MASSACHUSETTS WATER RESOURCES AUTHORITY

Board of Directors Report

on

Key Indicators of MWRA Performance

for

First Quarter FY2020

Q1	Q2	Q3	Q4
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Frederick A. Laskey, Executive Director
David Coppes, Chief Operating Officer
November 20, 2019

Board of Directors Report on Key Indicators of MWRA Performance

1st Quarter FY20

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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.

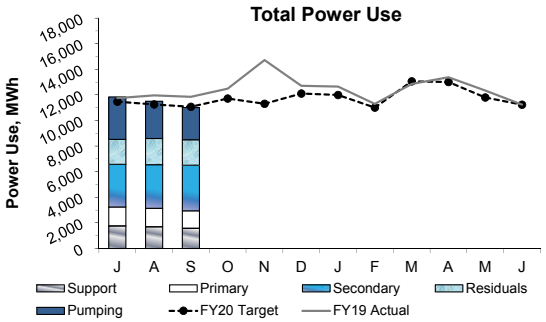
Frederick A. Laskey, Executive Director
David Coppes, Chief Operating Officer

November 20, 2019

OPERATIONS AND MAINTENANCE

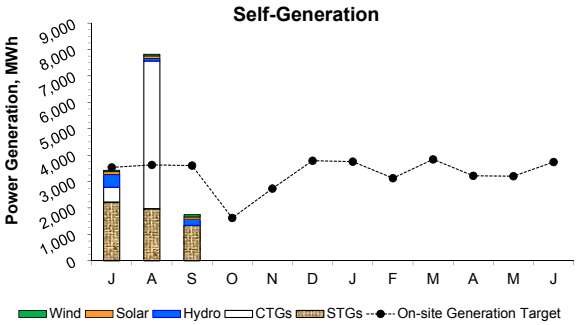
Deer Island Operations

1st Quarter - FY20

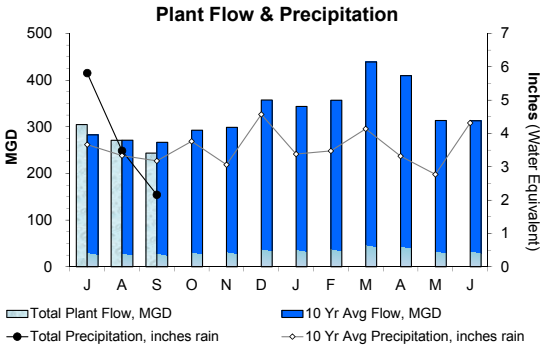


Total power usage in the 1st Quarter was 1.7% above target as the Total Plant Flow was 13.3% above target with the 4 year average plant flow. As expected, power usage for raw wastewater pumping was above target by 12.4% due to the higher plant flow. Power usage in the other process areas was similar to or below target.

Note: Power usage projections are based on 4 year averages.

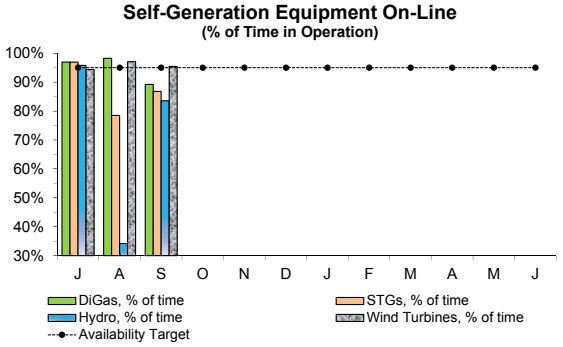


Power generated on-site during the 1st Quarter was 20.5% above target mainly due to the continuous operation of the CTGs for 18 consecutive days in August. The CTGs were operated during this period as DITP was disconnected from utility power to allow Eversource to complete the installation of the new cross-harbor electrical cable. STGs generation was 36.3% below target due to a vacuum system issue which has prevented the STG and BP-STG system from operating in "summer mode" which would have resulted in additional generation. Generation was also low due to an annual Thermal Power Plant (TPP) shutdown for maintenance in September. Generation from the Solar Panels was 4.3% above target and was 20.3% below target from the Wind Turbines. Hydro Turbine generation was 17.8% below target as the turbines were offline while DITP was disconnected from utility power in August to minimize stray voltage during CTG operation.

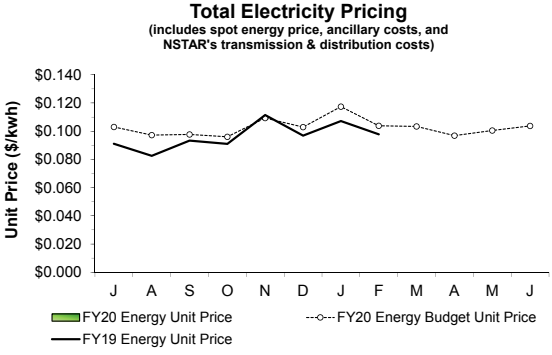


Total Plant Flow for the 1st Quarter was on target with the budgeted 10 year average plant flow (273.1 MGD actual vs. 273.5 MGD expected) even though precipitation was 12.5% above target (11.45 inches actual vs. 10.18 inches expected). However, Total Plant Flow was 13.3% higher than the 4 year average plant flow used for energy budget projections.

