MASSACHUSETTS WATER RESOURCES AUTHORITY

Board of Directors Report

on

Key Indicators of MWRA Performance

Second Quarter FY2023

Q1	Q2	Q3	Q4

Frederick A. Laskey, Executive Director
David Coppes, Chief Operating Officer
February 15, 2023

Board of Directors Report on Key Indicators of MWRA Performance

2nd Quarter - FY23

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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.

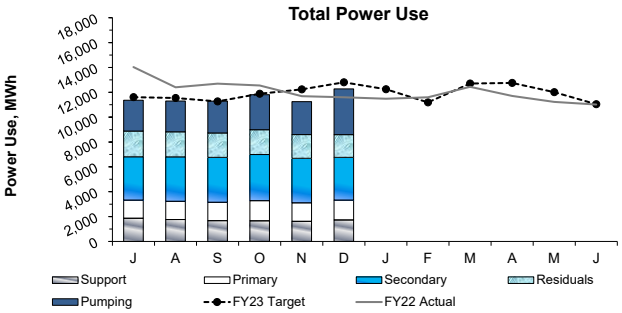
Frederick A. Laskey, Executive Director
David Coppes, Chief Operating Officer

February 15, 2023

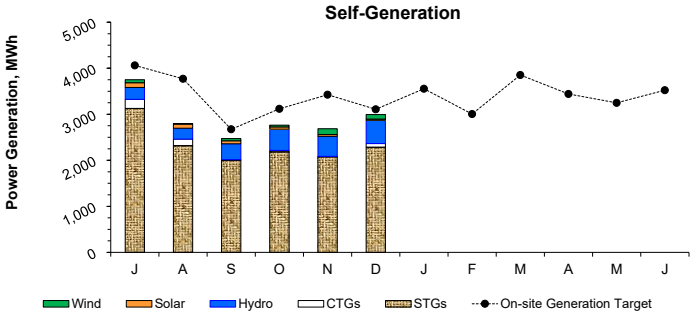
OPERATIONS AND MAINTENANCE

Deer Island Operations

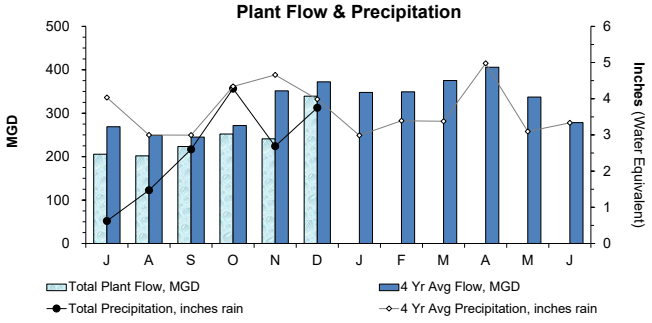
2nd Quarter - FY23



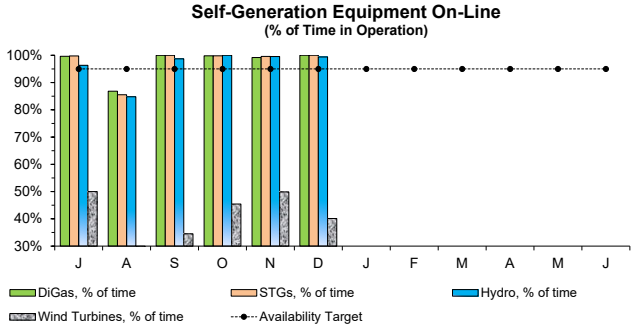
Total power usage in the 2nd Quarter was 4.3% below target as plant flow for this period was 16.4% below target with historical data (4 year average) used to generate the electricity model. As a result, power usage in nearly all areas and treatment processes was similar to or below target, including power used for raw wastewater pumping, which was 13.4% below target.



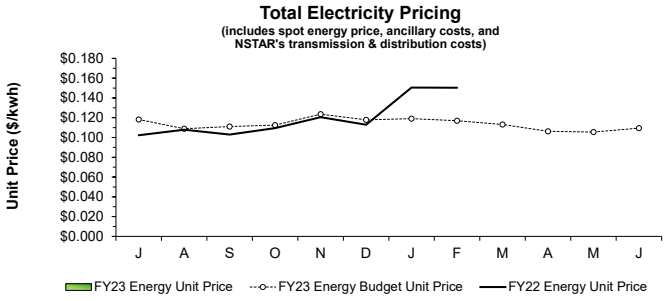
Power generated on-site during the 2nd Quarter was 12.5% below the target. CTGs generation was below target by 84.8% as they were required to operate less than budgeted as operation during high plant flow storm events was not needed. They were operated a total of 9.65 hours, for an ISO-New England (ISO-NE) winter Demand Response audit, an ISO-NE Demand Response event, briefly on four (4) days to allow Eversource to isolate their A- and B- bus transformers for annual scheduled maintenance, and for routine maintenance/checkout purposes. STGs generation was 6.9% below as digester gas production was 9.1% below target. Hydro Turbine generation was 28.6% above target due to improved output following Turbine #1 overhaul maintenance completed in 2019 compared to the historical (pre-overhaul) output used for the FY23 projections. Wind Turbine generation was 55.7% below target as Turbine #1 has been out of service since April 11 pending repairs to the failed main shaft bearing. Solar Panel generation was 6.5% below target due to a failed inverter on the Residuals Odor Control Facility rooftop array which has kept the array out of service since September 12.



Total Plant Flow for the 2nd Quarter was 16.4% below target with the budgeted 4 year average plant flow (277.4 MGD actual vs 331.9 MGD expected) as precipitation was 17.3% below target this quarter (10.72 inches actual vs. 12.98 inches expected).

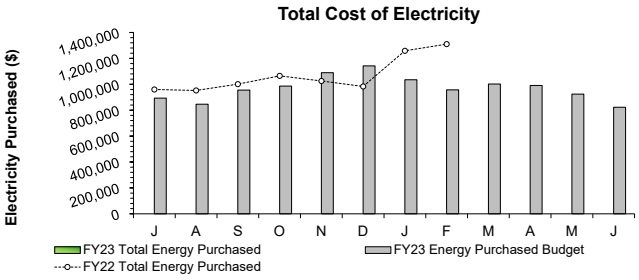


The DiGas System, STGs, and Hydro Turbines availability exceeded the 95% availability in the 2nd Quarter. The combined Wind Turbine availability was only 45.1% due to a main shaft bearing failure on Turbine #1 which has left this turbine out of service since April 11. Wind Turbine #2 was available 90.3% of the time during Quarter 2, slightly below the 95% target, due to scheduled maintenance and the turbine was out of service for several days in December due to an electrical issue and a faulty gear oil motor discovered at the end of the month.



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 Prices for July through December 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. The invoices with the fixed block and spot energy prices have been pending receipt since the March 2022 invoice.

Note: Only the actual energy prices are reported. Therefore, the dataset lags by ten (10) months, since March (FY22), due to the timing of invoice receipt and review.



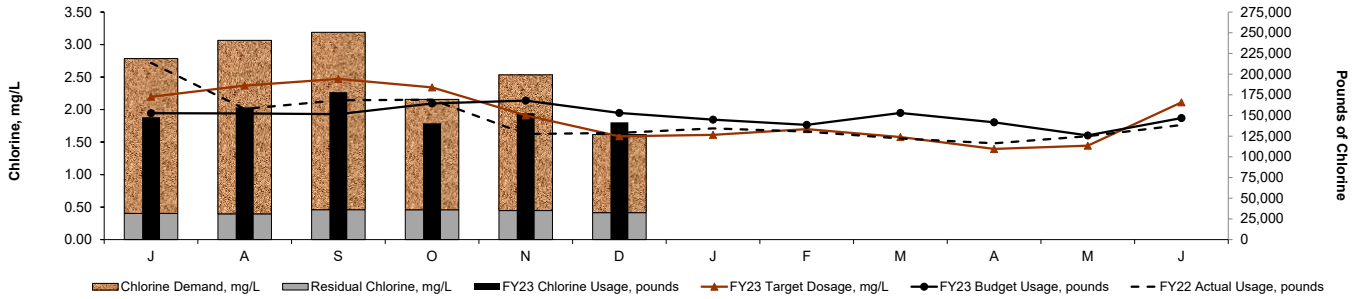
The Electricity cost data for Electricity Purchased in July through December are not yet available as the complete invoices have not been received. The invoices with the fixed block and spot energy prices have been pending receipt since the March 2022 invoice.

Note: Only months with complete Electricity Purchased data are reported. Therefore, the dataset lags by ten (10) months, since March (FY22), due to the timing of invoice receipt and review.

Deer Island Operations

2nd Quarter - FY23

Deer Island Sodium Hypochlorite Use



The disinfection dosing rate in the 2nd Quarter was 8.0% above target with budgetary estimates. However, actual sodium hypochlorite usage in pounds of chlorine was 10.4% lower-than-expected, as the average plant flow was 16.4% below target. DITP maintained an average disinfection chlorine residual of 0.44 mg/L this quarter with an average dosing rate of 2.10 mg/L (as chlorine demand was 1.66 mg/L). The higher hypochlorite dosing is due to a higher effluent chlorine demand resulting from the lower-than-expected plant flow. Additionally, the disinfection dosing rate was increased temporarily from November 7 to November 9 due to a scheduled maintenance shutdown of one (1) of the two (2) disinfection basins for maintenance. The total contact time for sodium hypochlorite with the plant effluent was reduced by half with the operation of a single basin. As such, the sodium hypochlorite dosing rate was increased to maintain a slightly higher total chlorine residual for proper pathogen inactivation.

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	0	0	0	100.0%	0.00
A	0	0	0	100.0%	0.00
S	0	0	0	100.0%	0.00
O	1	1	0	99.8%	2.43
N	1	1	0	99.9%	2.12
D	4	4	0	99.5%	17.95
J					
F					
M					
A					
M					
J					
Total	6	6	0	99.8%	22.50

99.7% of all flows were treated at full secondary during the 2nd Quarter. There were six (6) secondary blending events due to high plant flows from heavy precipitation. These blending events resulted in 22.50 hours of blending and a total of 68.87 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 2nd Quarter.

Deer Island Operations & Maintenance Report

Environmental/Pumping:
The plant achieved an instantaneous peak flow rate of 911.1 MGD during the late morning of October 14. This peak flow occurred during a storm event that brought 2.22 inches of rain to the metropolitan Boston area during a two (2) day span. The Total Plant Flow in Quarter 2 was 16.4% below the 4 year average plant flow target for the quarter.

Secondary Treatment:
Annual turnaround maintenance on Train #1 in the Cryogenic Oxygen Facility began on September 26 and was completed on October 7. 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 Train #1, as well as a number of other components in the oxygen plant. The same turnaround maintenance was completed on Train #2 in the spring (April).

Disinfection:
On November 7, Operations staff took Disinfection Basin 1 (East) out of service and began draining the basin in preparation for scum baffle replacement. During the basin shutdown, which took place during dry weather and low plant flow conditions, staff also inspected the sodium hypochlorite mixer blade assembly at the head end of the basin, as well as other equipment that could be visually inspected in the drained basin. Corrective maintenance was also completed for piping and other equipment that warranted attention. Staff returned the basin to service following completion of the work during the evening of November 9. Routine regulatory and process control sampling of the effluent in this basin resumed on November 10. Disinfection Basin 2 (West) remained in operation during this period. The total contact time for sodium hypochlorite with the plant effluent was therefore reduced by half with the operation of a single basin. As such, the sodium hypochlorite dosing rate was increased to maintain a slightly higher total chlorine residual for proper pathogen inactivation. In addition to the increased sodium hypochlorite feed, sodium bisulfite feed, to neutralize chlorine, was also increased to ensure the total chlorine residual in the final plant effluent remained below the discharge permit limits.

Residuals Treatment:
Module #1 Digester #3 was taken out of service on December 29 due to a clog in the digester's recirculation line which prevented the ability to properly heat the sludge in the digester and also prevented the addition of ferric chloride to control struvite formation to this single digester. The digester was in the process of being emptied of sludge to allow staff to perform essential corrective maintenance to remove the clog as of the end of December. The process of empyting a digester with 3 million gallons of sludge is a lengthy process which continued into January.

Deer Island Operations & Maintenance Report (continued)

Odor Control Treatment:
Carbon adsorber (CAD) units #3 through #6 in the West Odor Control (WOC) Facility were emptied and refilled with new regenerated activated carbon media in October as part of routine maintenance to replace spent activated carbon.

The odor control fans in the Secondary Odor Control (SOC) Facility, which is responsible for treating the process airflows from the secondary treatment facilities, were taken offline for 43 minutes on October 18 to allow staff to replace the air filter upstream of the heat exchanger for this odor control treatment system as part of routine preventative maintenance. Process air was contained within the building during this shutdown and there were no odor complaints associated with this work as there are no (negligible) hydrogen sulfides associated with the emissions from this process area.

The Centrifuge Thickener (CT) airflow treatment portion of the Residuals Odor Control (ROC) Facility was taken offline on three (3) separate days in December for approximately six (6) to seven (7) hours each day to allow a contractor to replace the damper on the airflow line from each of the secondary waste sludge wells. Process air was contained within the building during these shutdowns and there were no odor complaints associated with this work. The Gravity Thickener (GT) airflow treatment portion of the ROC Facility remained in operation the entire period during this damper replacement work.

Energy and Thermal Power Plant:
Overall, total power generated on-site accounted for 23.9% of Deer Island's total power use for the 2nd Quarter. Renewable power generated on-site (by Solar, Wind, STGs, and Hydro Turbines) accounted for 23.5% of Deer Island's total electrical power use for the quarter.

In October, Eversource, the electric utility company, performed scheduled maintenance on their A-bus and B-bus transformers at their Station 132 located on Deer Island. A CTG was operated briefly on the mornings of October 15 and October 30 to create a cross-tie of the DITP A- and B- buses, respectively, within the Thermal Power Plant (TPP), thus isolating the transformer for Eversource to perform maintenance. This cross-tie configuration also enables the electricity from the non-impacted Eversource bus to energize both the A- and the B- buses on DITP from the single Eversource bus. Eversource conducted maintenance on their A-bus transformer from October 15 to October 25 and on their B-bus transformer from October 30 to November 4. A CTG was operated after the maintenance on each bus transformer was completed, on October 25 (A-bus) and on November 4 (B-bus), to reconnect DITP to the isolated Eversource bus and thus returning the electrical connections for both A- and B- buses to the normal configuration.

During the week of December 12, CTG-2B was taken out of service for annual maintenance on all ancillary systems including instrumentation calibrations. The work was completed by early December 16, with the exception of the fire systems test which was postponed to a later date, in order to return the CTG to standby mode ahead of a storm which was arriving. The fire systems test will require the CTG to be our of service for four (4) to six (6) hours during a future date. CTG-2B was successfully test operated on the morning of December 16 and returned to standby mode (available for operation). CTG-1A was available during this work to act as the backup power unit in the event of a utility power loss.

CTG-1A was sucessfully operated for approximately 1.8 hours on December 7 for an ISO-New England (ISO-NE) Demand Response winter audit event and for approximately 3.2 hours on December 24 for an unplanned ISO-NE declared Demand Response (DR) curtailment event due to an ISO-NE power grid capacity scarcity event during a period of high electricity demand and an unstable power grid condition which saw ISO-NE electricity prices peak at levels that exceeded $2,500/MWh.

Wind Turbine #2 was out of service for several days in December due to scheduled maintenance, an electrical issue, and a faulty gear oil motor which took the turbine out of service on December 30. The faulty gear oil motor was later replaced in January. Wind Turbine #1 has been out of service since April 11, 2022 with a main shaft bearing failure and is pending repair.

DITP took delivery of 400,000 gallons of #2 fuel oil, a total of 40 oil tanker trucks, without incident from November 7 through November 16. This fuel oil is used for CTG operation, for boiler startup operations, and for supplemental fuel for boiler operation during periods of low or unstable digester gas production.

Clinton Operations & Maintenance Report

Dewatering Building
Maintenance staff replaced a motor on the # 2 polymer pump. Staff also repacked the # 2 Komline Sanderson piston pump and replaced the expansion tank. Staff completed several monthly Preventative Maintenance (PM) work orders. The Facilities Specialist replaced the threshold and sweep on a hallway door. Maintenance staff and the Facilities Specialist pressure washed the belt filter press conveyer. Staff also replaced all the torn and damaged sections of the conveyor then returned it to service. M&O staff fabricated and installed a new 1 1/2’ cooper drain line on Moyno sludge pump #2, and replaced the packing and lantern rings on same pump. A contractor installed new sludge garage door.

Chemical Building
Maintenance staff and the Facilities Specialist replaced the drive motor and gear box on the soda ash mixing tank. Staff also disassembled piping in order to remove soda ash buildup from the feed piping and the lower mix tank. Staff disassembled the # 3 WAS (Waste Activated Sludge) pump, removed an obstruction and returned the pump to service. Staff reassembled the louver vent from the back wall of chemical building that had been removed to replace the bird screening. Staff set up staging to replace the exhaust fan motor that was installed by a contractor. Maintenance staff replaced both chlorine contact chamber air diffuser valves.

Aeration Basins
Operations staff cleaned the pH and D.O. probes. The Facilities Specialist continues to repair the concrete and the expansion joints.

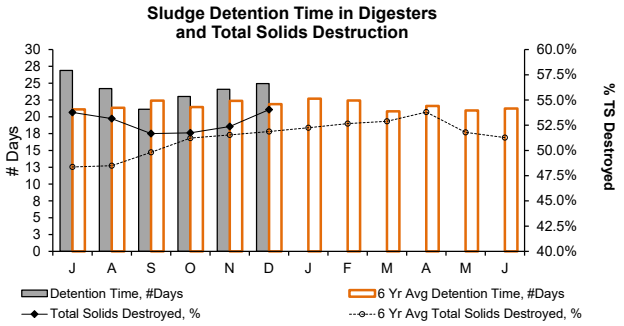
Phosphorus Building
Maintenance staff acid washed all three (3) disk filters, cleaned troughs, and inspected all nozzles. Operation staff cleaned both CL17 chlorine analyzers. The Phoshorus Reduction Facility (PRF) building was taken off line, all the tanks and channels were drained and washed down as part of routine winterization.

Headworks Building
Operations and Maintenance staff assisted JK Muir Engineering in gathering data for the screw and submersible pumps for possible National Grid rebates. Deer Island staff replaced the ultrasonic transducer for the influent pump station wet well level sensor. Maintenance staff also cleaned the influent and mechanical bar rack, and greased the upper and lower pin rack. Staff also assisted Xylem Pump with influent pump maintenance. The Heavy Equipment Operator brought the Godwin pump to a contractor to obtain an estimate for possible service.

Digester Building
The Facilities Specialist installed a replacement window in the boiler room and also cut and installed planks on the #2 digester to provide access to the Ovivo mixer. Maintenance staff checked all equipment for proper operation and also greased the Ovivo mixer on the floating cover. A contractor repaired a backflow preventer and replaced a miniature hot water heater.

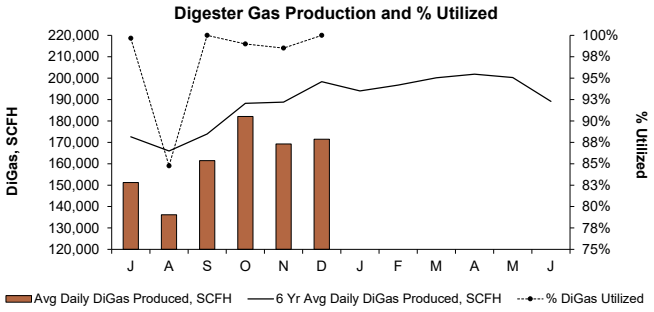
Deer Island Operations and Residuals

2nd Quarter - FY23



Total solids (TS) destruction following anaerobic sludge digestion averaged 52.7% during the 2nd Quarter, 2.3% above target with the 6 year average of 51.5%. Sludge detention time in the digesters was 24.0 days, 9.7% above target. 7.9 digesters were in operation, equal to the target with the the 6 year average of 7.9 digesters. Sludge detention time, and therefore solids destruction, was higher-than-expected as the volume of sludge going to the digesters was lower-than-expected.

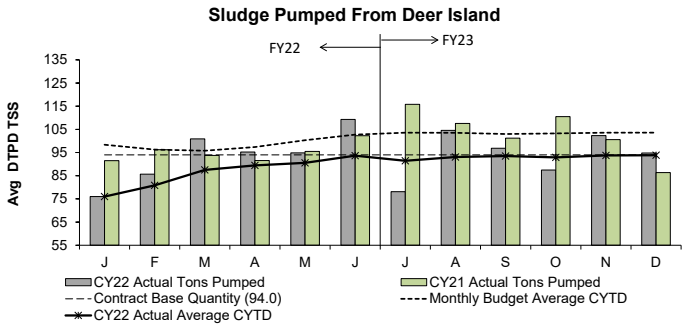
Total solids (TS) destruction is dependent on sludge detention time which is determined by primary and secondary solids production, plant flow, and the number of active digesters in operation. Solids destruction is also significantly impacted by changes in the number of digesters and the resulting shifting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



The Avg Daily DiGas Production in the 2nd Quarter was 9.1% below the 6 Year Avg Daily DiGas Production due to 8.6% lower-than-expected primary sludge production as a result of the lower plant flows. 99.2% of the Digas produced was utilized at the Thermal Power Plant .

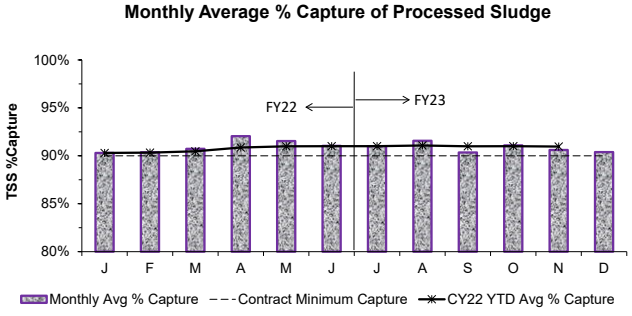
Residuals Pellet Plant

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).

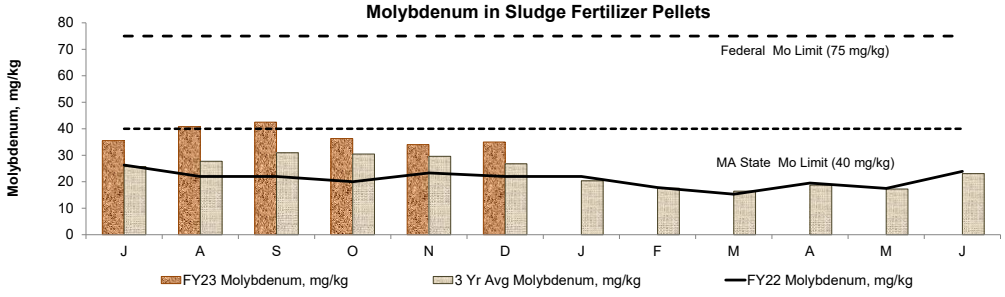


The average quantity of sludge pumped to the Biosolids Processing Facility (BPF) in the 2nd Quarter was 94.9 TSS Dry Tons Per Day (DTPD), 9.9% below target with the FY23 budget of 105.3 TSS DTPD for the same period due to lower-than-expected primary solids production as a result of the lower-than-expected plant flows.

The overall CY22 average quantity of sludge pumped was 93.8 DTPD, 9.4% below target compared to the CY22 average budget of 103.6 DTPD.



The contract requires NEFCO to capture at least 90.0% of the solids delivered to the Biosolids Processing Facility. The average capture for the 2nd Quarter was 90.7%.



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.

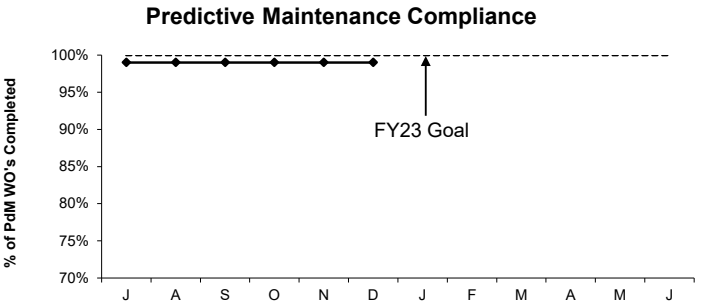
Overall, the levels have been below the DEP Type 1 limit for all three (3) metals. For Mo, the level in the MWRA sludge fertilizer pellets during the 2nd Quarter averaged 35.1 mg/kg, 21% above the 3 year average, 12% below target with the MA State Limit, and 53% below the Federal Limit.

Deer Island Maintenance

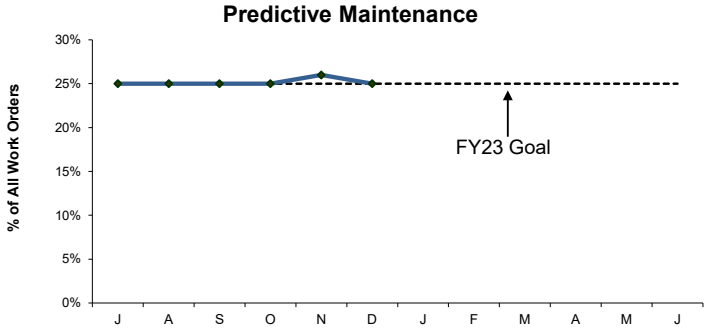
2nd Quarter - FY23

Productivity Initiatives

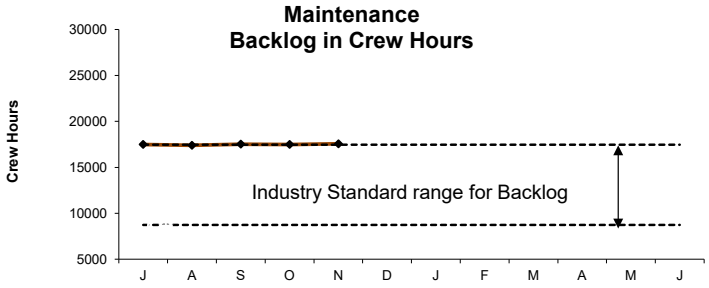
Productivity initiatives include increasing predictive maintenance compliance and increasing PdM work orders. Accomplishing these initiatives should result in a decrease in overall maintenance backlog.



Deer Island's FY23 predictive maintenance goal is 100%. DITP completed 99% of all PdM work orders this quarter.



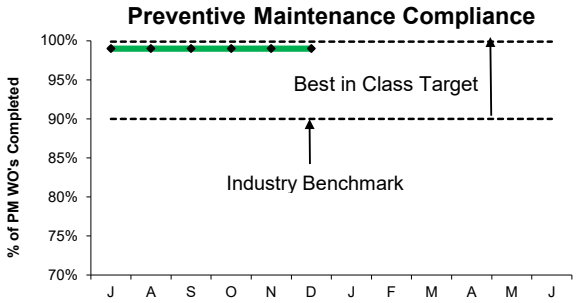
Deer Island's increased FY23 predictive maintenance goal is 25% of all work orders to be predictive. 25% of all work orders were predictive maintenance this quarter. The industry is moving toward increasing predictive maintenance work to reduce downtime and better predict when repairs are needed.



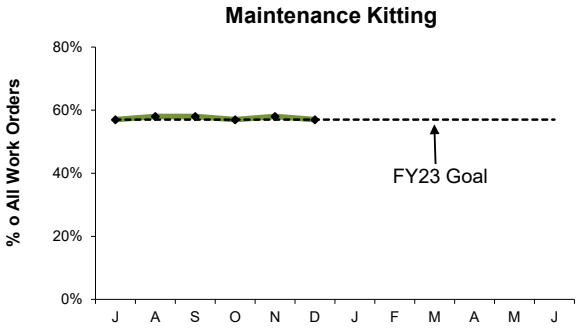
DITP's maintenance backlog at Deer Island is 17,480 hours this quarter. DITP is slightly above the industry average for backlog. The industry Standard for maintenance backlog with 97 staff (currently planned staffing levels) is between 8,730 hours and 17,460 hours. Backlog is affected by (5) vacancies; (2) Electricians, (1) O&M Specialist, (1) HVAC Technician and (1) I&C Tech. Management continues to monitor backlog and to ensure all critical systems and equipment are available.

Proactive Initiatives

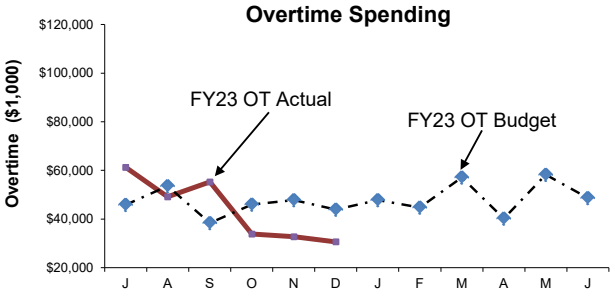
Proactive initiatives include completing 100% of all preventative maintenance tasks and increasing preventative maintenance kitting. These tasks should result in lower maintenance costs.



Deer Island's FY23 preventative maintenance goal is 100% completion of all work orders from Operations and Maintenance. DITP completed 99% of all PM work orders this quarter.



