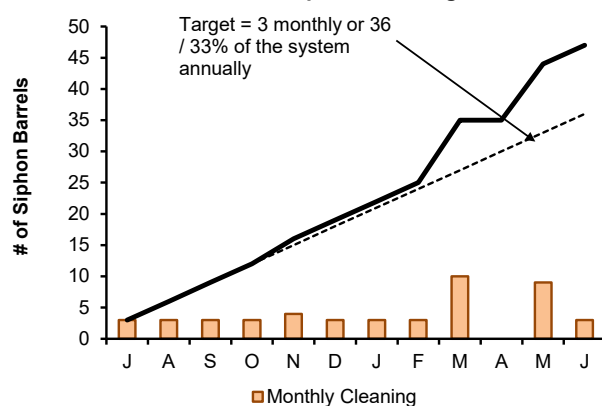
Staff replaced 14 frame and cover replacements this quarter. The year to date total is 84.

Inverted Siphon Inspections



Staff did not inspect any siphon barrels this quarter. The year total is 35 inspections.

Inverted Siphon Cleaning

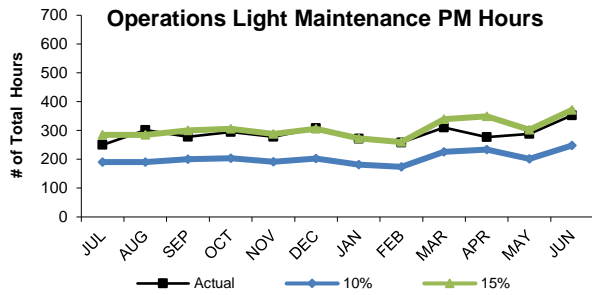


Staff cleaned 12 siphon barrels this quarter. The year total is 47.

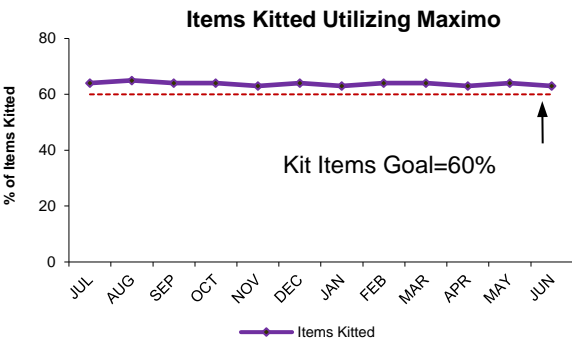
Field Operations' Metropolitan Equipment & Facility Maintenance

4th Quarter - FY22

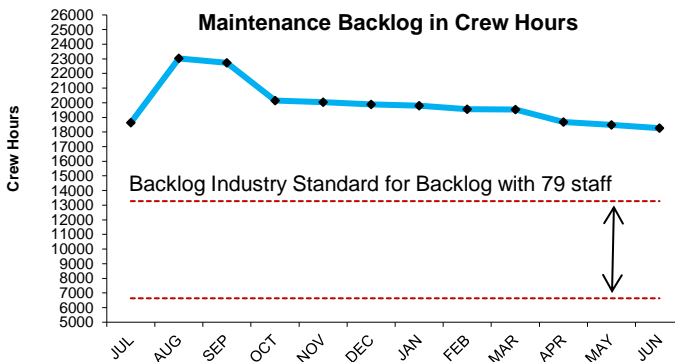
Several maintenance and productivity initiatives are in progress. The goal for the Overall PM completion and the Operator PM completion is 100%. The Operator PM and kitting initiatives frees up maintenance staff to perform corrective maintenance and project work, thus reducing maintenance spending. Backlog and overtime metrics monitor the success of these maintenance initiatives.



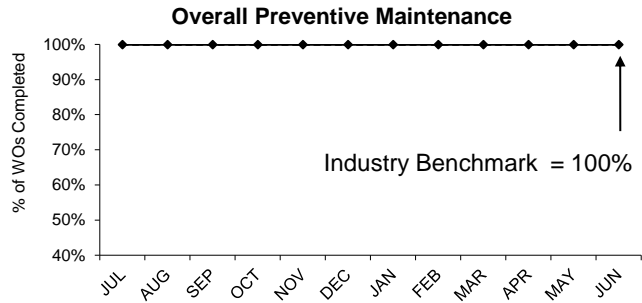
Operations staff averaged 306 hours per month of preventive maintenance during the 4th Quarter of FY22, an average of 14% of the total PM hours for the 4th Quarter, which is within the industry benchmark of 10% to 15%.



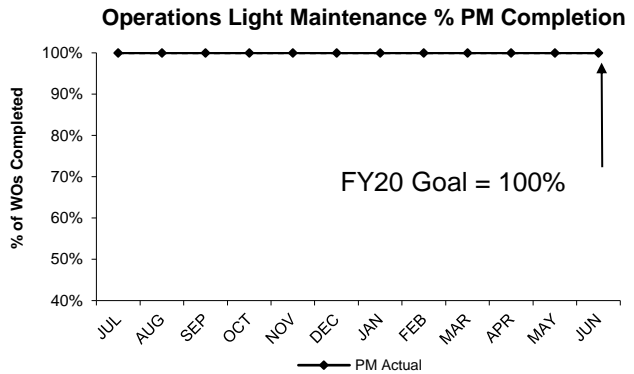
Operations' FY22 maintenance kitting goal has been set at 60% of all work orders to be kitted. Kitting is the staging of parts or material necessary to complete maintenance work. In the 4th Quarter of FY22, 63% of all applicable work orders were kitted. This resulted in more wrench time and increased productivity.



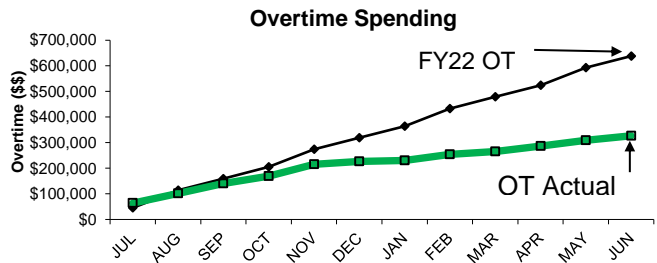
The 4th Quarter of FY22 backlog average is 18,476 hours. Management's goal is to continue to control overtime and try to get back within the industry benchmark of 6,636 to 13,275 hours. The increase is due to vacations, vacancies and several large maintenance projects.



The Field Operations Department (FOD) preventive maintenance goal for FY22 is 100% of all PM work orders. Staff completed 100% of all PM work orders in the 4th Quarter of FY22.



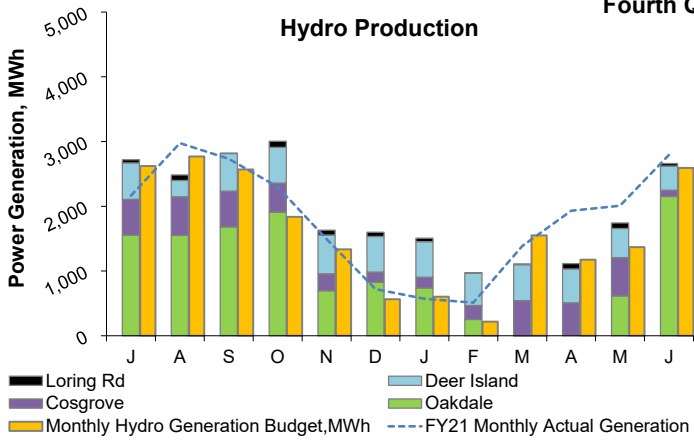
Wastewater Operations complete light maintenance PM's which frees up maintenance staff to perform corrective maintenance. Operations' FY22 PM goal is completion of 100% of all PM work orders assigned. Operations completed 100% of PM work orders in the 4th Quarter of FY22.



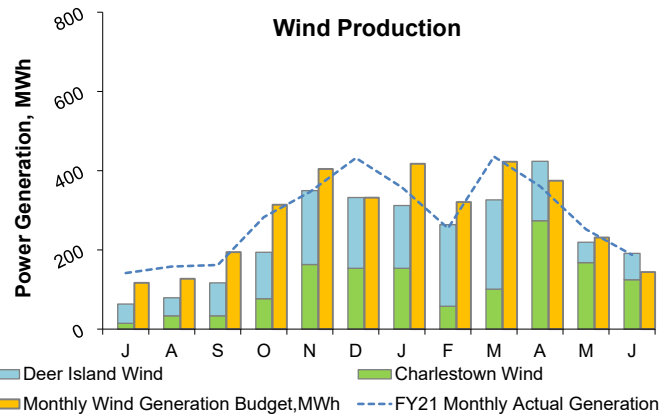
Maintenance overtime was \$34,421 under budget on average, per month, for the 4th Quarter of FY22. Overtime is used for critical maintenance repairs and wet weather events. The overtime budget through the 4th Quarter of FY22 is \$638,195. Overtime spending was \$326,889 which is \$311,306 under budget for the fiscal year.

Renewable Electricity Generation: Savings and Revenue

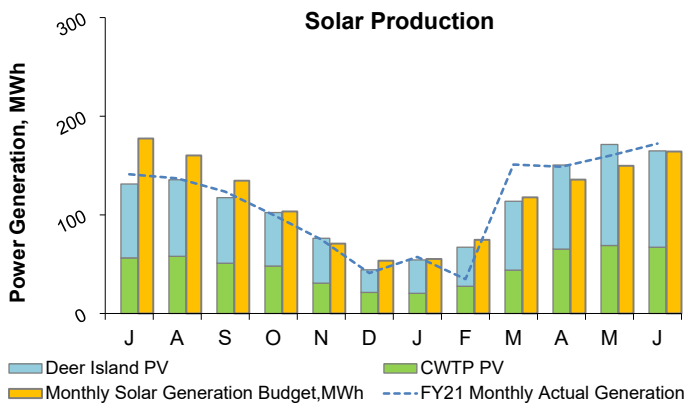
Fourth Quarter, 2022 - FY22



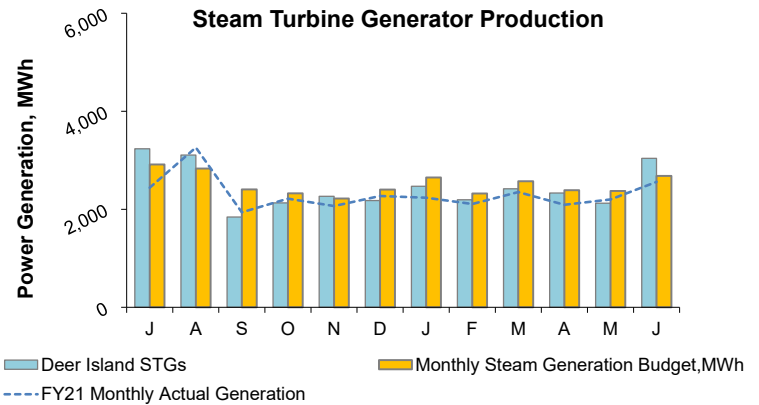
In Q4 of 2022, the renewable energy produced from all hydro turbines totaled 5,638 MWh; 10% above budget³. The total savings and revenue to date in FY22 (actuals through Feb¹) is \$1,230,077 ; 129% above budget³. The savings and revenue value does not include RPS REC revenue (see next page).



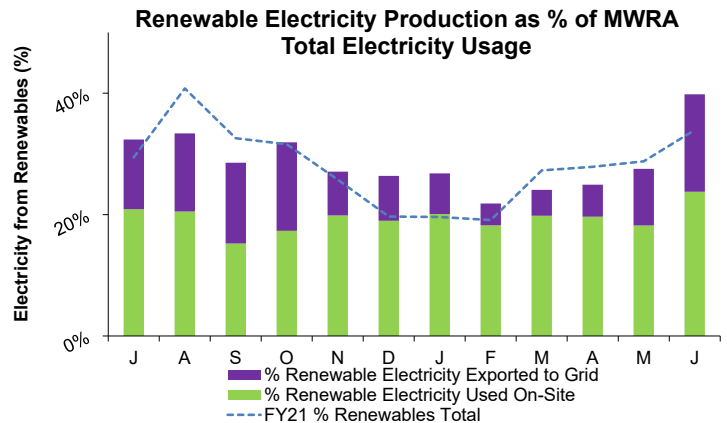
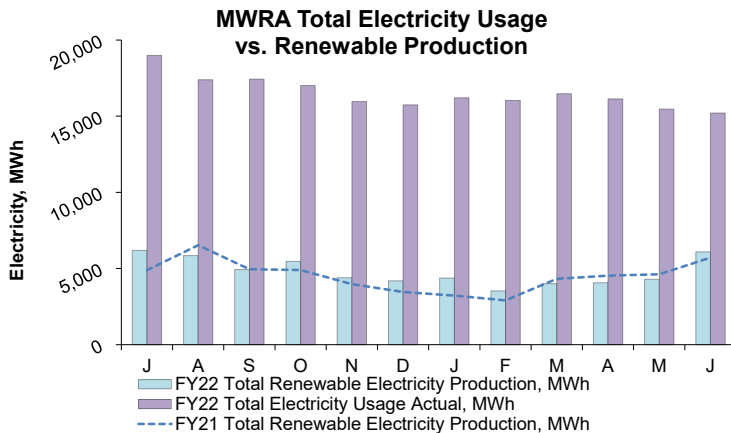
In Q4 of 2022, the renewable energy produced from all wind turbines totaled 835 MWh; 11% above budget³. The total savings and revenue to date in FY22 (actuals through Feb¹) is \$281,198 ; 23% below budget³. The savings and revenue value does not include RPS REC revenue (see next page).



In Q4 of 2022, the renewable energy produced from all solar PV systems totaled 487 MWh; 11% above budget³. The total savings and revenue to date in FY22 (actuals through Feb¹) is \$109,678 ; 3% above budget³. The savings and revenue value does not include RPS REC revenue (see next page).



In Q4 of 2022, the renewable energy produced from all steam turbine generators totaled 7,496 MWh; 1% above budget³. The total savings and revenue to date in FY22 (actuals through Feb¹) is \$2,308,973 ; 17% above budget³. The savings and revenue value does not include RPS REC revenue (see next page).

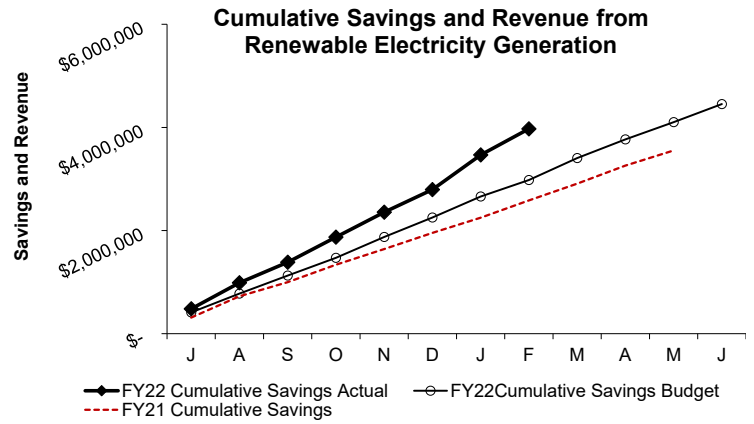
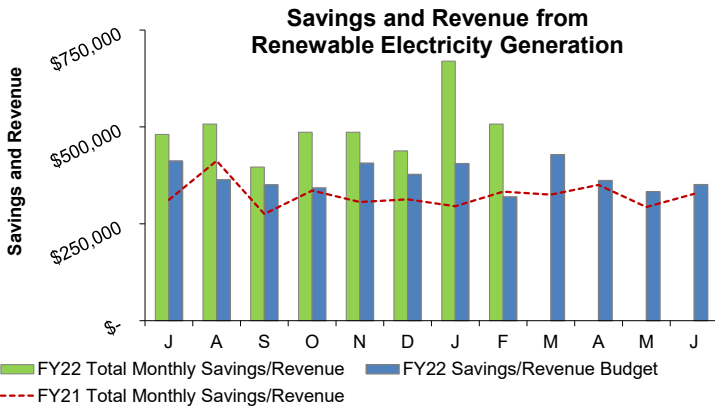


In Q4 of 2022, MWRA's electricity generation by renewable resources totaled 14,456 MWh, 5% above budget. MWRA's total electricity usage was approximately 46,817 MWh. Renewable generation was 31% of total electric use. The MWRA total electricity usage is the sum of all electricity purchased for Deer Island and FOD plus electricity produced and used on-site at these facilities. Approximately 99% of FOD electrical accounts are accounted for by actual billing statements; minor accounts that are not tracked on a monthly basis such as meters and cathodic protection systems are estimated based on this year's budget. All renewable electricity generated on DI is used on-site (this accounts for more than 50% of MWRA renewable generation). Almost all renewable electricity generated off-DI is exported to the grid.

- Notes:
1. Only the actual energy prices are being reported. Therefore, some of the data lags up to 2 months due to timing of invoice receipt.
 2. Savings and Revenue: Savings refers to any/all renewable energy produced that is used on-site therefore saving the cost of purchasing that electricity, and revenue refers to any value of renewable energy produced that is sold to the grid.
 3. Budget values are based on historical averages for each facility and include operational impacts due to maintenance work.

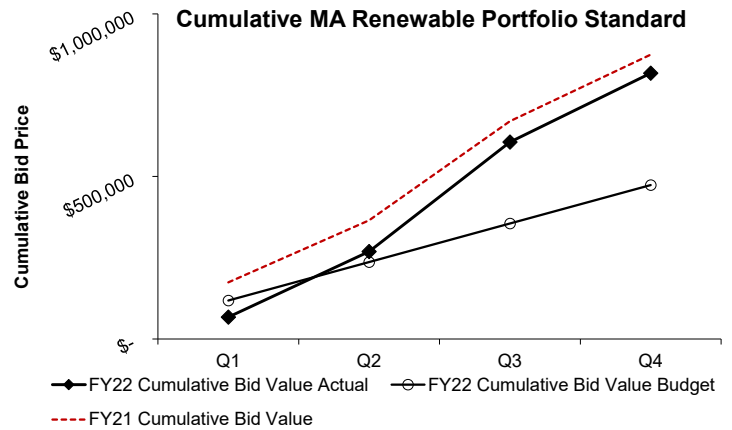
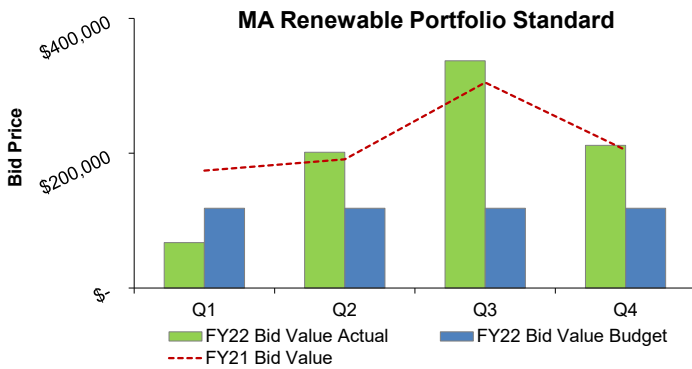
Renewable Electricity Generation: Savings and Revenue

Fourth Quarter 2022 - FY22



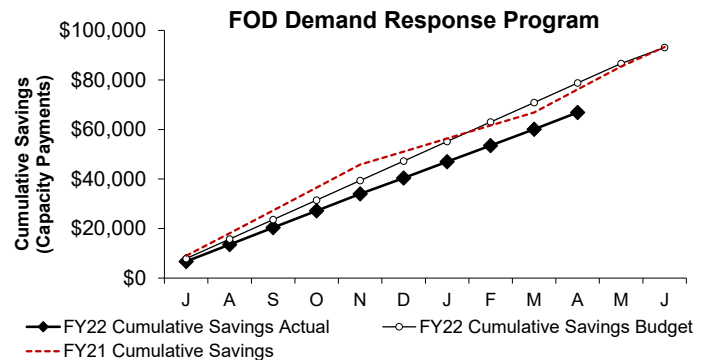
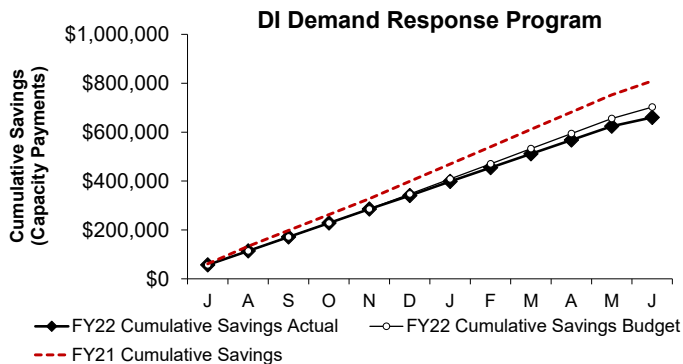
Savings and revenue from MWRA renewable electricity generation in the first eight months of FY22 (actuals only through Feb¹) is \$3,929,926 which is 32% above the budget³.

Savings and revenue² from all renewable energy sources include wind turbines, hydroelectric generators, solar panels, and steam turbines (DI). This includes savings and revenue due to electricity generation (does not include avoided fuel costs and RPS RECs). The use of DITP digester gas as a fuel source provides the benefit of both electricity generation from the steam turbine generators, and provides thermal value



Bids were awarded during the 4th Quarter¹ from MWRA's renewable energy assets; 3,216 Q4 CY2021 Class I Renewable Energy Certificates (RECs); 2,973 Q4 CY2021 Class 2 RECs; and 37 Q4 CY2021 Solar RECs were sold for a total value of \$211,682 RPS revenue; which is 79% above budget³ for the Quarter.

REC values reflect the bid value on the date that bids are accepted. Cumulative bid values reflects the total value of bids received to date.

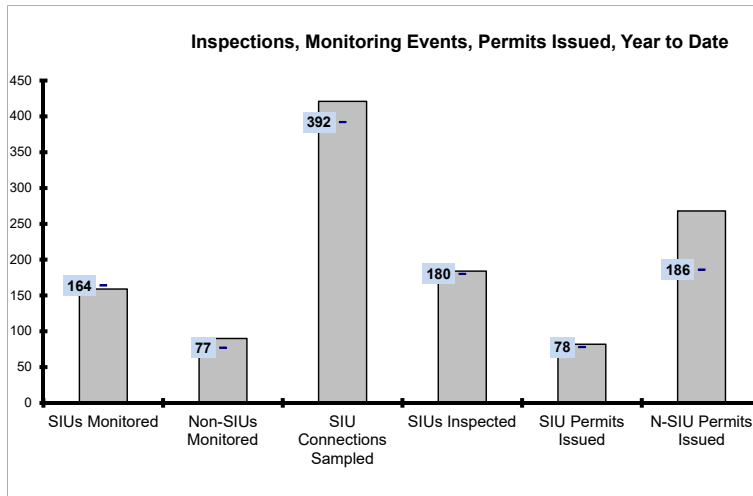


Currently Deer Island, JCWTP, Loring Rd, and Brusch participate in the ISO-New England Demand Response Programs⁴. By agreeing to reduce demand and operate the facility generators to help reduce the ISO New England grid demand during periods of high energy demand, MWRA receives monthly Capacity Payments from ISO-NE. When MWRA operates the generators during an ISO-NE called event, MWRA also receives energy payments from ISO-NE. FY22 Cumulative savings (Capacity Payments only) through June¹ total \$660,190 for DI and payments for FOD total \$66,900 through April¹.

- Notes:
1. Only the actual energy prices are being reported. Therefore, some of the data lags up to 2 months due to timing of invoice receipt.
 2. Savings and Revenue: Savings refers to any/all renewable energy produced that is used on-site therefore saving the cost of purchasing that electricity, and revenue refers to any value of renewable energy produced that is sold to the grid.
 3. Budget values are based on historical averages for each facility and include operational impacts due to maintenance work.
 4. Chelsea Creek, Columbus Park, Ward St., and Nut Island participated in the ISO Demand Response Program through May 2016, until an emissions related EPA regulatory change resulted in the disqualification of these emergency generators, beginning June 2016. MWRA is investigating the cost-benefit of emissions upgrades for future possible participation.