Note: Plant Flow and precipitation projections are based on 10 year averages but are 4 year averages for the energy budget projections.

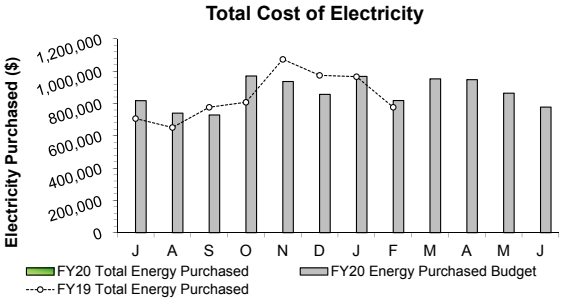


The DiGas system and the Wind Turbines met the 95% availability target for the 1st Quarter. The STGs fell below the 95% availability target following a plant-wide power outage that caused the STG to trip during the Eversource cross-harbor electrical cable installation work and the decision to keep it offline until DITP returned to utility power. Additional downtime resulted due to a scheduled maintenance shutdown of the Thermal Power Plant (TPP) in September. The Hydro Turbine availability fell below target as the units were kept offline during the Eversource cable work to minimize stray voltage during CTG operation.



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 in FY20 to date are not yet available as the complete invoices have not been received. The Total Energy Unit Price includes a fixed block price, spot energy price, transmission & distribution charges, and ancillary charges.

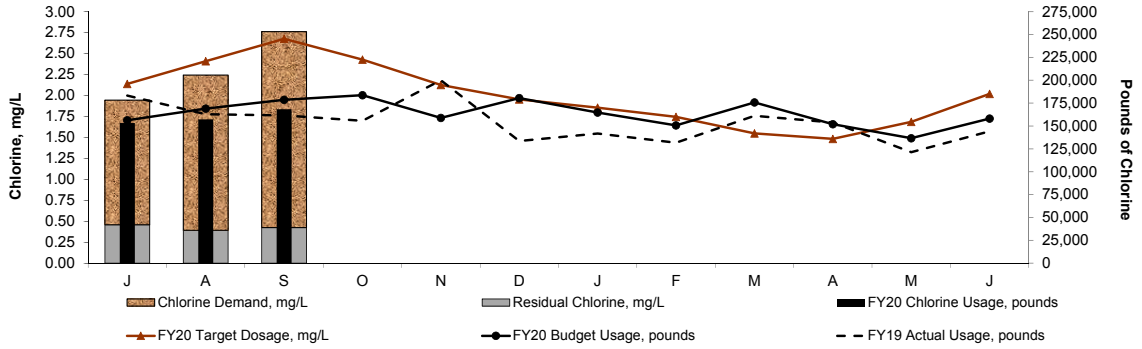
Note: Only the actual energy prices are reported. Therefore, the dataset lags by seven (7) months due to the timing of invoice receipt and review. The most up-to-date complete invoice available is for the month of February (FY19). The delay is due to invoice processing issues that the electricity supplier has been attempting to correct.



The Electricity cost data for Electricity Purchased in FY20 to date is not yet available.

Note: Only months with complete Electricity Purchased data are reported. Therefore, the dataset lags by seven (7) months due to the timing of invoice receipt and review. The most up-to-date complete invoice available is for the month of February (FY19). The delay is due to invoice processing issues that the electricity supplier has been attempting to correct.

Deer Island Sodium Hypochlorite Use



The disinfection dosing rate in the 1st Quarter was 4.0% below target with budgetary estimates. Actual sodium hypochlorite usage in pounds of chlorine was also 6.0% lower than expected. The lower sodium hypochlorite dosage and usage is indicative of a lower chlorine demand in the wastewater. DITP maintained an average disinfection chlorine residual of 0.42 mg/L this quarter with an average dosing rate of 2.32 mg/L (as chlorine demand was 1.89 mg/L).

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

Secondary Blending Events

Month	Count of Blending Events	Count of Blending Events Due to Rain	Count of Blending Events Due to Non-Rain-Related Events	Secondary, as a Percent of Total Plant Flow	Total Hours Blended During Month
J	4	4	0	99.6%	10.26
A	2	2	0	99.3%	7.64
S	1	1	0	99.8%	2.45
O					
N					
D					
J					
F					
M					
A					
M					
J					
Total	7	7	0	99.6%	20.35

99.6% of all flows were treated at full secondary during the 1st Quarter. There were seven (7) secondary blending events due to high plant flow resulting from heavy rain. These blending events resulted in a total of 20.35 hours of blending and 105.92 MGal of primary-only treated effluent with secondary effluent. The Maximum Secondary Capacity for the entire quarter was 700 MGD.