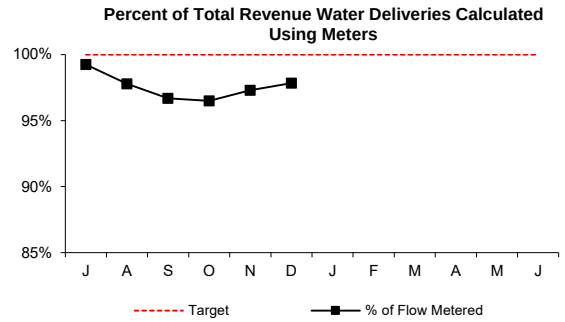
Deer Island's increased FY23 maintenance kitting goal is 57% of all work orders to be kitted. 57% of all work orders were kitted this quarter. Kitting is staging of parts or material necessary to complete maintenance work. This has resulted in more wrench time and increased productivity.



Maintenance overtime was under by $40K this quarter and $12k under for the year. Management continues to monitor backlog and to ensure all critical equipment and systems are available. This quarter's overtime was predominately used for Storm Coverage/High Flows, Fabrication of NMPS Sump Level Stairs, Handrails and Platforms, Cleaning of Cooling Towers 1 & 2, HVAC Winter Preparations, Disinfection Scum Baffle, and Clarifier Work.

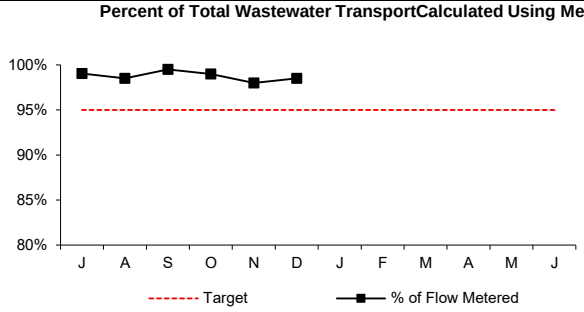
Operations Division Metering & Reliability
2nd Quarter - FY23

WATER METERS



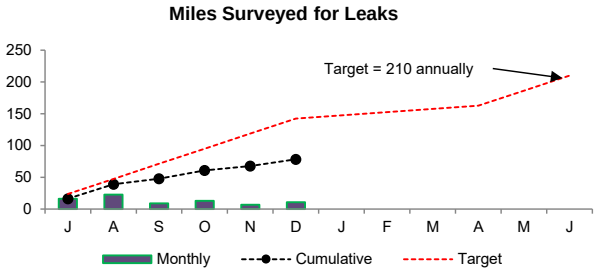
The target for revenue water deliveries calculated using meters is 100%. Estimates are generated for meters that are out of service due to instrumentation problems or in-house and capital construction projects. During Q2 FY23, 2.2% of the billed water flow was estimated. he majority of this estimate was because of an unmetered connection at meter 181 in Lexington. A total of 321 MG was estimated at this site alone, 2.9% of the overall total. The meter maintenance crew installed a temporary meter setup in late December to capture demands that this site. A total of 1.2% of the total was measured using annubar meters.

WASTEWATER METERS



The Wastewater Meter Replacement Project is complete. The new meters were installed during the period from April 2021 through December 2021. As of calendar year 2022 rates are being calculated using the new meters. The target for revenue collection meters is a 95% data capture rate. During Q2 FY23, 98.6% of billed data was metered with only 1.4% estimated. All ten months since the new wastewater meters have been online have been above the 95% target with the lowest month at 97.9%

WATER DISTRIBUTION SYSTEM PIPELINES



During Quarter 2 FY23, 30.51 miles of water mains were inspected. The total inspected for the fiscal year to date is 78.33.

Leak Backlog Summary													
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	Totals
Leaks Detected	2	1	1	1	3	2							10
Leaks Repaired	2	1	1	1	3	0							8
Backlog	4	4	4	4	4	6							n/a

During Quarter 2 FY23 six leaks were detected, and four were repaired. Refer to FY23 Leak Report below for details. Also, community service ranging from individual leak location to surveys were conducted for Belmont, BWSC, Malden, Medford, Milton, Newton, Quincy, Revere, Saugus, Somerville and Wakefield.

Quarter 2 - Leak Report FY23

Date Detected	Location of Leaks	Repaired
07/06/22	Felton St @ Water St., Waltham	07/15/22
07/18/22	Felton St @ Water St., Waltham	07/25/22
08/06/22	Duxbury Rd., @ RTE 128 Wellesley	08/06/22
09/22/22	Winthrop Ave. @ Upland Rd., Revere	09/22/22
10/03/22	Riverside Ave. @ Hall St., Medford	10/05/22
11/02/22	Linden St, @ Waverly Oaks Rd, Waltham	11/03/22
11/04/22	42 Waverly Oaks Rd., Waltham	11/07/22
11/07/22	46 Waverly Oaks Rd., Waltham	11/08/22

Date Detected	Location of Leaks/Unrepaired
12/04/16	710 Ashland St/Summer St. Lynn, Sect 91. Not surfacing. Leaking emergency connection valve btw MWRA & LWSC systems. LWSC has difficulty isolating 16" main.
08/27/20	**Hyde Park Ave. @ River St. Hyde Park. BWSC is in process of isolating their water main first.
01/14/22	#2 Woodland Rd., Gillis P.S. - Stoneham
06/09/22	West St. @ Pierce St., Hyde Park. Leak repair to be coordinated with Milton. Mobile Pumping Unit will need to be utilized.
12/08/22	Canal St @ Medford St., Malden
12/21/22	610 Lincoln Ave., Saugus
	** See above for: Hyde Park Ave. = MWRA is currently evaluating the abandonment of this pipeline based on hydraulic needs.

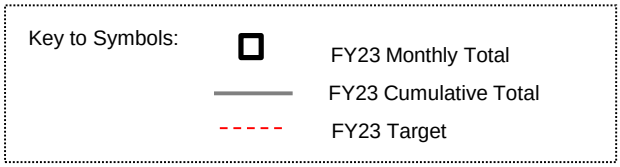
Water Distribution System Valves

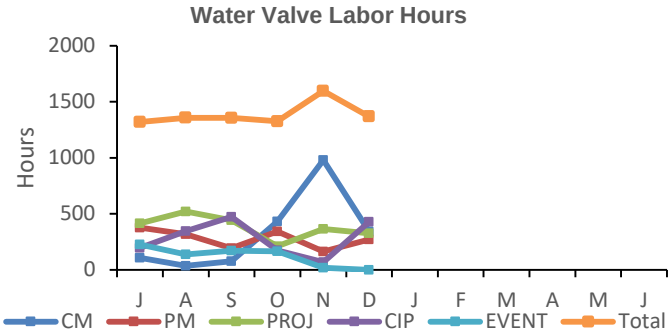
2nd Quarter - FY23

Background

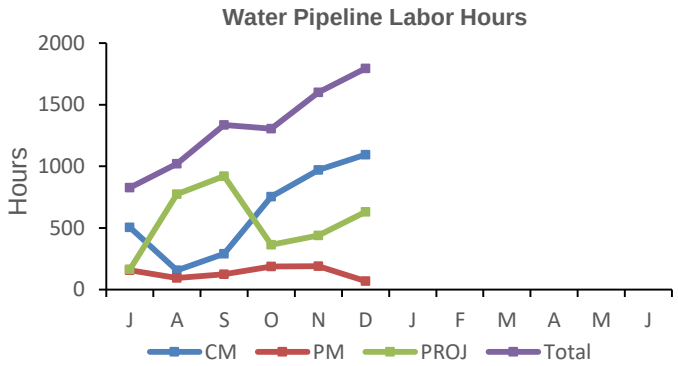
Valves are exercised, rehabilitated, or replaced in order to improve their operating condition. This work occurs year round. Valve replacements occur in roadway locations during the normal construction season, and in off-road locations during the winter season. Valve exercising can occur year round but 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	
		FY23 to Date	FY23 Targets
Main Line Valves	2,159	97.0%	95%
Blow-Off Valves	1,682	98.6%	95%
Air Release Valves	1,519	95.9%	95%
Control Valves	49	100.0%	95%

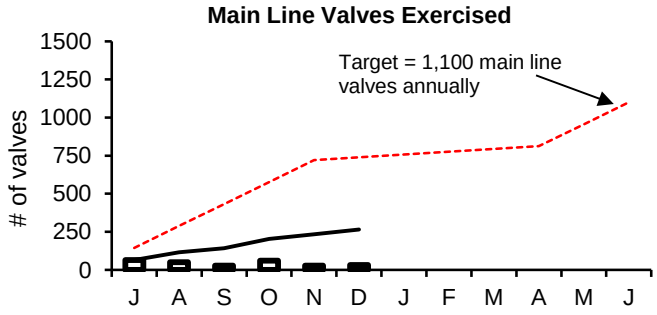




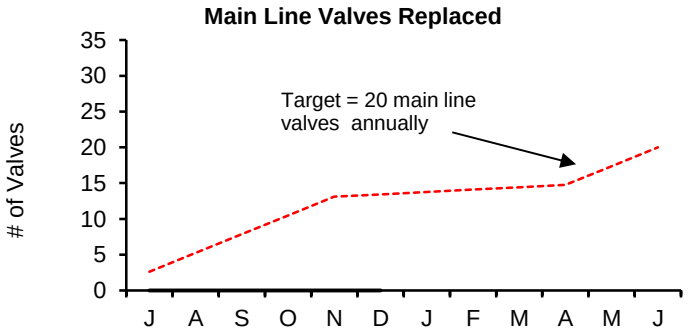
During Q2 of FY23 there was a total of 4,291 hours worked. Percentage breakdown; Corrective Maintenance 41%, Preventative Maintenance 18%, Project 21%, Capital Improvement Project 16%, Event - Wtr Fountain 4%



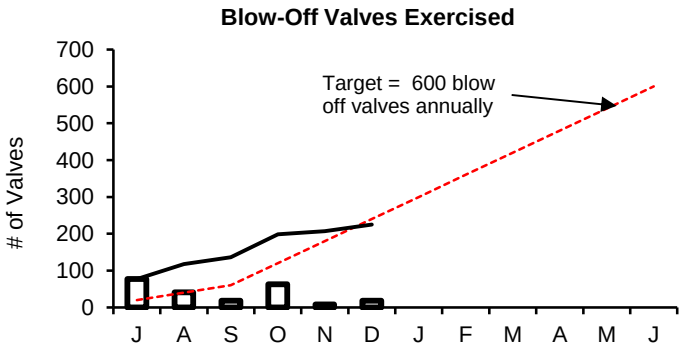
During Q2 of FY23 there was a total of 4,699 hours worked. Percentage breakdown; Corrective Maintenance 60%, Preventative Maintenance 9%, Project 31%



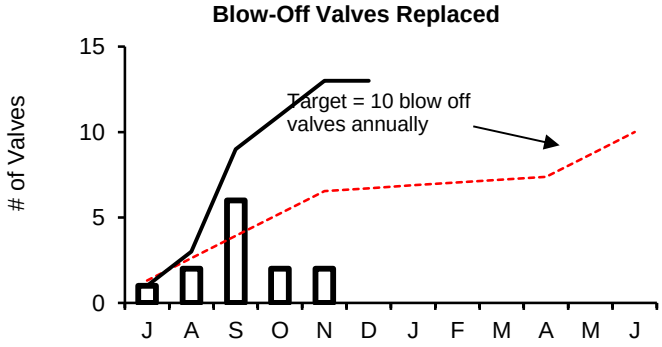
During Q2 of FY23, 122 main line valves were exercised. The total exercised for the fiscal year to date is 265. Below target due to necessary hours spent to support Capital Improvement Projects and in-house construction work.



During Q2 of FY23, there were no main line valves replaced. The total replaced for the fiscal year to date is 0. Below target due to staff vacancies.



During Q2 of FY23, 89 blow off valves were exercised. The total exercised for the fiscal year to date is 225.



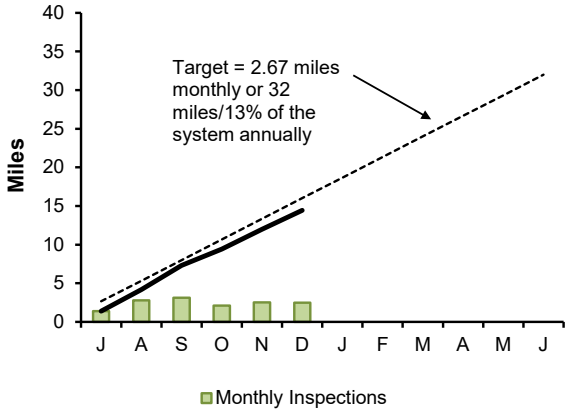
During Q2 of FY23, there were four blow off valves replaced. The total replaced for the fiscal year to date is 13.

Wastewater Pipeline and Structure Inspections and Maintenance

2nd Quarter - FY23

Inspections

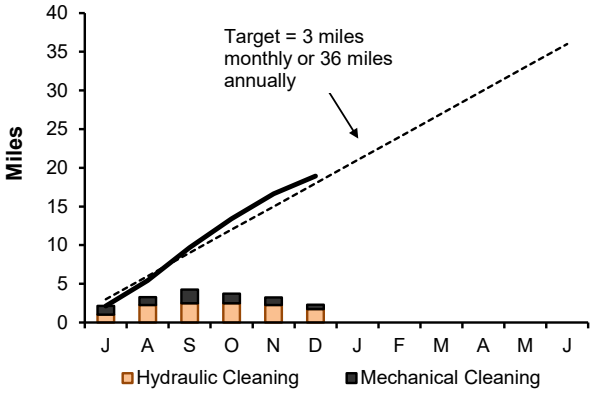
Pipeline Inspections



Staff internally inspected 7.11 miles of MWRA sewer pipe during this quarter. The year to date total is 14.44 miles. No Community Assistance was provided.

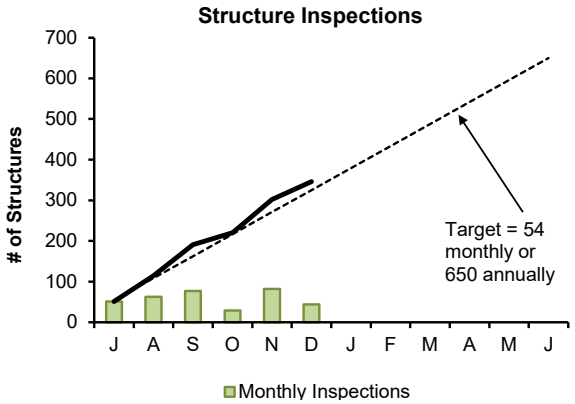
Maintenance

Pipeline Cleaning



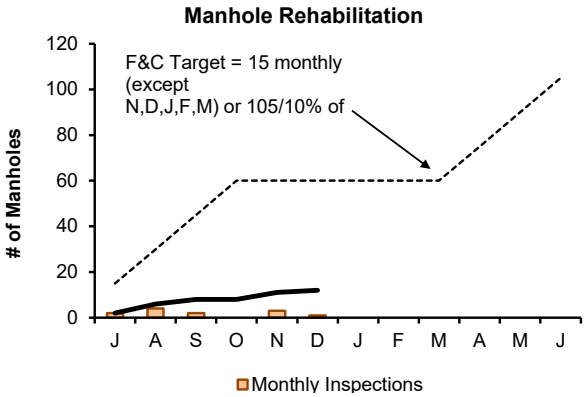
Staff cleaned 9.25 miles of MWRA sewer pipe, and removed 33 yards of grit. The year to date total is 18.93 miles. No Community Assistance was provided.

Structure Inspections



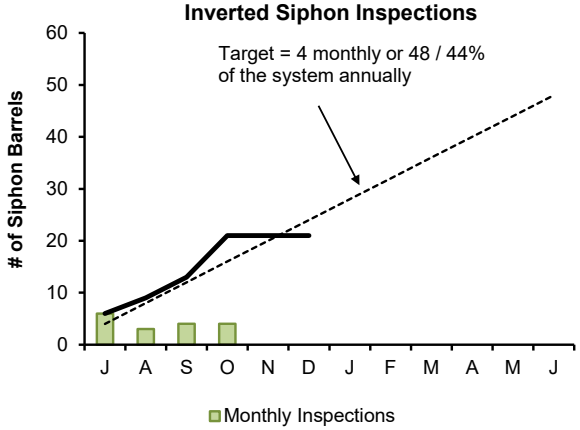
Staff inspected the 36 CSO structures and performed 119 other additional manhole/structure inspections during this quarter. The year to date total is 346 inspections.

Manhole Rehabilitation



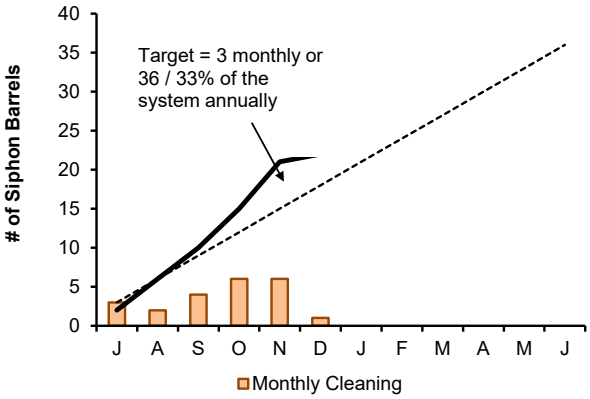
Staff replaced 4 frame and cover replacements this quarter.The year to date total is 12.

Inverted Siphon Inspections



Staff inspected 4 siphon barrels this quarter. The year total is 21 inspections.

Inverted Siphon Cleaning

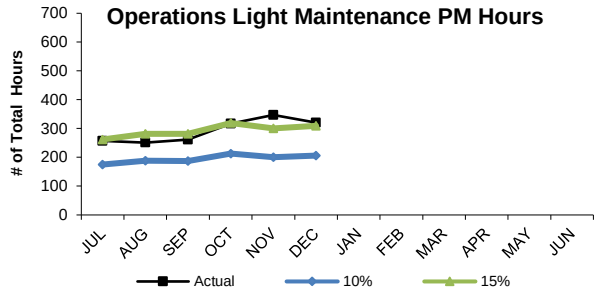


Staff cleaned 13 siphon barrels this quarter.

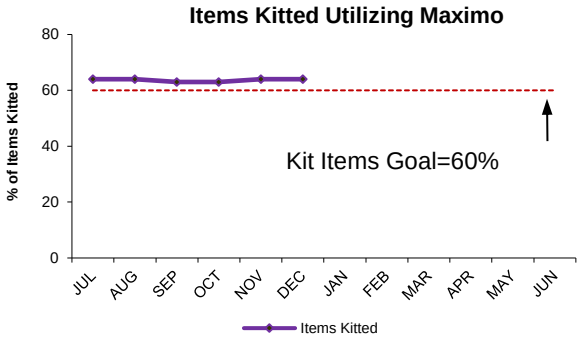
Field Operations' Metropolitan Equipment & Facility Maintenance

2nd Quarter - FY FY23

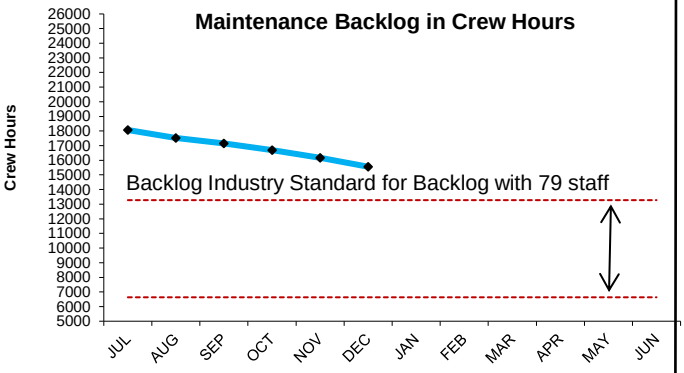
Several maintenance and productivity initiatives are in progress. The goal for the Overall PM completion and the Operator PM completion is 100%. The Operator PM and kitting initiatives frees up maintenance staff to perform corrective maintenance and project work, thus reducing maintenance spending. Backlog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



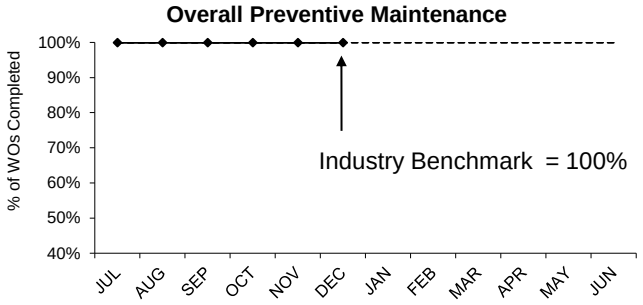
Operations staff averaged 328 hours per month of preventive maintenance during the 2nd Quarter of FY23, an average of 15% of the total PM hours for the 2nd Quarter, which is within the industry benchmark of 10% to 15%.



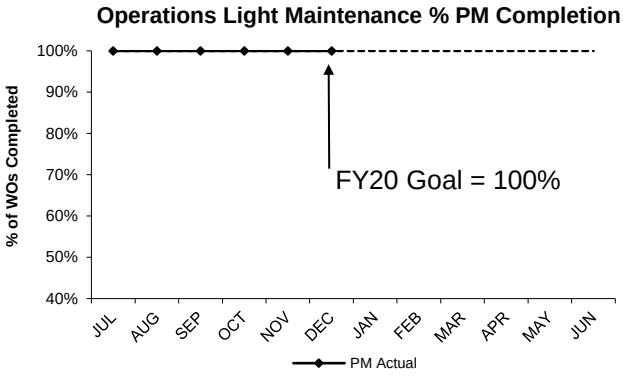
Operations' FY23 maintenance kitting goal has been set at 60% of all work orders to be kitted. Kitting is the staging of parts or material neccesary to complete maintenance work. In the 2nd Quarter of FY23, 64% of all applicable work orders were kitted. This resulted in more wrench time and increased productivity.



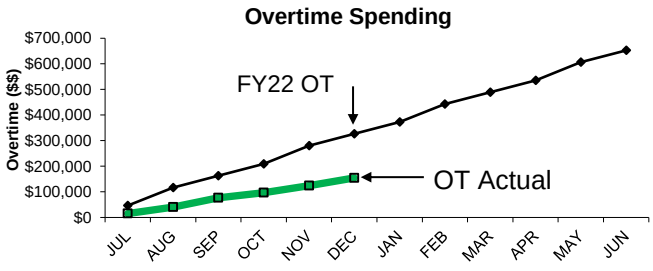
The 2nd Quarter of FY23 backlog average is 16,142 hours. Management's goal is to continue to control overtime and try to get back within the industry benchmark of 6,636 to 13,275 hours. The increase is due to vacations, vacancies and several large maintenance projects.



The Field Operations Department (FOD) preventive maintenance goal for FY23 is 100% of all PM work orders. Staff completed 100% of all PM work orders in the 2nd Quarter of FY23.



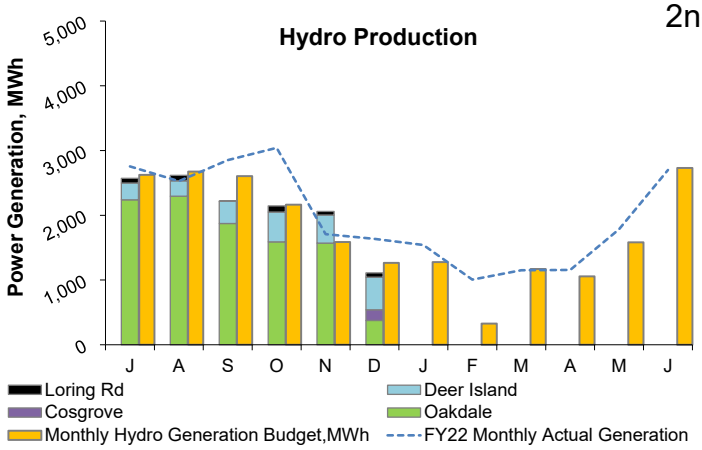
Wastewater Operations complete light maintenance PM's which frees up maintenance staff to perform corrective maintenance. Operations' FY23 PM goal is completion of 100% of all PM work orders assigned. Operations completed 100% of PM work orders in the 2nd Quarter of FY23.



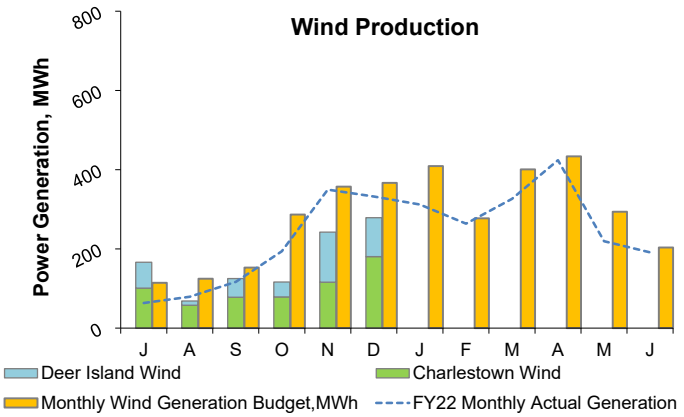
Maintenance overtime was $28,296 under budget on average, per month, for the 2nd Quarter of FY23. Overtime is used for critical maintenance repairs and wet weather events. The overtime budget through the 2nd Quarter of FY23 is $326,276. Overtime spending was $154,459 which is $171,817 under budget for the fiscal year.

Renewable Electricity Generation: Savings and Revenue

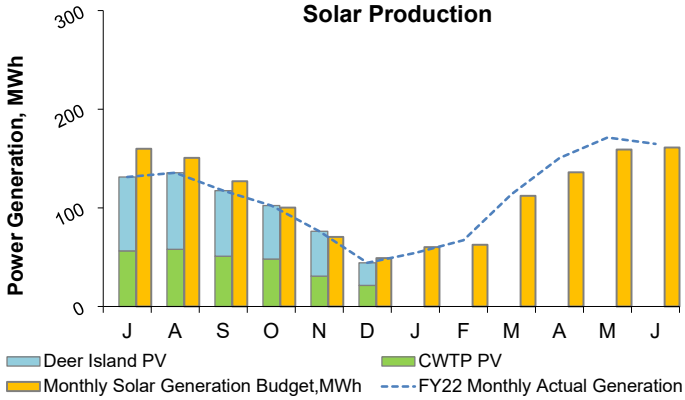
2nd Quarter - FY23



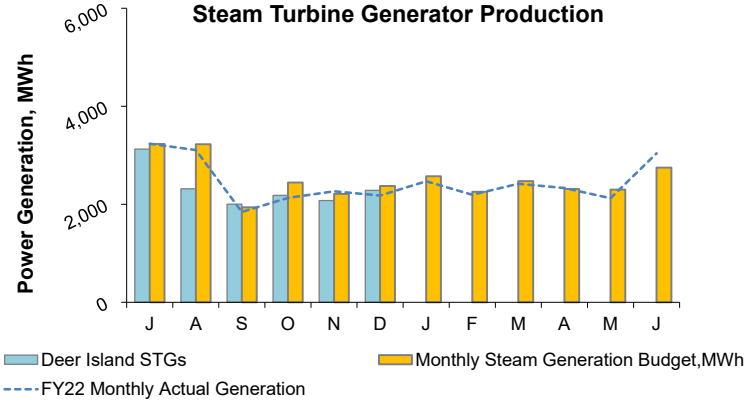
In Quarter 2 of FY23, the renewable energy produced from all hydro turbines totaled 5,425 MWh; 8% above budget[3]. Savings and revenue invoices have not yet been received for this FY23 reporting period.



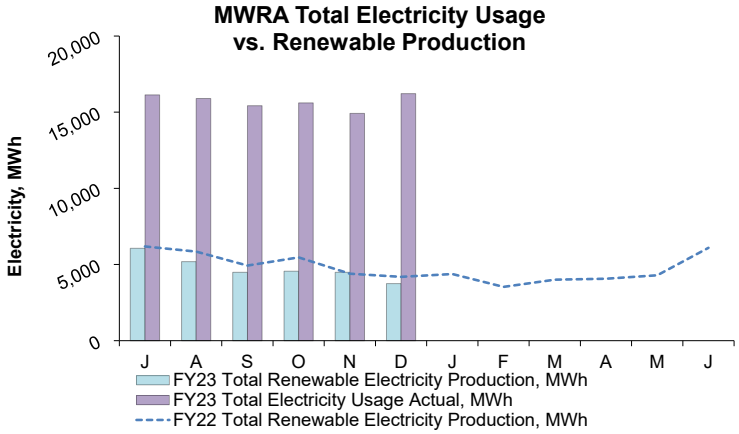
In Quarter 2 of FY23, the renewable energy produced from all wind turbines totaled 637 MWh; 37% below budget[3] . Savings and revenue invoices have not yet been received for this FY23 reporting period.

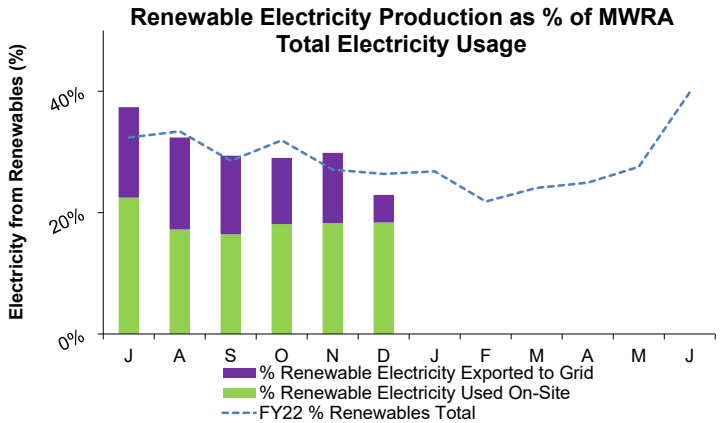


In Quarter 2 of FY23, the renewable energy produced from all solar PV systems totaled 205 MWh; 7% below budget[3]. Savings and revenue invoices have not yet been received for this FY23 reporting period.