Toxic Reduction and Control

4th Quarter - FY22



EPA Required SIU Monitoring Events for FY22: 164
YTD : **159**

Required Non-SIU Monitoring Events for FY22: 77
YTD : **90**

SIU Connections to be Sampled For FY22: 392
YTD: **421**

EPA Required SIU Inspections for FY22: 180
YTD: **184**

SIU Permits due to Expire In FY22: 78
YTD: **82**

Non-SIU Permits due to Expire for FY22: 186
YTD: **268**

Significant Industrial Users (SIUs) are MWRA's highest priority industries due to their flow, type of industry, and/or their potential to violate limits. SIUs are defined by EPA and require a greater amount of oversight. EPA requires that all SIUs *with flow* be monitored at least once during the fiscal year.

The "SIU Monitored" data above, reflects the number of industries monitored; however, many of these industries have more than one sampling point and the "SIU Connections Sampled" data reflect samples taken from multiple sampling locations at these industries.

EPA requires MWRA to issue or renew 90 percent of SIU permits within 120 days of receipt of the application or the permit expiration date - whichever is later. EPA also requires the remaining 10 percent of SIU permits to be issued within 180 days.

	Number of Days to Issue a Permit						Permits Issued	
	0 to 120		121 to 180		181 or more		SIU	Non-SIU
	SIU	Non-SIU	SIU	Non-SIU	SIU	Non-SIU		
Jul	3	9	2	1	0	0	5	10
Aug	0	14	0	6	0	3	0	23
Sep	0	7	0	8	0	4	0	19
Oct	2	12	0	5	0	3	2	20
Nov	0	6	0	2	0	2	0	10
Dec	1	2	0	1	0	0	1	3
Jan	2	3	1	3	1	18	4	24
Feb	2	12	2	10	3	22	7	44
Mar	5	9	12	3	2	8	19	20
Apr	1	12	4	1	1	6	6	19
May	6	18	6	10	4	15	16	43
Jun	19	21	0	1	3	11	22	33

% YTD	50%	47%	33%	19%	17%	34%	82	268
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This is the last quarter of the MWRA fiscal year, FY22. While the department caught up with overall numbers of SIU and non-SIU permits issued, due to staff turnover coupled with the workload of the available personnel and the lingering effects the COVID pandemic, the EPA standards were not achieved.

In the fourth quarter, 139 permits were issued, of which 44 were SIUs. Twenty-six of the SIU permits were issued within the 120-day timeframe, with eight issued beyond 181 days. There were 95 non-SIU permits issued, of which 44 were issued late.

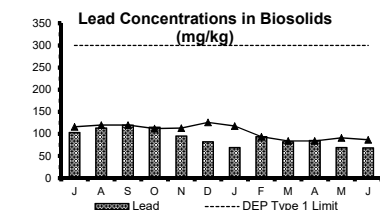
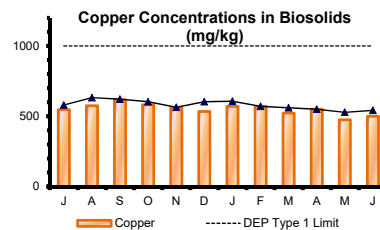
Reasons for late issuances continue to include a) waiting for critical data needed for permit processing b) delays relating to new start-up operations and c) the late payment of the relevant permit charges.

Overall, in this fiscal year, FY22, SIU permits have been issued with an EPA 50% compliance rate, falling short of the 90% compliance rate required.

During FY22, six SIUs changed status - three SIUs changed status from SIU to Non-SIU or went out of business while three industries were added to the SIU list. TRAC met the FY22 goals for number of SIU permits issued and completed SIU Inspections.

For the Clinton Sewer Service area, there were no SIU permits issued during the FY22 fiscal year.

TRAC's annual monitoring and inspection goals are set at the beginning of each fiscal year but they can fluctuate due to the actual number of SIUs. Monitoring of SIUs and Non-SIUs is dynamic for several reasons, including: newly permitted facilities; sample site changes within the year requiring a permit change; changes in operations necessitating a change in SIU designation; non-discharging industries; a partial sample event is counted as an event even though not enough sample was taken due to the discharge rate at the time; and also, increased/decreased inspections leading to permit category changes requiring additional monitoring events.



Copper, lead, and molybdenum are metals of concern for MWRA as their concentrations in its biosolids have, at times, exceeded regulatory standards for unrestricted use as fertilizer.

Overall, copper and lead levels remain relatively constant, below the DEP Type 1 Limit, and within the range of values over the past several years.

A discussion of molybdenum concentrations in biosolids is included in the Deer Island Residuals Pellet discussion.

Field Operations Highlights

4th Quarter – FY22

Western Water Operations and Maintenance

- Carroll Water Treatment Plant: In April, staff conducted a planned shutdown for approximately 4 hours to update the PLC settings for the UV system and ensure they are compatible with the upgraded SCADA equipment.
- The Hypochlorite Project to replace all the piping and pumps continued. All piping away from the pumps was completed in May. Three out of 5 of the new pumps are in place. Troubleshooting on the pump controls has continued through June.
- As part of the Marlborough pump station project, the main CWTP gate was closed on 2/28. An excavation was performed to reach the 30" supply line but a redesign for the tap and excavation was required. Most work was completed in May and the main gate was reopened in mid-June.
- Nash Hill Tank Inspection: As part of a larger storage tank inspection, staff isolated Nash Hill storage tank #1 in April and #2 in May. After successful ROV internal inspections, the tanks were tested and returned to service.
- Wachusett Reservoir Spill Drills: MWRA and DCR staff participated in two interagency drills at Wachusett Reservoir. On May 18, there was a drill with a number of state and local organizations along with PanAm and CSX railroad that responded to a simulated leaking derailed train car. Containment booms were actually deployed as part of this exercise. During the last week in June, staff took part in an EPA sponsored multi-day drill to discuss and respond to a possible spill of radioactive material. This was an interagency drill and involved many internal and external groups including EPA, DEP and MDPH.

Operations Engineering

- Staff provided support for system expansion planning to the north and south, and began the development of an Emergency Action plan for Newton and communities supplied by Section 80.

Wastewater Operations & Maintenance

- Nut Island Headworks Odor Control & HVAC Improvements: The contractor continued work on

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-
- the facility odor control system and HVAC equipment. Operations staff assisted with demolition and startup of existing air handling units in the pump and blower room and south mechanical room, installation of MCC buckets for new equipment, installation of temporary ductwork to maintain facility ventilation, relocation of existing fire alarm circuits and fire sprinkler piping in conflict with new equipment, commissioning odor control fans and dampers, and layout and initial commissioning of new wet scrubber equipment.

Metro Equipment and Facility Maintenance

- Columbus Park Headworks: Staff rehabilitated the #3 channel, including of all new chain, a new shaft, sprockets and flyghts as needed.
- Hingham Pump Station: Staff installed new suction, discharge and check valves for 3 pumps, and a plug valve on the bypass pump connection.
- New Neponset Pump Station: Electricians installed LED lights in the screen room.
- IPS: Vendor removed and replaced Facility Main Transformer.
- Chelsea Creek Headworks: Staff inspected Channel # 1 as part of facility turn over from Construction.
- Various Facilities: MWRA Electricians worked with Infra-Red Building and Power conducting non-invasive thermal imaging maintenance on electrical switch gear at Cottage Farm, Loring Road, Framingham Pump Station and Commonwealth Ave Pump Station.

TRAC

Compliance and Enforcement: TRAC issued 59 Notices of Violation, 3 Extension Letters, 4 Notices of Noncompliance/Order to Comply, 1 Return to Permit Letter, and 1 Penalty Assessment Notice.

Inspections and Permitting:

- This quarter TRAC issued a total of 78 MWRA 8(m) Permits allowing companies to work within an easement or other property interest held by the Authority. Permits were issued in an average of 94 days from the date of application.
- TRAC monitored the septage receiving sites 10 times and conducted 15 inspections of permitted

Field Operations Highlights

4th Quarter – FY22

septage haulers. Staff inspected 31 new and 12 existing gasoline/oil separators.

- TRAC staff conducted 42 Annual SIU Inspections and 217 other inspections, including inspections for enforcement, permit renewal, NSIU, follow-up, temporary construction dewatering sites, group/combined permit audits, out-of-business facility reviews, and surveys.
- 139 MWRA Sewer Use Discharge Permits were issued and/or renewed. One permit was issued and/or renewed in the Clinton Service Area.

Monitoring: TRAC completed 5 first time SIU monitoring events, 16 first time NSIU monitoring events and 385 other events including Clinton NPDES sampling, Clinton Local Limits sampling, Metropolitan Local Limits sampling, Clinton and Metropolitan Local Limits PFAS sampling, Special Sulfide sampling, Cosgrove and Oakdale NPDES sampling, CSO NPDES sampling, Sudbury Aqueduct monitoring and CSO Hypochlorite Tank chemical sampling

Environmental Quality-Water

- Algae: DCR and MWRA conducted sampling at Wachusett and Quabbin reservoirs. Low levels of nuisance algae were identified but were below levels of concern. The buoy data continues to help assess potential algae concentrations and focus sampling efforts.

Wachusett & Quabbin Reservoir Monitoring Buoys

- On April 25, Buoys B2 (near Cosgrove Intake) and B4 (Basin South) were deployed on Wachusett Reservoir. Buoys B3 (Basin North) and B5 (Quabbin Intake) were deployed on May 3 and 12.
- Regulatory Sampling: During spring Lead and Copper Rule sampling, four sites had results over the lead action level. In response staff collected and tested samples near those locations and all met pH and alkalinity limits. Staff collected quarterly samples for the Optimum Water Quality Parameters program during June, measuring pH and alkalinity at 27 sites across the MWRA service area. All samples met DEP required limits.
- Non-Regulatory: Starting in May, staff collected monthly conducted nitrification monitoring at all MWRA storage tanks. Staff participated in an expert panel discussion on distribution system

water quality, and two multi-agency contamination response drills.

Training & Guidance:

- In June, MWRA posted a YouTube video on proper sampling for coliform and chlorine.
- Staff conducted five chemical delivery training sessions for Wastewater Operator and Water Operator staff during the quarter.

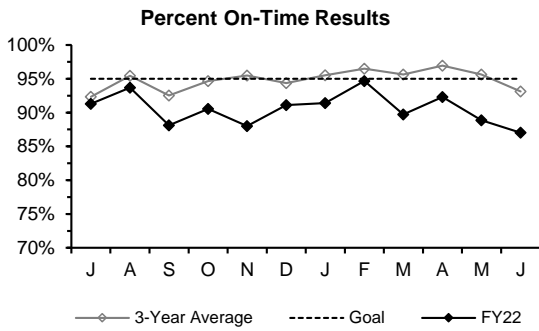
Environmental/Chemical Contract Management

- Staff are closely monitoring bulk chemical inventories and adherence to delivery schedules, which includes communication with chemical suppliers. Met with Operations, Procurement, and EnQual staff to review the draft Emergency Action Plan for chemical shortages on May 4th.

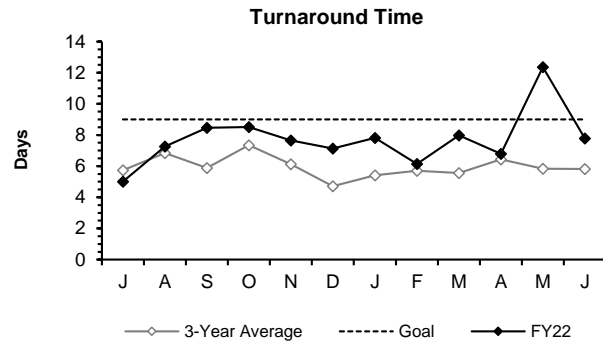
Environmental Quality-Wastewater

- Ambient Monitoring: Due to elevated paralytic shellfish poisoning observations by the Division of Marine Fisheries on June 21, *Alexandrium* rapid response surveys were initiated per our protocol, with the first survey combined with the regular water column survey on June 28. In April staff participated in the annual technical workshop on 2021 monitoring results, and provided the Outfall Monitoring Science Advisory Panel with a requested briefing on aspects of the Bays Eutrophication Model.
- Harbor/CSO Receiving Water Monitoring: Biweekly harbor and daily CSO receiving water monitoring continues. Daily posting of DCR beach monitoring data on MWRA's web site began before Memorial Day and will continue through the summer swimming season.
- Permitting and Compliance Reporting: Submitted Preliminary Public Notification Plan required by new sewage notification regulations and continued preparing for enhanced notifications that are required starting July 6. Worked with DLS on a required pH study to supplement the Deer Island permit application; submitted results to DEP and received approval to maintain a lower limit of pH 6 in the coming Deer Island permit. Submitted comments to EPA and MassDEP on the NPDES medium wastewater treatment plant general permit, which will apply to Clinton.

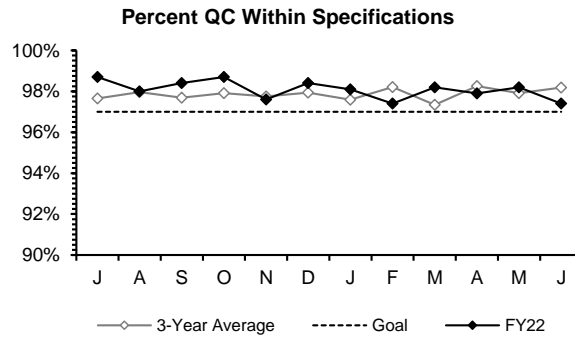
Laboratory Services 4th Quarter - FY22



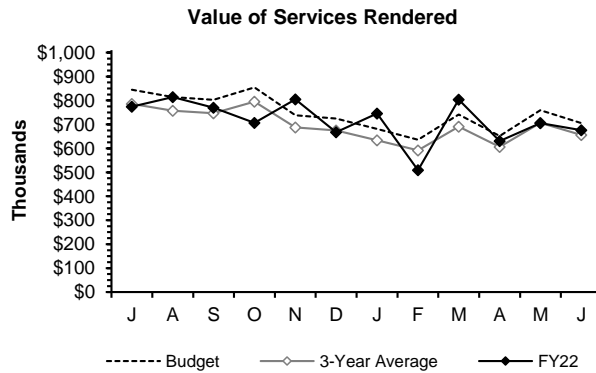
The Percent On-Time measurement continued to run below the 95% goal due to staffing vacancies.



Turnaround Time met the 9-day goal.



Percent of QC tests meeting specifications met the 97% goal.



Value of Services Rendered continued to run below the annual budget projection due to staffing vacancies.

Performance: Met Turnaround Time (average of 3 months) and Percent QC within Specification indicators for the quarter at reduced staffing level. Value of Services Rendered is slightly below budget, but ahead of the 3-year average for the year.

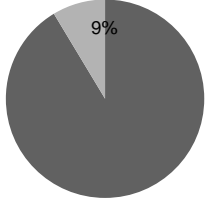
School Lead Program: During FY22, MWRA's lab completed 1,416 tests from 96 schools and childcare facilities in 34 communities. Since 2016, MWRA's Laboratory has conducted over 40,000 tests from 538 schools and daycares in 44 communities. We have also completed over 700 home lead tests under the DPH sampling program since 2017.

CONSTRUCTION PROGRAMS

Projects In Construction

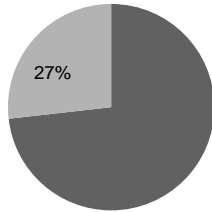
4th Quarter – FY22

Money



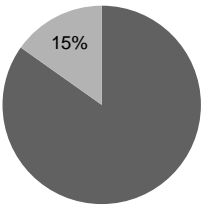
- Amount Remaining
- Billed to Date

Time



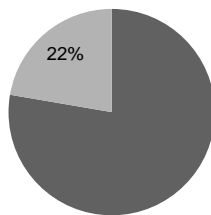
- Days Remaining
- Days Expended

Money



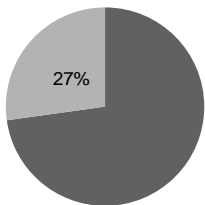
- Amount Remaining
- Billed to Date

Time



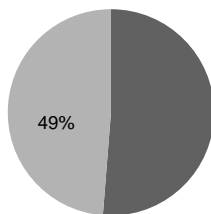
- Days Remaining
- Days Expended

Money



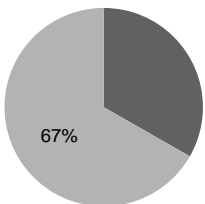
- Amount Remaining
- Billed to Date

Time



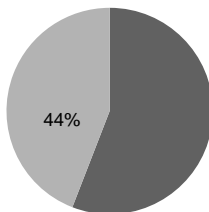
- Days Remaining
- Days Expended

Money



- Amount Remaining
- Billed to Date

Time



- Days Remaining
- Days Expended

Carroll Water Treatment Plant SCADA Improvements

Project Summary: This project will replace SCADA Control equipment at the Carroll Plant, to enhance cybersecurity, redundancy, ensure future reliability, and maintain secure plant operations.

Contract Amount: \$12,929,159.87

Contract Duration: 1,127 Days

Notice to Proceed: 1-Sep-21

Contract Completion: 2-Oct-24

Status and Issues: As of June, the Contractor laid out the routing of the conduits in the Chemical Building, installed the new conduits into control panel WHUV:IJNST.CP-01 in the PLC Room and poured the concrete for 14 equipment pads in the Operations Building, Ozone Building and the Chemical Building.

Section 89 Replacement Pipeline

Project Summary: This project will include replacement of a 10,500-foot portion of PCCP with class IV reinforcing wire, line valves and appurtenances, and abandonment of the 118-year old, 24-inch diameter cast iron Section 29 pipeline.

Contract Amount: \$32,619,000

Contract Duration: 1,475 Days

Notice to Proceed: 5-Aug-21

Contract Completion: 19-Aug-25

Status and Issues: As of June, the Contractor completed installing 132 LF of 36" DI Pipe from Sta.0+00-B to Sta.1+32-B to connect the existing Section 110. They also backfilled/restored the area at Gillis Pump Station, Stoneham. In addition, they completed installing water services and hydrant laterals from the new 12" ductile iron local water main at Forest Street, Winchester.

Low Service PRV Improvements

Project Summary: This project will replace pressure reducing valves on the Weston Aqueduct Supply Main (WASM) 4 at Nonantum Road in Boston and WASM 3 at Mystic Valley Parkway in Medford

Contract Amount: \$11,326,000

Contract Duration: 720 Days

Notice to Proceed: 14-Jul-21

Contract Completion: 4-Jul-23

Status and Issues: As of June, the Contractor completed driving H-piles, installing wailers and wooden lagging for Phase 2 SOE. They excavated and removed existing pipe and concrete structures within Phase 2 SOE. They also placed stone embedment to approx. 16" below pipe invert.

Rehabilitation of WASM 3

Project Summary: This project consists of the rehabilitation of 13,800 feet of 56-inch and 60-inch diameter water main in Arlington, Somerville and Medford.

Contract Amount: \$19,656,427.23

Contract Duration: 1,383 Days

Notice to Proceed: 28-Oct-20

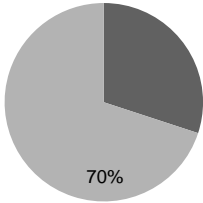
Contract Completion: 11-Aug-24

Status and Issues: As of June, the Contractor completed all restoration work including concrete placement, tree plantings with application of porous pavement, and installation of concrete planters, benches and bike rack. In addition, they replaced a section of sidewalk and access ramps, replaced granite curbing, and completed temporary paving.

Projects In Construction

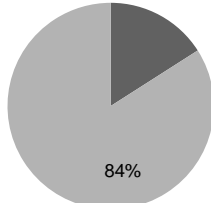
4th Quarter – FY22

Money



- Amount Remaining
- Billed to Date

Time



- Days Remaining
- Days Expended

Nut Island Odor Control and HVAC

Project Summary: This project will provide upgrades to the odor control system, heating, ventilation and air conditioning system and other equipment.

Contract Amount: \$58,913,925.69

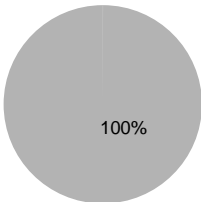
Contract Duration: 1,034 Days

Notice to Proceed: 12-Feb-20

Contract Completion: 12-Dec-22

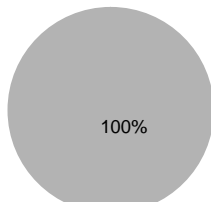
Status and Issues: As of June, the Contractor installed rebar and placed concrete for walls and slabs to elevation 139.00 (up to door 12D). They removed and replaced rebar for the slab at elevation 141.17 and placed 4,500 psi concrete. In addition, they patched holes in the concrete walls and started removal of existing standing seam roof.

Money



- Amount Remaining
- Billed to Date

Time



- Days Remaining
- Days Expended

Chemical Tank Relining & Pipe Replacement

Project Summary: This project involves replacing the chlorobutyl rubber linings in 3 sodium hypochlorite and 2 sodium bisulfite storage tanks and assorted gravity thickener overflow piping at Deer Island.

Contract Amount: \$8,794,899

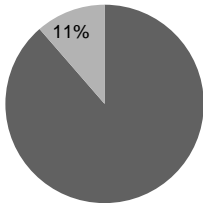
Contract Duration: 850 Days

Notice to Proceed: 13-Aug-19

Contract Completion: 10-Dec-21

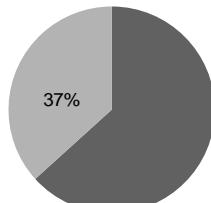
Status and Issues: This project is complete. Staff are awaiting bids for a future project to replace this one.

Money



- Amount Remaining
- Billed to Date

Time



- Days Remaining
- Days Expended

DITP Odor Control Damper Replacement

Project Summary: This project involves replacing three existing 30-inch diameter steel dampers with stainless steel dampers, surface preparation and coatings application on the existing 30-inch diameter ductile iron pipe. ,

Contract Amount: \$538,000

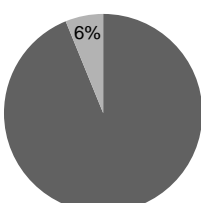
Contract Duration: 365 Days

Notice to Proceed: 3-Feb-22

Contract Completion: 3-Feb-23

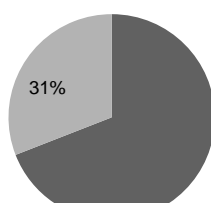
Status and Issues: As of June, the fabrication of the stainless steel dampers and spool piece continues.

Money



- Amount Remaining
- Billed to Date

Time



- Days Remaining
- Days Expended

Clinton Screw Pump Replacement

Project Summary: This project involves demolishing and replacing three screw pumps and motors and three existing 72-inch by 60-inch pump isolation slide gates and associated electrical and controls.

Contract Amount: \$3,452,985

Contract Duration: 540 Days

Notice to Proceed: 14-Jan-22

Contract Completion: 8-Jul-23

Status and Issues: As of June, the major equipment submittals were approved. The Contractor completed site verification of the isolation gate measurements and completed the sub surface utility investigation.