Secondary permit limits were met at all times during the 1st Quarter.

Deer Island Operations & Maintenance Report

Environmental/Pumping:
The plant achieved an instantaneous peak flow rate of 1,092.5 MGD in the early morning of August 7. This peak flow occurred during a storm event that brought 2.28 inches of rain to the metropolitan Boston area over the course of two (2) days. Overall, Total Plant Flow in the 1st Quarter was on target (-0.2%) with the 10 year average plant flow estimate for the quarter.

Work on the Winthrop Terminal Facility (WTF) VFD (Variable Frequency Drive) and Synchronous Motor Replacement project was started by the contractor in 2018 and entails the demolition of existing older obsolete equipment (electrical systems, motors and VFDs on each of the six (6) raw wastewater pumps). The pumps are currently powered by 600 volts service and will be changed to 4,160 volts, consistent with other major pumps in both the South System Pump Station (SSPS) and the North Main Pump Station (NMPS). The upgrade for WTF Pump #5 began on June 10, and was completed by August 21, and included final electrical connections for the new equipment that required a temporary shutdown of the electrical bus serving half the pumps in the WTF. Performance testing of the upgraded Pump #5 and necessary tuning adjustments continued through the remainder of September. To date, work has been completed on three (3) of the six (6) pumps (#6, #2, and #5), with Pump #5 pending final acceptance.

The MWRA has an on-going project to inspect, and eventually rehabilitate, the shafts that transport wastewater between the remote headworks facilities and the DITP. In order to support the inspections, the remote headworks facilities will be shut down to allow inspectors to safely enter the shafts. DITP worked closely with Wastewater Operations staff during four (4) trial shutdowns and one (1) inspectional shutdown of the remote headworks facilities in July through September as part of this Remote Headworks and Deer Island Shafts Study project. Wastewater flow going to the Chelsea Creek Headworks Facility was diverted to the Caruso Pump Station to the Winthrop Terminal Headworks Facility on July 3 for approximately two (2) hours and on July 10 for approximately five (5) hours. The Columbus Park and Ward Street Headworks Facilities were isolated on July 31 and on September 13 for approximately five (5) hours. These trial shutdowns were necessary to confirm the conditions under which the inspections will be permitted and the headworks facilities were isolated starting at 2:00AM while flows were at the lowest levels. A shaft inspectional shutdown for five (5) hours was completed on September 26 with flow isolation at the Columbus Park and Ward Street Headworks.

Deer Island Operations & Maintenance Report (continued)

Residuals Treatment:
Staff replaced the isolation valve to waste sludge pump #2 at the centrifuge facility on July 25. This work required a total shutdown of the secondary sludge wasting operation from all three batteries (A, B, and C) for nearly 12 hours. Secondary sludge wasting was adjusted accordingly to manage the secondary solids prior to and after the shutdown to minimize temporary impacts to the microbial population. The secondary return sludge operation was not impacted by this work and the biological activated sludge treatment process continued without interruption during this work.

Energy and Thermal Power Plant:
Overall, total power generated on-site accounted for 37.8% of Deer Island's total power use for the quarter as Deer Island operated the Combustion Turbine Generators (CTGs) for 18 consecutive days in August to allow Eversource to complete the installation of the new cross-harbor electrical cable. Renewable power generated on-site (by Solar, Wind, STGs, and Hydro Turbines) accounted for 19.9% of Deer Island's total electrical power use for the quarter.

The Eversource work to complete the installation and startup of the new cross-harbor electrical cable to DITP was completed on August 23. The installation of the new cross-harbor electrical cable required DITP to be isolated from utility power during the final stages of the Eversource cable startup from August 5 to August 23. During this utility power outage period, DITP operated the CTGs to provide the majority of the power needed to meet the electrical demands of the plant. The operation of a single CTG unit was sufficient during normal, dry weather, flow conditions and the simultaneous operation of both CTG units was only necessary for approximately 8 hours from midnight to the morning of August 8, due to high plant flow conditions resulting from a heavy rain event. The startup date of the new cross-harbor electrical cable was originally scheduled to occur on August 19 but was delayed due to adjustments that needed to be made on Eversource's new switchgear which became apparent only during the final checkout phase. On the morning of August 23, Deer Island successfully connected to the new cross-harbor electrical cable without incident and the CTG was taken offline. The new cross-harbor electrical cable continues to provide electricity seemlessly to DITP without issue.