In Quarter 2 of FY23, the renewable energy produced from all steam turbine generators totaled 6,540 MWh; 7% below budget[3]. Savings and revenue invoices have not yet been received for this FY23 reporting period.

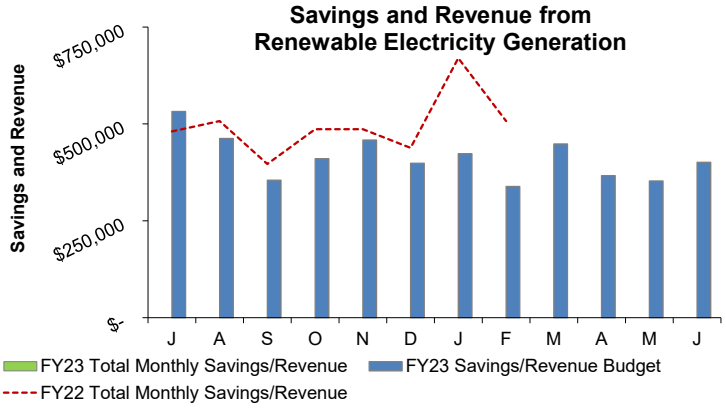


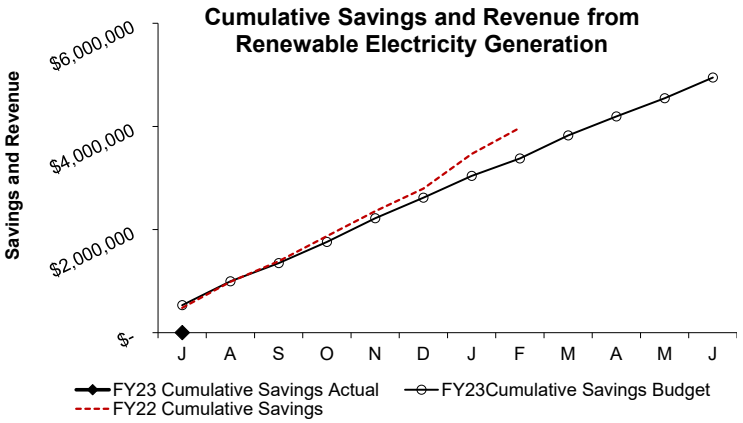


In Quarter 2 of FY23 MWRA's electricity generation by renewable resources totaled 12,807 MWh, 4% below budget.. MWRA's total electricity usage was approximately 46,748 MWh. Renewable resources were 27% of total usage. The MWRA total electricity usage is the sum of all electricity purchased for Deer Island 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.

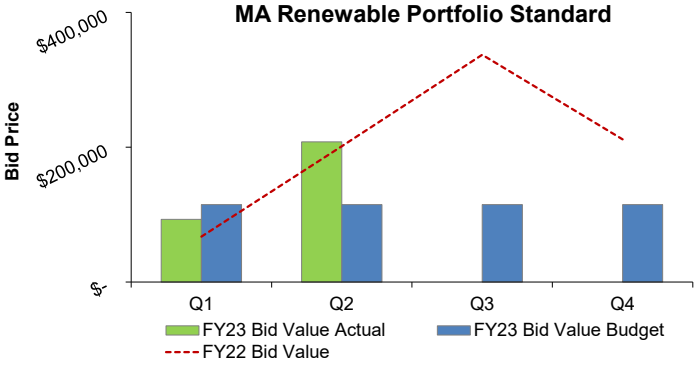
Renewable Electricity Generation: Savings and Revenue
2nd Quarter - FY23

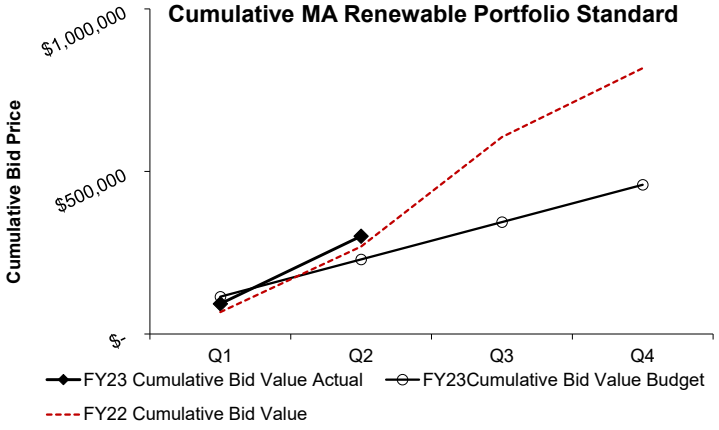




Savings and revenue invoices have not yet been received for this FY23 reporting period.

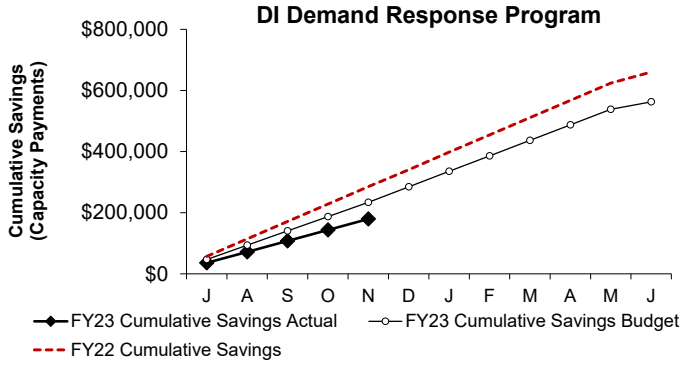
Savings and revenue[2] from all renewable energy sources include wind turbines, hydroelectric generators, solar panels, and steam turbines (DI). This includes savings and revenue due to electricity generation (does not include avoided fuel costs and RPS RECs).
The use of DITP digester gas as a fuel source provides the benefit of both electricity generation from the steam turbine generators, and provides thermal value for heating the plant, equivalent to approximately 5 million gallons of fuel oil per year (not included in charts above).

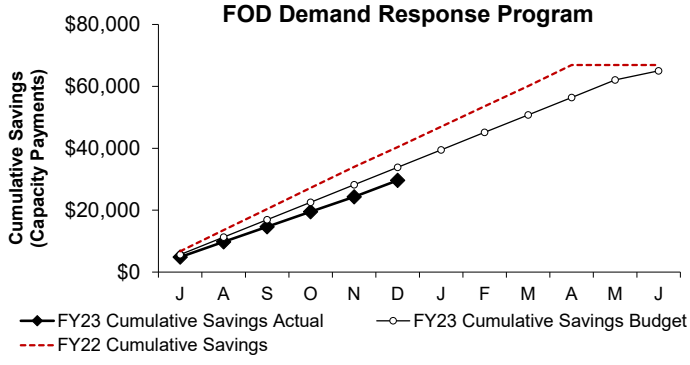




Bids were awarded during the 2nd Quarter[1] from MWRA's renewable energy assets; 3,329 Q2 CY2022 Class I Renewable Energy Certificates (RECs); and 3,250 Q2 CY2022 Class 2 RECs were sold for a total value of $208,058 RPS revenue; which is 81% above budget[3] for the Quarter.
REC values reflect the bid value on the date that bids are accepted. Cumulative bid values reflects the total value of bids received to date.

*MWRA's SRECs have transitioned to the Class 1 REC category starting in FY23.



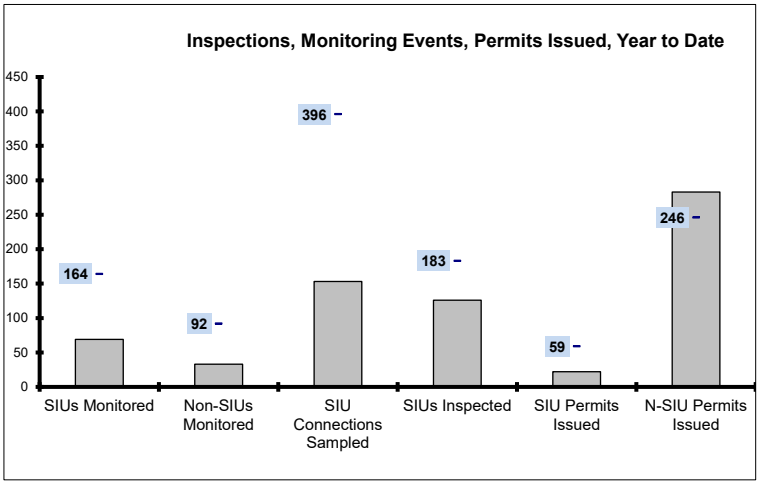


Currently Deer Island, JCWTP, Loring Rd, and Brutsch participate in the ISO-New England Demand Response Programs[4]. By agreeing to reduce demand and operate the facility generators to help reduce the ISO New England grid demand during periods of high energy demand, MWRA receives monthly Capacity Payments from ISO-NE. When MWRA operates the generators during an ISO-NE called event, MWRA also receives energy payments from ISO-NE. FY23 Cumulative savings (Capacity Payments only) through November[1] total $179,345 for DI and payments for FOD total $29,639 through December[1].

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

2nd Quarter - FY23



EPA Required SIU Monitoring Events
for FY23: 164
YTD : **69**

Required Non-SIU Monitoring Events
for FY23: 92
YTD : **33**

SIU Connections to be Sampled
For FY23: 396
YTD: **153**

EPA Required SIU Inspections
for FY23: 183
YTD: **126**

SIU Permits due to Expire
In FY23: 59
YTD: **22**

Non-SIU Permits due to Expire
for FY23: 246
YTD: **283**

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

	0 to 120		121 to 180		181 or more		Permits Issued	
	SIU	Non-SIU	SIU	Non-SIU	SIU	Non-SIU	SIU	Non-SIU
Jul	0	9	0	3	1	8	1	20
Aug	1	38	1	8	1	18	3	64
Sep	5	14	0	5	0	25	5	44
Oct	5	12	0	3	0	12	5	27
Nov	2	31	0	13	0	16	2	60
Dec	3	30	1	7	2	31	6	68
Jan							-	-
Feb							-	-
Mar							-	-
Apr							-	-
May							-	-
Jun							-	-
% YTD	73%	47%	9%	14%	18%	39%	22	283

This is the end of the second quarter or the first half of the MWRA fiscal yearFY23.

In the 2nd quarter, of the 168 permits issued, 13 were SIUs of which 10 were issued within the 120-day timeframe with 2 issued beyond the 180-day timeline.

In the first half, 305 permits were issued, of which 22 were SIUs.
Sixteen of the SIU permits were issued within the 120-day timeframe, with four issued beyond 180 days.
There were 283 non-SIU permits issued, of which more than half were issued late.

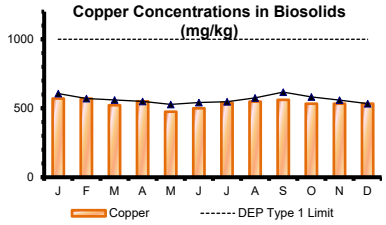
Reasons for late issuances continue to include:
a) staffing due to turnover and vacancies
b) waiting for critical data needed for permit processing
c) delays relating to new start-up operations and
d) the late payment of the relevant permit charges.

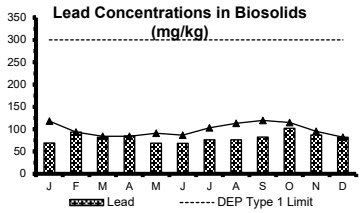
There are new Industrial Coordinators on board which cause some slow-down in processing while they get acquainted with their roles and there is still a backlog of permits/amendments waiting to be processed.

So far, in FY23, there were 150 completely new permits issued: 2 SIUs and 14 N-SIUs and also including 51 Low Flow Permits, 75-Dental, 1-Food Processing and 5-Construction dewatering.

For the Clinton Sewer Service area, there were no SIU permits issued during the first half of the FY23 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 – 2nd Quarter – FY23

Western Water Operations and Maintenance

- Carroll Water Treatment Plant Side B Maintenance: Staff completed the annual side B maintenance, in November and December. There was substantial project work to fit into this window for Hypo Piping, Fluoride Chemical Feed, and SCADA projects. Side A shutdown for maintenance is scheduled begin in January.

- Norumbega Covered Storage Tank Cleaning: In October staff isolated cell #2 of NCST to support the draining and cleaning project. Most of the water from this cell was pumped into the distribution system for use. Cell #2 of NCST remained isolated during November and December for cleaning. A structural inspection of the ceiling, walls, and floor was completed in December. The initial disinfection process started the last week of December. This cell is expected to be back online in late January.

- Wachusett Aqueduct Pump Station: During October, staff performed testing of the WAPS pumps through the overflow tower. This process begins at the Wachusett Dam Upper Gate House to direct water into the Wachusett Aqueduct that then flows to the Carroll Water Treatment Plant site. All 7 pumps were tested successfully.

- Ware River Diversion to Quabbin: During December, staff completed a training exercise for the Shaft 8 diversion over 2 days. This was the first time since December 2020 due to the construction project at Shaft 2 last winter. Staff coordinated with Barre Falls Dam to maximize river conditions.

Metro Water Operations and Maintenance

- Water Pipeline Program: Staff completed Blow-Off replacements in Brookline (Sections 96). Additional work during the quarter included leak repairs on the WASM 3 (56-inch main) in Waltham, Section 84 (48-inch main) in Malden and Section 57 (48-inch main) in Medford. Leak detection was performed on over 30 miles of MWRA water main and assistance was provided to ten customer communities.

Operations Engineering

- Staff continued to provide management and coordination with Arcadis to support the construction phase on the Carroll Water Treatment Plant SCADA system Upgrade project.
  - Section 89 Replacement – Staff continue to provide submittal review and coordinated the isolation and reactivation for all phase 1 work and developed an alternate supply for meter 234 and contingency plan for Winchester. Continued to develop alternatives for the Fallon Rd linestop.
  - Hydraulic Model Upgrades: Staff provided an in-depth review of the draft model and calibrations. Staff continued to support Pipeline and Valve Programs with some of the following activities: Operation Shutdown Plans, Exercise Schedule Packages and Disinfection Plans and Permitting.
- Staff provided support for system expansion to the north and south and to the Metro communities.
- Staff continued with the development of an Emergency Action plan for Newton and the communities supplied by Section 80.

Wastewater Operations & Maintenance

- Tour of Chelsea Creek HW for DEP Staff: Operations staff conducted a tour of the Chelsea Creek HW for two MassDEP staff on 12/2/22.
- Somerville Marginal CSO Facility MWR205 Tide Gate Replacement: Operations staff continues to work with Construction staff for the replacement of the tide gate at MWR205.
- Nut Island Headwork's Odor Control & HVAC Improvements: The contractor continues to perform work on the facility odor control system and HVAC equipment. Operations staff continue to receive training for the new wet scrubbers and chemical feed systems. Meetings are held on an as-needed basis to review wet scrubber performance and identify issues and concerns.

- Operations & Maintenance Meeting: Operations and maintenance staff attended weekly meetings to discuss the top critical maintenance issues and the schedule and prioritization for addressing maintenance requirements.

- Nuisance Alarm Review: Operations and Operations Engineering staff attended bi-weekly meetings to discuss the top 15 SCADA alarms to determine what steps and procedures are required to minimize nuisance alarms.

- Training: Operations staff attended confined space entry, lock out tag out, OSHA 10 Construction, underground fuel oil tank and PPE training. Staff also attended vendor training for chemical tanks/ pumps, wet scrubbers, recirculation pumps, odor control fans & VFD's as part of the odor control system upgrades at the Nut Island Headworks.

TRAC

Compliance and Enforcement

Field Operations Highlights – 2nd Quarter – FY23

- TRAC issued 21 Notices of Noncompliance, 37 Notices of Violation, 2 Rulings on Request for Reconsideration, 4 Return to Permit Letters, and 1 Extension Letter.

Inspections and Permitting

- This quarter TRAC issued a total of 118 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 119 days from the date the application was received.
- TRAC monitored the septage receiving sites a total of 30 times. Staff conducted inspection at 90 new construction gasoline/oil separators and 282 existing gasoline/oil separators.
- TRAC staff conducted 63 Annual SIU Inspections as required under TRAC's EPA approved Industrial Pretreatment Program, and 265 other inspections. Other inspections include inspections for permit renewal, enforcement, NSIU, follow-up, construction dewatering sites, group/combined permit audits, out-of-business facility reviews, and surveys.

- 171 MWRA Sewer Use Discharge Permits (Permits) were issued and/or renewed to its sewer users. Three permits were issued and/or renewed in the Clinton Service Area.

Monitoring

- During the second quarter of FY23, TRAC completed 101 first time SIU monitoring events, 18 first time NSIU monitoring events and 270 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 algae sampling at Quabbin & Wachusett Reservoirs. The buoy data continued to help assess chlorophyll-a levels throughout the water column and focus sampling efforts accordingly. Seasonal algal toxin and taste and odor compound sampling is complete for the season with no detections at source or finished water monitoring locations.

Regulatory Sampling: Staff began planning for monitoring associated with EPA's Unregulated Contaminant Monitoring Rule 5. On October 4th, MWRA staff participated in an emergency desktop drill, along with CVA Community and Mass DEP staff. Discussions focused on potential response actions associated with a disinfection treatment loss at the Brutsch Water Treatment Facility.

Non-Regulatory Sampling: As a pilot of the future EPA Lead & Copper Rule revisions, MWRA is collecting samples at locations near residences that have results over the lead action level. During each sample event, the results met MassDEP pH and alkalinity compliance targets.
Sampling & Analysis: Sampling staff assisted two communities with volatile organic compound sampling. Staff trained three communities on the operation of the HACH SL1000 portable water quality-testing device. Water quality managers presented at the Fall Community Emergency Response Plan Training sessions on UCMR5 and coliform sampling, detection, and response.
Training & Guidance: Staff conducted one coliform sampler training session and met with two communities to assist with a review of Mass DEP sanitary survey findings or an RTCR level assessment.

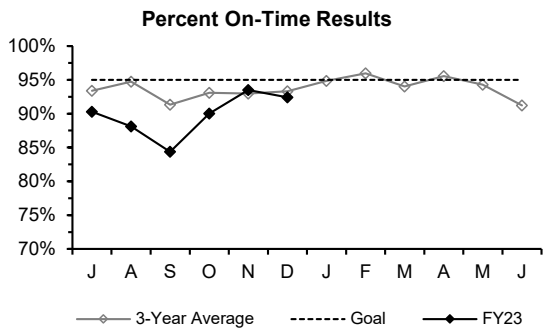
Chemical Supply Contracts: Staff are closely monitoring chemical inventories and continue to check-in with chemical suppliers to review adherence to delivery schedules. Conducted 5-year Spill Prevention Countermeasure & Control (SPCC) review for CWTP along with a qualified contractor. The SPCC plan will be updated, submitted for review and finalized. Where chemical contracts were updated, staff also updated delivery acceptance procedures.

Environmental Quality-Wastewater

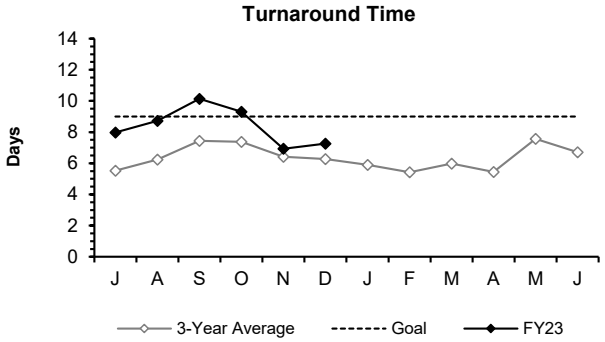
- Ambient Monitoring: The last routine water column surveys of Mass Bay for 2022 were completed in October. MWRA reported exceedances of the Contingency Plan thresholds for dissolved oxygen concentration and/or percent saturation in the outfall nearfield and in Stellwagen Basin, occurring in September and October; there is currently no evidence this lower dissolved oxygen is related to the DITP outfall discharge.
- Harbor/CSO Receiving Water Monitoring: Biweekly harbor monitoring continues year-round; daily CSO receiving water continued through October and will restart in spring 2023.
- Cooperation with other agencies: Continued follow up communication with Boards of Health and metro Boston CSO permittees about the new sewage notification regulation.

Laboratory Services

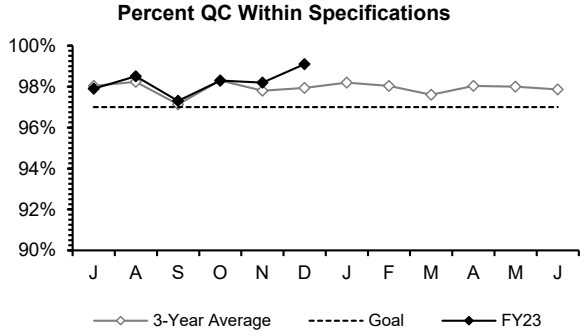
2nd Quarter - FY23



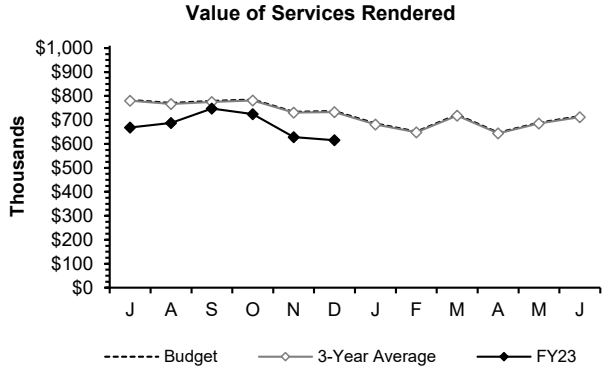
The Percent On-Time measurement continued to run below MWRA's 95% goal due to staffing vacancies, but continued to meet all regulatory deadlines.



Turnaround Time met the 9-day goal.



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



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

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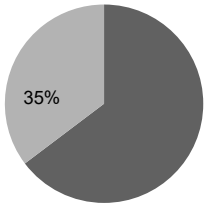
Performance: Percent QC within Specification continues to meet the goal, but all other indicators fell short of the goals for the quarter due to reduced staffing levels.

School Lead Program: During the 2nd quarter of FY23, MWRA's lab completed 32 tests from 9 schools and childcare facilities in 4 communities. Since 2016, MWRA's Laboratory has conducted over 40,000 tests from 560 schools and daycares in 44 communities. We have also completed over 790 home lead tests under the DPH sampling program since 2017.

CONSTRUCTION PROGRAMS

Projects In Construction
2nd Quarter – FY23

Money



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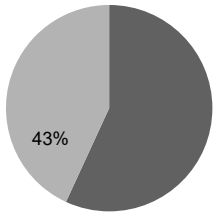


Carroll Water Treatment Plant SCADA Improvements

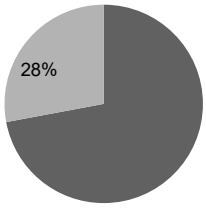
Project Summary: This project will replace SCADA Control equipment at the Carroll Plant, to enhance cybersecurity, redundancy, ensure future reliability, and maintain secure plant operations.

Contract Amount: $13,048,534.37 *Contract Duration:* 1,127 Days

Notice to Proceed: 1-Sep-21 *Contract Completion:* 2-Oct-24

Status and Issues: As of December, the power and communication mockup in the consoles were installed and the smartboard and monitors were mounted and the new circuit breaker was installed. In the Ozone Building in the Server Room, the temporary lighting was installed and the wall penetrations and holes were patched, conduits installed and labeled.

Money



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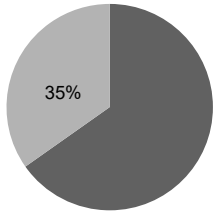


Section 89 Replacement Pipeline

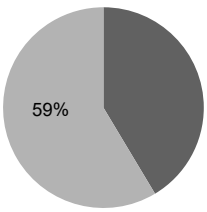
Project Summary: This project will include replacement of a 10,500-foot portion of PCCP with class IV reinforcing wire, line valves and appurtenances, and abandonment of the 118-year old, 24-inch diameter cast iron Section 29 pipeline.

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 December, the Contractor completed installing 15 LF of 36" DI Pipe from Sta.143+73.5 to Sta.143+88.5 including 36" Horizontal Gate Valve/4" Bypass Valve @ Sta.143+81 on Section 89 at Washington Street, Woburn.

Money



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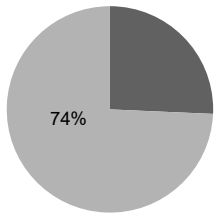


Low Service PRV Improvements

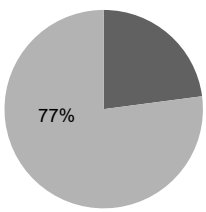
Project Summary: This project will replace pressure reducing valves on the Weston Aqueduct Supply Main (WASM) 4 at Nonantum Road in Boston and WASM 3 at Mystic Valley Parkway in Medford

Contract Amount: $11,580,859.21 *Contract Duration:* 720 Days

Notice to Proceed: 14-Jul-21 *Contract Completion:* 4-Jul-23

Status and Issues: As of December, the Contractor worked on hand finishing joints in the new steel pipes with a cement-mortar lined (CML) coating. They worked on painting pipes in the PRV vault. Installed 48" BFVs and vault base sections, and set the remaining pipes in place, installed couplings and restraint systems.

Money



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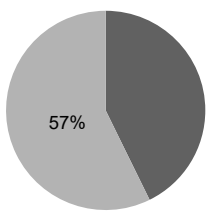


Rehabilitation of WASM 3

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.

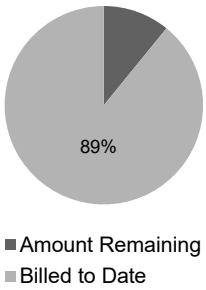
Contract Amount: $19,764,209.73 *Contract* Duration: 1,383 Days

Notice to Proceed: 28-Oct-20 *Contract Completion:* 11-Aug-24

Status and Issues: As of December, the Contractor cleaned 720 LF of 56" steel pipe along Pleasant Street, completing approximately 63% of phase 3 cleaning. In addition, they cement lined 550 LF of 56" steel from Swan Street to Maple Street, completing approximately 24% of phase 3 cement lining.

Projects In Construction
2nd Quarter – FY23

Money



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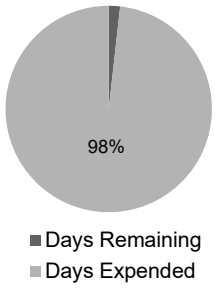


Nut Island Odor Control and HVAC

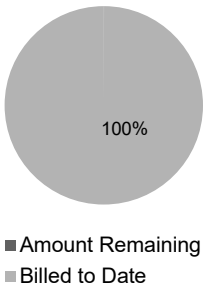
Project Summary: This project will provide upgrades to the odor control system, heating, ventilation and air conditioning system and other equipment.

Contract Amount: $59,919,644.62 *Contract Duration:* 1,034 Days

Notice to Proceed: 12-Feb-20 *Contract Completion:* 12-Dec-22

Status and Issues: As of December, the Contractor continued to receive deliveries of FRP ducts, CAD vessels, and FRP platforms. They continued installation of FRP ducts, supports, and platforms; rigged and set seven CADs on their equipment pads. In addition, they formed, rebar, and placed concrete for remaining CAD equipment pads and topping slab sections, and also placed concrete Stair 12 landing at the Bottom Level.

Money



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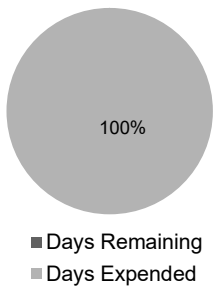


Chemical Tank Relining & Pipe Replacement

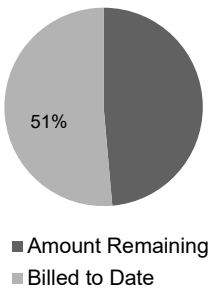
Project Summary: This project involves replacing the chlorobutyl rubber linings in 3 sodium hypochlorite and 2 sodium bisulfite storage tanks and assorted gravity thickener overflow piping at Deer Island.

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 status report.

Money



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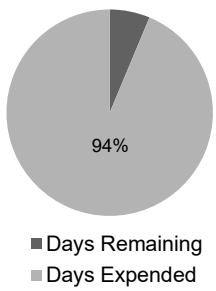


DITP Odor Control Damper Replacement

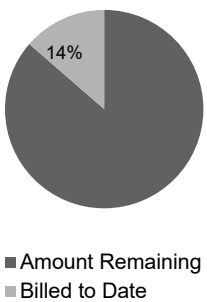
Project Summary: This project involves replacing three existing 30-inch diameter steel dampers with stainless steel dampers, surface preparation and coatings application on the existing 30-inch diameter ductile iron pipe. ,

Contract Amount: $538,000 *Contract Duration:* 365 Days

Notice to Proceed: 3-Feb-22 *Contract Completion:* 3-Feb-23

Status and Issues: As of December, the stainless steel dampers have been installed and tested.