CSO CONTROL PROGRAM

4th Quarter – FY22

All 35 projects in the CSO Long-Term Control Plan (LTCP) were complete as of December 2015 in compliance with milestones in the Federal District Court Order. MWRA has completed a multi-year CSO post-construction monitoring program and performance assessment, filing the Final CSO Post Construction Monitoring Program and Performance Assessment Report with the Court and submitted copies to EPA and DEP in December 2021. The report shows that 70 of 86 outfalls met the LTCP goals for CSO activation frequency and volume. MWRA and its member CSO communities are moving forward with plans to bring 6 of the 16 CSOs in line with the LTCP goals. With respect to the remaining 10 CSO outfalls, MWRA identified potentially feasible alternatives that may enable four of these outfalls to achieve CSO LTCP volume and activation goals; but at least six CSO outfalls remained particularly challenging. In early 2022 the MWRA reached an agreement with EPA, DEP and the Conservation Law Foundation (“CLF”) on a six-part framework to govern any unfinished work. The framework consisted of: (i) submission of the Final Report (which had been achieved); (ii) three-years of additional time for certain system improvements at six of the 16 outfalls, and continued investigations as to the remaining 10 outfalls; (iii) annual reporting; (iv) periodic meetings; (v) submission of a supplemental report in December 2024 as to the 16 outfalls; and (vi) corresponding additional Schedule Seven compliance milestones for the MWRA’s submission of the annual reports and supplemental report. On February 4, 2022, the MWRA filed a motion, with the assent of EPA, DEP and CLF, to amend Schedule Seven consistent with the proposed framework. On February 18, 2022, the Court issued Schedule Seven Compliance Order Number 250 in which it allowed the request to amend Schedule Seven. On April 29, 2022 the MWRA filed with the Court the Annual Compliance report along with the Annual Report for Calendar Year 2021 CSO Discharge Estimates and Rainfall Analyses in compliance with the new schedule seven milestones. Quarterly Meetings will be held with DEP/EPA through Sept. 2024 per Court Order associated with 16 outfalls. First meeting held March 28, the second meeting Scheduled for June. Of the \$913.1 million budget in the FY22 CIP for the CSO Control Program, **approximately \$1.8 million remain to be spent**, as described below.

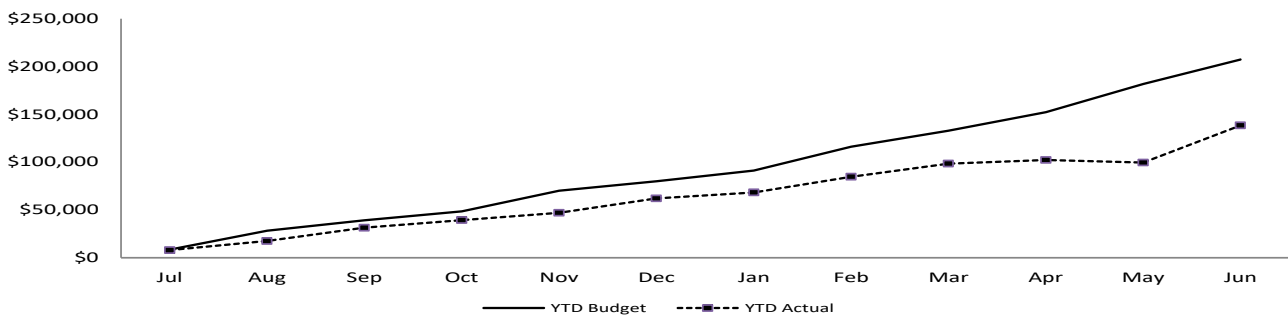
Project/Item	Status as of June30, 2021
BWSC Dorchester Interceptor Inflow Removal	This agreement with BWSC provided up to \$3.76 million in MWRA financial assistance for reimbursement of the eligible costs of construction to remove inflow from the BWSC’s Dorchester Interceptor system. BWSC awarded one construction contract for inflow removal in the amount of \$1.58 million. BWSC completed the contract work on June 30, 2021, when the financial assistance agreement ended. MWRA has received payment requests of \$1,382,953 from BWSC for completed work, which was paid in November of 2021. No further request for payment are expected on this FAA. \$2.18 million of remaining funds in the Dorchester agreement has been transferred into a new agreement by which BWSC will construct sewer separation and other CSO improvements in East Boston (see below).
BWSC Memorandum of Understanding and Financial Assistance Agreement	On April 14, 2021, the MWRA Board of Directors authorized the East Boston CSO financial assistance agreement in the amount of \$2.18 million for a term of two years, from July 1, 2021 through June 30, 2023. BWSC and MWRA executed the agreement on June 10, 2021. BWSC has awarded East Boston Sewer Separation Contract 3 and is finalizing design of an upgraded connection to the MWRA system to lower CSO discharges at Outfall BOS014. BWSC has submitted a request for payment of two-thirds of the agreement amount upon contract award, which had been processed on September 16, 2021 in the amount of \$1,454,445. BWSC submitted as-builts on the BOS014 modification. BWSC will be submitting a request for the release of the remaining one-third of the agreement amount, to be paid in the first quarter of FY23.
City of Cambridge Memorandum of Understanding and Financial Assistance Agreement	The City of Cambridge attained substantial completion of its last MWRA CSO plan project in December 2015 in compliance with Schedule Seven. The \$100.2 million MOU/FAA by which MWRA funded the eligible costs of the Cambridge-implemented CSO projects ended on June 30, 2018. With the assistance of internal audit, MWRA recently revisited the final eligibility review of the Cambridge construction contracts, making a few revisions and reviewing those edits with Cambridge. Cambridge is calculating the final eligible amount less the interest accrued. Once the final payment request is submitted MWRA will review. It is anticipated that the final payment will be made Q4 FY22.
City of Somerville Financial Assistance Agreement	By this agreement, MWRA will provide up to \$1.4 million upon construction award of City of Somerville’s repair of its combined sewer trunk line upstream of the Somerville Marginal CSO Facility. Pursuant to the agreement, the repair work is intended to maintain the full in-system storage capacity of the trunk sewer to support CSO control. Somerville completed the design that includes a cementitious/geopolymer lining and has awarded to National Water Main. The notice to proceed was issued in January. Somerville has request payment of the \$1.4 million to partial fund the work in accordance with the FAA. Payment was made on February 24, 2022.
WRA CSO Performance Assessment – Contract 7572	<p>MWRA issued the Notice to Proceed with the contract for CSO Post-Construction Monitoring and Performance Assessment to AECOM Technical Services, Inc., in November 2017. The contract includes CSO inspections, overflow metering, hydraulic modeling, system performance assessments and water quality impact assessments, culminating in the submission of a report to EPA and DEP in December 2021 verifying whether the LTCP goals are attained. The Board approved Amendment No. 3 on February 16th increasing the contract amount from \$5.28 million to \$6.84 million and extending the contract term by three years to April 7, 2025. Approximately \$4.6 million has been spent.</p> <p>On August 30, 2019, DEP issued five-year CSO variances to water quality standards for the Lower Charles River/Charles Basin and the Alewife Brook/Upper Mystic River effective through August 31, 2024. The variance conditions include receiving water quality modeling and CSO and stormwater sampling; the evaluation of certain additional CSO controls; other requirements intended to minimize CSO discharges, their impacts and public health risk; and preparation of updated CSO control plans for these waters. In compliance with the CSO variances, MWRA has implemented a subscriber-based system to notify the public of CSO discharges at its permitted outfalls within four hours of the start of discharge at each location, using meter readings. MWRA also reports estimated discharge volumes on its CSO notification web page.</p> <p>Cambridge and Somerville are also parties to the variances and have implemented notification systems for their own outfalls. First meeting on June 29th. AECOM continues to make progress with CSO variance-required project evaluations and other site-specific investigations to mitigate CSO discharges at locations where LTCP goals are not yet attained. In these efforts, MWRA is maintaining close coordination with the CSO communities. CSO mitigation implemented in late 2020/early 2021 included: BWSC completed its East Boston sewer separation Contract 1 and continues to make substantial progress on Contract 3, Chelsea raised the overflow weir at Outfall CHE004, Cambridge removed heavy sediments in the Outfall CAM401A system, - all expected to bring associated outfalls into attainment with LTCP discharge goals. In addition, Cambridge completed the partial sewer separation improvements that have reduced discharges from the Cottage Farm facility. Bids for were received on July 22nd for the Interceptor Connection at Chelsea’s Outfall CHE008, D’Alessandro Corp. (West Bridgewater, MA) was the low bidder at \$1,570,000. Design of the new pipe connection and control gate to the Somerville Marginal Conduit upstream of the Somerville Marginal Facility continues. Once the construction is completed it is predicted to significantly reduce CSO discharges from the facility (MWR205/MWR205A). MWRA and BWSC continue to meet monthly to discuss improving the flow conveyance at Outfall BOS017 in Charlestown. The dry-weather connection modification in East Eagle Square was added to Construction contract 3 (partially funded by MWRA) is complete. BWSC submitted the as-builts for review and upon approval MWRA will release payment. BWSC’s construction contractor completed approximately 45% of the construction of South Boston sewer separation Contract 1 that will lower CSO discharges to Fort Point Channel.</p> <ul style="list-style-type: none"> AECOM updated the MWRA hydraulic model to Q4-2021 system conditions in part to produce an updated Typical Year CSO performance assessment relative to the LTCP activation and volume goals. The Final CSO Post Construction Monitoring Program and Performance Assessment Report was submitted to the Court and EPA and DEP on December 29, 2021. The report shows that 70 of 86 outfalls met the LTCP goals for CSO activation frequency and volume. MWRA submitted the first Annual CSO Discharge Estimates and Rainfall Analysis for Calendar Year 2021 on April 29-2022. MWRA and its member CSO communities are moving forward with plans to bring 6 of the 16 CSOs in line with the LTCP goals. The remaining 10 will require further investigation to determine an appropriate plan. MWRA and the CSO communities will continue to identify and evaluate alternatives to further reduce discharges at these outfalls. AECOM continued to perform evaluations to optimize the performance to the Alewife Brook and Charles River systems. Utilizing receiving water quality models of the Lower Charles River and the Alewife Brook/Upper Mystic River AECOM completed and calibrated last fall, it performed water quality assessments of current river conditions and the impacts of remaining CSO and non-CSO (dry weather and stormwater) pollution sources. MWRA responded to comments provided on the draft and distributed a final Water Quality Assessment Report to EPA, DEP, the CSO communities, Charles River Watershed Association, and Mystic River Watershed Association. MWRA submitted the Water Quality Alternatives Assessment report in December. MWRA responded to comments on the report.

CIP Expenditures 4rd Quarter – FY22

FY22 Capital Improvement Program Expenditure Variances through June by Program - (\$ in thousands)				
Program	FY22 Budget Through June	FY22 Actual Through June	Variance Amount	Variance Percent
Wastewater	\$109,856	\$70,400	(\$39,456)	-35%
Waterworks	\$75,012	\$62,801	(\$12,211)	-16%
Business and Operations Support	\$22,445	\$5,262	(\$17,183)	-76%
Total	\$207,312	\$138,462	(\$68,850)	-33%

Project underspending within Wastewater was due to Prison Point Rehabilitation work on hold, updated schedules for DI Motor Control Center & Switchgear Replacements, Primary & Secondary Clarifier Rehab, Fire Alarm System Replacement, DI Dystor Membrane Replacements, timing of final work and costs for Winthrop Terminal Facility (WTF) VFD Replacement and Dorchester Interceptor Sewer, completion of some design and inspection tasks were later than anticipated for Ward Street and Columbus Park Headworks Upgrades Design/CA, and timing of work for the Nut Island Odor Control and HVAC Improvements. This underspending was partially offset by work scheduled in FY21 that was completed in FY22 for the Chelsea Creek Headworks Upgrades and Wastewater Metering project, and work completed earlier than anticipated for East Boston CSO Control. Project underspending in Waterworks was due to timing of community distributions for the Water Loan program, updated schedules for the NIH Section 89 & 29 Replacement, Wachusett Lower Gate House Boiler and Lead Replacement, less than anticipated Final Design and CA/RI work for CP-3 Sections 23, 24, and 47, and scope reduction for Sections 50 & 57 Water Rehabilitation - Design/ESDC. This underspending was partially offset by contractor progress for WASM 3 CP-1, NEH CP-1 and WASM/Spot Pond Supply Mains Pressure Reducing Valve Improvements, award higher than budgeted and contractor progress for CP-3 Sections 23, 24, and 47 Construction, and earlier than anticipated land purchase for the Tunnel Admin, Legal & Public Outreach contract.

Budget vs. Actual CIP Expenditures (\$ in thousands)
Total FY22 CIP Budget of \$207,312



Construction Fund Management

All payments to support the capital program are made from the Construction Fund. Sources of fund in-flows include bond proceeds, commercial paper, SRF reimbursements, loan repayments by municipalities, and current revenue. Accurate estimates of cash withdrawals and grant payments (both of which are derived from CIP spending projections) facilitate planning for future borrowings and maintaining an appropriate construction fund balance.

Cash Balance as of 6/30/22	\$123 million
Unused capacity under the debt cap:	\$1.835 billion
Estimated date for exhausting construction fund without new borrowing:	Aug-22
Estimated date for debt cap increase to support new borrowing:	Not anticipated at this time
Commercial paper/Revolving loan outstanding:	\$ 73 million
Commercial paper capacity / Revolving Loan	\$177 million
Budgeted FY22 Cash Flow Expectancy*:	\$186 million

* Cash based spending is discounted for construction retainage.

DRINKING WATER QUALITY AND SUPPLY

Source Water – Microbial Results and UV Absorbance

4th Quarter – FY22

Source Water – Microbial Results

Total coliform bacteria are monitored in both source and treated water to provide an indication of overall bacteriological activity. Most coliforms are harmless. However, fecal coliform, a subclass of the coliform group, are identified by their growth at temperatures comparable to those in the intestinal tract of mammals. They act as indicators of possible fecal contamination. The Surface Water Treatment Rule for unfiltered water supplies allows for no more than 10% of source water samples prior to disinfection over any six-month period to have more than 20 fecal coliforms per 100mL.

Sample Site: Quabbin Reservoir

Quabbin Reservoir water is sampled at the William A. Brutsch Water Treatment Facility raw water tap before being treated and entering the CVA system.

All samples collected during the quarter were below 20 cfu/100mL. **For the current six-month period, 0.0% of the samples have exceeded a count of 20 cfu/100mL.**

Sample Site: Wachusett Reservoir

Wachusett Reservoir water is sampled at the CWTP raw water tap in Marlborough before being treated and entering the MetroWest/Metropolitan Boston systems.

In the wintertime when smaller water bodies near Wachusett Reservoir freeze up, many waterfowl will roost in the main body of the reservoir - which freezes later. This increased bird activity tends to increase fecal coliform counts. DCR has an active bird harassment program to move the birds away from the intake area.

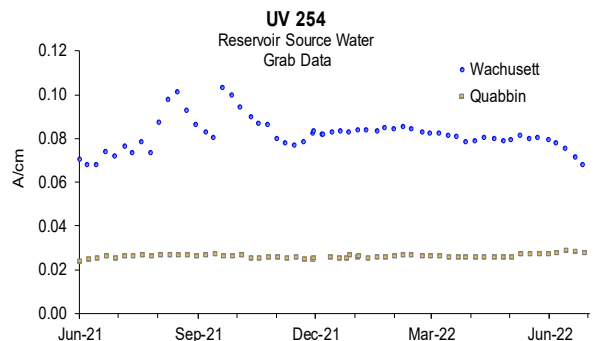
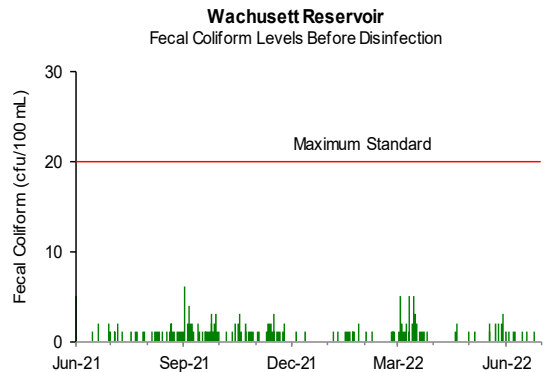
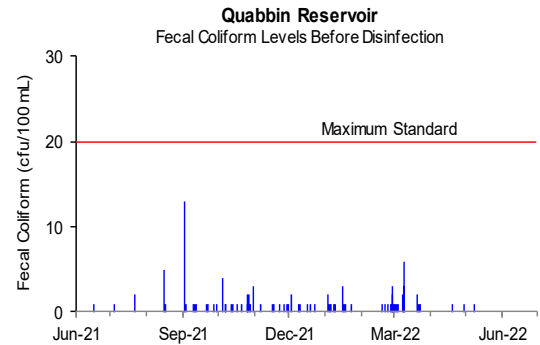
All samples collected during the 4th Quarter were below 20 cfu/100mL. **For the current six-month period, 0.0% of the samples exceeded a count of 20 cfu/100mL.**

Source Water – UV Absorbance

UV Absorbance at 254nm wavelength (UV-254), is a measure of the amount and reactivity of natural organic material in source water. Higher UV-254 levels cause increased ozone and chlorine demand resulting in the need for higher ozone and chlorine doses, and can increase the level of disinfection by-products. UV-254 is impacted by tributary flows, water age, sunlight and other factors.

Quabbin Reservoir UV-254 levels averaged 0.026 A/cm for the quarter.

Wachusett Reservoir UV-254 levels averaged 0.077 A/cm for the quarter.

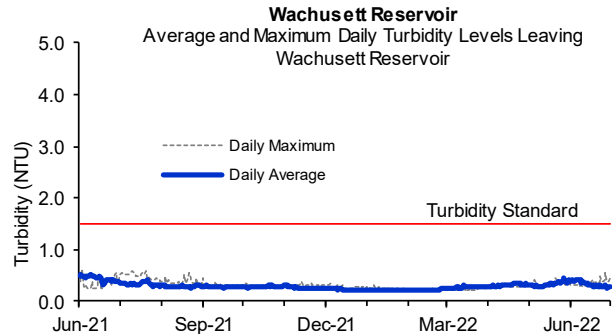
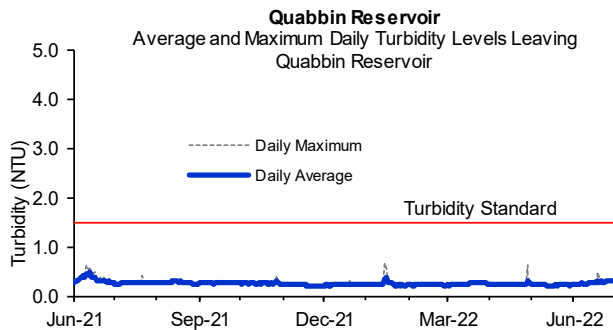


Source Water – Turbidity 4th Quarter – FY22

Turbidity is a measure of suspended and colloidal particles including clay, silt, organic and inorganic matter, algae and microorganisms. The effects of turbidity depend on the nature of the matter that causes the turbidity. High levels of particulate matter may have a higher disinfectant demand or may protect bacteria from disinfection effects, thereby interfering with the disinfectant residual throughout the distribution system.

There are two standards for turbidity: all water must be below five NTU (Nephelometric Turbidity Units), and water only can be above one NTU if it does not interfere with effective disinfection.

Turbidity of Quabbin Reservoir water is monitored continuously at the Brutsch Water Treatment Facility (BWTF) before UV and chlorine disinfection. Turbidity of Wachusett Reservoir is monitored continuously at the Carroll Water Treatment Plant (CWTP) before ozonation and UV disinfection. Maximum turbidity results at Quabbin and Wachusett were within DEP standards for the quarter.

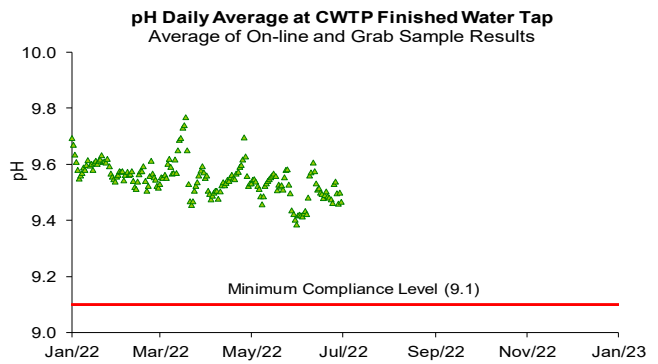
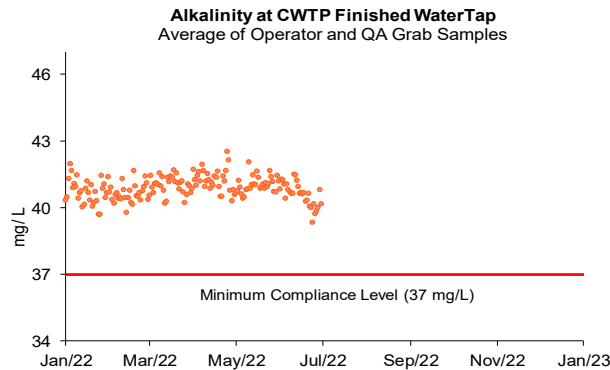


Treated Water – pH and Alkalinity Compliance

MWRA adjusts the alkalinity and pH of Wachusett water at CWTP to reduce its corrosivity, which minimizes the leaching of lead and copper from service lines and home plumbing systems into the water. MWRA tests finished water pH and alkalinity daily at the CWTP's Fin B sampling tap. MWRA's target for distribution system pH is 9.3; the target for alkalinity is 40 mg/l. Per DEP requirements, CWTP finished water samples have a minimum compliance level of 9.1 for pH and 37 mg/L for alkalinity. Samples from 27 distribution system locations have a minimum compliance level of 9.0 for pH and 37 mg/L for alkalinity. Results must not be below these levels for more than nine days in a six month period. Distribution system samples are collected in March, June, September, and December.

Each CVA community provides its own corrosion control treatment. See the CVA report: www.mwra.com/water/html/awqr.htm.

Quarterly distribution system samples were collected over a course of two weeks in March. Distribution system sample pH ranged from 9.5 to 9.7 and alkalinity ranged from 40 to 42 mg/L. No sample results were below DEP limits for this quarter.



Treated Water – Disinfection Effectiveness

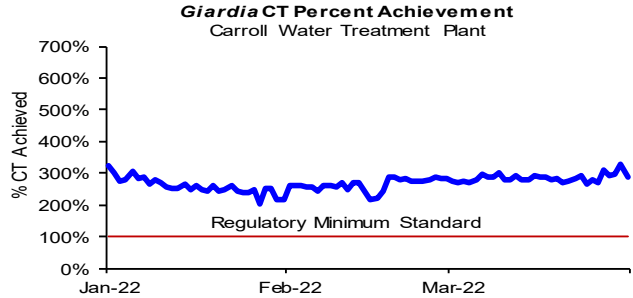
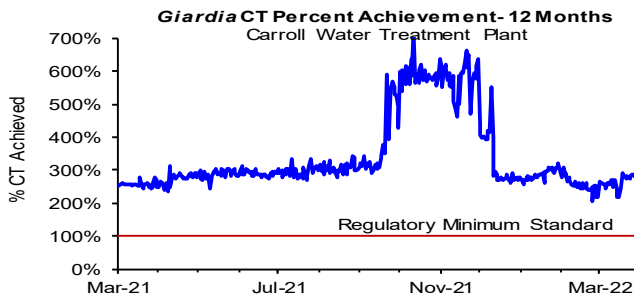
4th Quarter – FY22

At the Carroll Water Treatment Plant (CWTP), MWRA meets the required 99.9% (3-log) inactivation of *Giardia* using ozone (reported as CT: concentration of disinfectant x contact time) and the required 99% (2-log) inactivation of *Cryptosporidium* using UV (reported as IT: intensity of UV x time). MWRA calculates inactivation rates hourly and reports *Giardia* inactivation at maximum flow and *Cryptosporidium* inactivation at minimum UV dose. MWRA must meet 100% of required CT and IT.

CT achievement for *Giardia* assures CT achievement for viruses, which have a lower CT requirement. For *Cryptosporidium*, there is also an "off-spec" requirement. Off-spec water is water that has not reached the full required UV dose or if the UV reactor is operated outside its validated ranges. No more than 5% off-spec water is allowed in a month.