DITP experienced a brief unanticipated plant-wide power loss on the evening of August 16 due to a lube oil system issue on the operating CTG (#2B) that forced the CTG to go into a rapid controlled shutdown while DITP was disconnected from utility power. This resulted in a loss of power to all plant systems. Power was restored within several minutes when the second CTG unit (#1A) was immediately placed into service and operation of plant systems was restored based on order of importance with raw wastewater pumping resuming as quickly as possible after power was restored. No untreated wastewater was released at the Massachusetts Bay outfall as a result of this power loss event. There were no treated or untreated discharges from combined sewer overflows and no sanitary sewer overflows. No secondary process bypass occurred and no NPDES permitted effluent limits were exceeded as a result of this event.

Annual maintenance at the Thermal Power Plant (TPP) began on September 8 and continued through September 25. Various maintenance activities on the Steam Turbine Generators (STGs) and the two (2) Zurn boilers included maintenance on various pumps, valves, and instruments throughout the power plant. On September 8, the main STG was taken out of service for a major overhaul while Boiler 201 and the BP-STG remained in operation. The BP-STG was operated at maximum capacity to minimize the loss of power generation during this period when the main STG was out of service. Boiler 201 and the BP-STG were then also taken out of service on September 15 (shutdown of the entire TPP) to allow for maintenance on these units and on the common systems including the steam, condensate, and feed water systems. Boiler 101 and the BP-STG were returned to operation on September 18, while maintenance work continued on Boiler 201 and the main STG. On September 22 the maintenance on Boiler 201 was completed, and on September 24 the main STG was placed back on-line.

DITP took delivery of 462,000 gallons of #2 fuel oil, a total of 46 oil tanker trucks, without incident from August 21 through September 5. 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.

Regulatory:
Emissions compliance testing for the West Odor Control (WOC) treatment system at DITP was conducted by a contractor on September 24 to September 25. The WOC treatment system treats process air from South System Pump Station, Primary Batteries C and D, and the grit facility. The DITP Air Quality Operating Permit issued by the MA DEP requires that DITP conduct emissions compliance testing for the various odor control treatment emission units once every five (5) years to demonstrate compliance with applicable total reduced sulfur (TRS) and non-methane hydrocarbon (NMHC) emission limits. This testing requires the continuous emissions monitoring of the inlet and outlet of the odor control system over a 24-hour period for TRS at the outlet (stack) of the odor control system and for NMHC at the inlet. All preliminary emissions test results show that DITP was in compliance with the permit limits. The final report summarizing the test results will be prepared by the contractor and submitted to the MA DEP following review by DITP staff.

Regulators from the MA DEP were onsite at the DITP on September 25 to observe the compliance emissions testing for the WOC treatment system and to tour the wastewater treatment plant. The regulators were given a brief plant tour covering the wastewater and residuals treatment facilities, and a more in depth tour of the Thermal Power Plant and DITP's back up power systems.

Clinton Operations + Maintenance Report
Dewatering Building
Maintenance staff worked on the polymer feed line this quarter cleaning out diffusers and replacing a broken 2 inch valve on the same system. Staff replaced the upper and lower belts on Belt Filter Press #2 and washed down gravity thickener #2.

Chemical Building
Maintenance staff continued to work on replacing the #3 Return Activated Sludge (RAS) pump. Operations staff cleaned polymer pump #2. Staff replaced the 10 inch suction valve on the #2 RAS pump in preparation of pump replacement.

Aeration Basins
Staff completed cleaning 1#, #3, and #5 aeration basins with assistance from a Deer Island vactor crew. Staff also cleaned the pH and DO probes.

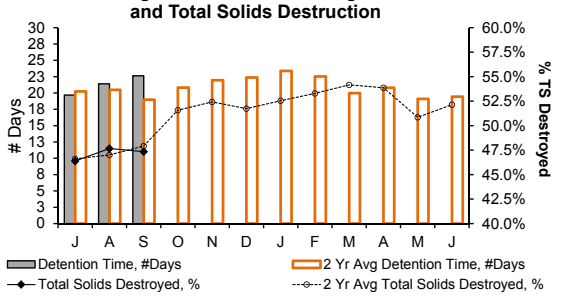
Phosphorus Building
Staff acid washed all three (3) disk filters and also cleaned troughs and inspected all nozzles.

Digester Building
Contractor replaced the #1 digester boiler.