Money



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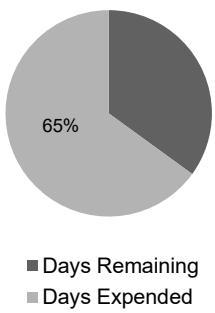


Clinton Screw Pump Replacement

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 December, the trailer utility installation has been completed and now awaiting delivery of the pumps.

CSO CONTROL PROGRAM
2nd Quarter – FY23

Overview

In compliance with milestones in the Federal District Court Order, all 35 projects in the CSO Long-Term Control Plan (LTCP) were complete as of December 2015. Subsequently, MWRA 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 there has been an 87% reduction in CSOs in a typical year, from 3.3 billion gallons to 414 million gallons, with 70 of 86 outfalls meeting the LTCP goals for CSO activation frequency and volume. MWRA and its member CSO communities are moving forward with plans to bring 10 of the 16 CSOs in line with the LTCP goals. With respect to the remaining 6 challenging CSO outfalls, MWRA and its CSO Consultant (AECOM) continue to investigate alternative to move closer to LTCP goals.

MWRA CSO Performance Assessment

In November 2017, MWRA signed a contract for CSO Post Construction Monitoring and Performance Assessment with AECOM Technical Services, Inc. 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 MassDEP in December 2021 verifying whether the LTCP goals are attained.

AECOM continues to support efforts to advance projects identified to meet performance goals at 10 of the 16 CSOs that didn't meet LTCP goals, evaluate alternatives for the remaining 6 challenging sites, and predict and report on annual CSO discharges.

Court Ordered Levels of CSO Control

Progress on the work to comply with the court ordered levels of CSO control is discussed with the EPA/MassDEP at progress meetings held quarterly. Most recent quarterly meeting was on **1/19/23** and the next meeting is scheduled for **3/23/23**.

Ongoing Projects as of December 31, 2022

East Boston CSO Control: As part of the East Boston CSO a FAA/MOU was executed in June 2021 for $2.1M, BWSC designed and is constructing additional sewer separation in East Boston, including modifications to the BOS003 system regulators and modification to the BOS014 system. Work at BOS014, BOS003 is complete and is expected to meet LTCP goals. Sewer separations is expected to be completed in Summer 2023.

CHE008 Pipe Replacement – Enlarging the CHE008 regulator connection is designed and now in construction. The $1.57M construction project is expected to be completed September 2023.

Somerville Marginal New Pipe Connection came out of the variance optimization study that recommended adding a new pipe from the facility's CSO influent conduit to the interceptor with an added control gate. The $1.2M (est.) construction project is expected to be completed in the Summer 2024.

Fort Point Channel and Mystic Confluence - BOS062, BOS065, BOS070 DBC and BOS017: FAA/MOU established for $10M to design and construct improvement at these 4 CSOs. Currently in design with substantial completion of construction by December 2024.

CSO variances

As part of MWRA's CSO Control Program, MassDEP has issued a series of multi-year CSO variances that allow MWRA, Cambridge, and Somerville to continue to have limited CSO discharges to Alewife Brook and the Upper Mystic River, as well as the Charles River lower basin. The most recent variances, issued in 2019, require the development of Updated LTCPs for the CSO outfalls that each entity owns and operates that may discharge to the corresponding waterbody. The Updated LTCPs must include a description of the existing level of CSO control, an evaluation of the costs and the performance and water quality improvements achieved by additional CSO control alternatives, a public participation plan, and an affordability analysis.

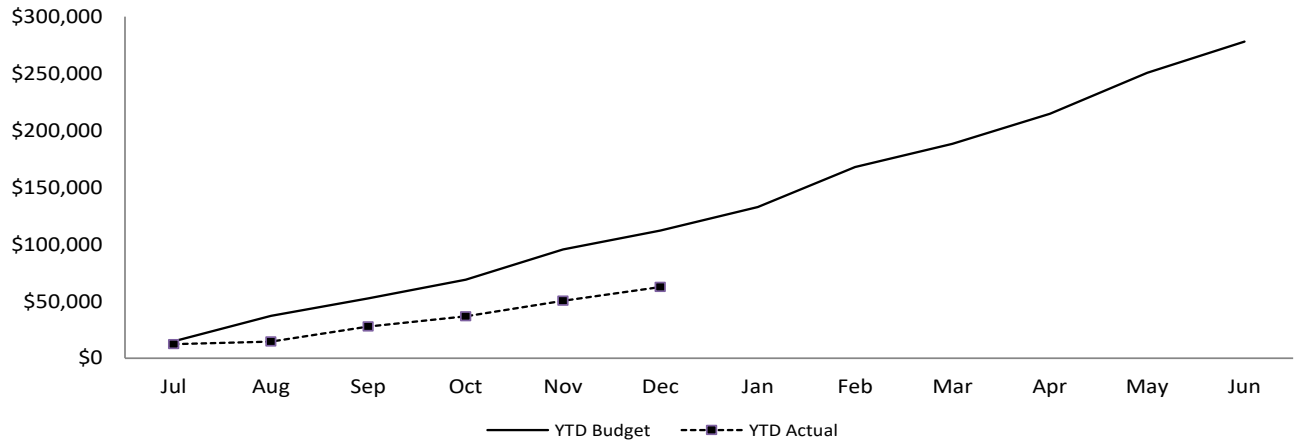
- MassDEP and EPA conditionally approved MWRA's Updated CSO Control Plan Scope of Work on **5/11/2022**. The Authority is currently working closely with the CSO communities of Cambridge and Somerville to develop these plans over the upcoming years.
- Schedule Extension Request for Deliverables Associated with Updated CSO Control Plan was submitted 9/22/22. EPA/MassDEP acknowledge that the extension request is officially under consideration, however no determination has been made.
    - As identified in the variance the progress is reported at monthly meetings with EPA/MassDEP. The last meeting was on **1/11/23** and the next meeting is scheduled for **2/8/23**. Key elements of the Updated CSO Control Plan are discussed including the development of an Updated Typical year which includes climate change and the development of a Unified Hydraulic Model.
- The 2nd of 8 planned meetings was held on 12/15/22. **The next Public Meeting is scheduled for the spring**.
- Development and Submittal of Studies as required under variance included the following:
    - Alewife PS Optimization Evaluation was submitted on 4/27/2021
    - Somerville Marginal CSO Reduction, Study and Preliminary Design was submitted on 12/27/2021
    - Alewife Brook and Charles River System Optimization Evaluation was submitted on 12/28/2022

CIP Expenditures
2nd Quarter – FY23

FY23 Capital Improvement Program Expenditure Variances through December by Program - ($ in thousands)				
Program	FY23 Budget Through December	FY23 Actual Through December	Variance Amount	Variance Percent
Wastewater	$35,381	$17,758	($17,623)	-50%
Waterworks	$62,754	$37,726	($25,029)	-40%
Business and Operations Support	$13,969	$7,116	($6,853)	-49%
Total	$112,105	$62,599	($49,506)	-44%

Project underspending within Wastewater was due to timing of grant and loan distributions for the I/I Local Financial Assistance program, contractor behind schedule for the Nut Island Odor Control and HVAC Improvements, completion of some design and inspection tasks were later than anticipated for Ward Street and Columbus Park Headworks Upgrades Design/CA, and updated schedule for DITP Roofing Replacement. Project underspending in Waterworks was due to timing of community distributions for the Water Loan program, long lead time for piping materials for Waltham Water Pipeline Construction, timing of work for WASM/SPSM Pressure Reducing Valves, WASM 3 Rehabilitation, Electrical Distribution Upgrades at Southborough, and CP3-Sections 23, 24, 47 Rehabilitation, timing of work and long lead time for materials for CWTP SCADA Upgrades, and scope changes for Cathodic Protection Shafts N & W. This underspending was partially offset by timing of consultant work for Section 53 and 99 Improvements - Design/CA, and contractor progress for CP-1 NEH Improvements, and NIH Section 89 & 29 Replacement.

Budget vs. Actual CIP Expenditures ($ in thousands)
Total FY23 CIP Budget of $278,053



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 12/24/22	$122.6 million
Unused capacity under the debt cap:	$2.1billion
Estimated date for exhausting construction fund without new borrowing:	Jan-23
Estimated date for debt cap increase to support new borrowing:	Not anticipated at this time
Commercial paper/Revolving loan outstanding: Commercial paper capacity / Revolving Loan	$140 million $110 million
Budgeted FY23 Cash Flow Expectancy*:	$248 million

* Cash based spending is discounted for construction retainage.

DRINKING WATER QUALITY AND SUPPLY

Source Water – Microbial Results and UV Absorbance

2nd Quarter – FY23

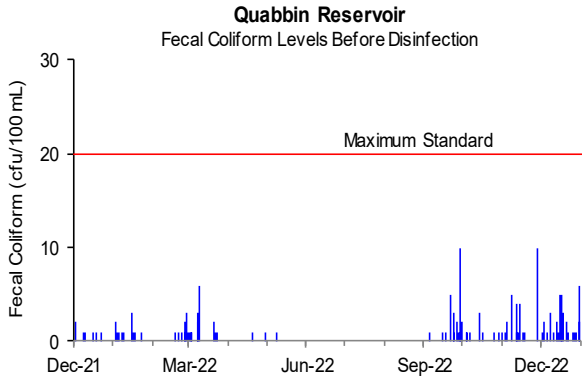
Source Water – Microbial Results

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 coliforms, 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.**

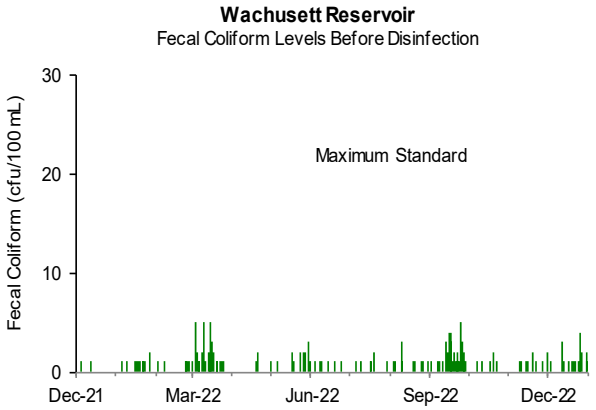


Sample Site: Wachusett Reservoir

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 2nd Quarter were below 20 cfu/100mL. **For the current six-month period, 0.0% of the samples exceeded a count of 20 cfu/100mL.**

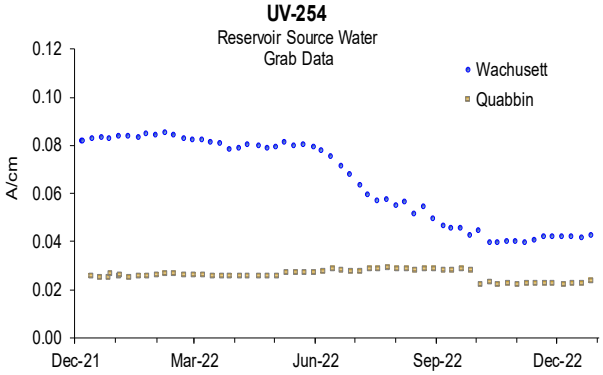


Source Water – UV Absorbance

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 0.022 A/cm for the quarter.

Wachusett Reservoir UV-254 levels averaged 0.041 A/cm for the quarter.

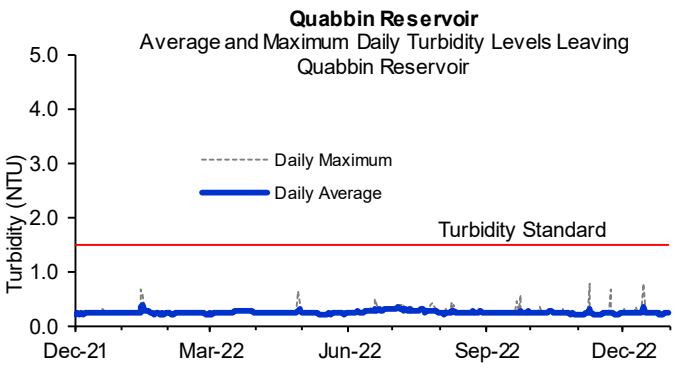


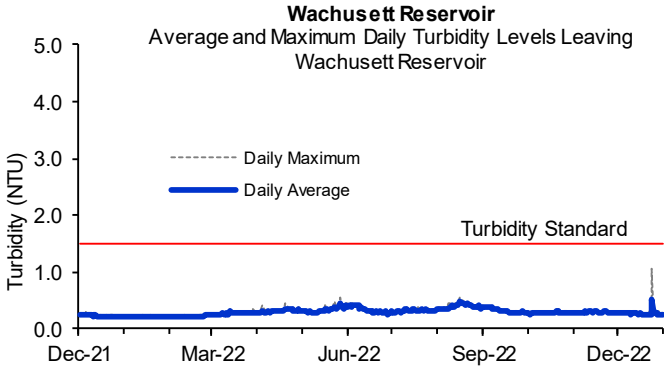
Source Water – Turbidity
2nd Quarter – FY23

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.



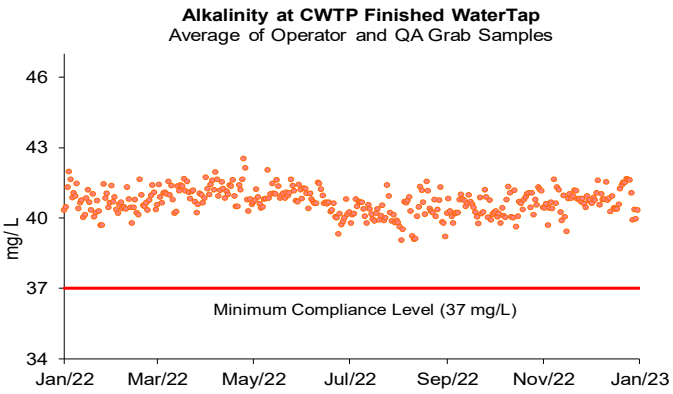


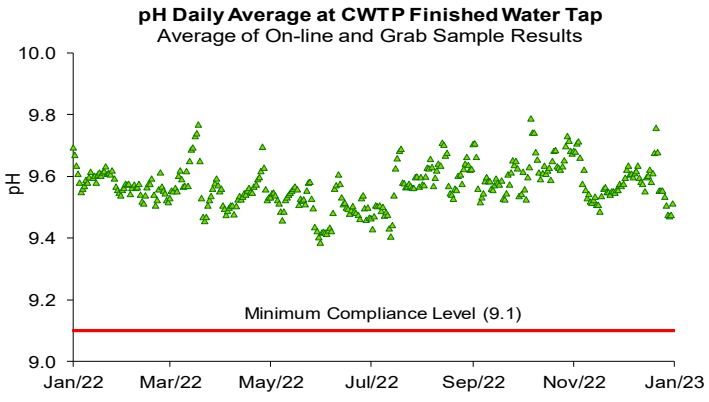
Treated Water – pH and Alkalinity Compliance

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 November. Distribution system sample pH ranged from 9.5 to 9.7 and alkalinity ranged from 40 to 43 mg/L. No sample results were below DEP limits for this quarter.





Treated Water – Disinfection Effectiveness

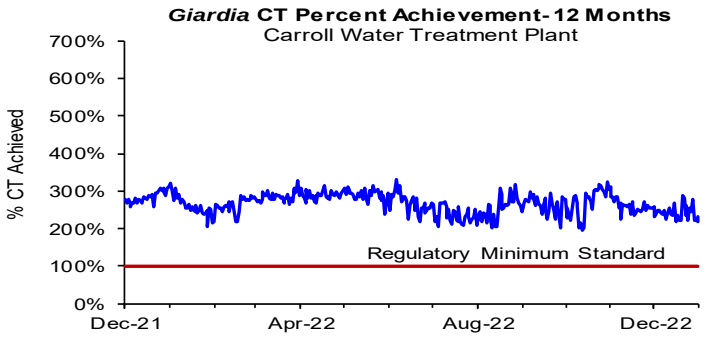
2nd Quarter – FY23

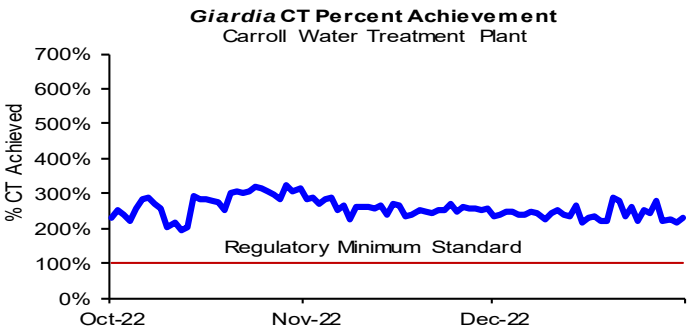
At the Carroll Water Treatment Plant (CWTP), MWRA meets the required 99.9% (3-log) inactivation of *Giardia* using ozone (reported as CT: concentration of disinfectant x contact time) and the required 99% (2-log) inactivation of *Cryptosporidium* using UV (reported as IT: intensity of UV x time). MWRA 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:

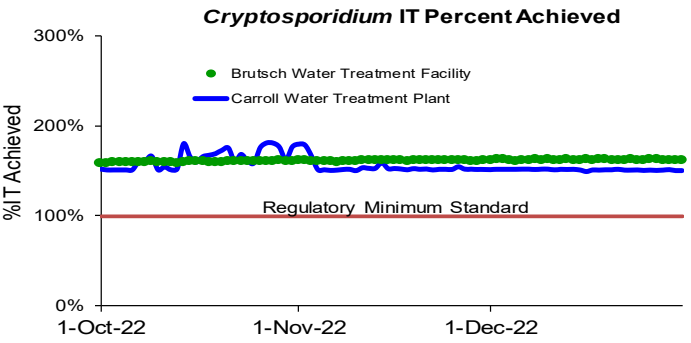
- The chlorine dose at the CWTP varied between 3.0 and 3.7 mg/L for the quarter.
- Ozone dose at the CWTP varied between 1.17 to 1.60 mg/L for the quarter.
- *Giardia* CT was maintained above 100% at all times the plant was providing water into the distribution system this quarter, as well as every day for the last fiscal year.
- *Cryptosporidium* IT was maintained above 100% for the quarter. Off-spec water was less than 5%.

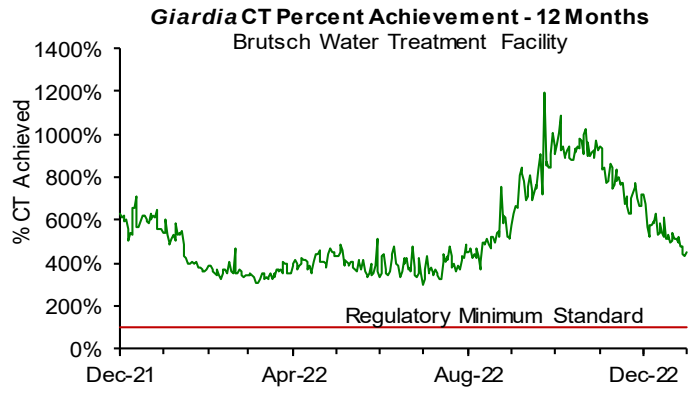


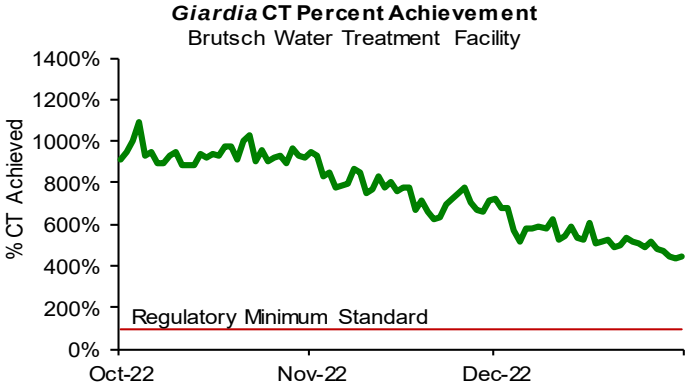


Quabbin Reservoir (CVA Supply) at:
Brutsch Water Treatment Facility

- 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 1.35 to 1.80 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%.





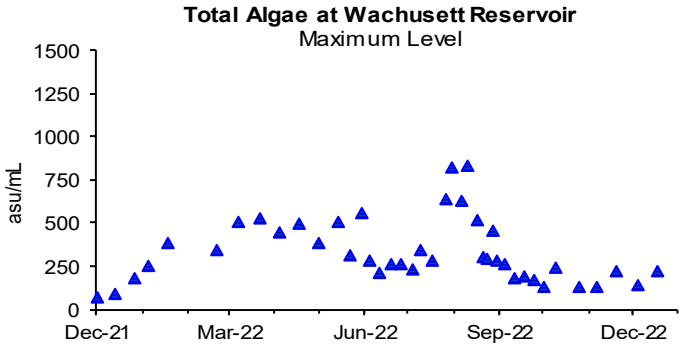


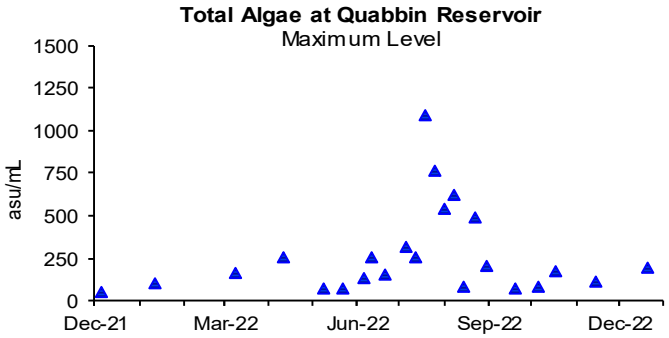
Source Water - Algae
2nd Quarter – FY23

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 2nd quarter, there were no complaints which may be related to algae reported from the local water departments.



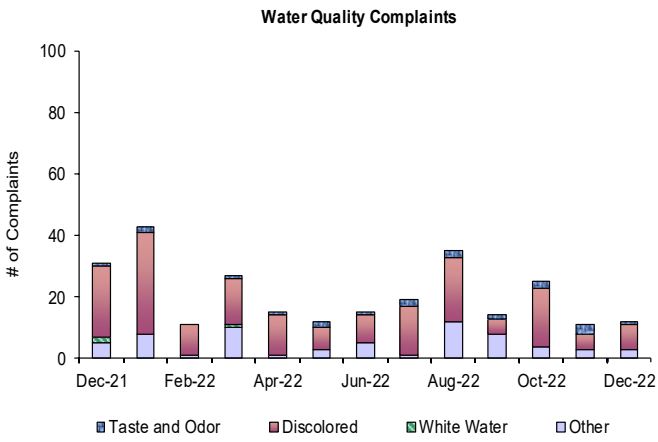


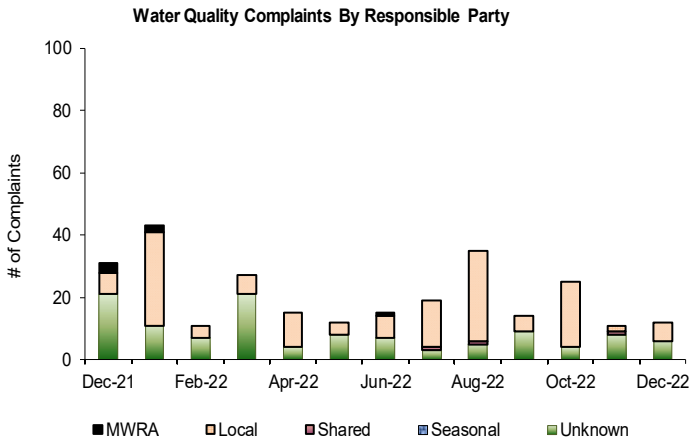
Drinking Water Quality Customer Complaints: Taste, Odor, or Appearance

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 48 complaints during the quarter compared to 138 complaints from 2nd Quarter of FY22. Of these complaints, 32 were for “discolored water”, 6 were for “taste and odor”, and 10 were for “other”. Of these complaints, 29 were local community issues, 1 was a shared local community and MWRA related issue, and 18 were unknown in origin.





Bacteria & Chlorine Residual Results for Communities in MWRA Testing Program

2nd Quarter – FY23

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 2nd Quarter, twenty-six of the 6,295 samples (0.41% system-wide) submitted to MWRA labs for analysis tested positive. Four of the 1862 MWRA locations or Community/MWRA Shared samples (0.21%) tested positive for total coliform. None of the 329 CVA/MWRA community samples tested positive for total coliform. Three communities were required to perform a Level Assessment. (Everett, Melrose, Wakefield – October). Only 0.5% of the Fully Served community samples had chlorine residuals lower than 0.2 mg/L for the quarter.

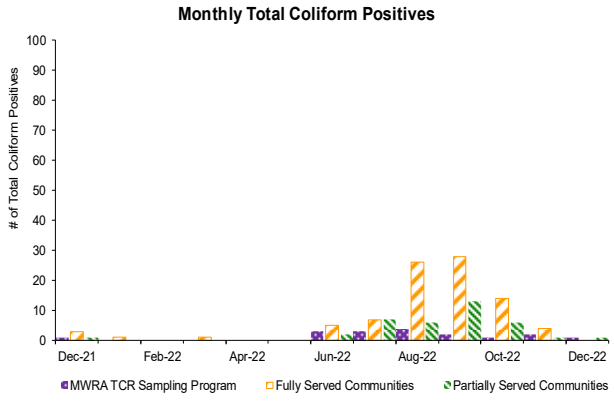
NOTES:

a) 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.

b) The number of samples collected depends on the population served and the number of repeat samples required.

c) These communities are partially supplied, and may mix their chlorinated supply with MWRA chloraminated supply.

d) Part of the Chicopee Valley Aqueduct System. Free chlorine system.



			Total Coliform # Samples (b)	Total Coliform # (%) Positive	*E.coli* # Positive	Assessment Required
MWRA	a	MWRA Locations	363	2 (0.55%)	0	
		Shared Community/MWRA sites	1499	2 (0.13%)	0	
		Total: MWRA	1862	4 (0.21%)	0	No
Fully Served		ARLINGTON	156	0 (0%)	0	
		BELMONT	104	0 (0%)	0	
		BOSTON	778	0 (0%)	0	
		BROOKLINE	224	0 (0%)	0	
		CHELSEA	169	0 (0%)	0	
		DEER ISLAND	52	0 (0%)	0	
		EVERETT	181	6 (3.31%)	0	Yes
		FRAMINGHAM	240	1 (0.42%)	0	No
		LEXINGTON	119	0 (0%)	0	
		LYNNFIELD	18	0 (0%)	0	
		MALDEN	234	0 (0%)	0	
		MARBLEHEAD	72	0 (0%)	0	
		MARLBOROUGH	126	0 (0%)	0	
		MEDFORD	198	2 (1.01%)	0	No
		MELROSE	126	4 (3.17%)	0	Yes
		MILTON	110	0 (0%)	0	
		NAHANT	30	0 (0%)	0	
		NEWTON	280	1 (0.36%)	0	No
		NORTHBOROUGH	48	0 (0%)	0	
		NORWOOD	99	0 (0%)	0	
		QUINCY	354	1 (0.28%)	0	No
		READING	130	0 (0%)	0	
		REVERE	198	1 (0.51%)	0	No
		SAUGUS	104	0 (0%)	0	
		SOMERVILLE	255	1 (0.39%)	0	No
		SOUTHBOROUGH	30	0 (0%)	0	
		STONEHAM	91	0 (0%)	0	
		SWAMPSCOTT	51	0 (0%)	0	
		WALTHAM	219	1 (0.46%)	0	No
		WATERTOWN	141	0 (0%)	0	
		WESTON	45	0 (0%)	0	
		WINTHROP	66	0 (0%)	0	
		Total: Fully Served	*5048*	*18 (0.36%)*		
Partially Served	c	BEDFORD	55	0 (0%)	0	
		BURLINGTON	127	0 (0%)	0	
		CANTON	87	0 (0%)	0	
		NEEDHAM	126	1 (0.79%)	0	No
		PEABODY	210	2 (0.95%)	0	No
		WAKEFIELD	138	3 (2.17%)	0	Yes
		WELLESLEY	112	0 (0%)	0	
		WILMINGTON	90	1 (1.11%)	0	No
		WINCHESTER	91	0 (0%)	0	
		WOBURN	211	1 (0.47%)	0	No
		Total: Partially Served	*1247*	*8 (0.64%)*		
		Total: Community Samples No CVA	*6295*	*26 (0.41%)*		
CVA	d	MWRA CVA Locations	105	0 (0%)	0	
		CHICOPEE	185	0 (0%)	0	
		SOUTH HADLEY FD1	20	0 (0%)	0	
		WILBRAHAM	19	0 (0%)	0	
		Total: CVA	*329*	*0 (0%)*		

Chlorine Residuals in Fully Served Communities

	2021	2022											
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
% <0.1	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
% <0.2	0.8	0.1	0.2	0.0	0.0	0.1	0.0	0.1	0.3	0.4	0.5	0.8	0.2
% <0.5	2.8	1.1	1.1	0.5	0.6	0.5	0.5	1.4	1.6	1.8	2.1	2.4	1.5
% <1.0	7.3	3.7	4.1	2.3	2.3	2.1	2.6	4.0	5.7	6.5	5.8	5.7	3.9
% ≥1.0	92.7	96.3	95.9	97.7	97.7	97.9	97.4	96.0	94.3	93.5	94.2	94.4	96.2

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

2nd Quarter – FY23

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.