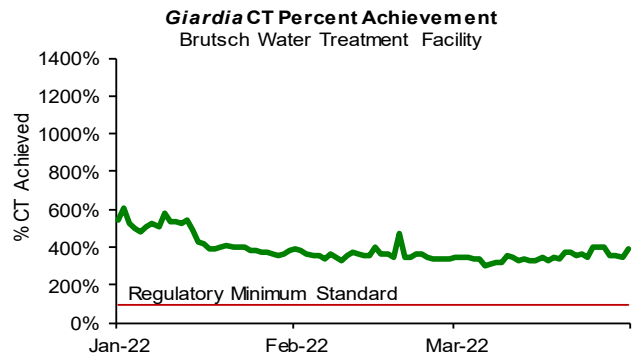
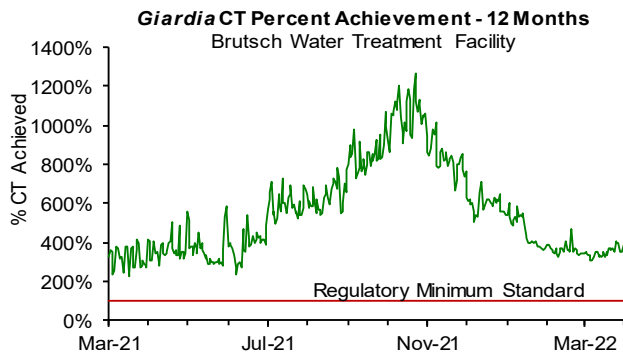
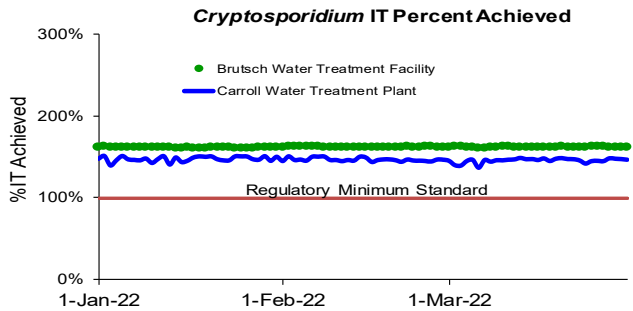
Wachusett Reservoir – MetroWest/Metro Boston Supply:

- The chlorine dose at the CWTP varied between 3.1 and 3.7 mg/L for the quarter.
- Ozone dose at the CWTP varied between 2.3 to 3.0 mg/L for the quarter.
- *Giardia* CT was maintained above 100% at all times the plant was providing water into the distribution system this quarter, as well as every day for the last fiscal year.
- *Cryptosporidium* IT was maintained above 100% for the quarter. Off-spec water was less than 5%.
- The ozone target was increased in mid-August 2021 through early November to reduce chlorine demand and decay, as during this time chlorine residuals declined in the distribution system.



Quabbin Reservoir (CVA Supply) at: Brutsch Water Treatment Facility

- The chlorine dose at BWTF is adjusted in order to achieve MWRA's seasonal target of 0.75 - 0.85 mg/L (November 1 – May 31) and 0.85 - 1.05 mg/L (June 1 – October 31) at Ludlow Monitoring Station.
- The chlorine dose at BWTF varied between 1.30 to 1.86 mg/L for the quarter.
- *Giardia* CT was maintained above 100% at all times the plant was providing water into the distribution system for the quarter.
- *Cryptosporidium* IT was maintained above 100% for the quarter. Off-spec water was less than 5%.



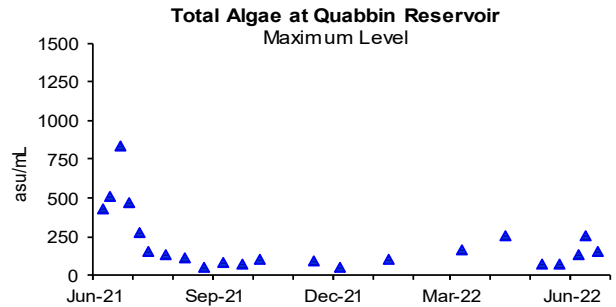
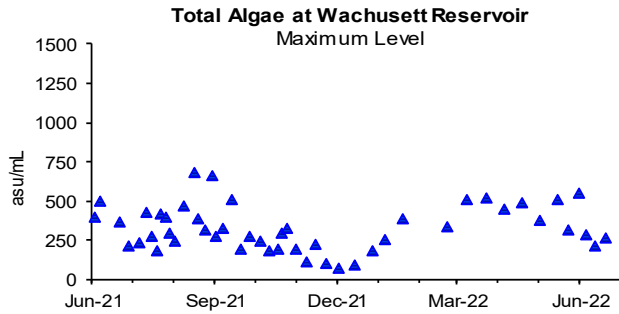
Source Water - Algae

4th Quarter – FY22

Algae levels in the Wachusett and Quabbin Reservoir are monitored by DCR and MWRA. These results, along with taste and odor complaints, are used to make decisions on source water treatment for algae control.

Taste and odor complaints at the tap may be due to algae, which originate in source reservoirs, typically in trace amounts. Occasionally, a particular species grows rapidly, increasing its concentration in water. When *Synura*, *Anabaena*, or other nuisance algae bloom, MWRA may treat the reservoirs with copper sulfate, an algaecide. During the winter and spring, diatom numbers may increase. While not a taste and odor concern, consumers that use filters may notice a more frequent need to change their filters.

In the 4th quarter, there were no complaints which may be related to algae reported from the local water departments.

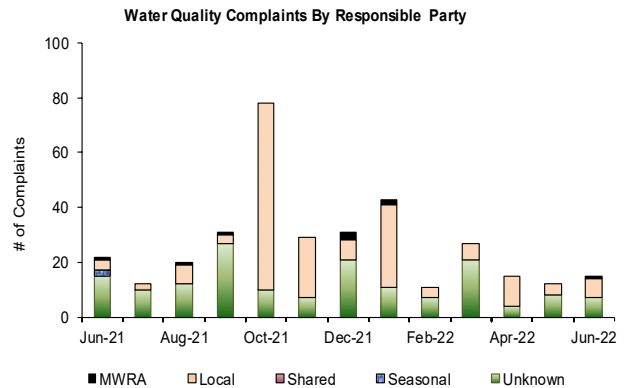
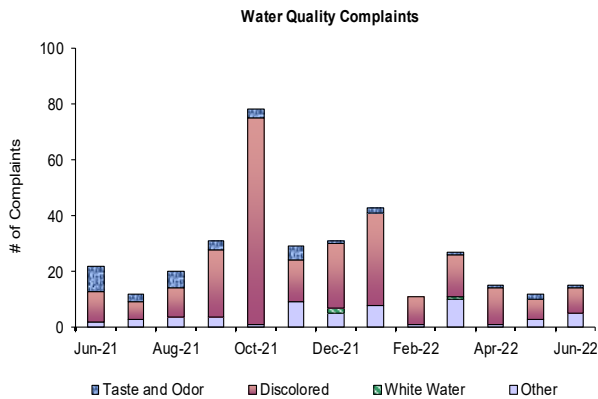


Drinking Water Quality Customer Complaints: Taste, Odor, or Appearance

MWRA collects information on water quality complaints that typically fall into four categories: 1) discoloration due to MWRA or local pipeline work; 2) taste and odor due to algae blooms in reservoirs or chlorine in the water; 3) white water caused by changes in pressure or temperature that traps air bubbles in the water; or 4) "other" complaints including no water, clogged filters or other issues.

MWRA routinely contacts communities to classify and tabulate water complaints from customers. This count, reflecting only telephone calls to towns, probably captures only a fraction of the total number of customer complaints. Field Operations staff have improved data collection and reporting by keeping track of more kinds of complaints, tracking complaints to street addresses and circulating results internally on a daily basis.

Communities reported 42 complaints during the quarter compared to 77 complaints from 4th Quarter of FY21. Of these complaints, 29 were for "discolored water", 4 were for "taste and odor", and 9 were for "other". Of these complaints, 22 were local community issues, 1 was an MWRA related issue, and 19 were unknown in origin.



Bacteria & Chlorine Residual Results for Communities in MWRA Testing Program 4th Quarter – FY22

While all communities collect bacteria samples and chlorine residual data for the Total Coliform Rule (TCR), data from the 44 systems that use MWRA's Laboratory are reported below.

The MWRA TCR program has 144 sampling locations. These locations include sites along MWRA's transmission system, water storage tanks and pumping stations, as well as a subset of the community TCR locations.

Samples are tested for total coliform and *Escherichia coli* (*E.coli*). *E.coli* is a specific coliform species whose presence likely indicates potential contamination of fecal origin.

If *E.coli* are detected in a drinking water sample, this is considered evidence of a potential public health concern. Public notification is required if repeat tests confirm the presence of *E.coli* or total coliform.

Total coliform provide a general indication of the sanitary condition of a water supply. If total coliform are detected in more than 5% of samples in a month (or if more than one sample is positive when less than 40 samples are collected), the water system is required to investigate the possible source/cause with a Level 1 or 2 Assessment, and fix any identified problems.

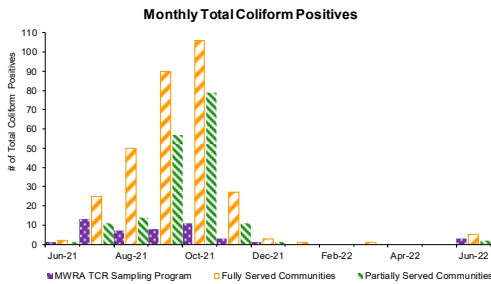
A disinfectant residual is intended to maintain the sanitary integrity of the water; MWRA considers a residual of 0.2 mg/L a minimum target level at all points in the distribution system.

Highlights

In the 4th Quarter, seven of the 6,667 samples (0.10% system-wide) submitted to MWRA labs for analysis tested positive. No communities were required to perform a Level Assessment. (Boston, Bedford, Medford, Newton, Peabody, Reading, Revere – June). Three of the 1928 MWRA locations or Community/MWRA Shared samples (0.16%) tested positive for total coliform. No samples tested positive for *E.coli*. Only 0.03% of the Fully Served community samples had chlorine residuals lower than 0.2 mg/L for the quarter.

NOTES:

- MWRA total coliform and chlorine residual results include data from community locations. In most cases these community results are indicative of MWRA water as it enters the community system; however, some are strongly influenced by local pipe conditions. Residuals in the MWRA system are typically between 1.0 and 2.8 mg/L.
- The number of samples collected depends on the population served and the number of repeat samples required.
- These communities are partially supplied, and may mix their chlorinated supply with MWRA chloraminated supply.
- Part of the Chicopee Valley Aqueduct System. Free chlorine system.



		Total Coliform		<i>E.coli</i> Positive	# Assessment Required
		# Samples (b)	# (%) Positive		
MWRA	MWRA Locations	400	0 (0%)	0	
	Shared Community/MWRA sites	1528	3 (0.20%)	0	
	Total: MWRA	1928	3 (0.16%)	0	No
Fully Served	ARLINGTON	156	0 (0%)	0	
	BELMONT	104	0 (0%)	0	
	BOSTON	782	1 (0.13%)	0	No
	BROOKLINE	224	0 (0%)	0	
	CHELSEA	169	0 (0%)	0	
	DEER ISLAND	52	0 (0%)	0	
	EVERETT	169	0 (0%)	0	
	FRAMINGHAM	237	0 (0%)	0	
	LEXINGTON	118	0 (0%)	0	
	LYNNFIELD	18	0 (0%)	0	
	MALDEN	234	0 (0%)	0	
	MARBLEHEAD	72	0 (0%)	0	
	MARLBOROUGH	126	0 (0%)	0	
	MEDFORD	192	1 (0.52%)	0	No
	MELROSE	117	0 (0%)	0	
	MILTON	102	0 (0%)	0	
	NAHANT	30	0 (0%)	0	
	NEWTON	278	1 (0.36%)	0	No
	NORHBOROUGH	48	0 (0%)	0	
	NORWOOD	99	0 (0%)	0	
	QUINCY	364	0 (0%)	0	
	READING	133	1 (0.75%)	0	No
	REVERE	198	1 (0.51%)	0	No
	SAUGUS	104	0 (0%)	0	
	SOMERVILLE	252	0 (0%)	0	
	SOUTHBOROUGH	30	0 (0%)	0	
	STONEHAM	91	0 (0%)	0	
SWAMPSCOTT	51	0 (0%)	0		
WALTHAM	216	0 (0%)	0		
WATERTOWN	130	0 (0%)	0		
WESTON	45	0 (0%)	0		
WINTHROP	66	0 (0%)	0		
	Total: Fully Served	5007	5 (0.10%)		
Partially Served	BEDFORD	58	1 (1.72%)	0	No
	BURLINGTON	149	0 (0%)	0	
	CANTON	90	0 (0%)	0	
	NEEDHAM	123	0 (0%)	0	
	PEABODY	209	1 (0.48%)	0	No
	WAKEFIELD	136	0 (0%)	0	
	WELLESLEY	114	0 (0%)	0	
	WILMINGTON	87	0 (0%)	0	
	WINCHESTER	91	0 (0%)	0	
	WOBURN	208	0 (0%)	0	
	Total: Partially Served	1265	2 (0.16%)		
CVA	MWRA CVA Locations	104	0 (0%)	0	
	CHICOPEE	186	0 (0%)	0	
	SOUTH HADLEY FD1	60	0 (0%)	0	
	WILBRAHAM	45	0 (0%)	0	
	Total: CVA	395	0 (0%)		
	Total: Community Samples	6667	7 (0.10%)		

Chlorine Residuals in Fully Served Communities

	2021						2022						
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
% <0.1	0.1	0.3	0.3	0.7	0.9	0.5	0.4	0.1	0.1	0.0	0.0	0.0	0.0
% <0.2	0.2	0.7	1.3	2.8	3.1	1.7	0.8	0.1	0.2	0.0	0.0	0.1	0.0
% <0.5	0.6	2.6	6.0	12.3	10.9	7.4	2.8	1.1	1.1	0.5	0.6	0.5	0.5
% <1.0	2.1	8.6	17.3	27.9	26.2	15.7	7.3	3.7	4.1	2.3	2.3	2.1	2.6
% ≥1.0	97.9	91.4	82.7	72.1	73.8	84.4	92.7	96.3	95.9	97.7	97.7	97.9	97.4

Treated Water Quality: Disinfection By-Product (DBP) Levels in Communities

4th Quarter – FY22

Total Trihalomethanes (TTHMs) and Haloacetic Acids (HAA5s) are by-products of disinfection treatment with chlorine. TTHMs and HAA5s are of concern due to their potential adverse health effects at high levels. EPA’s locational running annual average (LRAA) standard is 80 µg/L for TTHMs and 60 µg/L for HAA5s.

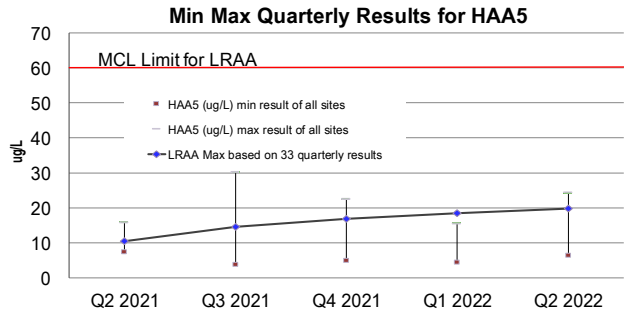
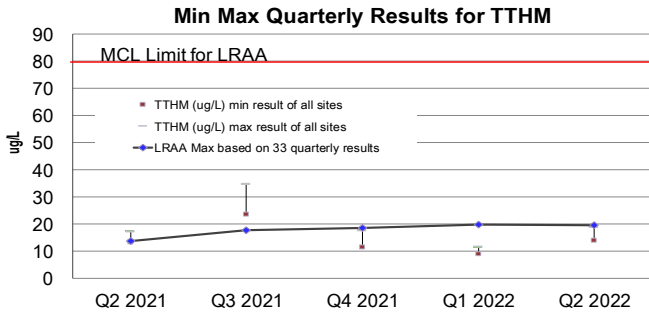
The locational running annual average calculated quarterly at each individual sampling location must be below the Total HAA5 or Total TTHM MCL standard. The charts below show the highest and lowest single values for all sites, and the LRAA of the highest location each quarter.

Partially served and CVA communities are responsible for their own compliance monitoring and reporting, and must be contacted directly for their individual results. The chart below combines data for all three CVA communities data (Chicopee, Wilbraham and South Hadley FD1). Each community is regulated individually.

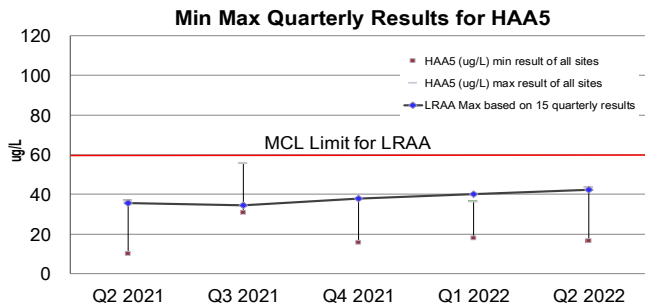
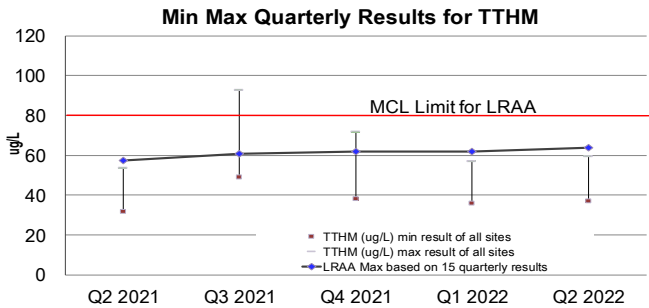
Bromate is tested monthly as required for water systems that treat with ozone. Bromide in the raw water may be converted into bromate following ozonation. EPA’s RAA MCL standard for bromate is 10 µg/L.

The LRAA for TTHMs and HAA5s for MWRA’s Compliance Program (represented as the line in the top two graphs below) remain below current standards. The Max LRAA in the quarter for TTHMs = 19.6 µg/L; HAA5s = 19.9 µg/L. The current RAA for Bromate = 0.0 µg/L. No LRAA exceedances or violations occurred this quarter for MetroBoston and any of the CVA communities. MWRA and the CVA communities continue to closely monitor and manage the disinfection process to minimize DBP production.

MetroBoston Disinfection By-Products



CVA Disinfection By-Products (Combined Results)



Water Supply and Source Water Management

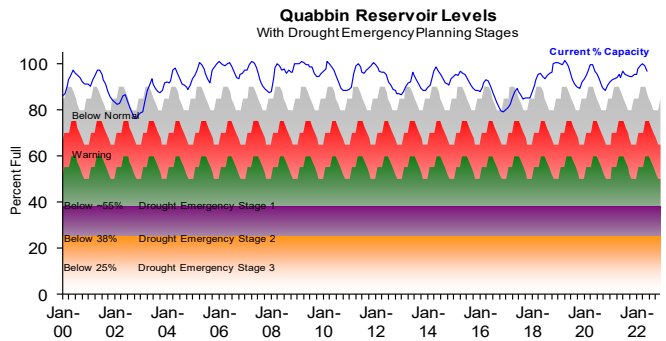
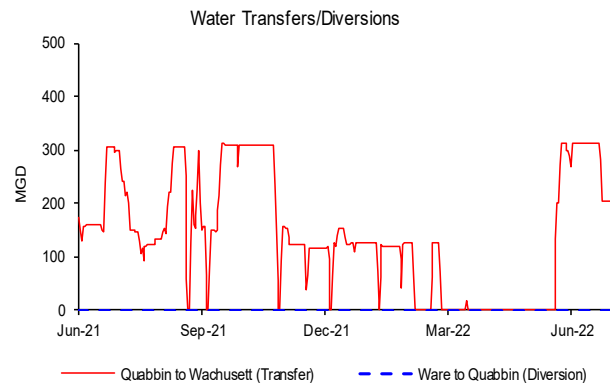
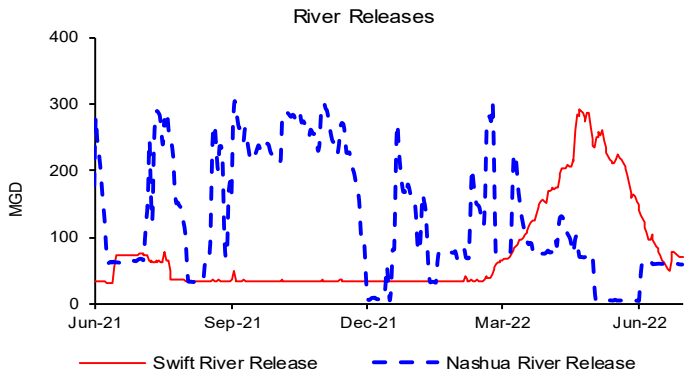
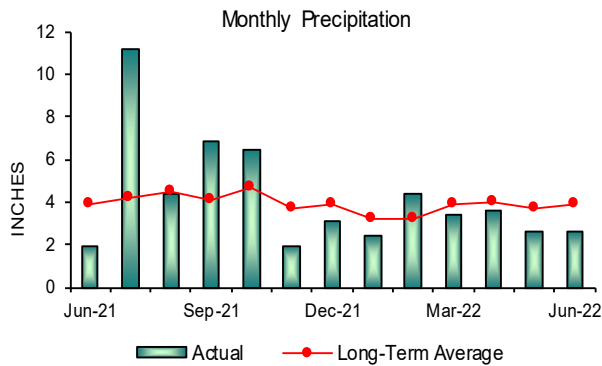
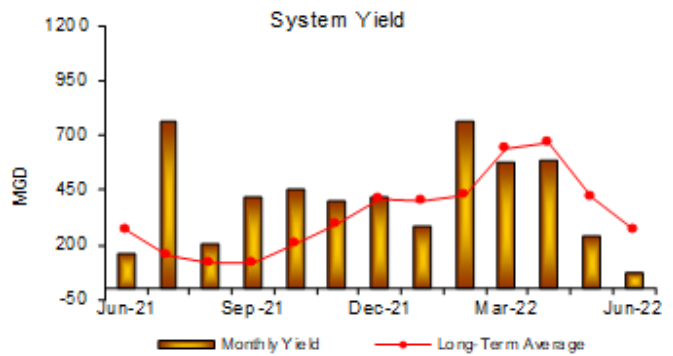
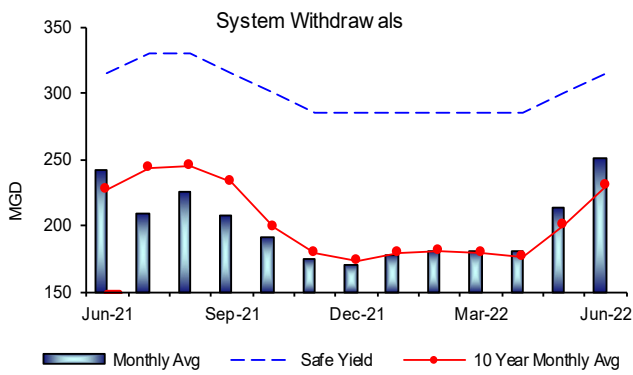
4th Quarter – FY22

Background

A reliable supply of water in MWRA's reservoirs depends on adequate precipitation during the year and seasonal hydrologic inputs from watersheds that surround the reservoirs. Demand for water typically increases with higher summer temperatures and then decreases as temperatures decline. Quabbin Reservoir was designed to effectively supply water to the service areas under a range of climatic conditions and has the ability to endure a range of fluctuations. Wachusett Reservoir serves as a terminal reservoir to meet the daily demands of the Greater Boston area. A key component to this reservoir's operation is the seasonal transfer of Quabbin Reservoir water to enhance water quality during high demand periods. On an annual basis, Quabbin Reservoir accounts for nearly 50% of the water supplied to Greater Boston. The water quality of both reservoirs (as well as the Ware River, which is also part of the System Safe Yield) depend upon implementation of DCR's DEP-approved Watershed Protection Plans. System Yield is defined as the water produced by its sources, and is reported as the net change in water available for water supply and operating requirements.