Deer Island Operations and Residuals

1st Quarter - FY20

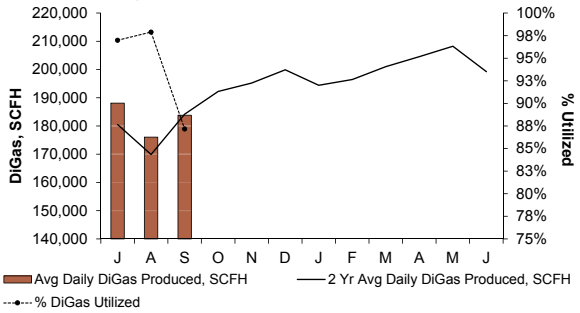
Sludge Detention Time in Digesters and Total Solids Destruction



Total solids (TS) destruction following anaerobic sludge digestion averaged 47.1% during the 1st Quarter, on target (-0.1%) with the 3 year average of 47.2%. Sludge detention time in the digesters was 6.8% higher than target at 19.9 days as DI operated with an average of 7.9 digesters, slightly higher than the 3 year average of 7.7 digesters.

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 significanty impacted by changes in the number of digesters and the resulting shifting around of sludge.

Digester Gas Production and % Utilized

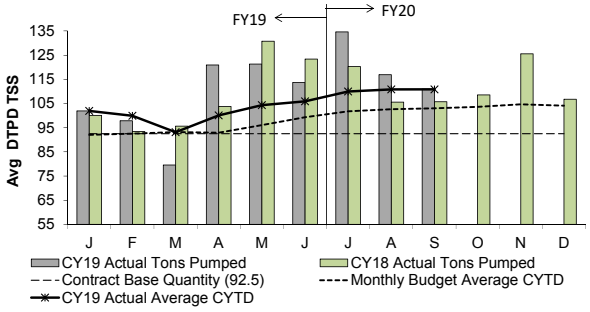


The Avg Daily DiGas Production in the 1st Quarter was 2.5% above target with the 3 Year Avg Daily DiGas Production. On average, 94.0% of all the DiGas produced in the quarter was utilized at the Thermal Power Plant (TPP). The slightly lower Digas usage was mainly due to a scheduled annual TPP maintenance shutdown in September.

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 92.5 DTPD/TSS as an annual average. The monthly invoice is based on 92.5 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 92.5 DTPD/TSS each year (FY19's budget is 98.9 DTPD/TSS and FY20's budget is 107.4 DTPD/TSS).

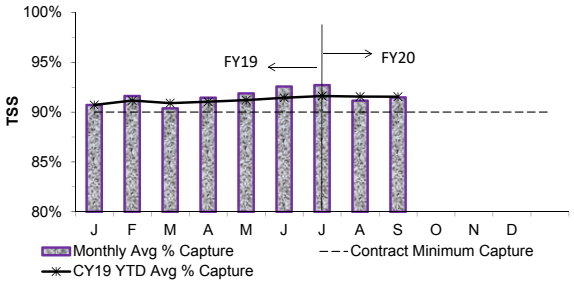
Sludge Pumped From Deer Island



The average quantity of sludge pumped to the Biosolids Processing Facility (BPF) in the 1st Quarter was 120.8 TSS Dry Tons Per Day (DTPD) - 9.4% above target with the FY20 budget of 110.4 TSS DTPD for the same period. Sludge delivered to the BPF was higher than expected during for the quarter mainly due to higher-than-expected secondary sludge production.

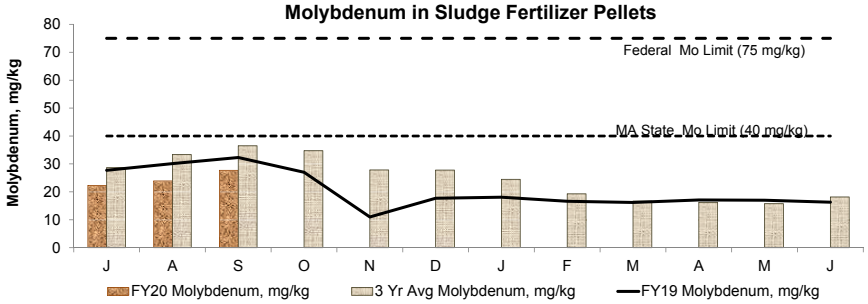
The CY19 average quantity of sludge pumped, through the month of September, is 110.8 DTPD - 7.6% above target with the CY19 average budget of 103.0 DTPD for the same time period.

Monthly Average % Capture of Processed Sludge



The contract requires NEFCO to capture at least 90.0% of the solids delivered to the Biosolids Processing Facility. The average capture for the 1st Quarter was 91.8% and the CY19 to date average capture is 91.5%.