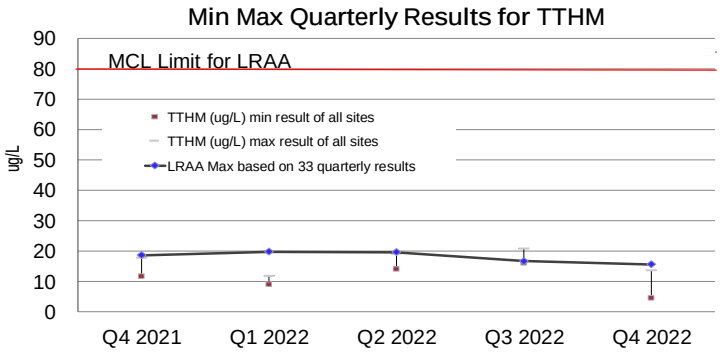
The locational running annual average calculated quarterly at each individual sampling location must be below the Total HAA5 or Total TTHM MCL standard. The charts below show the highest and lowest single values for all sites, and the LRAA of the highest location each quarter.

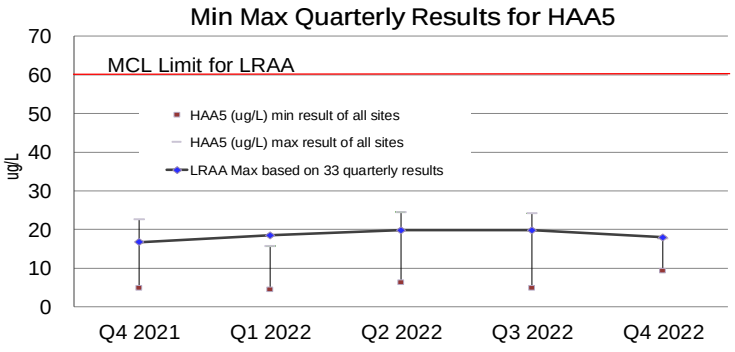
Partially served and CVA communities are responsible for their own compliance monitoring and reporting, and must be contacted directly for their individual results. The chart below combines data for all three CVA communities data (Chicopee, Wilbraham and South Hadley FD1). Each community is regulated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

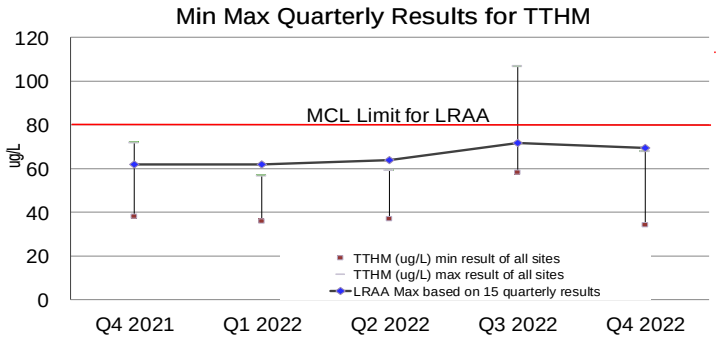
The LRAA for TTHMs and HAA5s for MWRA's Compliance Program (represented as the line in the top two graphs below) remain below current standards. The Max LRAA in the quarter for TTHMs = 15.6 ug/L; HAA5s = 18.0 ug/L. The current RAA for Bromate = 0.0 µg/L No LRAA exceedances or violations occurred this 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.

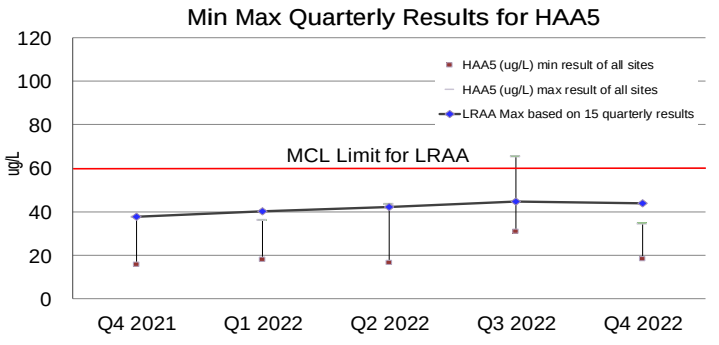
MetroBoston Disinfection By-Products





CVA Disinfection By-Products (Combined Results)

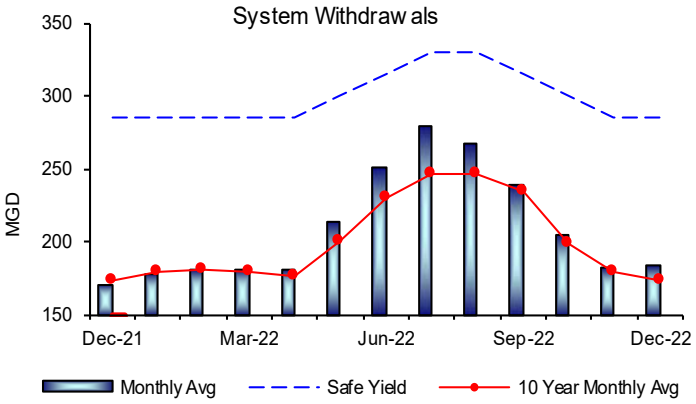


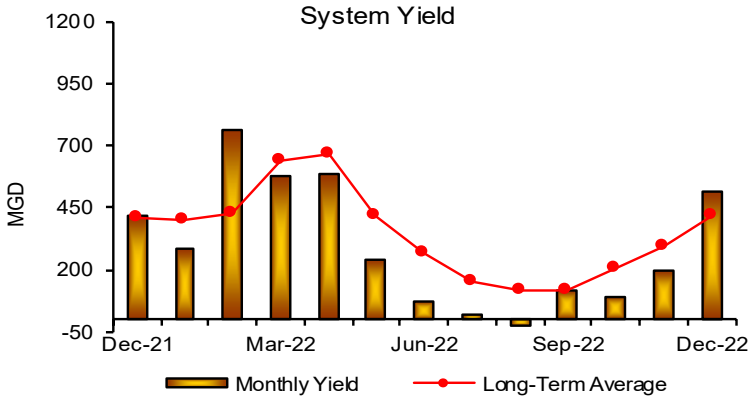


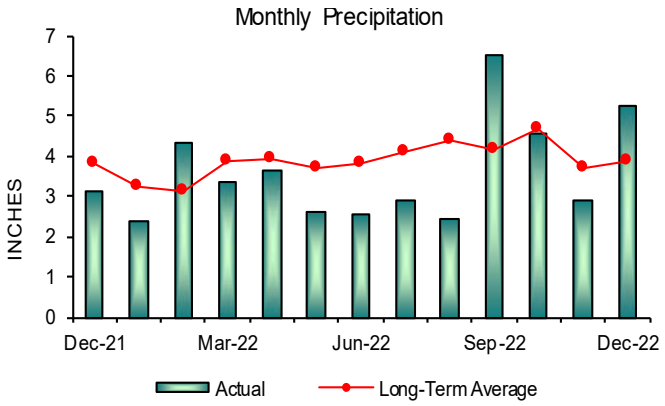
Water Supply and Source Water Management
2nd Quarter – FY23

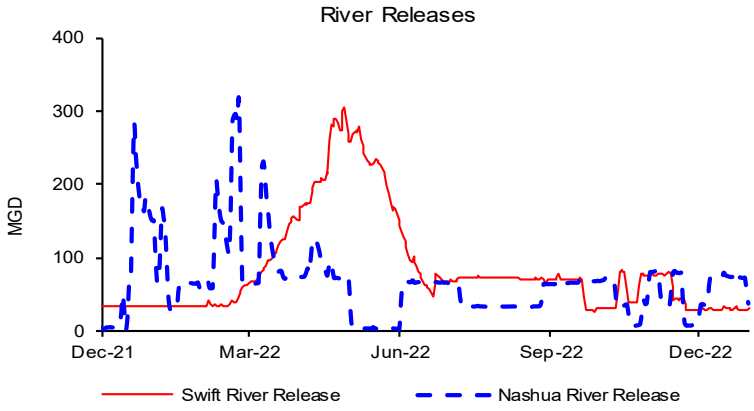
Background
A reliable supply of water in MWRA's reservoirs depends on adequate precipitation during the year and seasonal hydrologic inputs from watersheds that surround the reservoirs. Demand for water typically increases with higher summer temperatures and then decreases as temperatures decline. Quabbin 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.

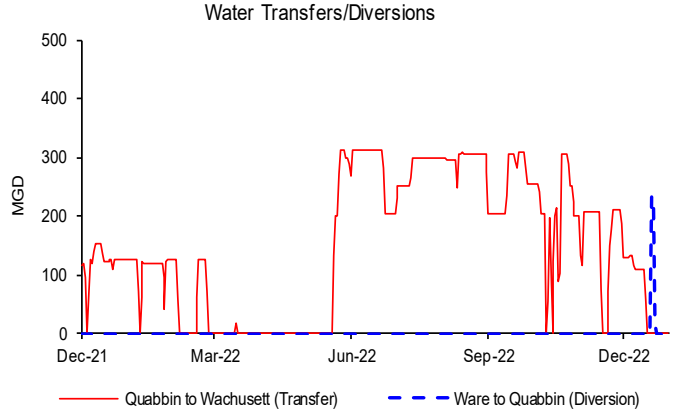
Outcome
The volume of the Quabbin Reservoir was at 88.0% as of December 31, 2022; a 0.70 % decrease for the quarter, which represents a loss of more than 3 billion gallons of storage and a decrease in elevation of 0.41'. System withdrawal and yield were below their long term quarterly averages. Precipitation was slightly above its long term quarterly average. Quabbin is in Normal Operating Range for this time of year.

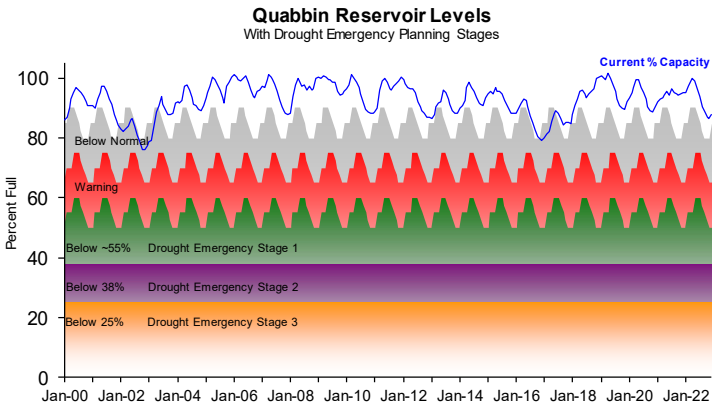












WASTEWATER QUALITY

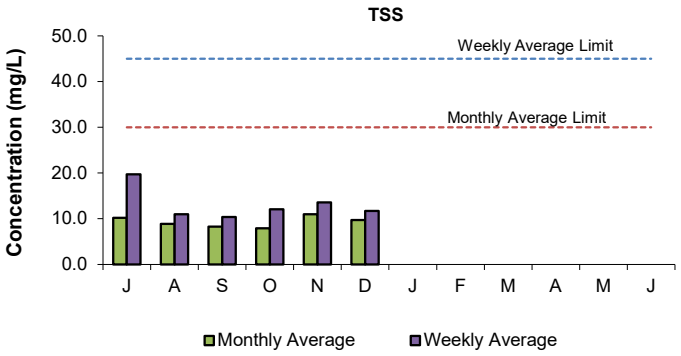
NPDES Permit Compliance: Deer Island Treatment Plant

2nd Quarter - FY23

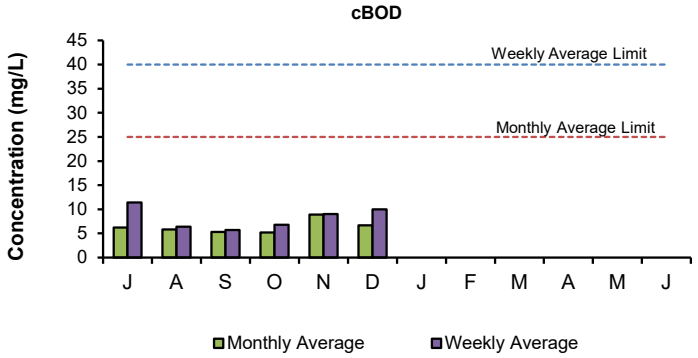
NPDES Permit Limits

Effluent Characteristics		*Units*	*Limits*	*October*	*November*	*December*	*2nd Quarter Violations*	*FY23 YTD Violations*
Dry Day Flow (365 Day Average):		mgd	436	256.6	246.5	248.3	0	0
cBOD:	Monthly Average	mg/L	25	5.2	8.9	6.7	0	0
	Weekly Average	mg/L	40	6.8	9.0	10.0	0	0
TSS:	Monthly Average	mg/L	30	7.9	11.0	9.7	0	0
	Weekly Average	mg/L	45	12.1	13.6	11.7	0	0
TCR:	Monthly Average	ug/L	456	0.0	0.0	1.5	0	0
	Daily Maximum	ug/L	631	0.0	0.0	23.3	0	0
Fecal Coliform:	Daily Geometric Mean	col/100mL	14000	31	27	341	0	0
	Weekly Geometric Mean	col/100mL	14000	7	7	12	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	6.4-6.9	6.4-6.9	6.5-6.9	0	0
PCB, Aroclors:	Monthly Average	ug/L	0.000045	UNDETECTED			0	0
Acute Toxicity:	Inland Silverside	%	≥50	77	93	>100	0	0
	Mysid Shrimp	%	≥50	72.9	91.4	>100	0	0
Chronic Toxicity:	Inland Silverside	%	≥1.5	25	25	50	0	0
	Sea Urchin	%	≥1.5	25	100	100	0	0

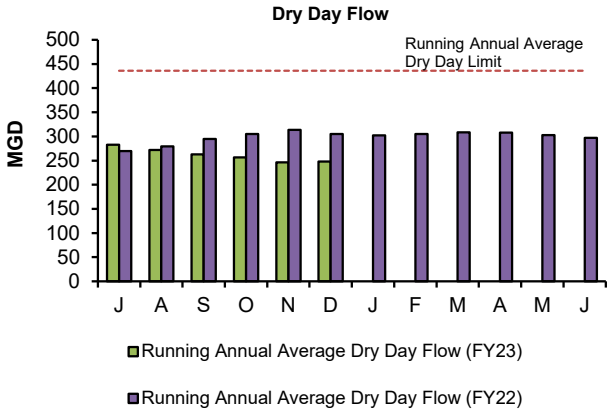
There have been no permit violations in FY23 to date at the Deer Island Treatment Plant (DITP).



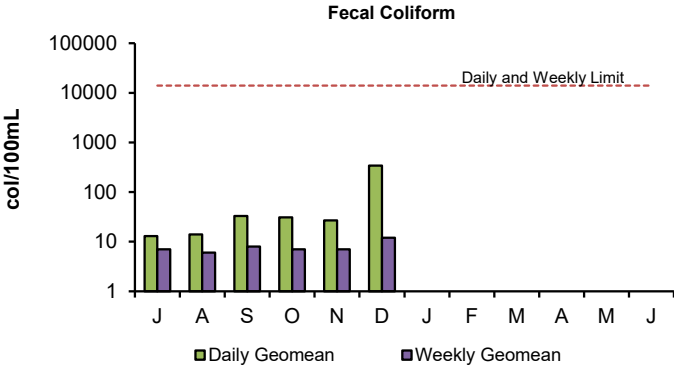
Total Suspended Solids (TSS) in the effluent is a measure of the amount of solids that remain suspended after treatment. All TSS measurements for the 2nd Quarter were within permit limits.



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 2nd 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 2nd 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 2nd Quarter, all permit conditions for fecal coliform were met.

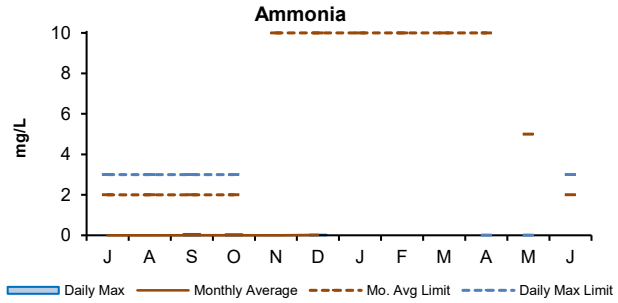
NPDES Permit Compliance: Clinton Wastewater Treatment Plant

2nd Quarter - FY23

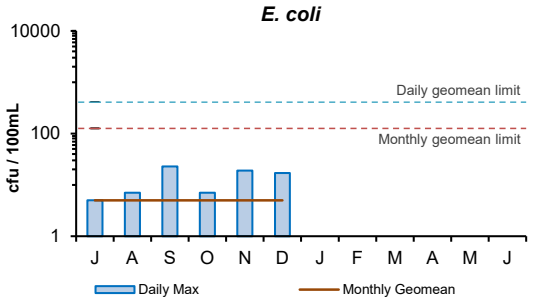
Effluent Characteristics		Units	Limits	October	November	December	2nd Quarter Violations	FY23 YTD Violations
Flow:	12-month Rolling Average:	mgd	3.01	2.51	2.36	2.38	0	1
BOD:	Monthly Average:	mg/L	20	1.4	1.8	2.0	0	0
	Weekly Average:	mg/L	20	1.5	2.8	2.8	0	0
TSS:	Monthly Average:	mg/L	20	1.3	2.2	3.8	0	0
	Weekly Average:	mg/L	20	1.5	3.0	5.1	0	0
pH:		SU	6.5-8.3	7.3-7.7	7.3-7.8	7.1-7.7	0	0
Dissolved Oxygen:	Daily Average Minimum:	mg/L	6	8.6	8.7	9.7	0	0
E. Coli:	Monthly Geometric Mean:	cfu/100mL	126	5	5	5	0	0
	Daily Geometric Mean:	cfu/100mL	409	7	19	17	0	0
TCR:	Monthly Average:	ug/L	17.6	0.13	0.00	0.00	0	0
	Daily Maximum:	ug/L	30.4	4.00	0.00	0.00	0	0
Copper:	Monthly Average:	ug/L	11.6	10.51	7.79	9.27	0	2
	Daily Maximum:	ug/L	14.0	11.10	7.79	10.00	0	0
Total Ammonia Nitrogen:	Monthly Average:	mg/L	10.0	0.01	0.00	0.02	0	0
November 1st - March 31st	Daily Maximum:	mg/L	35.2	0.05	0.00	0.03	0	0
Total Phosphorus:	Monthly Average:	ug/L	1000	56.0	157.8	196.5	0	0
November 1st - March 31st	Daily Maximum:	ug/L	RPT	168.0	383.0	233.0	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	1

There have been four permit violations in FY23 at the Clinton Treatment Plant.
1st Quarter: There were four permit violations in the first quarter. In July, plant flows exceeded the 12-month rolling average. July and August copper monthly averages exceeded the permit limit of 11.6 ug/L. The quarterly chronic toxicity result of 12.5% was below the minimum permit limit of 62.5%.
2nd Quarter: There were no permit violations in the second quarter.

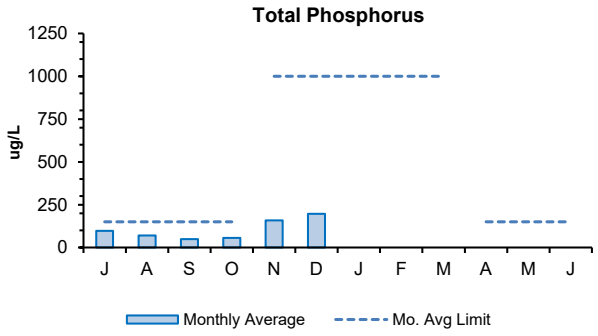
+ Toxicity testing at the Clinton Treatment Plant is conducted on a quarterly basis.



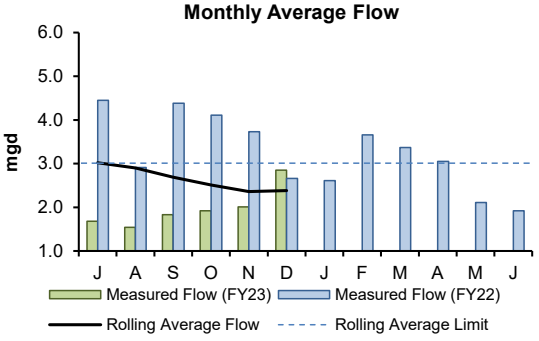
The 2nd Quarter's monthly average and daily maximum concentrations of ammonia were below the permit limits. The monthly average and daily maximum limits for the 2nd Quarter are variable. The permit limits are most stringent from June to October when warm weather conditions are most conducive to potential eutrophication.



E. coli is an indicator for the possible presence of pathogens. There were no violations of permit limits in the 2nd 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 2nd Quarter's monthly average concentrations for total phosphorus were below permit limits.

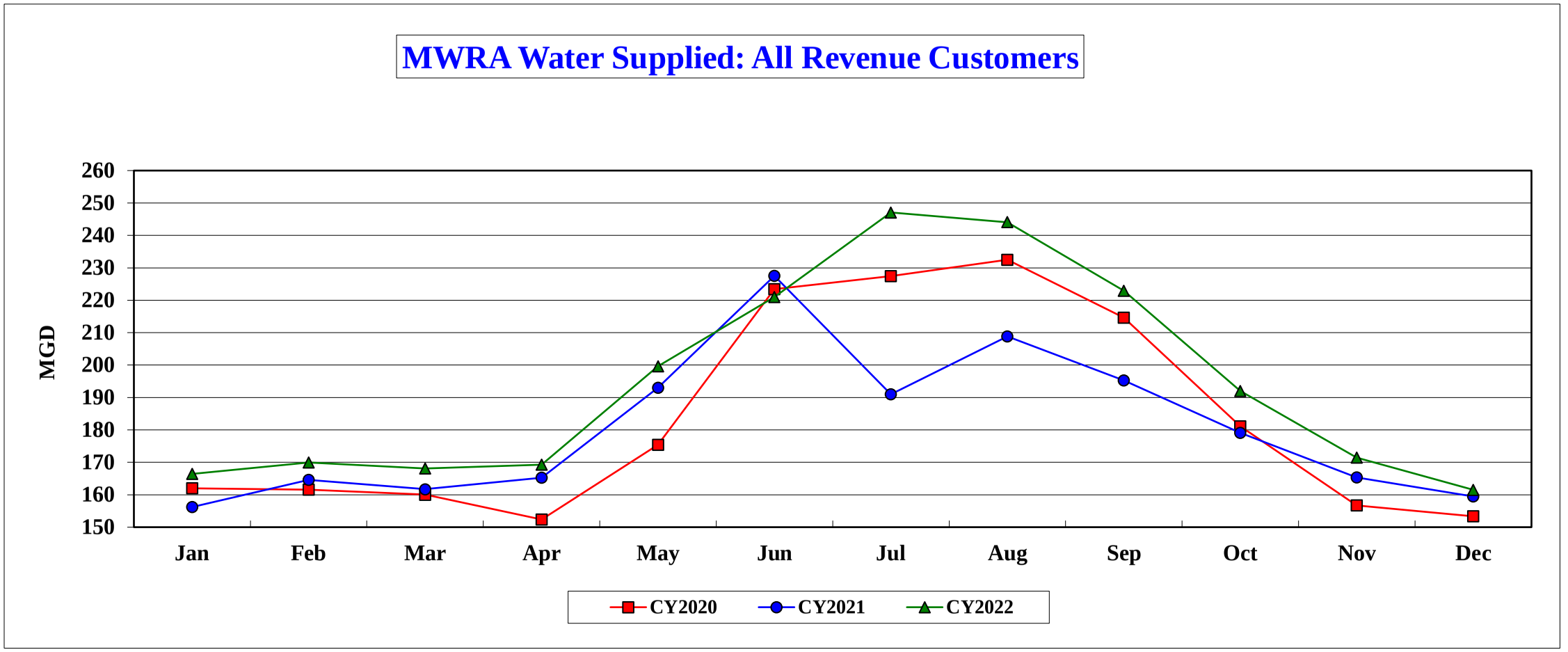


The graph depicts the rolling annual average monthly flow, measured in million gallons per day, exiting the plant.
The 12-month rolling average flows during the 2nd Quarter were below the permit limit.

COMMUNITY FLOWS AND PROGRAMS

Customer Water Use

2nd Quarter - FY23



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	183.462	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	180.641	180.641
CY2022	166.445	169.923	168.101	169.253	199.626	221.002	247.075	244.069	222.906	192.000	171.454	161.527	194.631	194.631

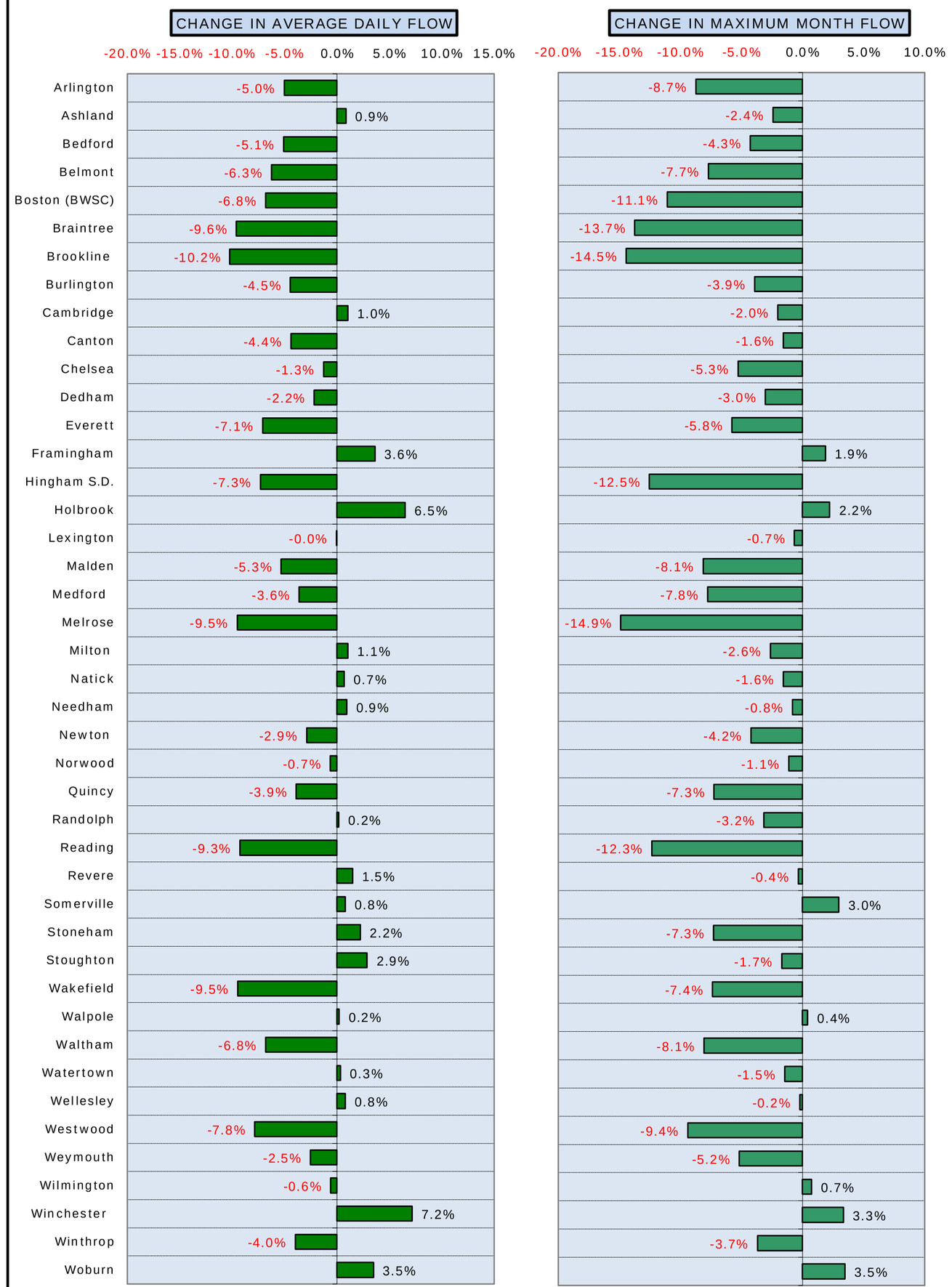
MG	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD Total	Annual Total
CY2020	5,022.510	4,684.968	4,960.567	4,571.025	5,438.470	6,702.146	7,051.078	7,207.384	6,438.520	5,614.399	4,701.821	4,754.375	67,147.263	67,147.263
CY2021	4,842.593	4,607.873	5,012.608	4,958.533	5,982.944	6,825.661	5,919.300	6,473.120	5,856.857	5,552.611	4,959.064	4,942.705	65,933.870	65,933.870
CY2022	5,159.791	4,757.839	5,211.126	5,077.587	6,188.394	6,630.049	7,659.321	7,566.152	6,687.180	5,951.985	5,143.609	5,007.333	71,040.367	71,040.367

The December 2022 Community Water Use Report was recently distributed to communities and customers served by the MWRA's 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.