Outcome

The volume of the Quabbin Reservoir was at 96.5% as of June 30, 2022; a 2.7 % decrease for the quarter, which represents a loss of more than 11 billion gallons of storage and a decrease in elevation of 1.42'. System withdrawal and precipitation were below their long term quarterly averages. Yield for the quarter was below its long term quarterly average. Quabbin is in Normal Operating Range for this time of year.



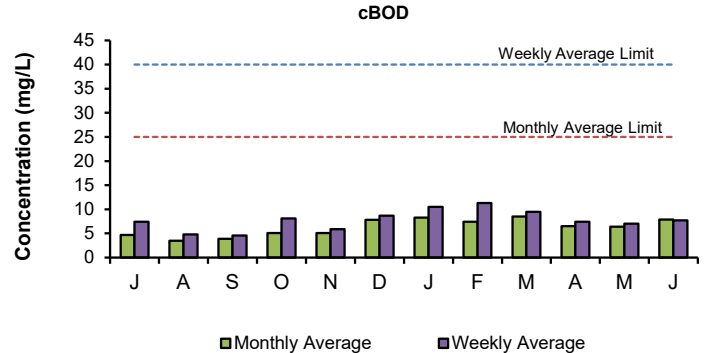
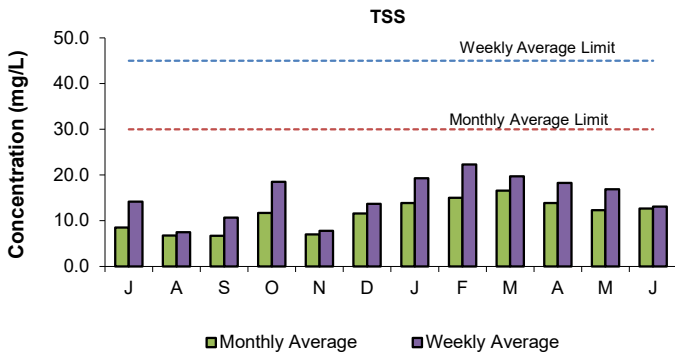
WASTEWATER QUALITY

NPDES Permit Compliance: Deer Island Treatment Plant 4th Quarter - FY22

NPDES Permit Limits

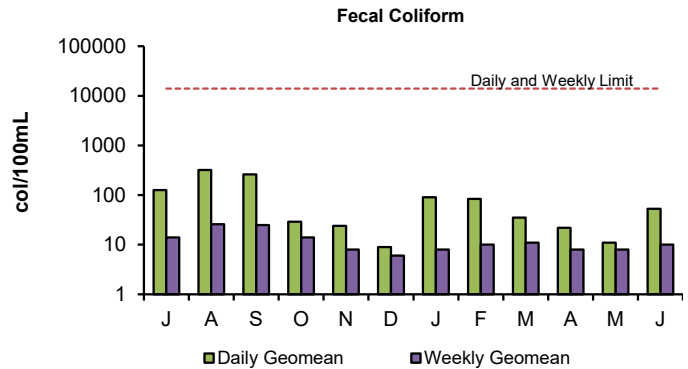
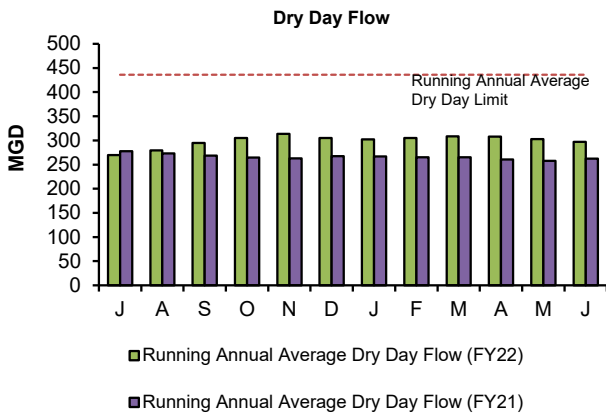
Effluent Characteristics		Units	Limits	April	May	June	4th Quarter Violations	FY22 YTD Violations
Dry Day Flow (365 Day Average):		mgd	436	308.0	302.5	297.0	0	0
cBOD:	Monthly Average	mg/L	25	6.5	6.4	7.9	0	0
	Weekly Average	mg/L	40	7.4	7.0	7.7	0	0
TSS:	Monthly Average	mg/L	30	13.9	12.3	12.7	0	0
	Weekly Average	mg/L	45	18.3	16.9	13.1	0	0
TCR:	Monthly Average	ug/L	456	0.0	0.0	0.0	0	0
	Daily Maximum	ug/L	631	0.0	0.0	0.0	0	0
Fecal Coliform:	Daily Geometric Mean	col/100mL	14000	22	11	53	0	0
	Weekly Geometric Mean	col/100mL	14000	8	8	10	0	0
	% of Samples >14000	%	10	0	0	0	0	0
	Consecutive Samples >14000	#	3	0	0	0	0	0
pH:		SU	6.0-9.0	6.5-6.9	6.5-7.0	6.5-6.9	0	0
PCB, Aroclors:	Monthly Average	ug/L	0.000045	UNDETECTED			0	0
Acute Toxicity:	Mysid Shrimp	%	≥50	>100	>100	>100	0	0
	Inland Silverside	%	≥50	>100	>100	>100	0	0
Chronic Toxicity:	Sea Urchin	%	≥1.5	100	100	100	0	0
	Inland Silverside	%	≥1.5	50	100	50	0	0

There have been no permit violations in FY22 to date at the Deer Island Treatment Plant (DITP).



Total Suspended Solids (TSS) in the effluent is a measure of the amount of solids that remain suspended after treatment. All TSS measurements for the 4th Quarter were within permit limits.

Carbonaceous Biochemical Oxygen Demand (cBOD) is a measure of the amount of dissolved oxygen required for the decomposition of organic materials in the environment. All cBOD measurements for the 4th Quarter were within permit limits.



Running Annual Average Dry Day Flow is the average of all dry weather influent flows over the previous 365 days. The Dry Day Flow for the 4th Quarter was well below the permit limit of 436 MGD.

Fecal Coliform is an indicator for the possible presence of pathogens. The levels of these bacteria after disinfection show how effectively the plant is inactivating many forms of disease-causing microorganisms. In the 4th Quarter, all permit conditions for fecal coliform were met.

NPDES Permit Compliance: Clinton Wastewater Treatment Plant
4th Quarter - FY22

NPDES Permit Limits

Effluent Characteristics		Units	Limits	April	May	June	4th Quarter Violations	FY22 YTD Violations
Flow:	12-month Rolling Average:	mgd	3.01	3.37	3.31	3.25	3	9
BOD:	Monthly Average:	mg/L	20	1.10	1.10	1.30	0	0
	Weekly Average:	mg/L	20	1.30	1.60	1.40	0	0
TSS:	Monthly Average:	mg/L	20	2.10	1.60	1.10	0	0
	Weekly Average:	mg/L	20	2.60	2.40	1.70	0	0
pH:		SU	6.5-8.3	7.2-7.8	7.3-7.8	7.2-7.7	0	0
Dissolved Oxygen:	Daily Average Minimum:	mg/L	6	9.90	9.00	8.30	0	0
E. Coli:	Monthly Geometric Mean:	cfu/100mL	126	5	5	5	0	0
	Daily Geometric Mean:	cfu/100mL	409	7	10	7	0	0
TCR:	Monthly Average:	ug/L	17.6	0.00	0.13	0.00	0	0
	Daily Maximum:	ug/L	30.4	0.00	4.00	0.00	0	0
Copper:	Monthly Average:	ug/L	11.6	7.15	10.10	12.25	1	1
	Daily Maximum:	ug/L	14.0	7.15	10.10	12.90	0	0
Total Ammonia Nitrogen: June 1st - October 31st	Monthly Average:	mg/L	2.0	0.05	0.00	0.02	0	0
	Daily Maximum:	mg/L	3.0	0.11	0.00	0.14	0	0
Total Phosphorus: April 1st - October 31st	Monthly Average:	ug/L	150	39	66	74	0	0
	Daily Maximum:	ug/L	RPT	51	123	140	0	0
Acute Toxicity*	Daily Minimum:	%	≥100	N/A	N/A	>100	0	0
Chronic Toxicity*	Daily Minimum:	%	≥62.5	N/A	N/A	100	0	0

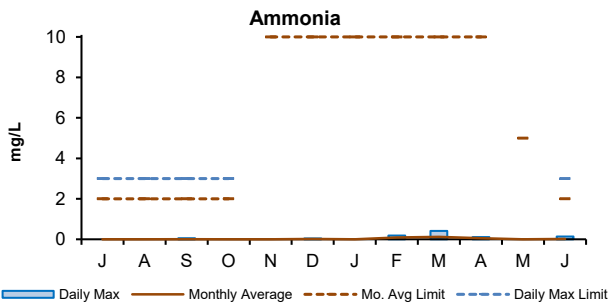
There have been nine permit violations at the Clinton Treatment Plant in FY22.

2nd Quarter: There were three permit violations in the second quarter, all rolling average flow exceedances. The 12-month rolling average flow exceeded 3.01 MGD in the 2nd quarter due to excessive rains in the region during summer 2021.

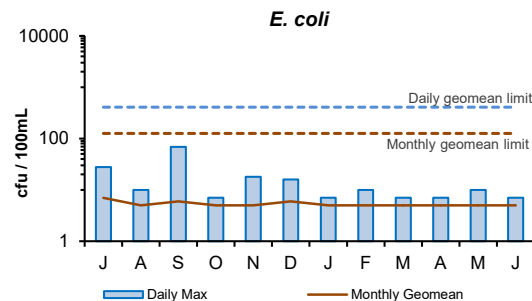
3rd Quarter: There were three permit violations in the third quarter, all rolling average flow exceedances. The 12-month rolling average flow exceeded 3.01 MGD in the 3rd quarter due to excessive rains in the region during summer 2021.

4th Quarter: There were four permit violations in the fourth quarter. Three were rolling average flow exceedances. The 12-month rolling average flow exceeded 3.01 MGD in the 4th quarter due to excessive rains in the region during summer 2021. The other violation was an exceedance of the monthly average copper permit.

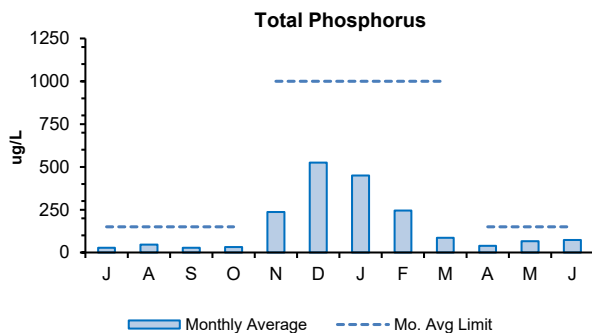
+ Toxicity testing at the Clinton Treatment Plant is conducted on a quarterly basis.



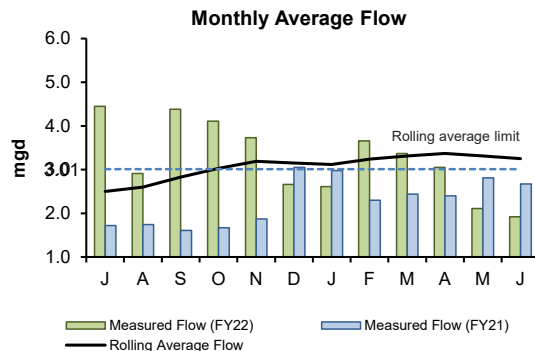
The 4th Quarter's monthly average and daily maximum concentrations of ammonia were below the permit limits. The monthly average and daily maximum limits for the 4th Quarter are variable. The permit limits are most stringent from June to October when warm weather conditions are most conducive to potential eutrophication.



E. coli is an indicator for the possible presence of pathogens. There were no violations of permit limits in the 4th Quarter. The monthly and daily limits are 126 cfu/100 mL and 409 cfu/100 mL respectively.



Total phosphorus limits are most stringent during the growing season from April to October. The 4th Quarter's monthly average concentrations for total phosphorus were below permit limits.



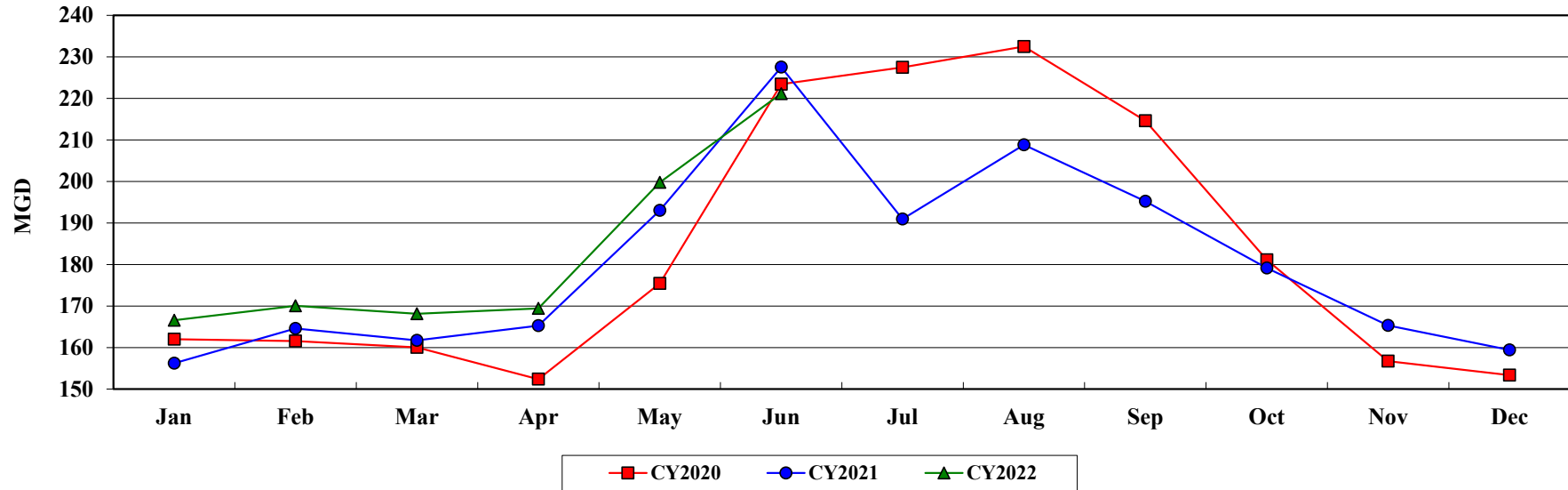
The graph depicts the rolling annual average monthly flow, measured in million gallons per day, exiting the plant. The 12-month rolling average flows during the 4th Quarter were above the permit limit.

COMMUNITY FLOWS AND PROGRAMS

Customer Water Use

4th Quarter - FY22

MWRA Water Supplied: All Revenue Customers



MGD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD Average	Annual Average
CY2020	162.016	161.551	160.018	152.368	175.435	223.405	227.454	232.496	214.617	181.110	156.727	153.367	172.416	183.462
CY2021	156.213	164.567	161.697	165.284	192.998	227.522	190.945	208.810	195.229	179.116	165.302	159.442	178.067	180.641
CY2022	166.570	170.056	168.107	169.415	199.769	221.149	-	-	-	-	-	-	182.576	182.576

MG	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD Total	Annual Total
CY2020	5,022.510	4,684.968	4,960.567	4,571.025	5,438.470	6,702.146	7,051.078	7,207.384	6,438.520	5,614.399	4,701.821	4,754.375	31,379.686	67,147.263
CY2021	4,842.593	4,607.873	5,012.608	4,958.533	5,982.944	6,825.661	5,919.300	6,473.120	5,856.857	5,552.611	4,959.064	4,942.705	32,230.213	65,933.870
CY2022	5,163.682	4,761.563	5,211.326	5,082.449	6,192.845	6,634.472	-	-	-	-	-	-	33,046.338	33,046.338

The June 2022 Community Water Use Report was recently distributed to communities served by the MWRA Metropolitan and Chicopee Valley waterworks systems. Each community's annual water use relative to the system as a whole is the primary factor in allocating the annual water rate revenue requirement to MWRA water communities. Calendar year 2022 water use will be used to allocate the FY2024 water utility rate revenue requirement.

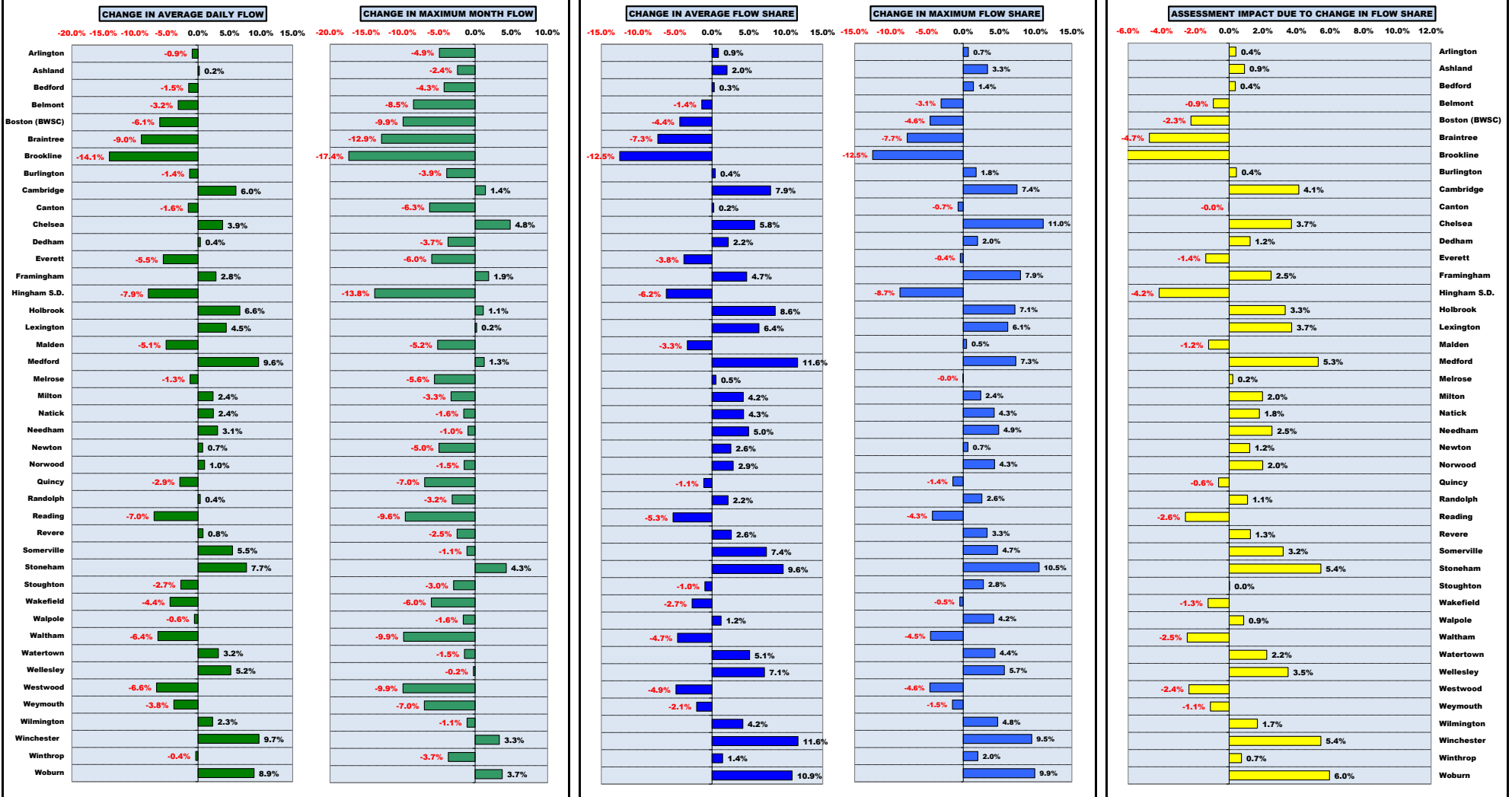
MWRA customers used an average of 196.81 mgd in the 4th quarter (Apr-Jun 2022) of FY2022. This is an increase of 1.57 mgd or 0.8% compared to the 4th quarter of FY2021.

How CY2020-22 Community Wastewater Flows Could Effect FY2024 Sewer Assessments ^{1,2,3}

The flow components of FY2024 sewer assessments will be calculated using a 3-year average of CY2020 to CY2022 wastewater flows compared to FY2023 assessments that will use a 3-year average of CY2019 to CY2021 wastewater flows.

But as MWRA's sewer assessments are a ZERO-SUM calculation, a community's assessment is strongly influenced by the **RELATIVE** change in CY2020 to CY2022 flow share compared to CY2019 to CY2021 flow share, compared to all other communities in the system.

The chart below illustrates the change in the **TOTAL BASE** assessment due to **FLOW SHARE CHANGES**. ⁴



¹ MWRA uses a 3-year flow average to calculate sewer assessments. Three-year averaging smoothes the impact of year-to-year changes in community flow share, but does not eliminate the long-term impact of changes in each community's relative contribution to the total flow.
² Based on actual flows for 2019 and 2022 (through April), and January to March, and June to December 2020. April & May 2020 based on the average of three prior years, adjusted for 2020 water use. January to December 2021 estimated based on the average of the three prior years.
³ Flow data is preliminary and subject to change pending additional MWRA and community review.
⁴ Represents **ONLY** the impact on the total BASE assessment resulting from the changes in average and maximum wastewater **FLOW SHARES**.

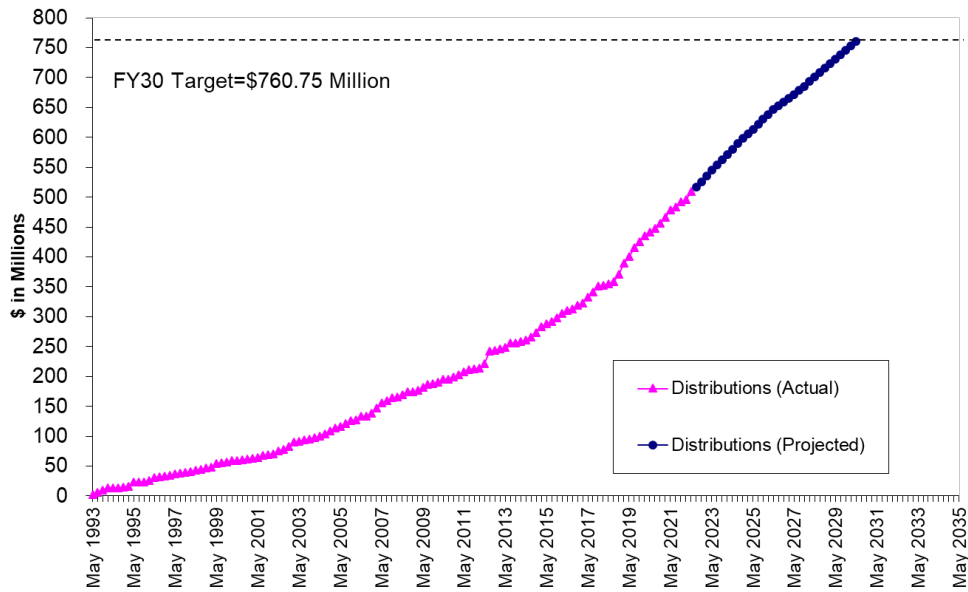
Community Support Programs

4th Quarter – FY22

Infiltration/Inflow Local Financial Assistance Program

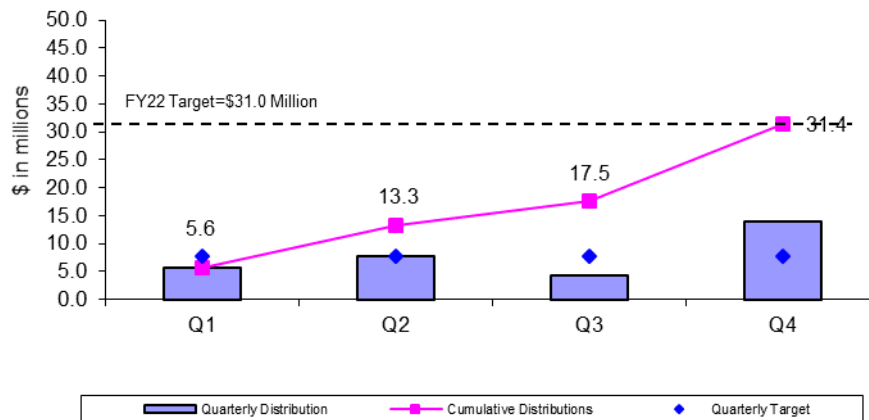
MWRA's Infiltration/Inflow (I/I) Local Financial Assistance Program provides \$760.75 million in grants and interest-free loans (average of about \$20 million per year from FY93 through FY30) to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned collection systems. Eligible project costs include: sewer rehabilitation construction, pipeline replacement, removal of public and private inflow sources, I/I reduction planning, engineering design, engineering services during construction, etc. I/I Local Financial Assistance Program funds are allocated to member sewer communities based on their percent share of MWRA's wholesale sewer charge. Phase 1-8 funds (total \$300.75 million) were distributed as 45% grants and 55% loans with interest-free loans repaid to MWRA over a five-year period. Phase 9 through 12 funds (total \$360 million) are distributed as 75% grants and 25% loans with interest-free loans repaid to MWRA over a ten-year period. Phase 13 provides an additional \$100 million in ten-year loan-only funds.