Molybdenum in Sludge Fertilizer Pellets



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

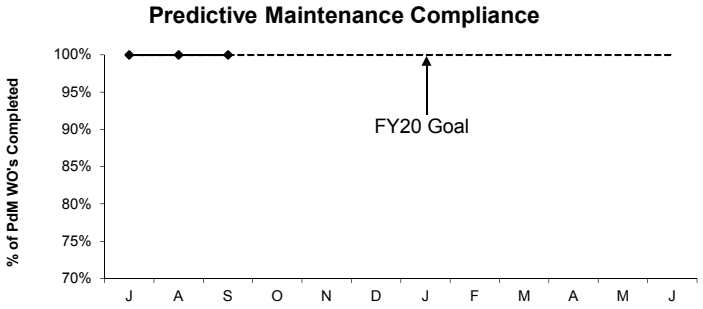
The levels have been below the DEP Type 1 limit for all three (3) metals. For Mo, the level in the MWRA sludge fertilizer pellets during the 1st Quarter averaged 24.3 mg/kg, 25% below the 3 year average, 38% below the MA State Limit, and 67% below the Federal Limit.

Deer Island Maintenance

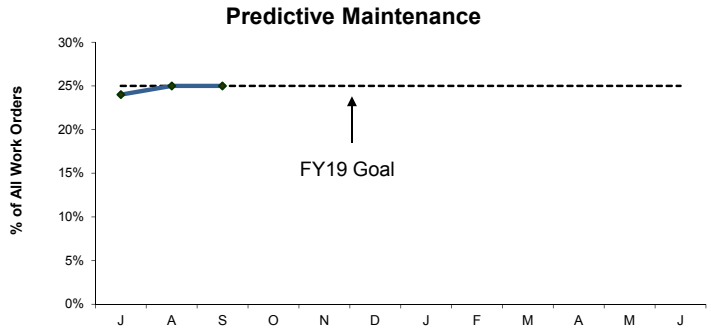
1st Quarter - FY20

Productivity Initiatives

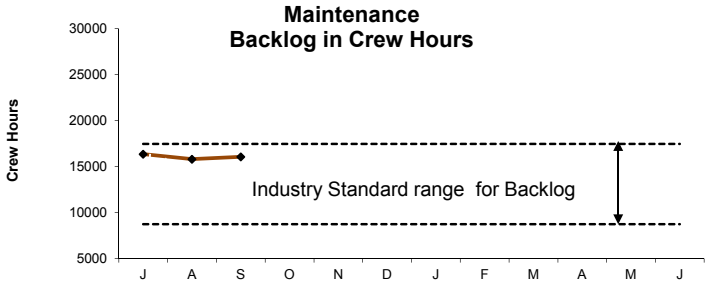
Productivity initiatives include increasing predictive maintenance compliance and increasing PdM work orders. Accomplishing these initiatives should result in a decrease in overall maintenance backlog.



Deer Island's FY20 predictive maintenance goal is 100%. DITP completed 100% of all PdM work orders this quarter. DITP is continuing with an aggressive predictive maintenance program.



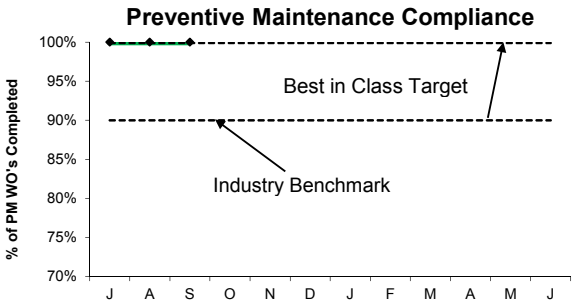
Deer Island's increased FY20 predictive maintenance goal is 25% of all work orders to be predictive. 25% of all work orders were predictive maintenance this quarter. The industry is moving toward increasing predictive maintenance work to reduce downtime and better predict when repairs are needed.



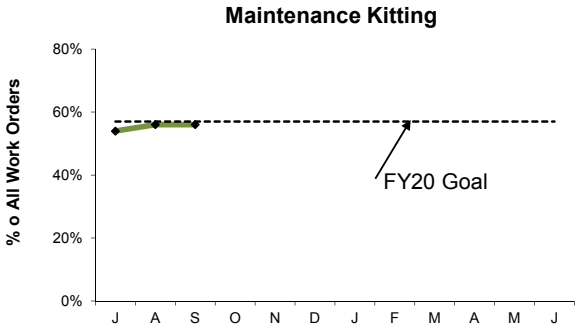
DITP's maintenance backlog at Deer Island is 16,068 hours this quarter. DITP is at the upper end of the industry average for backlog. The industry Standard for maintenance backlog with 97 staff (currently planned staffing levels) is between 8,730 hours and 17,460 hours. Backlog is affected by five vacancies; (1) Plumber, (2) Electricians, and (2) M&O Specialists. Management continues to monitor backlog and to ensure all critical systems and equipment are available.