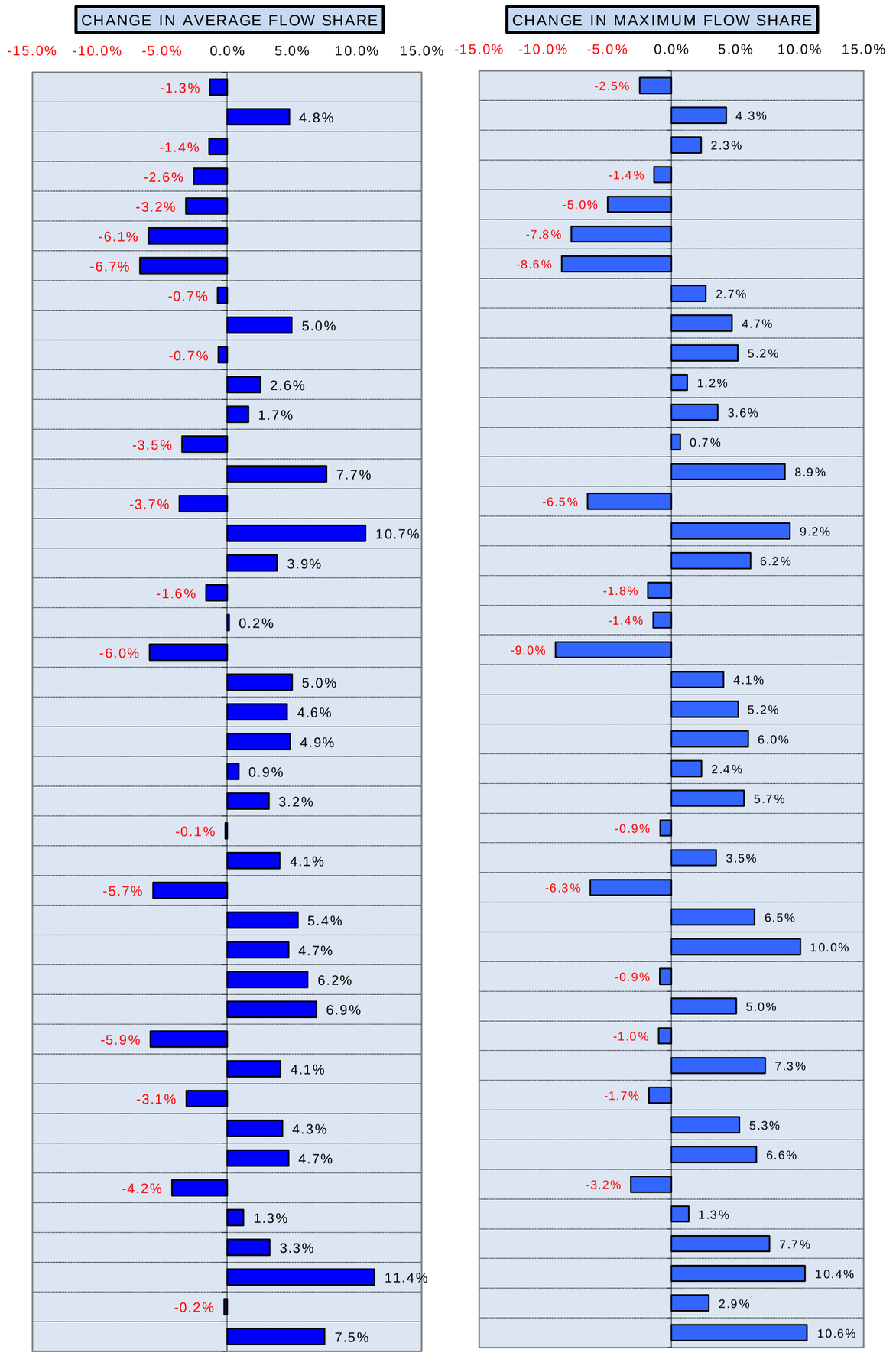
MWRA customers used an average of 175.0 mgd in the 2nd quarter (Oct-Dec 2022) of FY2023. This is an increase of 9.1 mgd or 5.5% compared to the average of the 2nd quarters in FY2020 and FY2021.

How CY2020-22 Community Wastewater Flows Could Effect FY2024 Sewer Assessments [1,2,3]

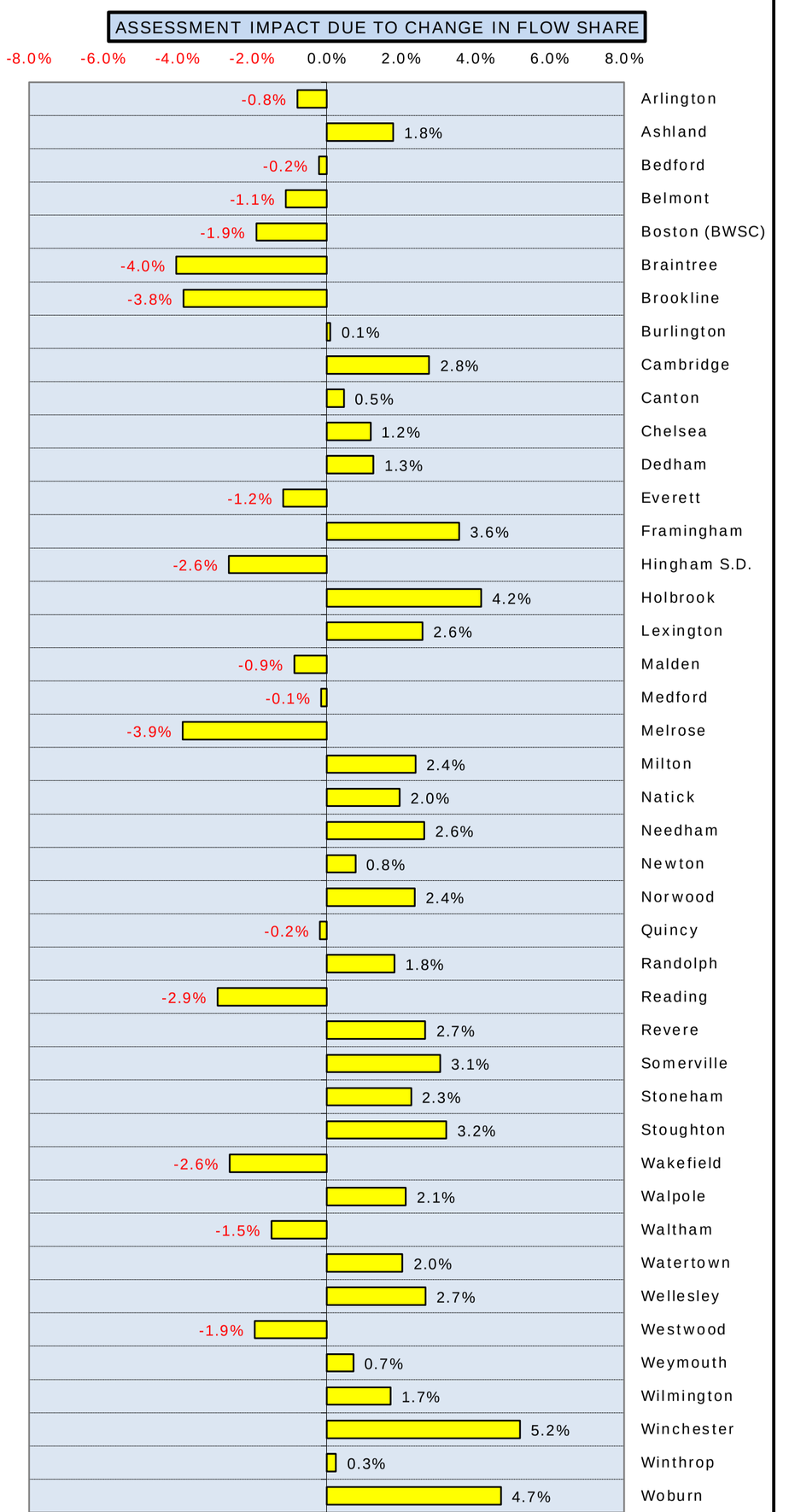
The flow components of FY2024 sewer assessments will be calculated using a 3-year average of CY2020 to CY2022 wastewater flows compared to FY2023 assessments that will use a 3-year average of CY2019 to CY2021 wastewater flows.



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, and January to March, and June to December 2020. April & May 2020 based on the average of 3 prior years, adjusted for 2020 water use. January to December 2021 estimated based on the average of the 3 prior years.

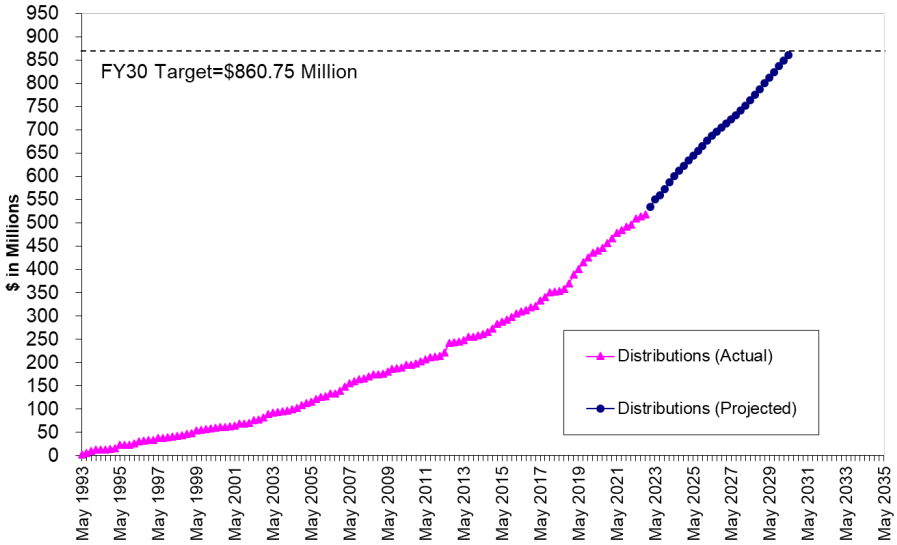
[3] Flow data is preliminary and subject to change pending additional MWRA and community review.

[4] Represents ONLY the impact on the total BASE assessment resulting from the changes in average and maximum wastewater FLOW SHARES.

Infiltration/Inflow Local Financial Assistance Program

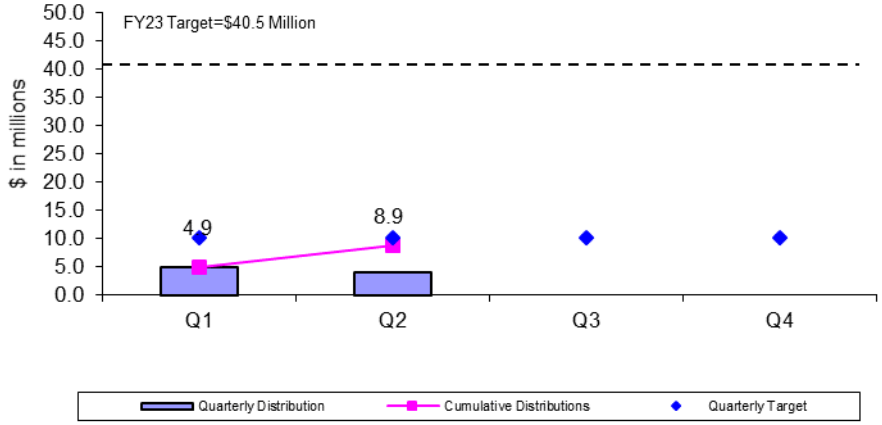
MWRA's Infiltration/Inflow (I/I) Local Financial Assistance Program provides $860.75 million in grants and interest-free loans (average of about $22 million per year from FY93 through FY30) to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned 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. Phase 14 funds (total $100 million) are distributed as 75% grants and 25% loans with interest-free loans repaid to MWRA over a ten-year period.

I/I Local Financial Assistance Program Distribution FY93-FY30



During the 2nd Quarter of FY23, $4.0 million in financial assistance (grants and interest-free loans) was distributed to fund local sewer rehabilitation projects in Bedford, Brookline and Watertown. Total grant/loan distribution to date for FY23 is $8.9 million. From FY93 through 2nd Quarter of FY23, all 43 member sewer communities have participated in the program and $519 million has been distributed to fund 651 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.

FY23 Quarterly Distributions of Sewer Grant/Loans

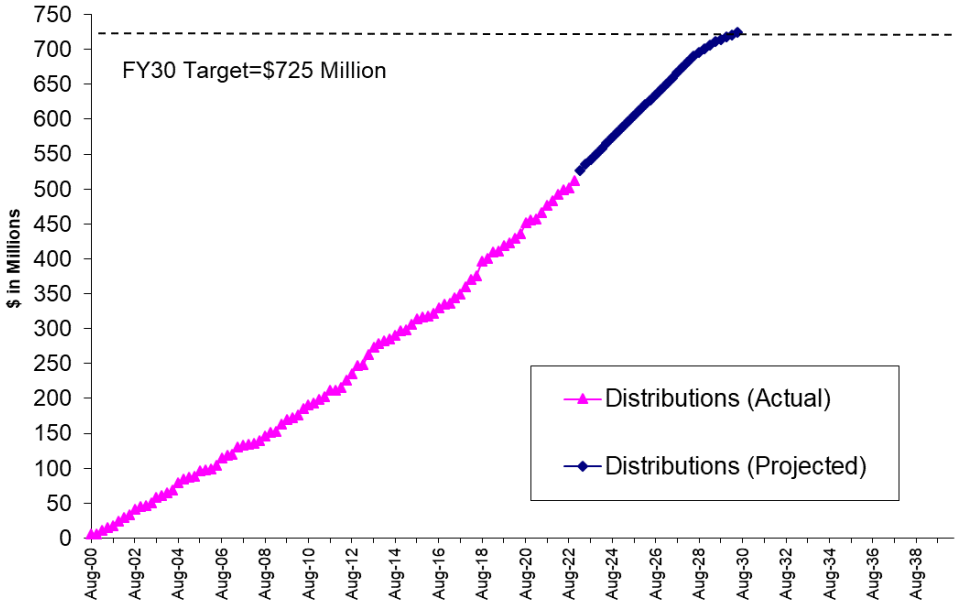


Community Support Programs
2nd Quarter – FY23

Local Water System Assistance Program

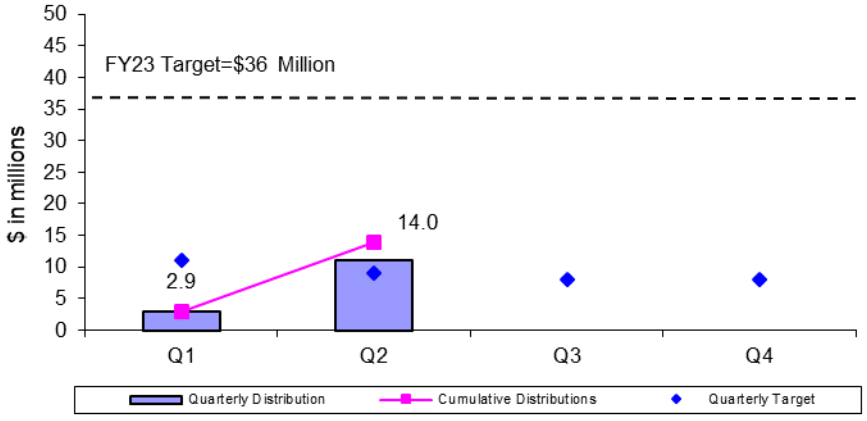
MWRA's Local Water System Assistance Programs (LWSAP) provides $725 million in interest-free loans (an average of about $24 million per year from FY01 through FY30) to member water communities to perform water main rehabilitation projects within their locally-owned water distribution systems. There have 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 FY25. The Phase 3 Water Loan Program is authorized for distributions FY18 through FY30.

Local Water System Assistance Program Distribution FY01-FY30



During the 2nd Quarter of FY23, $11.1 million in interest-free loans was distributed to fund local water projects in Medford, Watertown, Wellesley and Weston. Total loan distribution to date for FY23 is $14.0 million. From FY01 through the 2nd Quarter of FY23, $513 million has been distributed to fund 510 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.

FY23 Quarterly Distributions of Water Loans



Community Support Programs
2nd Quarter – FY23

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. To date, $34 million dollars have been distributed to 14 communities.

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.

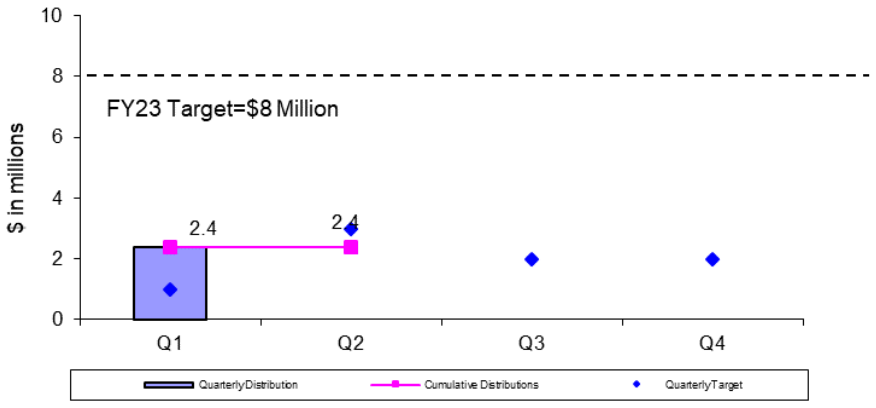
FY22 is the sixth year of the Lead Loan Program – MWRA made six Lead Loans.

FY23 is the seventh year in the Lead Loan Program – MWRA made three Lead Loans in the first two quarters.

Summary of Lead Loans:

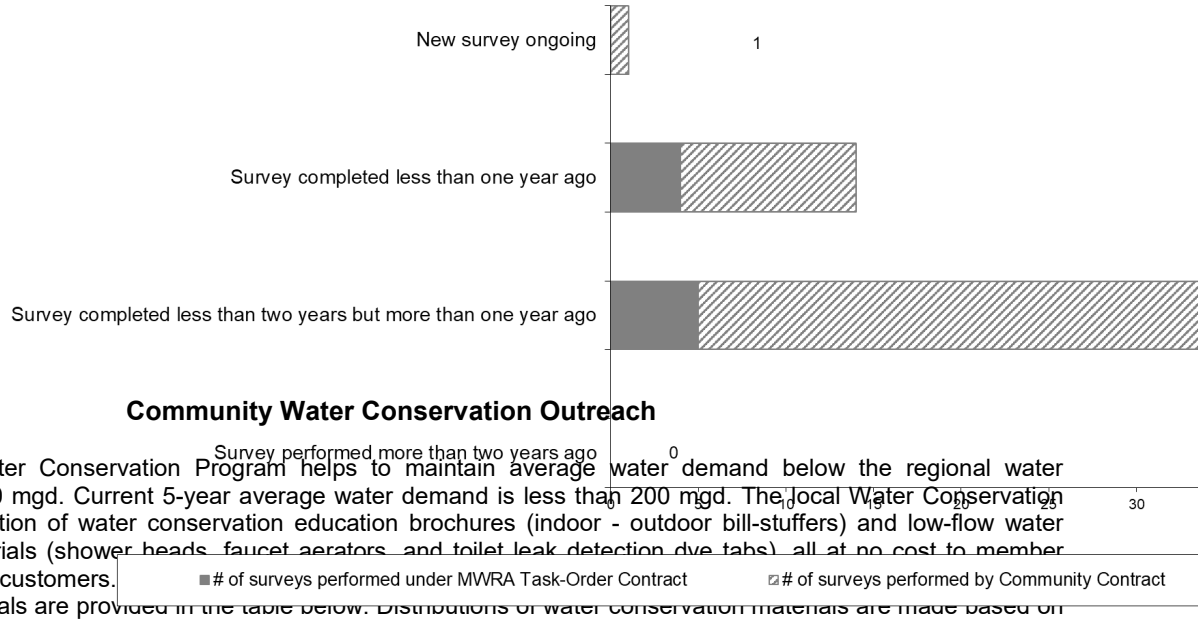
Reading in FY23	$1.5 Million	Marlborough in FY19	$1.0 Million
Watertown in FY23	$0.3 Million	Winthrop in FY19	$0.5 Million
Winchester in FY23	$0.6 Million	Chelsea in FY19	$0.1 Million
Everett in FY22	$1.5 Million	Everett in FY19	$1.0 Million
Boston in FY22	$0.9 Million	Needham in FY18	$1.0 Million
Winthrop 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	Winchester in FY17	$0.5 Million
Boston in FY21	$2.6 Million	TOTAL	$34 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		

FY23 Quarterly Distributions of Lead Service Line Replacement Loans



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 2nd Quarter of FY23, 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. 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	17,985	16			18,001
Low-Flow Fixtures (showerheads and faucet aerators)	10,000	2,302	46			2,348
Toilet Leak Detection Dye Tablets	_____	3,151	21			3,172

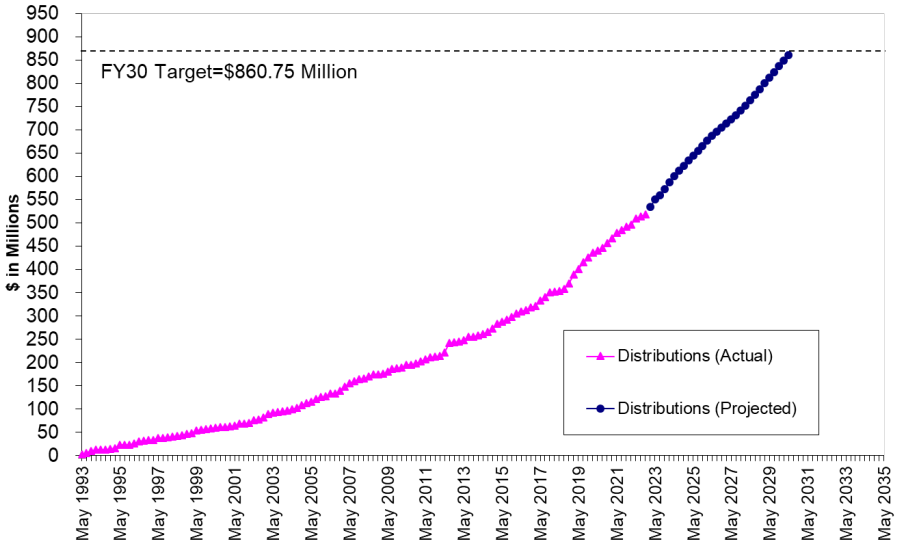
Community Support Programs

2nd Quarter – FY23

Infiltration/Inflow Local Financial Assistance Program

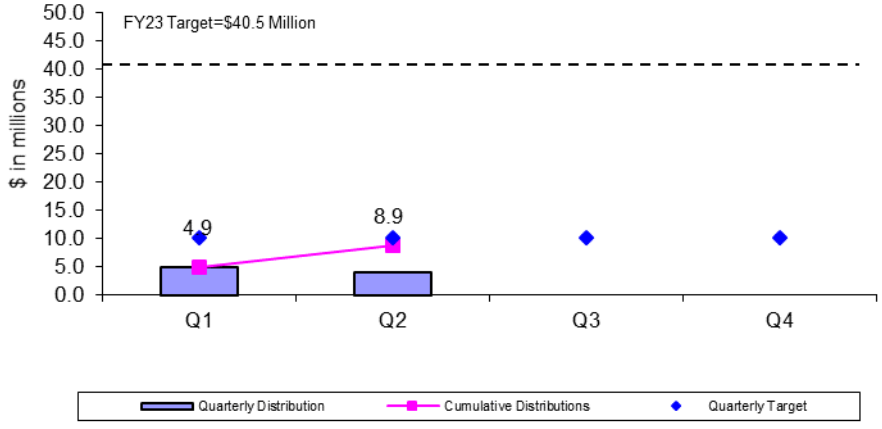
MWRA's Infiltration/Inflow (I/I) Local Financial Assistance Program provides $860.75 million in grants and interest-free loans (average of about $22 million per year from FY93 through FY30) to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned 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. Phase 14 funds (total $100 million) are distributed as 75% grants and 25% loans with interest-free loans repaid to MWRA over a ten-year period.

I/I Local Financial Assistance Program Distribution FY93-FY30



During the 2nd Quarter of FY23, $4.0 million in financial assistance (grants and interest-free loans) was distributed to fund local sewer rehabilitation projects in Bedford, Brookline and Watertown. Total grant/loan distribution to date for FY23 is $8.9 million. From FY93 through 2nd Quarter of FY23, all 43 member sewer communities have participated in the program and $519 million has been distributed to fund 651 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.

FY23 Quarterly Distributions of Sewer Grant/Loans



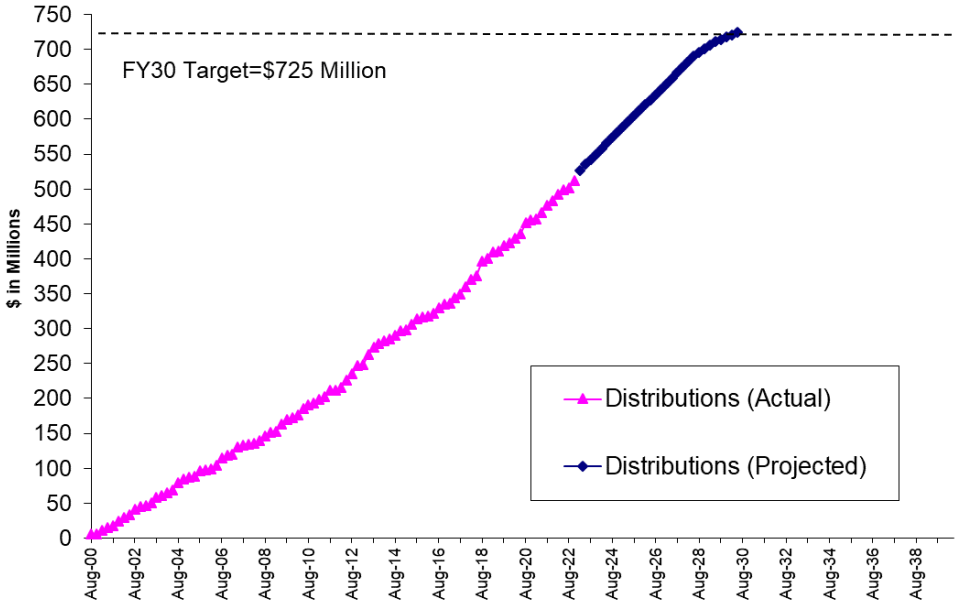
Community Support Programs

2nd Quarter – FY23

Local Water System Assistance Program

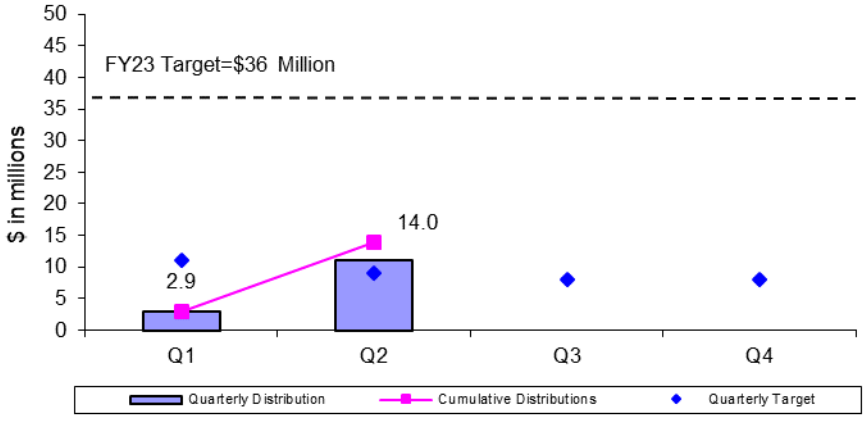
MWRA's Local Water System Assistance Programs (LWSAP) provides $725 million in interest-free loans (an average of about $24 million per year from FY01 through FY30) to member water communities to perform water main rehabilitation projects within their locally-owned water distribution systems. There have 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 FY25. The Phase 3 Water Loan Program is authorized for distributions FY18 through FY30.

Local Water System Assistance Program Distribution FY01-FY30



During the 2nd Quarter of FY23, $11.1 million in interest-free loans was distributed to fund local water projects in Medford, Watertown, Wellesley and Weston. Total loan distribution to date for FY23 is $14.0 million. From FY01 through the 2nd Quarter of FY23, $513 million has been distributed to fund 510 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.

FY23 Quarterly Distributions of Water Loans



Community Support Programs
2nd Quarter – FY23

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. To date, $34 million dollars have been distributed to 14 communities.

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.

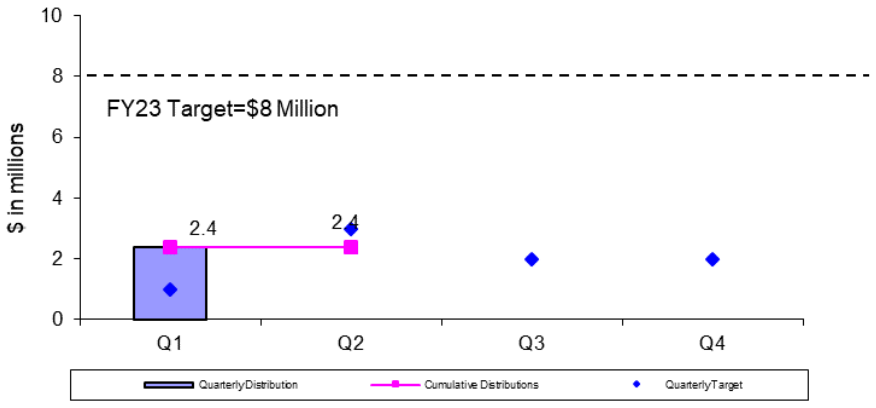
FY22 is the sixth year of the Lead Loan Program – MWRA made six Lead Loans.