I/I Local Financial Assistance Program Distribution FY93-FY30



During the 4th Quarter of FY22, \$13.9 million in financial assistance (grants and interest-free loans) was distributed to fund local sewer rehabilitation projects in Boston, Braintree, Canton and Everett. Total grant/loan distribution to date for FY22 is \$31.3 million. From FY93 through the 4th Quarter of FY22, all 43 member sewer communities have participated in the program and \$510 million has been distributed to fund 642 local I/I reduction and sewer system rehabilitation projects. Distribution of the remaining funds has been approved through FY30 and community loan repayments will be made through FY40. All scheduled community loan repayments have been made.

FY22 Quarterly Distributions of Sewer Grant/Loans



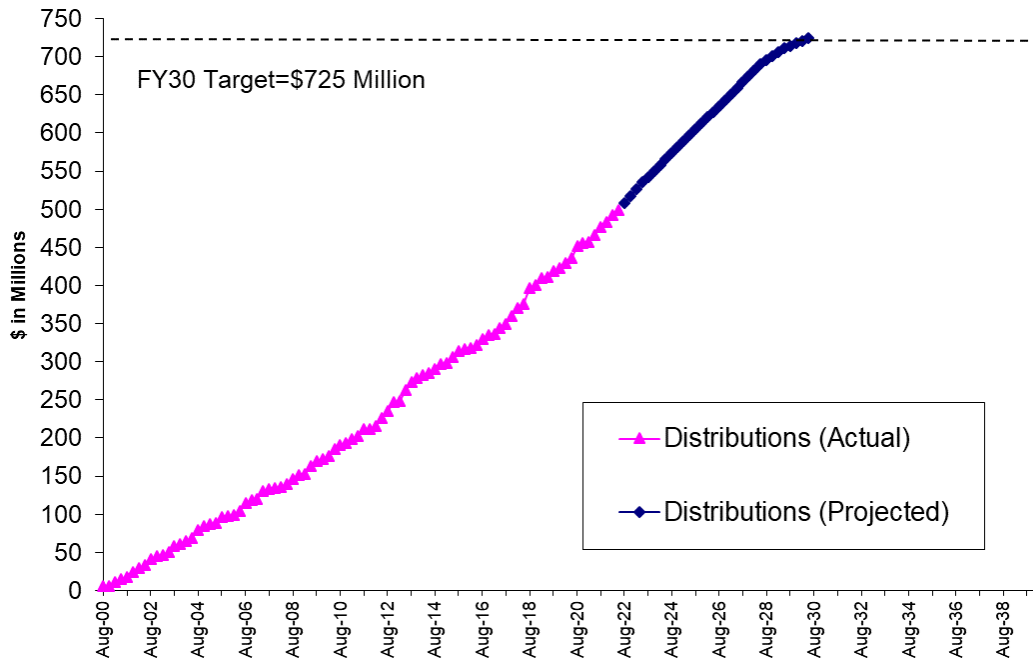
Community Support Programs

4th Quarter – FY22

Local Water System Assistance Program

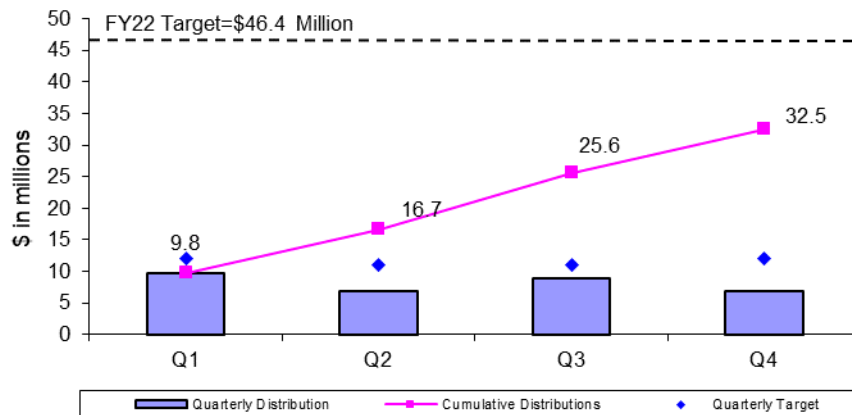
MWRA's Local Water System Assistance Programs (LWSAP) provides \$725 million in interest-free loans (an average of about \$24 million per year from FY01 through FY30) to member water communities to perform water main rehabilitation projects within their locally-owned water distribution systems. There have been 3 phases: Phase 1 at \$222 Million, Phase 2 at \$210 Million, and Phase 3 at \$293 Million. Eligible project costs include: water main cleaning/lining, replacement of unlined water mains, lead service replacements, valve, hydrant, water meter, tank work, engineering design, engineering services during construction, etc. MWRA partially-supplied communities receive pro-rated funding allocations based on their percentage use of MWRA water. Interest-free loans are repaid to MWRA over a ten-year period beginning one year after distribution of the funds. The Phase 1 water loan program concluded in FY13 with \$222 million in loan distributions. The Phase 2 - LWSAP continues distributions through FY23. The Phase 3 Water Loan Program is authorized for distributions FY18 through FY30.

Local Water System Assistance Program Distribution FY01-FY30



During the 4th Quarter of FY22, \$6.9 million in interest-free loans was distributed to fund local water projects in Lexington, Lynnfield, Melrose, and Stoneham. Total loan distribution to date for FY22 is \$32.4 million. From FY01 through the 4th Quarter of FY22, \$499 million has been distributed to fund 500 local water system rehabilitation projects in 43 MWRA member water communities. Distribution of the remaining funds has been approved through FY30 and community loan repayments will be made through FY40. All scheduled community loan repayments have been made.

FY22 Quarterly Distributions of Water Loans



Community Support Programs

4th Quarter – FY22

Lead Service Line Replacement Loan Program

By its vote on March 16, 2016, the Board approved an enhancement to the Local Water System Assistance Program to provide up to \$100 million in 10-year zero-interest loans to communities solely for efforts to fully replace lead service lines. The Lead Service Line Replacement Loan Program is also referenced as the Lead Loan Program or LLP. Each community can develop its own program, tailored to their local circumstances. MWRA's goal in providing financial assistance to member communities is to improve local water systems so that the high quality water MWRA delivers can make it all the way to the consumer's tap. The presence of a lead service line connecting a home to the main in the street can lead to elevated lead levels in tap water, especially if that water sits stagnant for an extended period. MWRA's stable water quality and effective corrosion control treatment reduce the risk that a lead service line will cause elevated lead levels, and measured lead levels in high risk homes have decreased by 90 percent since corrosion control was brought on-line in 1996. However, the risk of elevated levels remains as long as lead service lines are in use.

FY17 was the first year of the Lead Service Line Replacement Loan Program – MWRA made three Lead Loans.

FY18 was the second year of the Lead Loan Program - MWRA made five Lead Loans.

FY19 was the third year of the Lead Loan Program - MWRA made four Lead Loans.

FY20 was the fourth year of the Lead Loan Program - MWRA made eight Lead Loans.

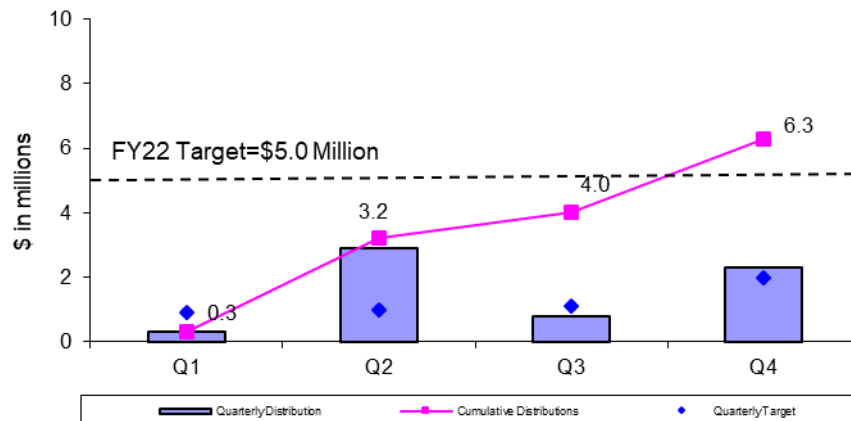
FY21 is the fifth year of the Lead Loan Program – MWRA made seven Lead Loans.

FY22 is the sixth year of the Lead Loan Program – MWRA made six Lead Loans.

Summary of Lead Loans:

Everett in FY22	\$1.5 Million	Everett in FY19	\$1.0 Million
Boston in FY22	\$0.9 Million	Needham in FY18	\$1.0 Million
Winthrop in FY22	\$0.8 Million	Winchester in FY18	\$0.5 Million
Somerville in FY22	\$1.6 Million	Revere in FY18	\$0.2 Million
Revere in FY22	\$1.3 Million	Winthrop in FY18	\$0.3 Million
Chelsea in FY22	\$0.3 Million	Marlborough in FY18	\$1.0 Million
Watertown in FY21	\$0.6 Million	Newton in FY17	\$4.0 Million
Marlborough in FY21	\$2.0 Million	Quincy in FY17	\$1.5 Million
Everett in FY21	\$1.5 Million	<u>Winchester in FY17</u>	<u>\$0.5 Million</u>
Boston in FY21	\$2.6 Million	TOTAL	\$31.4 Million
Winthrop in FY21	\$0.8 Million		
Chelsea in FY21	\$0.3 Million		
Winchester in FY21	\$0.6 Million		
Everett in FY20	\$0.5 Million		
Marlborough in FY20	\$1.0 Million		
Winchester in FY20	\$0.6 Million		
Winthrop in FY20	\$0.7 Million		
Weston in FY20	\$0.2 Million		
Everett in FY20	\$1.0 Million		
Somerville in FY20	\$0.9 Million		
Chelsea in FY20	\$0.3 Million		
Marlborough in FY19	\$1.0 Million		
Winthrop in FY19	\$0.5 Million		
Chelsea in FY19	\$0.1 Million		

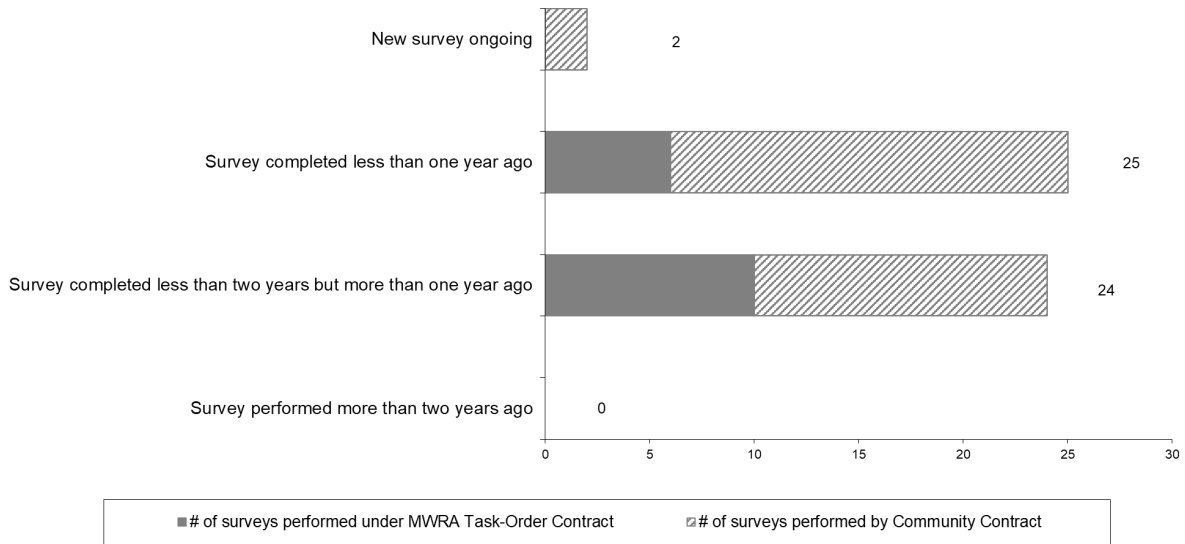
FY22 Quarterly Distributions of Lead Service Line Replacement Loans



Community Support Programs 4th Quarter – FY22

Community Water System Leak Detection

To ensure member water communities identify and repair leaks in locally-owned distribution systems, MWRA developed leak detection regulations that went into effect in July 1991. Communities purchasing water from MWRA are required to complete a leak detection survey of their entire distribution system at least once every two years. Communities can accomplish the survey using their own contractors or municipal crews; or alternatively, using MWRA’s task order leak detection contract. MWRA’s task order contract provides leak detection services at a reasonable cost that has been competitively procured (3-year, low-bid contract) taking advantage of the large volume of work anticipated throughout the regional system. Leak detection services performed under the task order contract are paid for by MWRA and the costs are billed to the community the following year. During the 4th Quarter of FY22, all member water communities were in compliance with MWRA’s Leak Detection Regulation.



Community Water Conservation Outreach

MWRA’s Community Water Conservation Program helps to maintain average water demand below the regional water system’s safe yield of 300 mgd. Current 5-year average water demand is less than 200 mgd. The local Water Conservation Program includes distribution of water conservation education brochures (indoor - outdoor bill-stuffers) and low-flow water fixtures and related materials (shower heads, faucet aerators, and toilet leak detection dye tabs), all at no cost to member communities or individual customers. The Program’s annual budget is \$25,000 for printing and purchase of materials. Annual distribution targets and totals are provided in the table below. Distributions of water conservation materials are made based on requests from member communities and individual customers.

	Annual Target	Q1	Q2	Q3	Q4	Annual Total
Educational Brochures	100,000	732	11,066	124	24,662	36,584
Low-Flow Fixtures (showerheads and faucet aerators)	10,000	1,070	1,091	551	1,433	4,145
Toilet Leak Detection Dye Tablets	_____	1,432	715	1,286	678	4,111

BUSINESS SERVICES

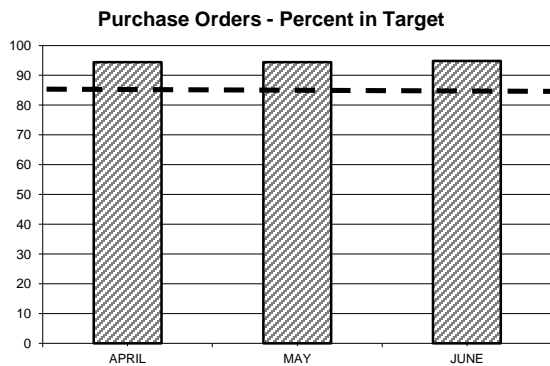
Procurement: Purchasing and Contracts

4th Quarter - FY22

Background: Goal is to process 85% of Purchase Orders and 80% of Contracts within Target timeframes.

Outcome: Processed 91% of purchase orders within target; Average Processing Time was 5.39 days vs. 4.41 days in Qtr 4 of FY21. Processed 70% (7 of 10) of contracts within target timeframes; Average Processing Time was 122 days vs. 138 days in Qtr 4 of FY21.

Purchasing



	No.	TARGET	PERCENT IN TARGET
\$0 - \$500	482	3 DAYS	84.2%
\$500 - \$2K	562	7 DAYS	93.7%
\$2K - \$5K	443	10 DAYS	96.3%
\$5K - \$10K	50	25 DAYS	88.0%
\$10K - \$25K	55	30 DAYS	78.1%
\$25K - \$50K	33	60 DAYS	84.8%
Over \$50K	32	90 DAYS	100.0%

The Purchasing Unit processed 1657 purchase orders, 46 less than the 1703 processed in Qtr 4 of FY21 for a total value of \$15,684,353 versus a dollar value of \$11,880,029 in Qtr 4 of FY21.

The purchase order processing target was not met for the \$0 - \$500 category due to item clarifications; the \$10K - \$25K category due to price confirmations, end user evaluations and sole source requirements; and the \$25K - \$50K category due to staff summary requirements.

Contracts, Change Orders and Amendments

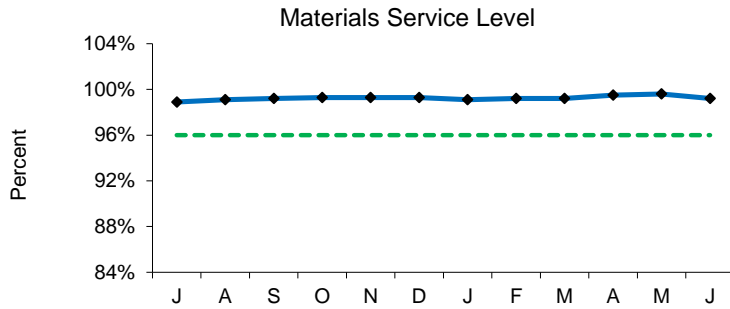
Procurement executed ten contracts with a value of \$14,295,071 and five amendments with a value of \$2,761,973. Eighteen change orders were executed during the period. The dollar value of all non-credit change orders during Q4 FY22 was \$982,322 and the value of credit change orders was (\$389,938).

Three contracts were not executed within the target timeframes. The first contract was delayed due to delays associated with the contractor signing the MWRA contract agreement documents. Another contract was delayed due to delays associated with negotiations regarding the terms and conditions in addition to delays associated with the drafting of the contract for two parties. The final contract was delayed due to negotiations between MWRA and the vendor regarding contract language.

Staff reviewed 26 proposed change orders and 19 draft change orders.

Materials Management

4th Quarter - FY22



The service level is the percentage of stock requests filled. The goal is to maintain a service level of 96%. Staff issued 7,348 (99.5%) of the 7,387 items requested in Q4 from the inventory locations for a total dollar value of \$1,928,347.

Inventory Value - All Sites

Inventory goals focus on:

- Maintaining optimum levels of consumables and spare parts inventory
- Adding new items to inventory to meet changing business needs
- Reviewing consumables and spare parts for obsolescence
- Managing and controlling valuable equipment and tools via the Property Pass Program

The FY22 goal is to reduce consumable inventory from the July '21 base level (\$8.5 million) by 2.0% (approximately \$170,754), to \$8.3 million by June 30, 2022. This goal has been achieved. Consumable inventory reduction amounted to \$287,514, a value of \$116,760 over the goal.

Items added to inventory this quarter include:

- Deer Island – wire brushes, wire wheels, batteries and compressor for HVAC; motor oil, hydraulic oil, cabin filters for Fleet Services; air filters, disconnect switch, expansion joint and coolant for Maintenance; syringe filters and sample pads for Lab; transformer and fuses for Electrical.
- Chelsea – batteries, air, oil and fuel filters for Fleet Services; silicone earplugs for Safety; voltage detector and plugs for Electrical; lamps for Facilities; ink cartridges for Procurement; motor and gear box for FOD.
- Southboro – flanges, unions, couplings, caps and adapters for Plumbing; air filters for Fleet Services; gaiters and safety glasses for all Trades.

Property Pass Program:

- Fourteen audits were conducted during Q4.
- Scrap revenue received for Q4 amounted to \$33,136. Year to date revenue received amounted to \$74,045.
- Revenue received from online auctions held during Q4 amounted to \$90,599. Year to date revenue received amounted to \$575,794.

Items	Base Value July-21	Current Value w/o Cumulative New Adds	Reduction / Increase To Base
Consumable Inventory Value	8,537,690	8,250,176	-287,514
Spare Parts	9,317,998	9,274,200	-43,798
Total	17,855,688	17,524,376	-331,312

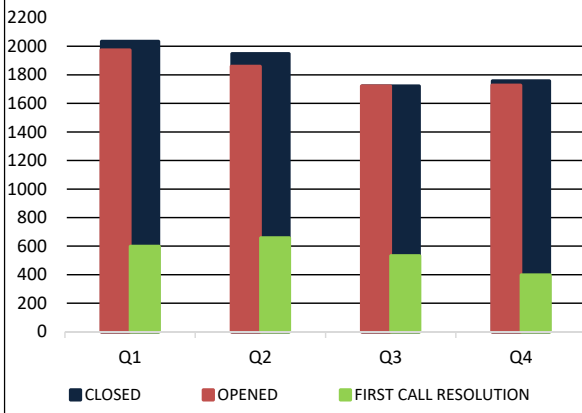
Note: New adds are items added at an inventory location for the first time for the purpose of servicing a group/department to meet their business needs/objectives.

MIS Program

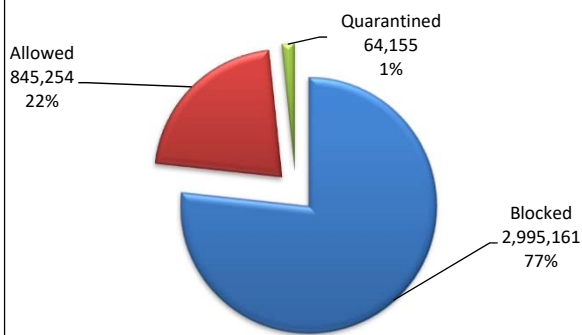
Fourth Quarter – FY22

Numbers & Statistics

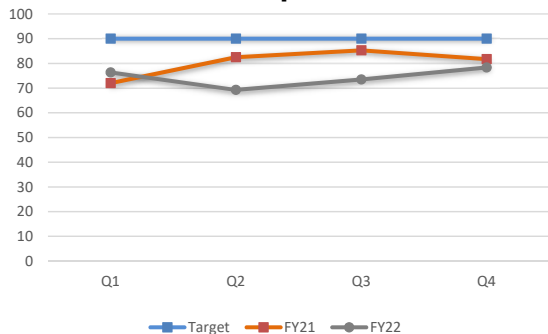
Monthly Call Volume



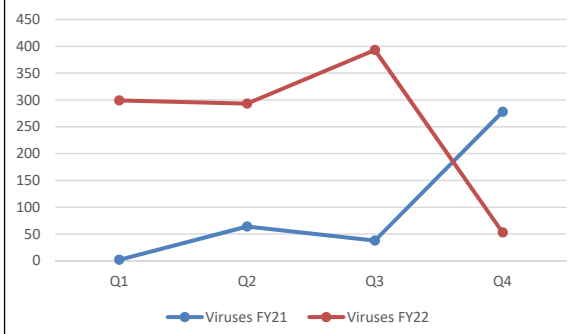
Emails Received: 3,904,570



PC Compliance



Viruses Caught by McAfee



Project Updates

Infrastructure & Security

Managed Security Services Contract: The RFQ/P package was completed, and bidding was initiated and completed during Q4. Selection Committee to meet during Q1 FY23 for evaluation and recommendation.