Proactive Initiatives

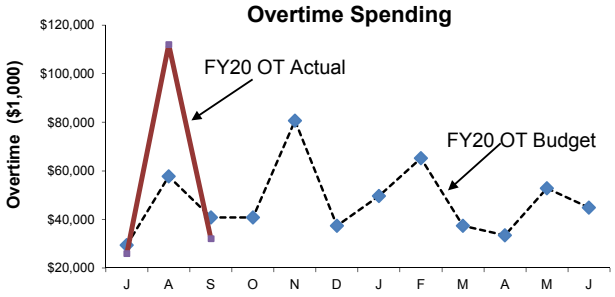
Proactive initiatives include completing 100% of all preventative maintenance tasks and increasing preventative maintenance kitting. These tasks should result in lower maintenance costs.



Deer Island's FY20 preventative maintenance goal is 100% completion of all work orders from Operations and Maintenance. DITP completed 100% of all PM work orders this quarter.



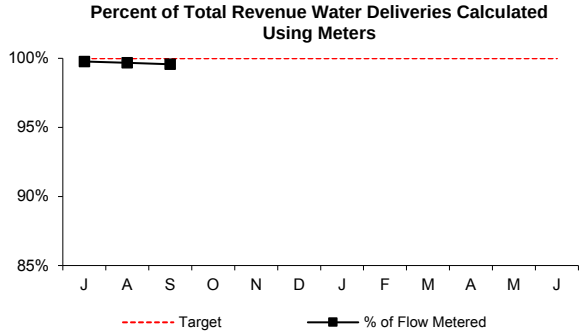
Deer Island's increased FY20 maintenance kitting goal is 57% of all work orders to be kitted. 55% of all work orders were kitted this quarter. Kitting is staging of parts or material necessary to complete maintenance work. This has resulted in more wrench time and increased productivity.



Maintenance overtime was over budget by $20K this quarter and $20k over 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, the HEEC Cable Outage which required staffing to be onsite 24hrs/day for 12 consecutive days, Fabrication of Thermal Caustic Storage Tank Catwalk and Thermal Power Plant Shutdown and Start-Up Support.

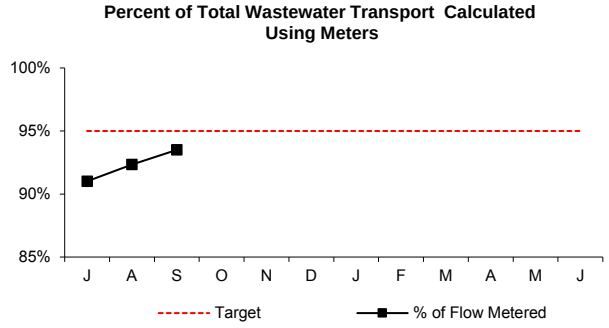
Operations Division Metering & Reliability
1st Quarter - FY20

WATER METERS



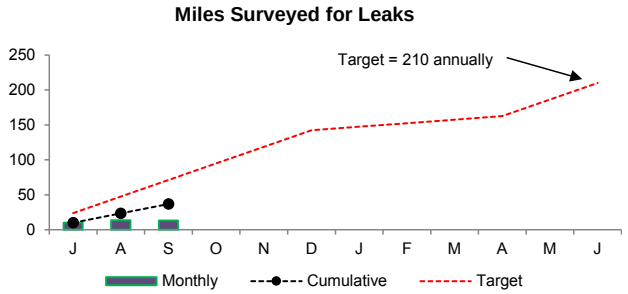
The target for revenue water deliveries calculated using meters is 100%. Estimates are generated for meters that are out of service due to instrumentation problems or in-house and capital construction projects. During the 1st Quarter of FY20, meter actuals accounted for 99.67% of flow; only 0.33% of total revenue water deliveries were estimated. The following is the breakdown of reasons for estimations:
In-house and Capital Construction Projects - 0.01%
Instrumentation Failure - 0.32%

WASTEWATER METERS



The target for revenue wastewater transport calculated using meters is 95%. Estimates are generated for meters missing data due to instrument failure and/or erratic meter behavior usually related to storm events. Estimates are produced using data from previous time periods under similar flow conditions. During the 1st Quarter of FY20, meter actuals accounted for 92.28% of flow. 7.32% of flow was estimated. Of that value, 21.6% was estimated using Manning's equation using a measured depth with no velocity available.

WATER DISTRIBUTION SYSTEM PIPELINES



During the 1st Quarter of FY20, 36.74 miles of water mains were inspected.

Leak Backlog Summary

Month	J	A	S	O	N	D	J	F	M	A	M	J	Totals
Leaks Detected	5	1	1										7
Leaks Repaired	2	3	2										7
Backlog	9	7	6										n/a

During the 1st Quarter, seven new leaks were detected, and seven were repaired. Refer to FY20 Leak Report below for details. Also, community service ranging from individual leak location to hydrant surveys were conducted for: Bedford, Belmont, Boston, Boston Water & Sewer Cambridge, Framingham, Lexington, Malden, Medford, Revere and Somerville.