FY23 is the seventh year in the Lead Loan Program – MWRA made three Lead Loans in the first two quarters.

Summary of Lead Loans:

Reading in FY23	$1.5 Million	Marlborough in FY19	$1.0 Million
Watertown in FY23	$0.3 Million	Winthrop in FY19	$0.5 Million
Winchester in FY23	$0.6 Million	Chelsea in FY19	$0.1 Million
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	Winchester in FY17	$0.5 Million
Boston in FY21	$2.6 Million	TOTAL	$34 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		

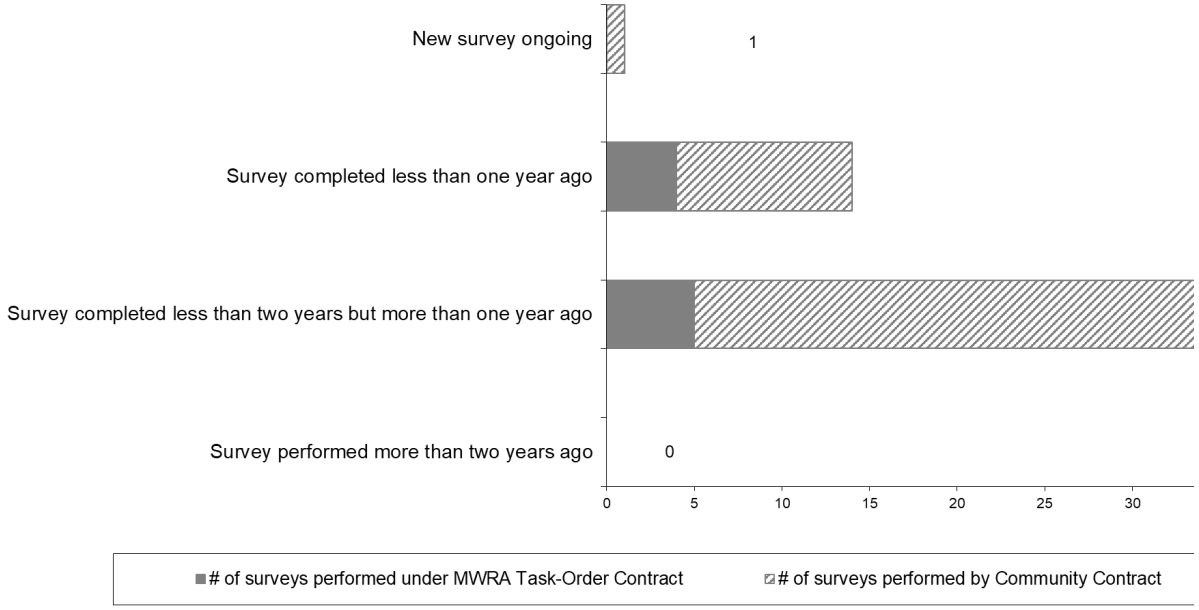
FY23 Quarterly Distributions of Lead Service Line Replacement Loans



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 2nd Quarter of FY23, all member water communities were in compliance with MWRA's Leak Detection Regulation.

Community Water Conservation Outreach



	Annual Target	Q1	Q2	Q3	Q4	Annual Total
Educational Brochures	100,000	17,985	16			18,001
Low-Flow Fixtures (showerheads and faucet aerators)	10,000	2,302	46			2,348
Toilet Leak Detection Dye Tablets	_____	3,151	21			3,172

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.

BUSINESS SERVICES

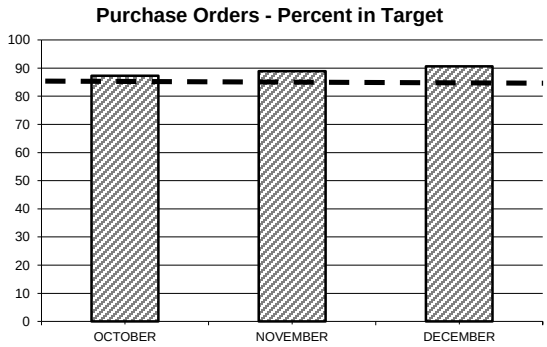
Procurement: Purchasing and Contracts

2nd Quarter - FY23

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

Outcome: Processed 93% of purchase orders within target; Average Processing Time was 5.04 days vs. 4.85 days in Qtr 2 of FY22. Processed 33% (2 of 6) of contracts within target timeframes; Average Processing Time was 199 days vs. 217 days in Qtr 2 of FY22.

Purchasing



	No.	TARGET	PERCENT IN TARGET
$0 - $500	461	3 DAYS	88.5%
$500 - $2K	558	7 DAYS	95.5%
$2K - $5K	481	10 DAYS	96.8%
$5K - $10K	75	25 DAYS	88.0%
$10K - $25K	60	30 DAYS	78.3%
$25K - $50K	14	60 DAYS	100.0%
Over $50K	29	90 DAYS	89.6%

The Purchasing Unit processed 1678 purchase orders, 27 more than the 1651 processed in Qtr 2 of FY22 for a total value of $11,782,181 versus a dollar value of $19,232,725 in Qtr 2 of FY22.

The purchase order processing target was not met for the $10K - $25K category due to end user evaluations and price confirmations.

Contracts, Change Orders and Amendments

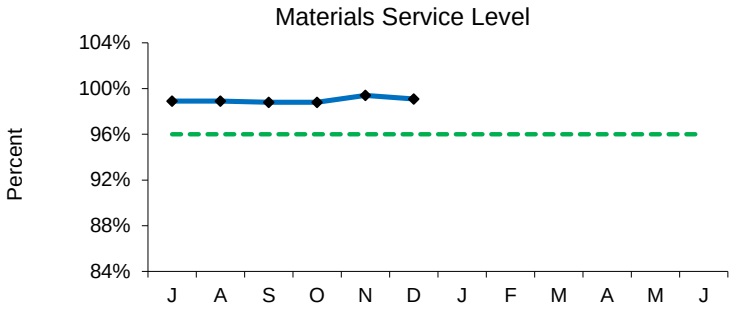
Procurement executed six contracts with a value of $3,859,265 and seven amendments with a value of $30,900. Seventeen change orders were executed during the period. The dollar value of all non-credit change orders during Qtr 2 was $1,612,079 and the value of credit change orders was ($635,848).

Four contracts were not processed within the target timeframes. One contract was delayed due to additional revisions to the scope of work necessitated by the complexity of the tasks in addition to staffing changes. The second contract was delayed due to several changes to the scope of work and dollar amount as well as additional time required to approve a replacement project manager due to a conflict of interest. Another contract was delayed due to the need to schedule a second pre-bid conference due to non-submittals. Once the contract was awarded, there were additional delays by the company submitting their financial statements. The final contract was delayed due to the necessary approval by the City of Chelsea.

Staff reviewed 35 proposed change orders and 27 draft change orders.

Materials Management

2nd Quarter - FY23



The service level is the percentage of stock requests filled. The goal is to maintain a service level of 96%. Staff issued 7,093 (99.1%) of the 7,157 items requested in Q2 from the inventory locations for a total dollar value of $1,982,163.

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 '22 base level ($8.3 million) by 2.0% (approximately $167,437), to $8.2 million by June 30, 2023.

Items added to inventory this quarter include:

- Deer Island – heater, actuator, condensate pump for HVAC; butterfly valve, expansion joints, couplings, converter and pressure regulator for Maintenance; adapters, ells, unions, elbows, couplings and tees for Plumbers; deodorizers for Facilities; contact tips for Welders.
- Chelsea – flanges, valves, elbows, tees, reducers, adapters and unions for Plumbers; air release valves, filter elements and gear boxes for Field Operations; wall mount brackets, sling wire rope, resistors and gaskets for Metering.
- Southboro – there were no new adds.

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Property Pass Program:

- Thirteen audits were conducted during Q2.
- Scrap revenue received for Q2 amounted to $11,870. Year to date revenue received amounted to $19,746.
- Revenue received from online auctions held during Q2 amounted to $71,379. Year to date revenue received amounted to $177,630.

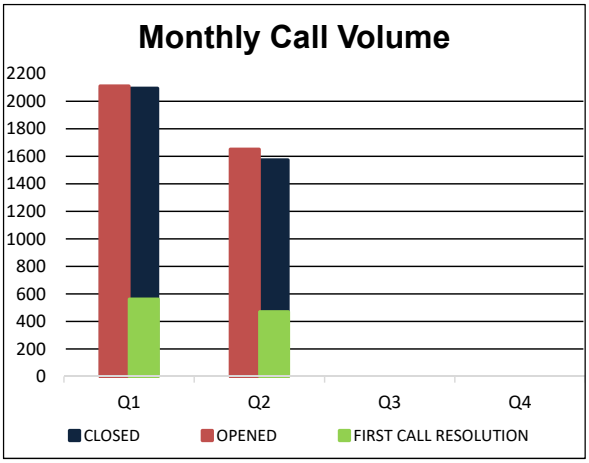
Items	Base Value July-22	Current Value w/o Cumulative New Adds	Reduction / Increase To Base
Consumable Inventory Value	8,371,867	8,278,431	-93,436
Spare Parts	9,447,310	9,549,328	102,018
Total	17,819,177	17,827,759	8,582

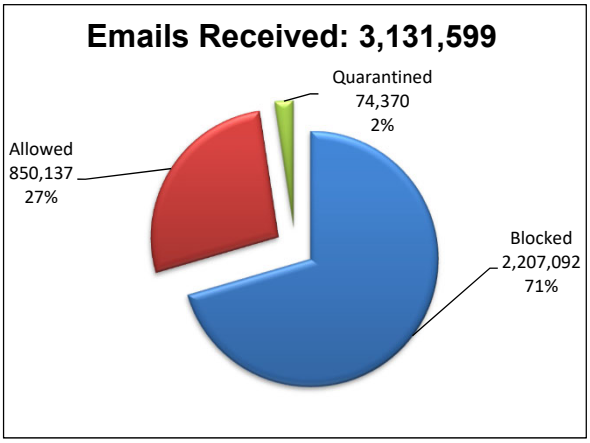
Note: New adds are items added at an inventory location for the first time for the purpose of servicing a group/department to meet their business needs/objectives.

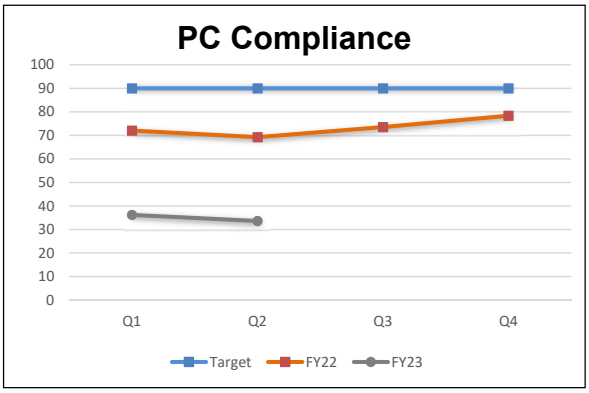
MIS Program

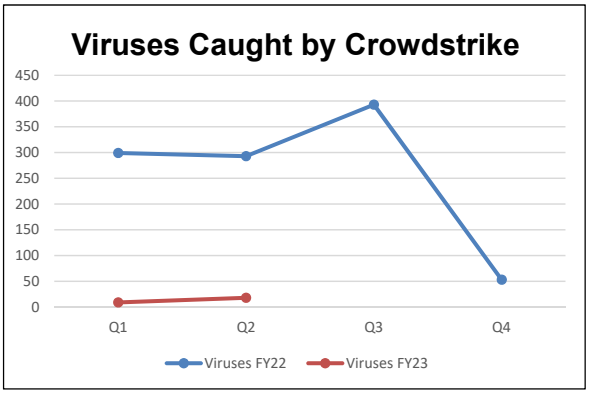
2nd Quarter – FY23

Numbers & Statistics









Project Updates

Infrastructure & Security

Managed Security Services Contract: NTP & go-live occurred during Q2. Additional onboarding tasks also occurred during Q2, in preparation for Task 1 (design review and validation) activities to occur in Q3.

Firewall Replacement: New Fortinet firewalls for DITP and intrusion detection sensors at Chelsea, DITP, and Marlborough have gone live. Remote sites' firewalls are still being configured and will be rolled out during Q3, as sites come online (with Comcast).

Single Sign-on (SSO): Okta has been deployed and is now working.

Forticlient VPN Solution: Fortinet VPN has been implemented. MIS began migrating all users and vendors to the new Fortinet solution.

PBX (Telephone System Upgrade): VOIP phones roll-out completed for all site except DITP. Cabling conduit paths are required in order to upgrade cabling to support VOIP phones in all building.

Expansion of Wi-Fi Networking: DITP wireless network implementation on hold pending completion of construction.

Other Software & Custom Applications

ECM/Electronic Document Management: Processed Task Order 2 to address additional meetings needed from the SME redesigns and the Okta integration. Finalized scope and held sessions with technical teams to integrate our ECM platform with Okta. Focusing on Records Management (RM) for planned roll out in April. Tested system functionality around borrowing, transferring, and dispositioning and reviewed RM related out-of-the-box reports. Continued to work on data prep for full data migration.

MWRA Website Refresh: Procurement process continues. RFQ/P portal posting closed in mid-December; Eight responsive bids were received. Selection Committee will hold demos for finalists and expect to select a winner in January.

InspectNTrack Upgrade: User Acceptance Testing (UAT) has begun and is expected to continue through the end of January. MIS continued evaluating and establishing the base configuration for the iPad scanner devices and is reviewing the Wastewater Op Water Meters report in the upgraded system. Implementation of the upgraded application is expected in February.

BOE Upgrade: The contractor is continuing to migrate the ENQUAL Discoverer reports, having completed 20/61 workbooks and 80/499 reporting worksheets thus far. MIS and the end users are validating each as they become available.

Maximo/Lawson Interface: The vendor Starboard process of finalizing the process flow documentation including the IT Storeroom requirements. Interface development has continued and is approximately 60% complete at this point.

Library, Record Center, & Training

Library: Undertook 10 research requests, supplied 18 books for circulation, provided 10 new books and 1 new standard (aside from subscription). The MWRA Library Portal supported 474 end user searches, including: PFAS state activity tracker, water tank inspection, historic drawings of Charlestown Pump Station, decreasing DBP in water tanks.

Record Center (RC): The Record Center added 319 new boxes (595 YTD), handled 356 total boxes (845 YTD), and shredded 22, 65 gallon bins (58 YTD) and 3, 96 gallon bins (11 YTD) of confidential documentation on-site. It performed database/physical box searches for multiple departments, which saved the delivery of physical boxes and resulted in scanning of 379 images to the end user.

Training: In Q2, 19 online IT lessons were taken (71 YTD), by 21 employees, spanning 60 hours (135 YTD). 0 standard class lessons were taken.

Legal Matters
2nd Quarter - FY2023

PROJECT ASSISTANCE

Real Estate, Contract, Environmental and Other Support:

- **8(m) Permits and License Agreements:** Reviewed one hundred and fifteen (115) 8(m) permits, including any related MEPA Section 61 findings. Reviewed two (2) wastewater direct connect permits.

- **Real Property**: Drafted licenses for the Arlington Housing Authority and the Town of Lexington related to temporary use of land needed for MWRA Contract 6224 - Siphon and Junction Structure Rehabilitation. Reviewed plans and commenced drafting documents related to land acquisitions for MWRA Contract 6224 - Siphon and Junction Structure Rehabilitation. Reviewed legislation and real property rights related to Norumbega Covered Storage facility. Reviewed T-Mobile Northeast wireless agreement for use of MWRA's Walnut Hill facility in Arlington. Finalized and recorded grant of permanent and temporary easements and plan for MWRA Contract 7117 - Northern Intermediate High Section 89 Replacement Pipeline. Finalized consent letters to owners of property in Chelsea related to construction work for MWRA's Contract OP-339 Eastern Avenue/Griffin Way Traffic Signalization. Drafted staff summary and draft easement language related to the proposed relocation of MWRA's Section 80 water main located at the MBTA's Riverside Green Line Station property in Newton by the developer of the Riverside Station Redevelopment Project. Reviewed draft grant of easement document and easement plan related to DCAMM's grant of easement to the Town of Hingham and drafted grant of easement language for easement from DCAMM to MWRA related to MWRA's access to its Hingham Pump Station. Reviewed property rights in Newton. Researched property rights for bridge located over the Wachusett Aqueduct, Northborough. Reviewed property rights for parcels of interest for Tunnel Redundancy Program and Article 97 restrictions. Finalized lease for Core Storage Facility for Tunnel Redundancy. Reviewed and updated draft legislation for real property disposition in Quincy.

- **Energy:** Assisted MWRA Finance with favorable resolution of a billing dispute with a gas local distribution company regarding an MWRA facility account. Reviewed and prepared summary regarding electricity local distribution company “opt-in” tariff provision in MWRA’s WR rate for transmission service pricing. Reviewed contract with the Mass CEC regarding a grant under the Commonwealth Hydro program. Assisted energy team with Site Host Agreement with local electrical utility regarding electric vehicle charging infrastructure at MWRA facility.

- **Environmental/NPDES:** Finalized comments regarding U.S. EPA’s proposed rule designating PFOA and PFOS (collectively “PFAS”) as CERCLA Hazardous Substances. Supported the preparation of comments regarding proposed revisions to the implementing regulations under (a) the Massachusetts Environmental Policy Act; and (b) the Water Management Act. Finalized a Memorandum of Understanding and Financial Assistance Agreement with the Boston Water and Sewer Commission for the implementation of Fort Point Channel and Mystic/Chelsea Confluence Combined Sewer Overflow Control Projects. Reviewed section 308(b)(1)(2) of the Clean Water Act and provided assistance to ENQUAL staff regarding categorizing public record data/information as shared with EPA, other agencies, and individuals.

- **Miscellaneous:** Archived records for Law Division. Updated memorandum on archiving procedures following current practices of Records Center. Reviewed documents for submission to Records Conservation Board for disposition. Reviewed MIS policies concerning video surveillance, physical security program and terminated employee data. Reviewed property information and updating addresses for MWRA facilities on Deer Island. Verified updates to commonly used codes using the current edition of the Massachusetts Statewide Records Retention Schedule. Assisted with securing electrical inspection for Chelsea Facility by DPS pursuant to MWRA Enabling Act Section 8(k).

Reviewed renewable energy supply contract for request concerning replacement of parental guarantee and release agreement.

- **Public Records Requests:** During the 2nd Quarter of FY23, MWRA received and responded to **One Hundred Fifty-one (151)** public records requests.

LABOR, EMPLOYMENT AND ADMINISTRATIVE

New Matters

Unemployment appeal involving a former employee who claims resignation was due to childcare needs.

Unemployment appeal of a determination that former employee's discharge was not attributable to deliberate misconduct in willful disregard of the employing unit's interest.

Arbitration demand alleging MWRA violated the collective bargaining agreement when it approved an employee overtime rather than callback pay.

Arbitration demand alleging MWRA violated the collective bargaining agreement when it approved an employee overtime rather than callback pay.

Arbitration demand alleging MWRA violated the collective bargaining agreement by reclassifying an employee's position without bargaining over a new pay rate.

Charge filed with the Massachusetts Commission Against Discrimination alleging unlawful discipline based on gender identity and in retaliation for protected activity.

Matters Concluded

Received an arbitrator's decision in favor of the MWRA in a grievance alleging that the Authority violated the collective bargaining agreement by failing to compensate employees who routinely worked unapproved compensatory time during their meal breaks.

A union withdrew a demand for arbitration in a grievance alleging a new employee should have been hired at a higher step in grade after the union and MWRA entered into an agreement regarding a recruitment rate pilot program

A union withdrew a demand for arbitration in a grievance alleging an employee's required use of accrued leave under MWRA's COVID safety protocols was in violation of the collective bargaining agreement.

The Massachusetts Department of Labor Relations dismissed a charge of prohibited practice filed by a union in connection with the MWRA's COVID vaccination requirement after a period of administrative closure.

Received a decision from the Department of Unemployment Assistance in favor of the MWRA in connection with an appeal of unemployment benefits wherein the DUA concluded that the individual failed to establish that he left his job with good cause attributable to the employer or involuntarily for urgent, compelling, and necessitous reasons.

A union withdrew a charge of prohibited practice at the Massachusetts Department of Labor Relations alleging that MWRA violated M.G.L. c. 150E, sections 10(a)(1) and (a)(5), when it posted a position in Unit 3 without bargaining with Unit 2.

LITIGATION/CLAIMS

New Lawsuits/Claims:

Massachusetts Water Resources Authority v National Association of Government Employees, Local R1-168, Suffolk Superior Court, 2284CV02453. On October 28, 2022, MWRA filed a complaint in Suffolk Superior Court seeking to vacate an arbitrator's award. MWRA alleges that the arbitrator exceeded his authority by requiring MWRA to negotiate over the wage, and by implication, the contents of a job posting. MWRA maintains that the arbitrator's award infringes on MWRA's non-delegable managerial rights, grants relief beyond which the parties bound themselves during bargaining negotiations, and contravenes public policy.

Jon Eldridge, et. al. v. City of Framingham, MWRA and RJV Construction Corporation, Middlesex Superior Court, 2281CV03049. This is a personal injury lawsuit filed on August 12, 2022 but served on November 7, 2022 arising from an alleged fall at the site of a construction project involving the City of Framingham and a general contractor, RJV Construction Corp. The project involved water and sewer repairs including, without limitation, the replacement of sewer pipe along the eastbound direction of Worcester Road. The project was funded, in part, by MWRA's I/I Local Financial Assistance Program.

RE: Edward Marques; MVA Claim: MWRA received a demand letter with respect to a personal injury claim arising out of a motor vehicle accident that occurred with an MWRA vehicle on November 29, 2021, in Braintree, MA.

RE: Jorge Amaya; MVA Claim: MWRA received a personal injury claim arising from a motor vehicle accident that occurred on March 16, 2021 involving an MWRA vehicle, in Chelsea, MA.

Significant Developments:

Conservation Law Foundation (CLF) v. MWRA, D. Mass. Case No. 1:22-cv-10626-AK**:** On July 19, 2022, MWRA filed an Objection to Lack of Relatedness Designation and a Motion of Reassignment; and on September 23, 2022, the Authority filed a Motion to Dismiss the suit. CLF opposed both motions. In October 2022, the parties filed further pleadings regarding the Authority's Motion to Dismiss. To date, no decision has been made by the Court on either of MWRA's motions.

Closed Cases:

In re: Mercedes-Benz Emissions Litigation, United States District Court for the District of New Jersey, 16-cv-881 (KM) (ESK). Law Division was notified of a class action lawsuit relating to six Mercedes-Benz or Sprinter Blue TEC II diesel vehicles owned or previously owned by MWRA, for which settlement payments may be available following approved emissions modifications. MWRA previously filed a claim and received payment for a vehicle that it sold. In September 2022, MWRA filed claims for the remaining five vehicles. On November 7, 2022, MWRA received a class action settlement payment in the total amount of $17,950 for those vehicles. This matter is now closed.

Closed Claims:

There are no closed claims to report.

Subpoenas:

During Second Quarter FY 2023, no subpoenas were received and no subpoenas were 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 Dec 2022	As of Sept 2022	As of June 2022
Construction/Contract/Bid Protest	0	0	0
Tort/Labor/Employment	3	1	4
Environmental/Regulatory/Other	4	4	3
Eminent Domain/Real Estate	0	0	0
Total	**7**	**5**	**7**
Other Litigation matters (restraining orders, class action lawsuit, etc.)	1	2	2
Total – all pending lawsuits	**8**	**7**	**9**
Claims not in suit: 3 MVA Claims	3	0	0
Bankruptcy	2	1	1
Wage Garnishment	2	2	2
TRAC/Adjudicatory Appeals	1	0	0
Subpoenas	0	0	0
TOTAL – ALL LITIGATION MATTERS	**16**	**10**	**12**

TRAC/MISC.

New Appeals: There was one new appeal in the 2nd Quarter FY 2023: IN RE: 1058 Beacon Street, Newton, MA; MWRA Docket No. 22-01. A developer, 1058 Beacon Street, LLC, has filed a claim for an adjudicatory proceeding in response to an administrative order by MWRA, which ordered the removal of a fence on MWRA property.

Settlement by Agreement of Parties There were no Settlements by Agreement of Parties in the 2nd Quarter FY 2023.

Stipulation of Dismissal No Stipulations of Dismissal were filed in 2nd Quarter FY 2023.

Notice of Dismissal Fine paid in full No Notices of Dismissal for Fines Paid in Full were filed in the 2nd Quarter FY 2023.

Tentative Decision No Tentative Decisions were issued in the 2nd Quarter FY 2023.

Final Decisions No Final Decisions were issued in the 2nd Quarter FY 2023.

INTERNAL AUDIT AND CONTRACT AUDIT ACTIVITIES

2nd Quarter - FY23

Highlights

During the 2nd quarter FY23, Internal Audit (IA) substantially completed a fleet physical inventory of all plated vehicles and equipment in coordination with management. In addition, an updated Mandatory Confined Space Entry Training report and a review of water and wastewater license and certifications is nearing completion. An internal review of MIS assets is progressing.

Internal Audit completed preliminary reviews of 3 professional service contracts, 4 labor burden reviews and 1 incurred cost audits is in process. IA also issued 16 indirect cost rate letters to consultants following a review of their consultant disclosure statements. Internal Audit has continued to verify Harbor Electric Energy Company (HEEC) Cross-Harbor Cable project costs as incurred and reviewed HEEC's filing with the DPU.

Status of Recommendations

During FY23, 1 recommendation was 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
Fleet Services Non-Plated Equipment Inspections (3/30/20)	1	14	15
Total Recommendations	*1*	*14*	*15*

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 3rd quarter FY23.