Identity and Access Management: Implementation of the Okta single sign-on (SSO) solution continued in Q4, and application was integrated with 5 other key applications (LMS, PBX, GIS, etc). Okta's multi-factor authentication (MFA) solution was procured, and migration from Cisco DUO MFA has begun, to be completed in Q1 FY23.

PBX (Telephone System Upgrade): VOIP phones roll-out started in Q4 of FY22. It will be completed for all Authority (minus DI) in Q1 of FY2023. Cabling and other required infrastructure upgrades that started during FY22 will continue through 2023.

Firewall Replacement: Cutover from the Cisco firewalls that were serving as MWRA's single gateway to the Internet and were End of Life to the new Fortinet firewalls was completed in Q4. The new firewalls also cover Intrusion Detection and Prevention and web-based filtering which were previously done by outdated applications.

Foriclient VPN Solution: The new Forticlient VPN solution has been deployed to a pilot group of MIS users with Okta MFA in preparation for the full MWRA roll out.

Laptop Deployment: Deployment of laptops to approved teleworkers that are currently using their own devices was completed in Q4.

Other Software & Custom Applications

Union Contract Processing: MIS has worked with Human Resources to implement the recently completed Union contract settlements. Retroactive and hazard pay as well as signing bonuses were calculated and paid back to 2020 for all unions except Union #2.

ECM/Electronic Document Management: Training for Subject Matter Experts (SMEs) began in May and User Acceptance Testing (UAT) started shortly thereafter. Testing will continue through the summer while vendor continues to work on workflow design changes and bugs that are identified during that testing. Significant progress continues to be made on data and document migration from various systems.

MWRA Website Replacement: RFQ/P was posted in May, but none of the responses met the requirements of the SOW. Completed internal evaluation of the SOW and decided to repost in the future with updated requirements.

Learning Management System: Integrated LMS with LinkedIn and Okta SSO, and updated the dashboards for Learners, Managers, and Administrators in preparation for go live in Q1FY23.

Oracle Contract Migration to SSCM: MIS has completed the migration of open Contracts from our legacy Oracle application to Infor's Contract management Module. A total of 272 open contracts have been migrated. MIS will be retiring the legacy Oracle Contract Module once the closed contracts have been archived and are accessible to users with a reporting solution.

Library, Record Center, & Training

Library: undertook 18 research requests, supplied 15 books for circulation, provided 9 articles, and 7 new standards. The MWRA Library Portal supported 725 end user searches. Research topics included: technique for chlorine:ammonio jar test, Forbes Hill Open Reservoir Quincy, PFAS research, Frederick Stearns-history of Water System.

Record Center (RC): The Record Center added 174 new boxes, handled 241 total boxes, and shredded (41) 65 gallon bins and (10) 96 gallon bins of confidential documentation on-site. It performed 60 database/physical box searches for multiple departments on various topics, including administrative info, law cases, and project docs for Engineering.

Training: In Q4, 24 online IT lessons were taken, by 9 employees, spanning 35 hours (295 YTD). 21 total sessions of 6 standard class lessons were taken by 15 employees, spanning 132 hours (444 YTD). 0 outside certification were earned.

Legal Matters
4th Quarter FY 2022

PROJECT ASSISTANCE

Real Estate, Contract, Environmental and Other Support:

- **8(m) Permits and License Agreements:** Reviewed seventy (70) 8(m) permits. Drafted one-day license for use of area at DITP for a non-profit event. Finalized amendment to the public access 8(m) permit for the Town of Southborough. Revised draft amendment to Town of Northborough public access 8(m) permit. Drafted initial amendment to public access 8(m) permit for the Town of Sherborn.
- **Real Property:** Drafted license from Town of Wellesley to MWRA related to borings to be taken at 100 Walnut Street in Wellesley for Tunnel Redundancy program. Reviewed property rights in Quincy in areas of Forbes Hill Standpipe and Rhoda Street. Revised licenses for Chelsea Traffic light project. Researched property rights for land subject to Article 97 process for potential shaft sites for Tunnel Redundancy. Finalized Memorandum of Agreement, draft legislation and quitclaim deed with revised plan for 12 Cleverly Court, Quincy. Researched title to commonwealth owned properties in the care of DCR, DPH and DCAMM for Metropolitan Water Tunnel Program. Researched and reviewed order of taking and construction plans for MWRA Sewer Main at 159-174 Ruggles, Roxbury. Reviewed and edited preliminary easement and plan for Suffolk Downs development project. Researched various property references in Newton for MWRA notice letter to abutters. Researched property rights and Article 97 concerning parcels of land near Hegarty Pump Station, Wellesley. Drafted cease and desist order related to unauthorized construction activities within the Sudbury Aqueduct property by the owner of 251 Grant Avenue in Newton, MA. Reviewed Sudbury Aqueduct property rights in Sherborn, MA. Finalized grant of permanent water easements document and easement plan related to new MWRA water meters and water main lines at proposed development in Revere/Boston at site of former Suffolk Downs. Reviewed MWRA property interests and plans of land concerning Sudbury Aqueduct. Reviewed Quabbin Aqueduct takings and plans. Researched temporary and permanent easements for MWRA Contract 6224: Siphon/Junction Structure Rehab Project. Researched property rights for land subject to Article 97 process for potential shaft site. Reviewed CNY Building 39 lease and amendments identifying tenant obligations before lease expiration. Recorded AUL at Suffolk Registry of Deeds for property at Marginal Street, Chelsea. Drafted Memorandum of Agreement between MWRA and the Town of Ludlow regarding construction and ownership of an antenna tower at Nash Hill Reservoir for communication equipment.
- **Energy:** Provided legal support to the energy team regarding updates to the Cosgrove and Oakdale Hydro facilities' Interconnection Services Agreements with National Grid and related interconnection processes.
- **Environmental/NPDES:** Assisted TRAC with collection of a \$20,000 civil administrative penalty. Reviewed summary of CSO receiving water quality monitoring in Charles River and Upper Mystic River/Alewife Brook. Drafted memorandum relative to April 28, 2022, decision by the United States Court of Appeals for the First Circuit in Blackstone Headwaters Coal, Inc. v. Gallo Builders, Inc. Finalized comments regarding EPA's general NPDES permit for medium waste water treatment facilities, which is applicable to MWRA's Clinton wastewater treatment plant facility. Prepared case summary of *West Virginia v. Environmental Protection Agency, No. 20-1530 (2022)*.
- **Miscellaneous:** Drafted notice letters for survey and boring work in Waltham pursuant to statutory right of entry. Edited Professional Services Long Form Agreement. Reviewed EOEI Article 97 Land Disposition Policy. Verified terms of Verizon's permit for wireless equipment at MWRA's Turkey Hill water tank, Arlington. Reviewed documents for submission to Records Conservation Board for destruction. Prepared historical deeds, plans of land and easements for permanent archiving with Records Center. Researched MWRA land takings and added to database for mapping and archiving electronic records. Updated reference guide for commonly used codes from Statewide Records Retention schedule, and reviewed documents, identified applicable codes and retention periods for various MWRA departments. Researched personal information exemption, G. L. c. 4, § 7 (26)(c). Researched regulations and statutory requirements for water operator license and wastewater treatment operator licenses and requested information from DPL, DEP and NEIWPCC for certifications/licenses. Reviewed Bays Eutrophication Model for MWRA Procurement OP-442 and confirmed readiness for public bidding process. Reviewed and provided guidance on amendments to parental guarantee agreements for Procurement Division. Reviewed Cingular and Verizon permit agreements for the installation, operation, and maintenance of wireless equipment on MWRA's Turkey Hill water tank in Arlington. Finalized Memorandum of Agreement for Chelsea Traffic Signalization. Edited geotechnical consultant contract. Collaborated with Real Property Division to improve and expand Real Property/GIS interactive database with information for Clinton Path waterline. Edited contract documents for easement takings associated

with Section 101 Water Main Ext. Finalized legal review of MWRA video surveillance policy. Reviewed documents concerning section 1 of Chapter 2015 of the Acts of 2018 concerning DCAMM and DCR granting a permanent subsurface easement and temporary subsurface easement. Summarized Senate Bill 1179 entitled, An Act to Prevent Wage Theft, Promote Employer Accountability, and Enhance Public Enforcement. Reviewed procurement documents for Metropolitan Water Tunnel Program lease for core storage facility. Reviewed legislation for Senate Bill 2104 and House Bill 3213 concerning a further extension of remote participation for public meetings subject to the Open Meeting Law. Researched statutory and common law public record exemptions. Researched updates to COVID-19 vaccine mandate and litigation.

- **Public Records Requests:** During the 4th Quarter of FY22, MWRA received and responded to one hundred seventy one (171) public records requests.

LABOR, EMPLOYMENT AND ADMINISTRATIVE

New Matters

Two demands for arbitration were filed.

An unfair labor practice charge was filed alleging that MWRA failed to bargain to resolution or impasse prior to implementing a COVID vaccination policy.

A union filed a charge of prohibited practice at the Massachusetts Department of Labor Relations alleging the MWRA violated Chapter 150E when it announced it would not bargain over the decision to make changes to job descriptions.

A union filed a petition for mediation to secure a successor Collective Bargaining Agreement.

Matters Concluded

Settled an arbitration case alleging the MWRA violated a collective bargaining agreement when two employees alleged to be working out of title.

Settled two Department of Labor Relations matters regarding the PFML Contribution Rate.

LITIGATION/CLAIMS

New Lawsuits/Claims:

Conservation Law Foundation (“CLF”) v. MWRA, U.S. District Court 1:22-cv-10626:

A complaint was filed in federal district court alleging Clean Water Act violations in connection with MWRA’s Industrial Pretreatment Program. Plaintiff seeks declaratory and injunctive relief, civil penalties and attorneys’ fees and costs.

MWRA v. Saba Development LLC, et al., Suffolk Superior Court C.A. No. 2284CV00968:

MWRA filed a Complaint for declaratory judgment and injunctive relief against the property owners Saba Development, LLC and Farzin Kiani to end unpermitted construction operations within the Sudbury Aqueduct property (“Aqueduct”) to the rear of Defendants’ residential property at 251 Grant Avenue in Newton. The Defendants began the restoration work on June 23rd. Once MWRA has verified that Defendants are in full compliance, the lawsuit will be dismissed.

Significant Developments:

(Current Employee) v. MWRA, Suffolk Superior Court C.A. No. 21841434: On June 8, 2022, the Court allowed MWRA’s motion to compel certain records. Discovery remains ongoing.

GEICO v. MWRA, Suffolk Superior Court C.A. No. 2184CV02107: The parties reached a settlement of GEICO’s subrogation claim and are expected to file a Stipulation of Dismissal shortly.

Closed Cases:

(Former Employee) v. Dept. of Unemployment Assistance (DUA) and MWRA, Worcester District Court C.A. No. 2262-000304: A former employee filed a Complaint appealing the

denial of benefits by DUA. A Judgement in favor of MWRA and DUA was entered on May 27, 2022.

(Former Employee) v. MWRA, Suffolk Superior Court C.A. No. 1684CV3708E: The parties participated in mediation. The Plaintiff's employment claims were settled and a Joint Notice of Dismissal was filed on June 6, 2022. This matter is closed.

MWRA v. Bharat Bhushan, et al., Suffolk Superior Court C.A. No. 1984CV03586: A Joint Stipulation of Dismissal was filed with the court on May 12, 2022 after MWRA approved Defendants' subsequent remediation of the site. The matter is now closed.

Closed Claims: There are no closed claims to report.

Subpoenas: During Fourth Quarter FY 2022, no subpoenas were received and one subpoena was closed.

Wage Garnishments: There are two wage garnishment matters that are active and monitored by Law Division.

SUMMARY OF PENDING LITIGATION MATTERS

TYPE OF CASE/MATTER	As of June 2022	As of Mar 2022	As of Dec 2021
Construction/Contract/Bid Protest (other than BHP)	0	0	0
Tort/Labor/Employment	3	4	5
Environmental/Regulatory/Other	4	3	3
Eminent Domain/Real Estate	0	0	0
Total	7	7	8
Other Litigation matters (restraining orders, etc.)	2	2	2
Total – all pending lawsuits	9	9	10
Claims not in suit:	0	0	0
Bankruptcy	2	1	1
Wage Garnishment	2	2	2
TRAC/Adjudicatory Appeals	0	0	0
Subpoenas	0	0	0
TOTAL – ALL LITIGATION MATTERS	13	13	13

TRAC/MISC.

New Appeals: There were no new appeals in the 4th Quarter FY 2022.

Settlement by Agreement of Parties: There were no Settlements by Agreement of Parties in the 4th Quarter FY 2022.

Stipulation of Dismissal: No Stipulations of Dismissal were filed in 4th Quarter FY 2022.

Notice of Dismissal Fine paid in full: No Notices of Dismissal for Fines Paid in Full were filed in the 4th Quarter FY 2022.

Tentative Decision: No Tentative Decisions were issued in the 4th Quarter FY 2022.

Final Decisions: No Final Decisions were issued in the 4th Quarter FY 2022.

INTERNAL AUDIT AND CONTRACT AUDIT ACTIVITIES
4th Quarter FY22

Highlights

During the 4th quarter FY22, Internal Audit (IA) coordinated with management to conduct a fleet physical inventory of all plated vehicles and equipment (planned for 1st quarter FY23). This procedure will provide additional information for an internal review of inspection compliance which is progressing. An internal review of water and wastewater license and certifications is nearing completion. An internal review of MIS assets is progressing.

In addition, IA completed a true-up of 2021 operating expenses for the HEEC cable, reviewed the Fore River Railroad 2021 tax return, issued 55 indirect cost rate letters to professional service consultants, completed preliminary reviews of 3 professional service contracts while 1 other was in process, completed 4 incurred cost reviews while 3 are in process and completed 2 labor burden review while 2 are in process. Management advisory services included support on MWRA's leases.

There are 6 new security policies under review.

Status of Recommendations

During FY22, 24 recommendations were closed.

IA follows-up on open recommendations on a continuous basis. All open recommendations have target dates for implementation. When a recommendation has not been implemented within 36 months, the appropriateness of the recommendation is re-evaluated.

All Open Recommendations Pending Implementation – Aging Between 0 and 36 Months

Report Title (issue date)	Audit Recommendations		
	Open	Closed	Total
Asset Tracking – Fleet Data Verification (8/21/19)	-	16	16
Fleet Services Non-Plated Equipment Inspections (3/30/20)	1	14	15
Total Recommendations	1	30	31

Note: The Compliance Status of Employees' Mandatory Confined Space Entry Training report issued on 6/30/21 has been retracted. An amended report will be issued in the 1st quarter FY23.

Cost Savings

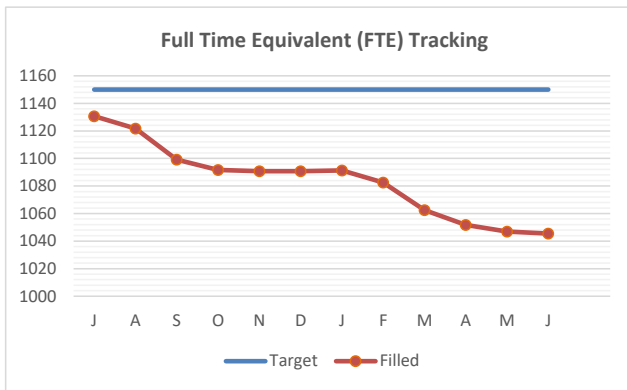
IA's target is to achieve at least \$1,000,000 in cost savings each year. Cost savings vary each year based upon many factors. In some cases, cost savings for one year may be the result of prior years' audits.

Cost Savings	FY18	FY19	FY20	FY21	FY22 Q4	TOTALS
Consultants	\$118,782	\$262,384	\$643,845	\$563,525	\$39,938	\$1,628,474
Contractors & Vendors	\$1,323,156	\$3,152,884	\$2,097,729	\$1,547,223	\$1,714,614	\$9,835,606
Internal Audits	\$204,202	\$210,063	\$212,517	\$214,458	\$222,554	\$1,063,794
Total	\$1,646,140	\$3,625,331	\$2,954,091	\$2,325,206	\$1,977,106	\$12,527,875

OTHER MANAGEMENT

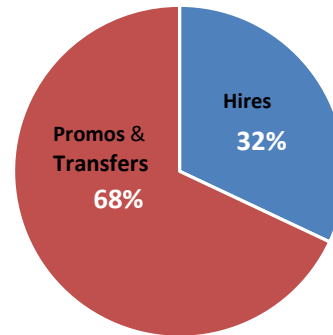
Workforce Management

4th Quarter - FY22

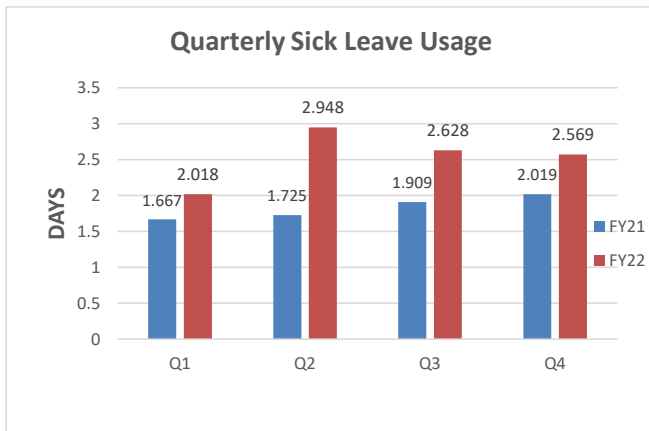


FY22 Target for FTE's = 1150
 FTE's as of June 2022 = 1045.5
 Tunnel Redundancy as of June 2022 = 10

Position Filled by Hires/Promos & Transfer for YTD



	Pr/Trns	Hires	Total
FY20	84 (59%)	58 (41%)	142
FY21	81 (56%)	64 (44%)	145
FY22	138 (68%)	65 (32%)	203

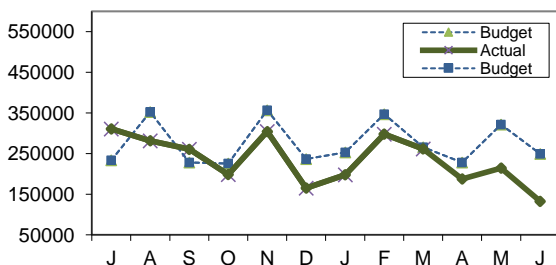


Average quarterly-sick leave for the 4th Quarter of FY22 has increased compared to the 4th Quarter of FY21 (2.569 from 2.019)

	Number of Employees	YTD (usage to date)	Annualized Total	Annual FMLA %	FY21
Admin	131	7.57	7.57	10.3%	5.87
Aff. Action	4	8.73	8.73	38.1%	3.14
Executive	3	3.11	3.11	0.0%	3.60
Finance	46	6.21	6.21	0.0%	3.17
Int. Audit	5	1.47	1.47	0.0%	0.89
Law	11	12.27	12.27	21.4%	5.83
OEP	4	5.56	5.56	0.0%	1.33
Operations	836	10.87	10.87	21.1%	7.95
Tunnel Red	10	3.94	3.94	27.3%	1.62
Pub. Affs.	9	10.17	10.17	57.5%	1.13
MWRA Avg	1059	10.16	10.16	20.7%	7.32

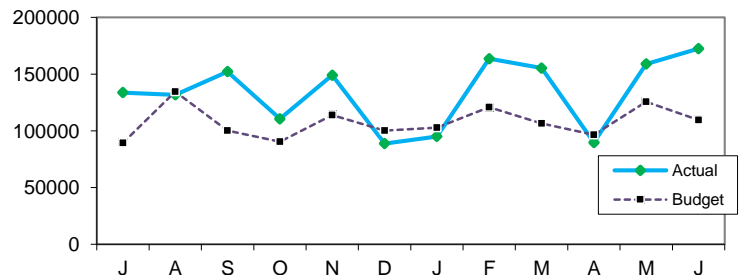
Percent of sick leave usage for FY22, attributable to Family and Medical Leave Act (FMLA) is 20.7%.

Field Operations FY22 Thru Q4



Total Overtime for Field Operations for June was \$133k which is (\$116k) under budget. Emergency overtime was \$46k, which is (\$33k) under budget. Rain events were \$26k and Emergency Maintenance was \$26k. Coverage overtime was \$48k, which is (\$23k) under budget, reflecting the month's shift coverage requirements. Planned overtime was \$34k or (\$20k) under budget. Spending of \$11k for Community Assistance, primarily the Water Fountain community events.

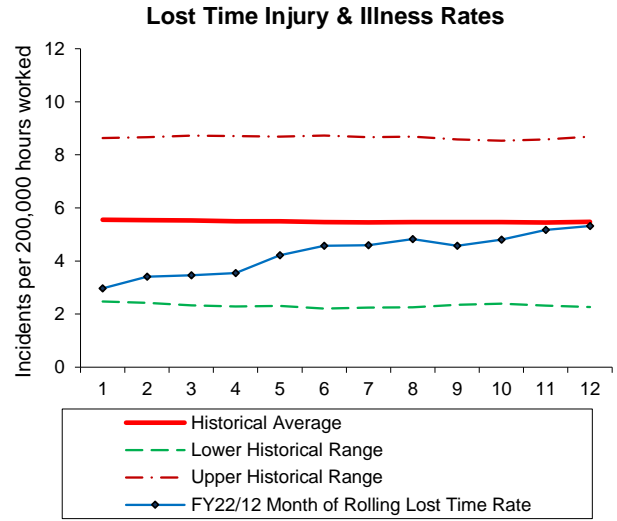
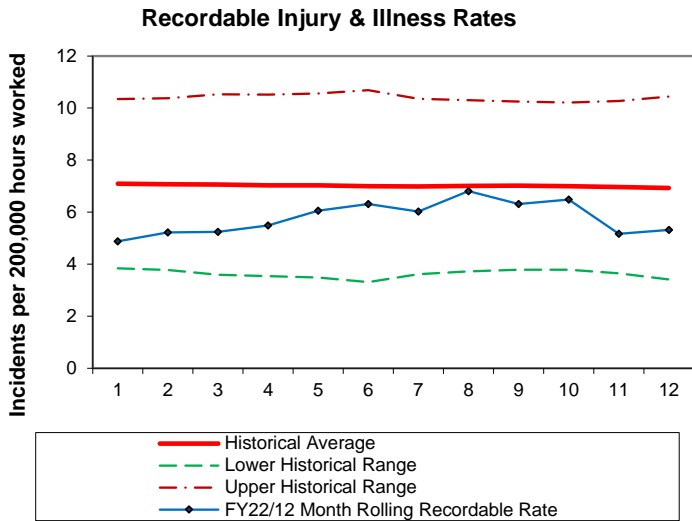
Deer Island Treatment Plant FY22 Thru Q4



Deer Island's total overtime expenditure in the fourth quarter of FY22 was \$421k, which was \$89k or 26.9% over budget. In fourth quarter Deer Island experienced higher than anticipated shift coverage of \$128k and planned/unplanned overtime of \$7k. This is offset by lower than anticipated storm coverage of (\$46k). YTD Deer Island's overtime spending is \$1.6M, which is \$310k or 24.0% over budget due to higher than anticipated shift coverage of \$403k. This is offset by lower than anticipated planned/unplanned overtime of (\$78k) and storm coverage of (\$15k).