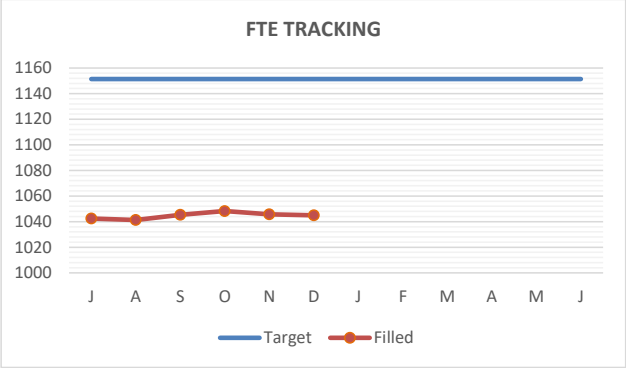
Cost Savings

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	FY19	FY20	FY21	FY22	FY23 Q2	TOTALS
Consultants	$262,384	$643,845	$563,525	$39,938	$215,616	$1,725,308
Contractors & Vendors	$3,152,884	$2,097,729	$1,547,223	$1,714,614	$1,365,128	$9,877,578
Internal Audits	$210,063	$212,517	$214,458	$222,554	$108,574	$968,166
Total	**$3,625,331**	**$2,954,091**	**$2,325,206**	**$1,977,106**	**$1,689,318**	**$12,571,053**

OTHER MANAGEMENT

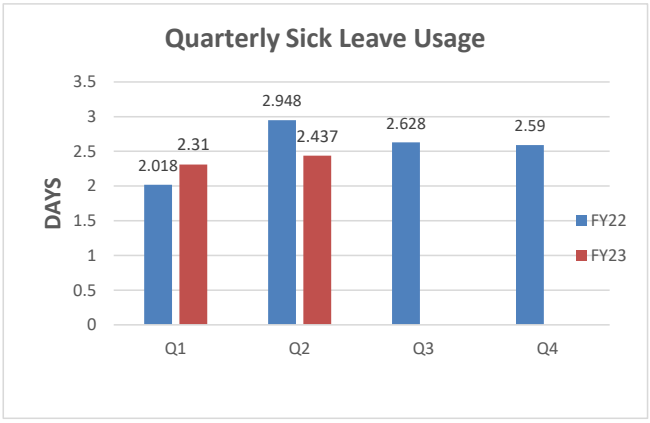
Workforce Management
2nd Quarter - FY23



FY23 Target for FTE's = 1151.4
FTE's as of December 2022= 1045
Tunnel Redundancy as of Dec 2022 = 10

Position Filled by Hires/Promos & Transfer for YTD

	Pr/Trns	Hires	Total
FY21	81 (56%)	64 (44%)	145
FY22	138 (68%)	65 (32%)	203
FY23	74 (60%)	49 (40%)	123



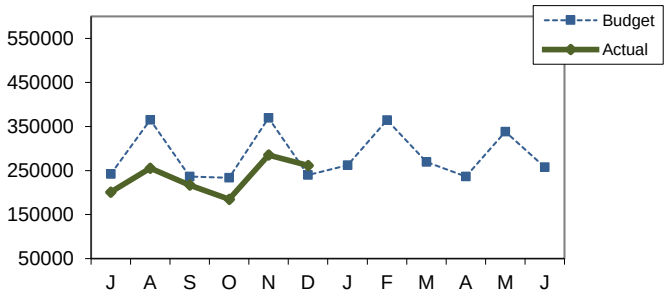
Sick Leave and FMLA Usage by Division

	Number of Employees	YTD (usage to date)	Annualized Total	Annual FMLA %	FY22
Admin	135	5.37	10.74	8.5%	7.57
Aff. Action	5	8.44	9.46	51.7%	8.73
Executive	3	3.57	7.61	0.0%	3.11
Finance	47	3.90	5.47	0.0%	6.21
Int. Audit	5	3.03	3.78	0.0%	1.47
Law	10	3.48	1.90	13.1%	12.27
OEP	4	18.54	0.00	0.0%	5.56
Operations	831	4.70	0.00	21.2%	10.87
Tunnel Red	10	2.92	0.00	29.0%	3.94
Pub. Affs.	9	1.26	2.52	40.4%	11.41
MWRA Avg	**1059**	**2.44**	**9.49**	**20.6%**	**10.16**

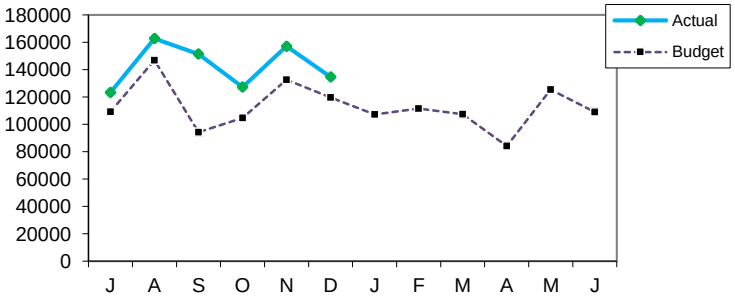
Average quarterlysick leave for the 2nd Quarter of FY23 has decreased as compared to the 2nd Quarter of FY22 (2.437 from 2.948)

Percent of sick leave usage for FY23, attributable to Family and Medical Leave Act (FMLA) is 20.6%

Field Operations
Second Quarter FY23 Overtime $



Deer Island Treatment Plant
Second Quarter FY23 Overtime $

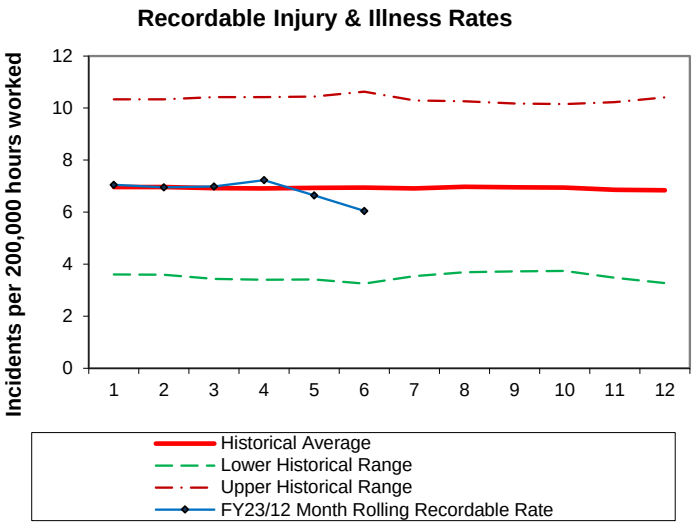


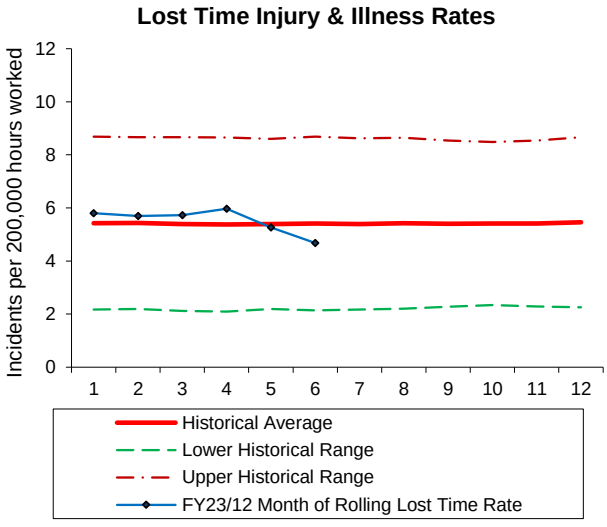
Total Overtime for Field Operations for second quarter was $731k, which is $98k or 11.8% under budget. Emergency overtime was $242k, which is $186k under budget or 43.4%, primarily due to fewer inclement weather events. Coverage overtime totaling $232k which is $86k over budget or 58.9%, primarily due to covering numerous vacant shifts. Planned overtime was $257k or $79k over budget with a combination spending of $123k for scheduled maintenance and $42k for work completion projects.

Deer Island's total overtime expenditure second quarter was $419K, which is $62K or 17.3% over budget due to higher than anticipated shift coverage of $147K. This is offset by lower spending for storm coverage of ($53K) and planned/unplanned overtime of ($32K). YTD Deer Island's overtime spending is $856K, which is $149K or 21.1% over budget due to higher than anticipated shift coverage of $226K. This is offset by lower than anticipated storm coverage of ($69K) and planned/unplanned overtime of ($8K).

Workplace Safety

2nd Quarter - FY23





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

	2nd Quarter Information		
	New	Closed	Open Claims
Lost Time	7	24	67
Medical Only	11	16	14
Report Only	15	15	
	QYTD		FYTD
Regular Duty Returns	4		13
Light Duty Returns	1		1
Indeminity payments as of December 2022 included in open claims listed			22

COMMENTS:

Regular Duty Returns

Oct	1	Employees returned to full duty/no restrictions
Nov	3	Employees returned to full duty/no restrictions
Dec	0	Employees returned to full duty/no restrictions

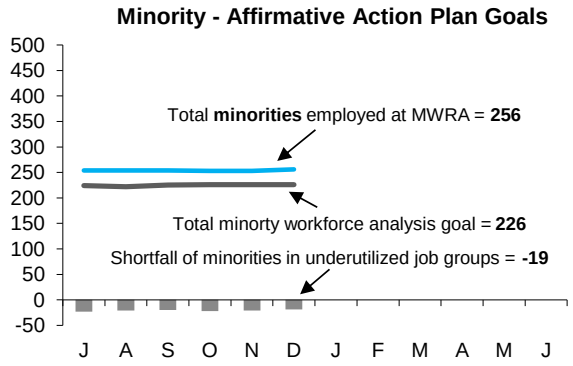
Light Duty Returns

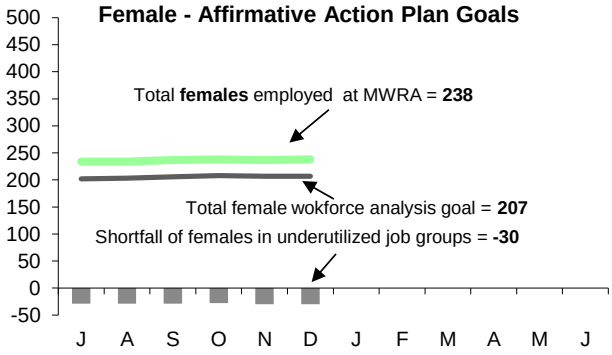
Oct 1 Employee returned to light duty
Nov N/A
Dec N/A

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

2nd Quarter - FY23





Highlights:

At the end of Q2 FY23, 3 job groups or a total of 19 positions are underutilized by minorities as compared to 5 job groups for a total of 22 positions at the end of Q2 FY22; 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 Q2 FY22. During Q2, 5 minorities and 3 females were hired. During this same period, 2 minorities and 2 females were terminated.

Underutilized Job Groups - Workforce Representation

Job Group	Employees as of 12/31/2022	Minorities as of 12/31/2022	Achievement Level	Minority Over or Under Underutilized	Females As of 12/31/2022	Achievement Level	Female Over or Under Underutilized
Administrator A	27	5	3	2	14	7	7
Administrator B	22	1	5	-4	4	5	-1
Clerical A	23	7	3	4	19	17	2
Clerical B	24	7	6	1	3	12	-9
Engineer A	82	21	19	2	20	15	5
Engineer B	59	19	15	4	14	14	0
Craft A	111	16	20	-4	0	5	-5
Craft B	123	24	23	1	1	6	-5
Laborer	54	14	12	2	3	2	1
Management A	87	18	18	0	32	24	8
Management B	37	11	7	4	6	9	-3
Operator A	62	4	15	-11	2	4	-2
Operator B	59	19	6	13	3	1	2
Professional A	29	7	7	0	17	11	6
Professional B	153	47	45	2	69	39	30
Para Professional	47	15	10	5	23	25	-2
Technical A	52	18	10	8	6	9	-3
Technical B	8	3	2	1	2	2	0
Total	**1059**	**256**	**226**	**49/-19**	**238**	**207**	**61/-30**

AACU Candidate Referrals for Underutilized Positions

Job Group	Title	# of Vac	Requisition Int. / Ext.	Promotions/Transfers	AACU Ref. External	Position Status
Craft A	Asst Auto Tech in Training	1	Int./Ext.	0	0	NH=HM
Craft A	Electrical Operations Supervisor	1	Int.	1	0	PROMO = WM
Craft A	Unit Supervisor-Electrician	1	Int.	1	0	PROMO = WM
Craft A	Vehicle Services Foreman	1	Int.	1	0	PROMO = WM
Craft A	WDS General Foreman	1	Int.	1	0	PROMO = WM
Craft A	Sr WDS Foreman	1	Int.	1	0	PROMO = WM
Craft A	Valve Maintenance Foreman	1	Int./Ext.	1	0	PROMO = WM
Craft B	HVAC Specialist	1	Ext.	0	0	NH=WM
Craft B	Jr Instrument Technician	2	Ext.	0	0	NH=1BM, 1HM
Craft B	Second Class Engineer	1	Int./Ext.	0	0	NH=WM
Craft B	Metal Fabrication/Welder	1	Ext.	0	0	NH=WM
Craft B	Facilities Specialist	3	Int.	3	0	PROMO=2WM, 1BM
Operator A	Area Supervisor	2	Ext.	0	0	NH = 2WM
Technical A	Sr Draftsperson	1	Int./Ext.	0	0	NH=WM
Technical A	Statistical Supervisor	1	Int./Ext.	1	1	PROMO=HF

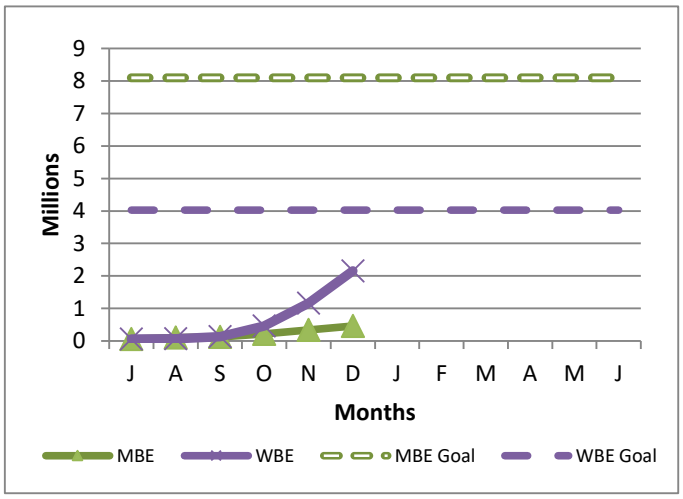
MBE/WBE Expenditures

2nd Quarter - FY23

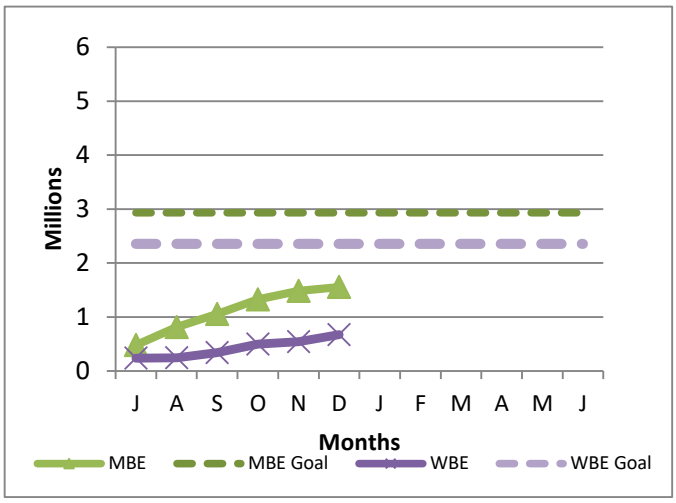
MBE/WBE targets are determined based on annual MWRA expenditure forecasts in the procurement categories noted below. The goals for FY23 are based on 85% of the total construction and 75% of the total professional projected spending for the year. Certain projects have been excluded from the goals as they have no MBE/WBE spending goals.

MBE/WBE percentages are the results from a 2002 Availability Analysis, and MassDEP's Availability Analysis. As a result of the Availability Analyses, the category of Non-Professional Services is included in Goods/Services. Consistent with contractor reporting requirements, MBE/WBE expenditure data is available through December.

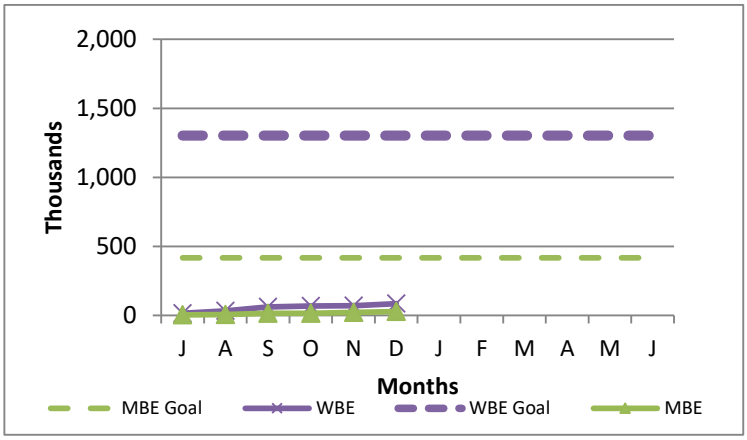
Construction



Professional Services



Goods/Services



FY23 spending and percentage of goals achieved, as well as FY22 performance are as follows:

MBE					WBE			
FY23 YTD		FY22			FY23 YTD		FY22	
Amount	Percent	Amount	Percent		Amount	Percent	Amount	Percent
460,301	5.7%	3,102,188	56.2%	Construction	2,156,721	56.6%	1,276,049	46.5%
1,554,614	53.0%	3,156,867	147.1%	Prof Svcs	674,194	28.6%	1,737,850	100.8%
21,736	5.2%	387,120	102.7%	Goods/Svcs	84,869	6.5%	365,393	27.6%
2,036,651	17.8%	6,646,175	82.6%	**Totals**	2,915,784	37.9%	3,379,292	58.3%

FY23 MBE/WBE dollar totals do not include MBE and WBE payments to prime contractors and consultants.

MWRA FY23 CEB Expenses through 2nd Quarter – FY23

As of December 2022, total expenses are $385.6 million, $7.1 million or 1.8% lower than budget, and total revenue is $430.9 million, $9.9 million or 2.3% over budget, for a net variance of $17.0 million.

Expenses –

Direct Expenses are $127.5 million, $6.4 million or 4.8% under budget.

- **Wages & Salaries** are $6.1 million under budget or 10.9%. Regular pay is $6.2 million under budget, due primarily to lower head count, and timing of backfilling positions. YTD through December, the average Full Time Equivalent (FTE) positions was 1,055, one hundred and twelve fewer than the 1,167 FTE's budgeted.
- **Other Services** expenses are $1.3 million under budget or 9.1%, due to lower Sludge Pelletization expense of $443k, lower than anticipated Telecommunication costs of $366k, Space/Lease Rentals of $148k due to Rock Shed Lease timing, and Grit Screening Removal of $139k.
- **Fringe Benefits** expenses are $477k under budget or 4.1%, primarily due to lower health insurance expense $362k under budget, reflecting the lower headcount.
- **Professional Services** expenses are $342k under budget or 8.6%, primarily due to under spending for Other Professional Services of $210k, and Engineering of $100k. Underspending was partially offset by higher spending on Lab Testing & Analysis of $85k.
- **Workers Compensation** expenses are $322k under budget or 25.6%, primarily due to lower spending for Compensation Payments of $246k and Medical Payments of $42k.
- **Chemicals** are $1.0 million over budget or 13.1% due to higher spending for Sodium Hypochlorite, $548k over budget due to greater usage at DITP due to lower flows and greater need for odor control and higher contract price at Carroll Water Treatment Plant. Spending for Hydrogen Peroxide and Ferric Chloride were over budget by $162k and $156k, respectively.
- **Utilities** expenses are **over** budget by $853k or 5.6%. This reflects higher spending on Electricity of 816k, 7.0% over budget. Spending at DITP of $810k above budget due to higher real time pricing as well as higher usage, and peak demand charges.
- **Ongoing Maintenance** is $462k over budget or 2.6%. The variance reflects the actual timing of projects.

Indirect Expenses are $27.7 million, $666k or 2.3% under budget due primarily to lower Watershed Reimbursement of $707k.

Capital Finance Expenses totaled $230.4 million, matching budget after transfer of $3.5 million to defeasance account. Defeasance savings due primarily to lower than budgeted variable interest expense which was $2.5 million under budget and lower Senior Debt spending of $1.1 million as a result of timing for the new money transaction, partially offset by higher SRF spending of $121k due to timing.

Revenue and Income –

Total Revenue and Income is $430.9 million, or $9.9 million over budget or 2.3%. The surplus was driven by Other User Charges which were $4.7 million over the estimate reflecting water purchases from the City of Cambridge during facility maintenance, Investment income $4.3 million over budget due to higher than budget interest rates, and Other Revenue of $0.9 million primarily due to timing for Miscellaneous Revenue of $0.4 million and Energy Revenue of $0.3 million.

	Dec 2022 Year-to-Date			
	Period 6 YTD Budget	Period 6 YTD Actual	Period 6 YTD Variance	%
EXPENSES				
WAGES AND SALARIES	$ 56,497,672	$ 50,359,252	$ (6,138,420)	-10.9%
OVERTIME	2,696,431	2,492,061	(204,370)	-7.6%
FRINGE BENEFITS	11,757,965	11,281,439	(476,526)	-4.1%
WORKERS' COMPENSATION	1,259,876	937,783	(322,093)	-25.6%
CHEMICALS	7,904,349	8,939,627	1,035,278	13.1%
ENERGY AND UTILITIES	15,331,553	16,184,632	853,079	5.6%
MAINTENANCE	17,529,378	17,991,536	462,158	2.6%
TRAINING AND MEETINGS	271,858	128,940	(142,918)	-52.6%
PROFESSIONAL SERVICES	3,965,968	3,623,646	(342,322)	-8.6%
OTHER MATERIALS	2,255,447	2,438,818	183,371	8.1%
OTHER SERVICES	14,485,930	13,161,951	(1,323,979)	-9.1%
TOTAL DIRECT EXPENSES	**$ 133,956,427**	**$ 127,539,685**	**$ (6,416,742)**	**-4.8%**
INSURANCE	$ 1,958,001	$ 1,906,053	$ (51,948)	-2.7%
WATERSHED/PILOT	8,608,583	7,901,462	(707,121)	-8.2%
HEEC PAYMENT	3,166,062	3,258,941	92,879	2.9%
MITIGATION	867,847	867,846	(1)	0.0%
ADDITIONS TO RESERVES	1,209,227	1,209,227	-	0.0%
RETIREMENT FUND	12,555,203	12,555,203	-	0.0%
POST EMPLOYEE BENEFITS	-	-	-	---
TOTAL INDIRECT EXPENSES	**$ 28,364,923**	**$ 27,698,732**	**$ (666,191)**	**-2.3%**
STATE REVOLVING FUND	$ 43,792,576	$ 43,914,470	$ 121,894	0.3%
SENIOR DEBT	148,426,636	147,298,430	(1,128,206)	-0.8%
DEBT SERVICE ASSISTANCE	(1,182,494)	(1,182,494)	-	0.0%
CURRENT REVENUE/CAPITAL	-	-	-	---
SUBORDINATE MWRA DEBT	37,733,455	37,733,455	-	0.0%
LOCAL WATER PIPELINE CP	-	-	-	---
CAPITAL LEASE	1,608,530	1,608,530	-	0.0%
VARIABLE DEBT	-	(2,459,605)	(2,459,605)	---
DEFEASANCE ACCOUNT	-	3,465,918	3,465,918	---
DEBT PREPAYMENT	-	-	-	---
TOTAL CAPITAL FINANCE EXPENSE	**$ 230,378,703**	**$ 230,378,703**	**$ -**	**0.0%**
TOTAL EXPENSES	**$ 392,700,053**	**$ 385,617,120**	**$ (7,082,933)**	**-1.8%**
REVENUE & INCOME				
RATE REVENUE	$ 407,324,000	$ 407,324,000	$ -	0.0%
OTHER USER CHARGES	4,759,460	9,443,156	4,683,696	98.4%
OTHER REVENUE	4,338,247	5,214,687	876,440	20.2%
RATE STABILIZATION	490,000	490,000	-	0.0%
INVESTMENT INCOME	4,134,243	8,463,577	4,329,334	104.7%
TOTAL REVENUE & INCOME	**$ 421,045,950**	**$ 430,935,420**	**$ 9,889,470**	**2.3%**

Cost of Debt
2nd Quarter – FY23

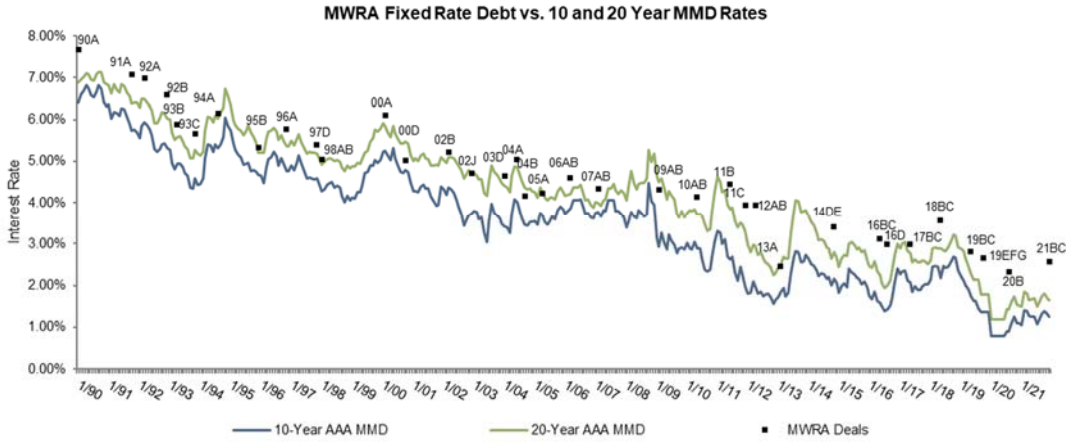
MWRA borrowing costs are a function of the fixed and variable tax exempt interest rate environment, the level of MWRA's variable interest rate exposure and the perceived creditworthiness of MWRA. Each of these factors has contributed to decreased MWRA borrowing costs since 1990.

Average Cost of MWRA Debt FYTD

Fixed Debt ($3.20 billion)	3.28%
Variable Debt ($269.01million)	2.47%
SRF Debt ($758.6 million)	1.67%
Weighted Average Debt Cost ($4.22 billion)	2.94%

Most Recent Senior Fixed Debt Issue
December 2021

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

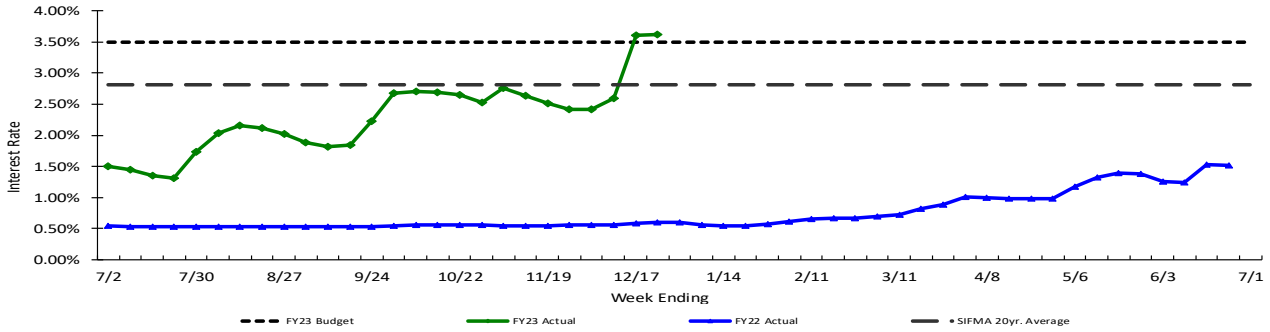


Bond Deal	1996A	1997D	1998AB	2000A	2000D	2002B	2002J	2003D	2004A	2004B	2005A	2006AB	2007AB	2009AB
Rate	5.78%	5.40%	5.04%	6.11%	5.03%	5.23%	4.71%	4.64%	5.05%	4.17%	4.22%	4.61%	4.34%	4.32%
Avg Life	19.5 yrs	21.6 yrs	24.4 yrs	26.3 yrs	9.8 yrs	19.9 yrs	19.6 yrs	18.4 yrs	19.6 yrs	13.5 yrs	18.4 yrs	25.9 yrs	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	18.8yrs	11.2 yrs	11.7yrs	11.9yrs	9.73 yrs.	15.6 yrs	12.2 yrs

Weekly Average Variable Interest Rates vs. Budget

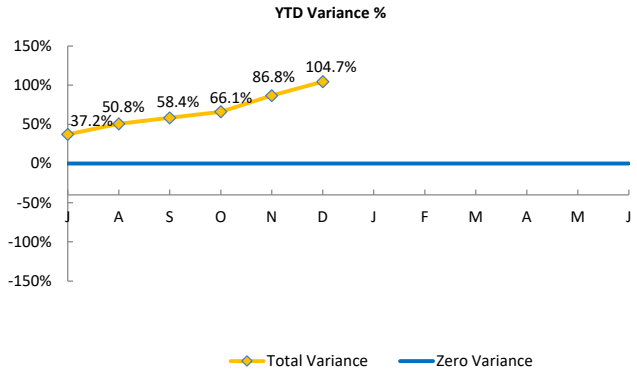
MWRA currently has eight variable rate debt issues with $443.9 million outstanding, excluding commercial paper. Of the eight outstanding series, three have portions which have been swapped to fixed rate. Variable rate debt has been less expensive than fixed rate debt in recent years as short-term rates have remained lower than long-term rates on MWRA debt issues. In December, the SIFMA rate ranged from a high of 3.80% to a low of 2.21% 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.



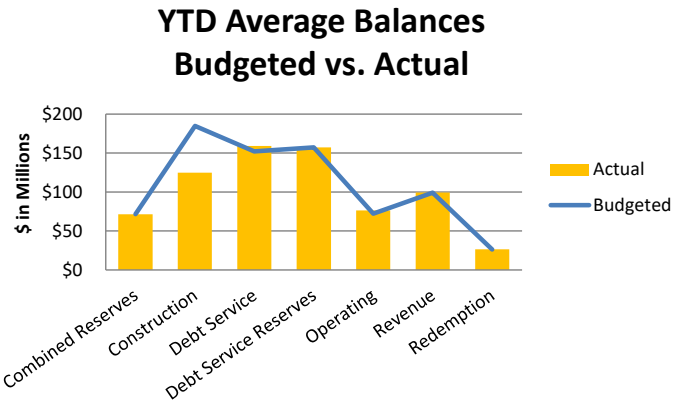
Investment Income

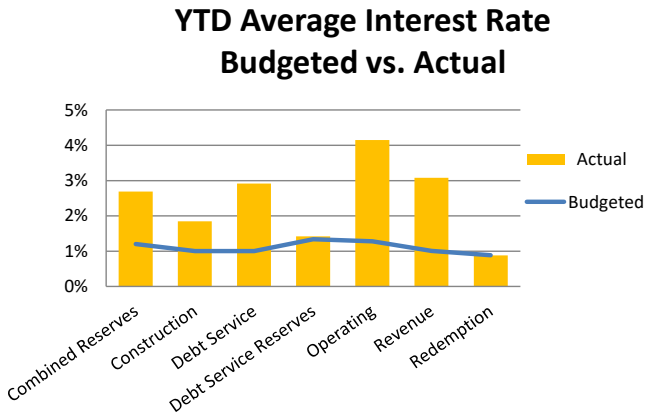
2nd Quarter – FY23

Year To Date



	YTD BUDGET VARIANCE ($000)			
	BALANCES IMPACT	RATES IMPACT	TOTAL	%
Combined Reserves	$0	$518	518	123.8%
Construction	($397)	$903	506	56.3%
Debt Service	$34	$1,484	1,517	204.4%
Debt Service Reserves	$0	$63	63	6.1%
Operating	$29	$696	725	161.9%
Revenue	$1	$1,000	1,001	205.3%
Redemption	$0	($1)	(1)	-0.8%
Total Variance	($333)	$4,662	$4,329	104.7%





Monthly