Workplace Safety

4th Quarter - FY22



- 1 "Recordable" incidents are all work-related injuries and illnesses which result in death, loss of consciousness, restriction of work or motion, transfer to another job, or require medical treatment beyond first aid. Each month this rate is calculated using the previous 12 months of injury data.
- 2 "Lost-time" incidents, a subset of the recordable incidents, are only those incidents resulting in any days away from work, days of restricted work activity or both - beyond the first day of injury or onset of illness. Each month this rate is calculated using the previous 12 months of injury data.
- 3 The "Historical Average" is computed using the actual MWRA monthly incident rates for FY99 through FY22. The "Upper" and "Lower Historical Ranges" are computed using these same data – adding and subtracting two standard deviations respectively.
- 4 With Changes in state law, in February 1, 2019, MWRA began record keeping and reporting according to Federal OSHA standards for injury and illness record keeping. Strictly adhering to the federal OSHA reporting regulation has caused an increase in recorded injuries and illnesses. This increase is causing both the Recordable injury and illness Rate and the Lost Time Injury and Illness rate to trend higher than in past years but does not necessarily mean there is an increase in injuries or illnesses. OSHA injuries and illnesses, and lost time are recorded differently than the Massachusetts Workers' Compensation standards and could result in an increase in the OSHA rate while the Workers' Compensation claims are decreasing. Over time, the rise on the charts should stabilize as new data replaces the older data.

WORKERS COMPENSATION HIGHLIGHTS

	4th Quarter Information		Open Claims
	New	Closed	
Lost Time	8	16	63
Medical Only	9	17	9
Report Only	11	21	
	QYTD		FYTD
Regular Duty Returns	6		27
Light Duty Returns	0		0
Indemnity payments as of June 2022 included in open claims listed			23

COMMENTS:

Regular Duty Returns

Apr 2 Employees returned to full duty/no restrictions
May 1 Employees returned to full duty/no restrictions
June 3 Employees returned to full duty/no restrictions

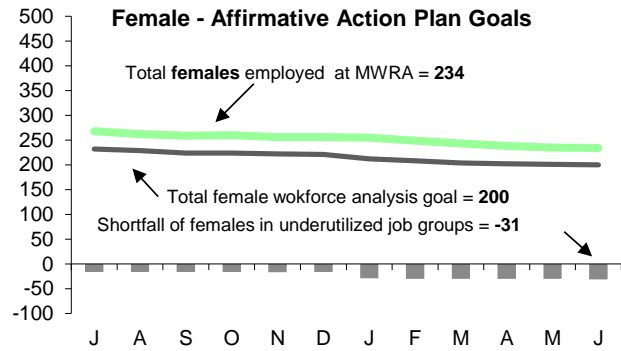
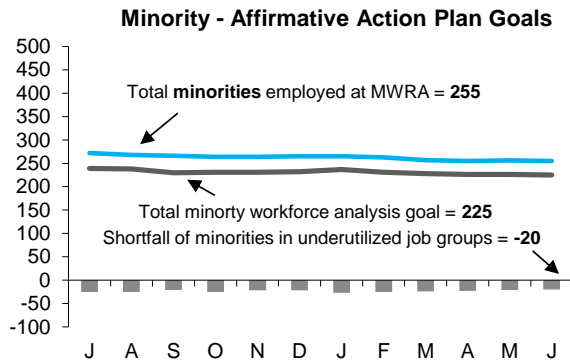
Light Duty Returns

Apr N/A
May N/A
June N/A

Note: Claims may initially be counted in one category and changed to another category at a later date. Examples include a medical treatment only claim (no lost time from work) but the employee may require surgery at a later date resulting in the claim becoming a lost time claim. At that time we would only count the claim as opened but not as a new claim. *Report only claims are closed the month they are filed.

MWRA Job Group Representation

4th Quarter - FY22



Highlights:

At the end of Q4 FY22, 5 job groups or a total of 21 positions are underutilized by minorities as compared to 5 job groups for a total of 24 positions at the end of Q4 FY21; for females 8 job groups or a total of 30 positions are underutilized by females as compared to 5 job groups or a total of 16 positions at the end of Q4 FY21. During Q4, 7 minorities and 7 females were hired. During this same period 4 minorities and 6 females were terminated.

Underutilized Job Groups - Workforce Representation

Job Group	Employees	Minorities	Achievement	Minority	Females	Achievement	Female
	as of 6/30/2022	as of 6/30/2022	Level	Over or Under Underutilized	As of 6/30/2022	Level	Over or Under Underutilized
Administrator A	26	4	3	1	13	7	6
Administrator B	25	3	6	-3	8	6	2
Clerical A	20	7	2	5	17	15	2
Clerical B	22	7	5	2	3	11	-8
Engineer A	80	20	19	1	20	14	6
Engineer B	58	19	15	4	12	14	-2
Craft A	109	16	20	-4	0	5	-5
Craft B	128	22	24	-2	1	6	-5
Laborer	59	19	13	6	4	2	2
Management A	87	18	18	0	32	24	8
Management B	37	10	7	3	5	9	-4
Operator A	60	4	14	-10	2	4	-2
Operator B	68	20	7	13	3	1	2
Professional A	29	6	7	-1	16	11	5
Professional B	147	46	44	2	68	37	31
Para Professional	46	16	10	6	22	24	-2
Technical A	52	16	10	6	6	9	-3
Technical B	6	2	1	1	2	1	1
Total	1059	255	225	50/-20	234	200	65/-31

AACU Candidate Referrals for Underutilized Positions

Job Group	Title	# of Vac	Requisition Int. / Ext.	Promotions/Transfers	AACU Ref. External	Position Status
Administrator A	Manager, Occup Health & Safety	1	Int./Ext.	0	0	NH = WM
Administrator A	Controller	1	Int./Ext.	0	0	NH = BM
Clerical B	Records Coordinator, TRAC	1	Int./Ext.	0	0	NH = WM
Clerical B	inventory Control Specialist	1	Int./Ext.	1	0	PROMO = WM
Engineer B	Staff Engineer	1	Int./Ext.	0	0	NH = WM
Engineer B	Project Manager	3	Int./Ext.	1	0	NH=2WF PROMO=BF
Engineer B	Project Manager, PICS	1	Int./Ext.	1	0	PROMO = BM
Engineer B	Project Manager, Meter Engin	1	Int./Ext.	1	0	PROMO = WM
Craft A	M & O Specialist	1	Int./Ext.	0	0	NH = WM
Craft A	Unit Supervisor	1	Int./Ext.	1	0	PROMO = WM
Craft B	Jr Instrument Technician	1	Int./Ext.	0	0	NH = WM
Craft B	Electrician	1	Int./Ext.	0	0	NH = HM
Craft B	Plumber/Pipefitter	1	Int./Ext.	0	0	NH = WM
Operator A	Area Supervisor	1	Int./Ext.	0	0	NH = WM
Operator A	Sr Trans/Treatment Operator	1	Int./Ext.	1	0	PROMO = WM
Para Professional	TIC Clerk	1	Int./Ext.	0	0	NH = BM
Para Professional	Administrative Systems Coord	3	Int./Ext.	1	0	NH=2WF PROMO=HF
Professional A	Sr Staff Counsel	1	Int./Ext.	0	0	NH = WF
Technical A	Sr Draftsperson	1	Int./Ext.	0	0	NH = HM
Technical A	Sr Field Service Technician	2	Int./Ext.	2	0	PROMO = 2WM
Technical A	Sr Instrument Tech	46	1	1	0	PROMO = HM
Technical A	Sr SCADA Maint Technician	1	Int./Ext.	1	0	PROMO = WM

MWRA FY22 CEB Expenses through 4th Quarter – FY22

As of June 2022, total expenses are \$788.8 million, \$24.2 million or 3.0% lower than budget, and total revenue is \$819.7 million, \$6.7 million or 0.8% over budget, for a net variance of \$30.9 million.

Expenses –

Direct Expenses are \$241.7 million, \$18.2 million or 7.0% under budget.

- **Wages & Salaries** are \$11.3 million under budget or 9.7%. Regular pay is \$11.2 million under budget, due primarily to lower head count, and timing of backfilling positions. YTD through June, the average Full Time Equivalent (FTE) positions was 1,097, seventy fewer than the 1,167 FTE's budgeted.
- **Utilities** expenses are \$4.6 million over budget or 18.6%, due over spending for Electricity of \$3.6 million due to higher flows and rates at Deer Island which accounted for \$2.3 million of the electricity variance. Field Operations accounted for overspending of \$1.3 million in electricity over spending. Deer Island purchased 2.0% more kWh than planned as plant flows were 4.0% over budget due to wet weather events earlier in the year. On-site generation at DI was 3.6% under target. Higher electricity prices under new supply contracts and higher transmission charges contributed to the spending variance. Higher spending for diesel, \$0.9 million over budget, reflects higher quantity purchased at a higher price.
- **Ongoing Maintenance** expenses are \$3.6 million under budget or 11.1%, primarily due to the timing of projects.
- **Other Materials** expenses are \$3.3 million under budget or 39.5%, reflecting the funding shift to the CIP for the CNY move project.
- **Fringe Benefits** expenses are \$1.5 million under budget or 6.6%, primarily due to lower health insurance expense \$1.2 million under budget, reflecting the lower headcount.
- **Professional Services** expenses are \$1.4 million under budget or 16.0%, primarily due to under spending for Computer System Consultant of \$1.3, Engineering of \$363k, and Lab Testing and Analysis \$339k,. Underspending was partially offset by higher spending on Other Professional Services and Security which were over budget by \$405k and \$308k, respectively.
- **Workers Compensation** expenses are \$949k under budget or 36.3%, due to under spending for Compensation Payments of \$576k and Medical Payments of \$319k. This reflects the uncertainties of when spending will occur, the budget is spread evenly throughout the year.
- **Chemicals** expenses are \$414k under budget or 3.4%, primarily due to under spending for Hydrogen Peroxide of \$384k based on usage as excessive rainfall helped lower H2S levels at Deer Island, Soda Ash of \$108k driven by Water Operations due to lower average flows at CWTP, Activated Carbon of \$89k primarily due to timing of replacements at DITP, and Polymer of \$76k. These are partially offset by higher spending for Ferric Chloride of \$275k, Liquid Oxygen of \$118k, and Sodium Bisulfite of \$69k.

Indirect Expenses are \$55.3 million, \$1.3 million or 2.4% under budget. Lower Watershed Reimbursements of \$769k due primarily to lower spending on Maintenance, Equipment, Telecommunications, and Operational Supplies, as well as under budget HEEC payments of \$351k, and lower insurance expense of \$230k.

Capital Finance Expenses totaled \$491.9 million and was \$4.7 million or 0.9% below budget after the impact of the spring defeasance. Surplus was a result of lower than budget variable interest expense of \$10.1 million due to lower interest rates combined with lower SRF spending of \$5.9 million due to bond issue timing, lower Water Pipeline CP of \$4.8 million due to lower than budgeted interest rates, offset by higher Senior Debt of \$16.1 million, as a result of defeasance expenditures of \$25.4 million.

Revenue and Income –

Total Revenue and Income is \$819.7 million, or \$6.7 million or 0.7% over budget. Other Revenue was \$3.5 million or 35.9% over budget due to a Payment from the Commonwealth of Massachusetts of \$1.2 million for Debt Service Assistance, higher Miscellaneous Revenue of \$1.2 million driven by \$443k in reimbursement from the Commonwealth of Massachusetts for Biobot costs associated with FY21, Energy Revenue of \$659k, Income from the Disposal of Equipment of \$305k, and Energy Rebates of \$264k. Other User Charges were over budget by \$1.7 million or 18.9% primarily due to unplanned water use by the Town of Burlington. Investment Income was \$1.5k over budget due to higher than budgeted interest rates.

	Jun 2022 Year-to-Date			
	Period 12 YTD Budget	Period 12 YTD Actual	Period 12 YTD Variance	%
EXPENSES				
WAGES AND SALARIES	\$ 116,680,341	\$ 105,394,954	\$ (11,285,387)	-9.7%
OVERTIME	5,156,681	5,010,758	(145,923)	-2.8%
FRINGE BENEFITS	23,253,137	21,714,918	(1,538,219)	-6.6%
WORKERS' COMPENSATION	2,614,159	1,665,017	(949,142)	-36.3%
CHEMICALS	12,202,286	11,788,437	(413,849)	-3.4%
ENERGY AND UTILITIES	24,749,865	29,352,756	4,602,891	18.6%
MAINTENANCE	32,442,382	28,842,198	(3,600,184)	-11.1%
TRAINING AND MEETINGS	473,994	232,056	(241,938)	-51.0%
PROFESSIONAL SERVICES	8,773,258	7,373,709	(1,399,549)	-16.0%
OTHER MATERIALS	8,334,774	5,039,040	(3,295,734)	-39.5%
OTHER SERVICES	25,129,234	25,243,013	113,779	0.5%
TOTAL DIRECT EXPENSES	\$ 259,810,111	\$ 241,656,856	\$ (18,153,254)	-7.0%
INSURANCE	\$ 3,943,600	\$ 3,713,849	\$ (229,751)	-5.8%
WATERSHED/PILOT	26,731,490	25,962,906	(768,584)	-2.9%
HEEC PAYMENT	6,991,953	6,640,820	(351,133)	-5.0%
MITIGATION	1,693,360	1,693,359	(1)	0.0%
ADDITIONS TO RESERVES	1,412,647	1,412,646	(1)	0.0%
RETIREMENT FUND	11,205,000	11,205,000	-	0.0%
POST EMPLOYEE BENEFITS	4,673,624	4,673,624	-	0.0%
TOTAL INDIRECT EXPENSES	\$ 56,651,674	\$ 55,302,204	\$ (1,349,471)	-2.4%
STATE REVOLVING FUND	\$ 95,673,399	\$ 89,764,495	\$ (5,908,904)	-6.2%
SENIOR DEBT	244,957,128	261,060,493	16,103,365	6.6%
DEBT SERVICE ASSISTANCE	(1,287,870)	(1,287,870)	-	0.0%
CURRENT REVENUE/CAPITAL	17,200,000	17,200,000	-	0.0%
SUBORDINATE MWRA DEBT	125,046,218	125,046,218	-	0.0%
LOCAL WATER PIPELINE CP	6,120,127	1,353,576	(4,766,551)	-77.9%
CAPITAL LEASE	3,217,060	3,217,060	-	0.0%
VARIABLE DEBT	-	(10,083,161)	(10,083,161)	---
DEFEASANCE ACCOUNT	-	-	-	---
DEBT PREPAYMENT	5,609,355	5,609,355	-	0.0%
TOTAL CAPITAL FINANCE EXPENSE	\$ 496,535,417	\$ 491,880,165	\$ (4,655,252)	-0.9%
TOTAL EXPENSES	\$ 812,997,202	\$ 788,839,225	\$ (24,157,977)	-3.0%
REVENUE & INCOME				
RATE REVENUE	\$ 792,084,000	\$ 792,084,000	\$ -	0.0%
OTHER USER CHARGES	9,222,883	10,962,933	1,740,050	18.9%
OTHER REVENUE	6,479,203	9,989,560	3,510,357	54.2%
RATE STABILIZATION	1,250,000	1,250,000	-	0.0%
INVESTMENT INCOME	3,961,116	5,435,309	1,474,193	37.2%
TOTAL REVENUE & INCOME	\$ 812,997,202	\$ 819,721,802	\$ 6,724,600	0.8%

Cost of Debt 4th Quarter – FY22

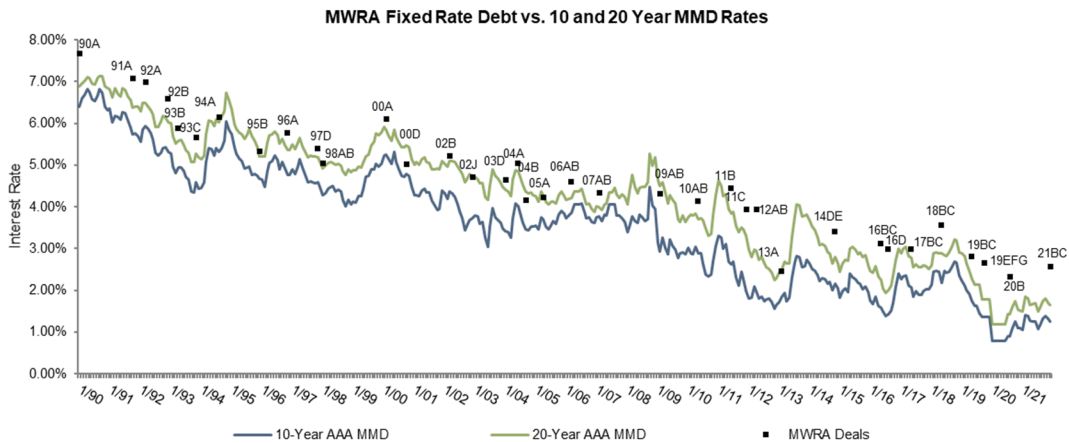
MWRA borrowing costs are a function of the fixed and variable tax exempt interest rate environment, the level of MWRA's variable interest rate exposure and the perceived creditworthiness of MWRA. Each of these factors has contributed to decreased MWRA borrowing costs since 1990.

Average Cost of MWRA Debt FYTD

Fixed Debt (\$3.41 billion)	3.22%
Variable Debt (\$299.1million)	0.58%
SRF Debt (\$822.0 million)	1.63%
Weighted Average Debt Cost (\$4.53 billion)	2.75%

Most Recent Senior Fixed Debt Issue December 2021

2021 Series B and C (\$748.0 million) 2.56%

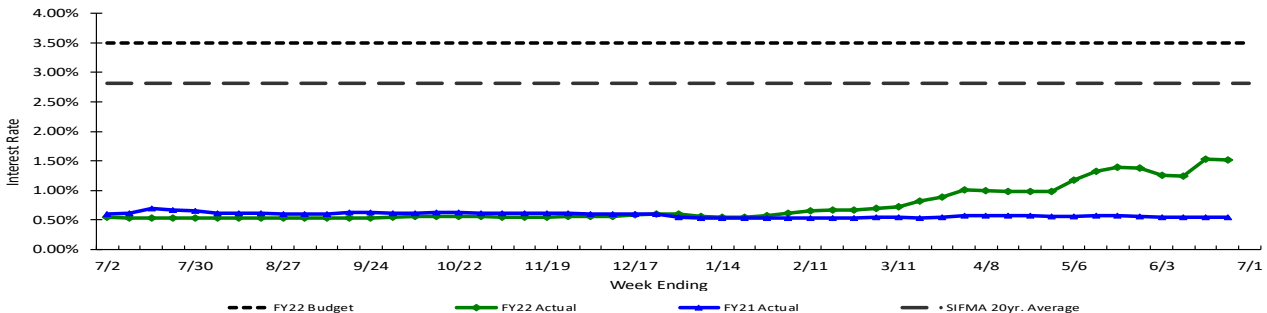


Bond Deal	1996A	1997D	1998AB	2000A	2000D	2002B	2002J	2003D	2004A	2004B	2005A	2006AB	2007AB	2009AB
Rate	5.78%	5.40%	5.04%	6.11%	5.03%	5.23%	4.71%	4.64%	5.05%	4.17%	4.22%	4.61%	4.34%	4.32%
Avg Life	19.5 yrs	21.6 yrs	24.4 yrs	26.3 yrs	9.8 yrs	19.9 yrs	19.6 yrs	18.4 yrs	19.6 yrs	13.5 yrs	18.4 yrs	25.9 yrs	24.4 yrs	15.4 yrs

Bond Deal	2010AB	2011B	2011C	2012AB	2013A	2014D-F	2016BC	2016D	2017BC	2018BC	2019BC	2019EFG	2020B	2021BC
Rate	4.14%	4.45%	3.95%	3.93%	2.45%	3.41%	3.12%	2.99%	2.98%	3.56%	2.82%	2.66%	2.33%	2.56%
Avg Life	16.4 yrs	18.8 yrs	16.5 yrs	17.9 yrs	9.9 yrs	15.1 yrs	17.4 yrs	18.8 yrs	11.2 yrs	11.7 yrs	11.9 yrs	9.73 yrs.	15.6 yrs	12.2 yrs

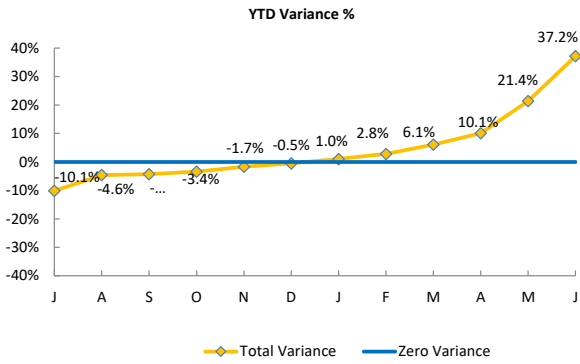
Weekly Average Variable Interest Rates vs. Budget

MWRA currently has ten variable rate debt issues with \$532.7 million outstanding, excluding commercial paper. Of the ten outstanding series, four have portions which have been swapped to fixed rate. Variable rate debt has been less expensive than fixed rate debt in recent years as short-term rates have remained lower than long-term rates on MWRA debt issues. In June, the SIFMA rate ranged from a high of 0.98% to a low of 0.62% for the month. MWRA's issuance of variable rate debt, although consistently less expensive in recent years, results in exposure to additional interest rate risk as compared to fixed rate debt.



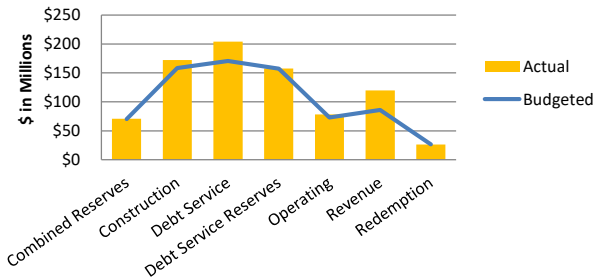
Investment Income 4th Quarter – FY22

Year To Date



	YTD BUDGET VARIANCE				
	(\$000)				
	BALANCES IMPACT	RATES	IMPACT	TOTAL	%
Combined Reserves	\$4		\$62	67	10.0%
Construction	\$23		\$200	223	93.5%
Debt Service	\$50		\$569	619	242.0%
Debt Service Reserves	\$4		\$126	130	7.0%
Operating	\$40		\$84	124	24.4%
Revenue	\$79		\$232	311	153.7%
Redemption	(\$1)		\$1	1	0.2%
Total Variance	\$201		\$1,274	\$1,474	37.2%

YTD Average Balances Budgeted vs. Actual

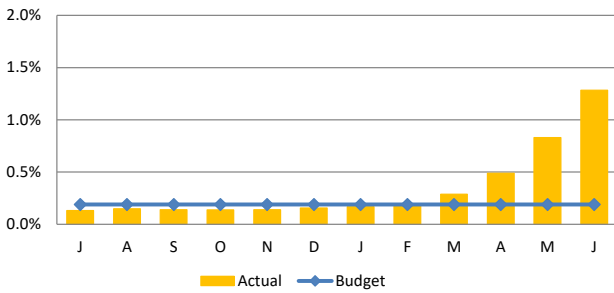


YTD Average Interest Rate Budgeted vs. Actual

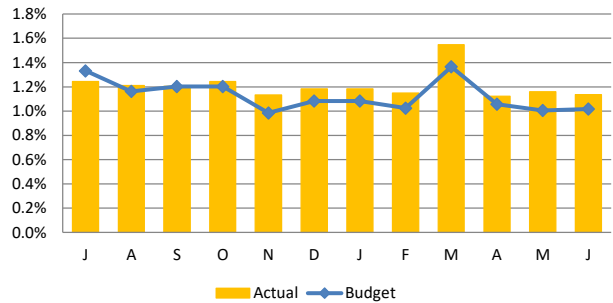


Monthly

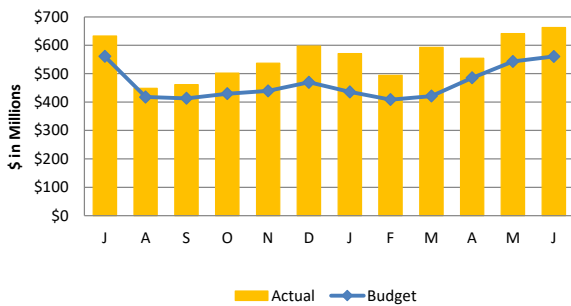
Short -Term Interest Rates



Long -Term Interest Rates



Short-Term Average Balances



Long-Term Average Balances