1st Quarter - FY 20 Leak Report

Date Detected	Location of Leaks	Repaired
07/19/19	Ocean Ave., @ Revere St., Revere	07/31/19
07/29/19	Wadsworth Rd., Dow St., Arlington	07/31/19
07/16/19	Watham St. @ Concord Ave., Lexington	08/14/19
07/24/19	#1098 Waltham St., Lexington	08/14/19
08/11/19	South Street Court, Medford	08/12/19
09/04/19	Pearl St. @ Center St. Malden	09/04/19
07/08/19	River St. Bridge @ Memorial Dr., Cambridge.	09/05/19

Date Detected	Location of Leaks/Unrepaired
06/08/15	Allandale Rd. @ Grove St., Brookline, Sect 78, located acoustically. Not surfacing. No redundancy.
06/17/15	Washington St. at East St., Dedham; Sect 77, located acoustically. Not surfacing. Need redundant SEH pipeline to enable isolation.
07/01/16	241 Forest St. Winchester, Sect 89, leaking blow of valve. Not surfacing. Need redundant NIH pipeline to enable isolation.
12/04/16	1025 W Roxbury Pkwy, Brookline, Sect 95, located acoustically. Not surfacing. Leaking blow off valve. No redundancy.
12/04/16	710 Ashland St/Summer St. Lynn, Sect 91. Not surfacing. Leaking emergency connection valve between MWRA and LWSC systems. LWSC has difficulty isolating 16" main.
07/20/17	Mystic Valley Parkway, Medford. Not surfacing.

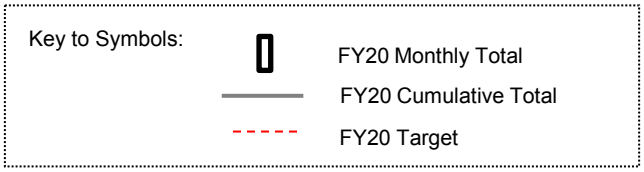
Water Distribution System Valves

1st Quarter - FY20

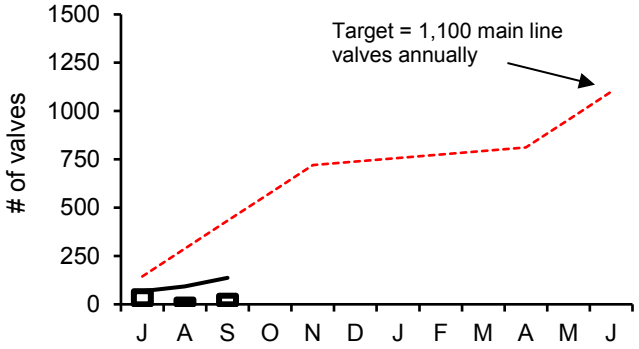
Background

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	
		FY19 to Date	FY19 Targets
Main Line Valve	2,159	96.8%	95%
Blow-Off Valves	1,317	98.6%	95%
Air Release Valv	1,380	95.1%	95%
Control Valves	49	100.0%	95%

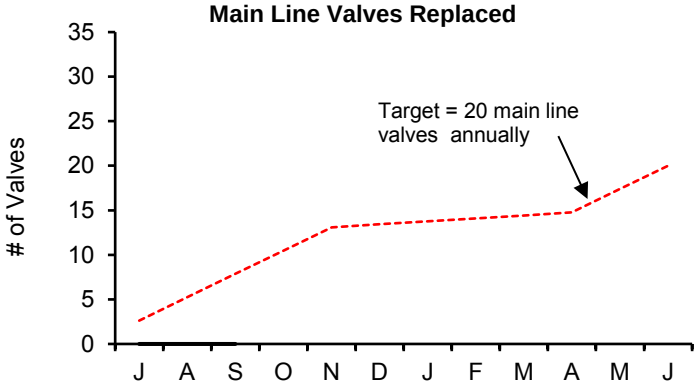


Main Line Valves Exercised



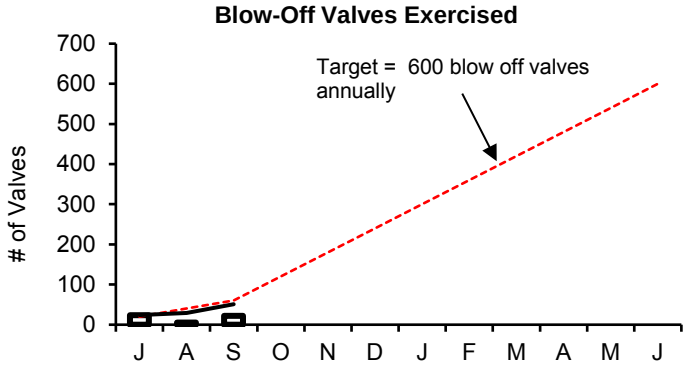
During the 1st Quarter of FY20, 137 main line valves were exercised.

Main Line Valves Replaced



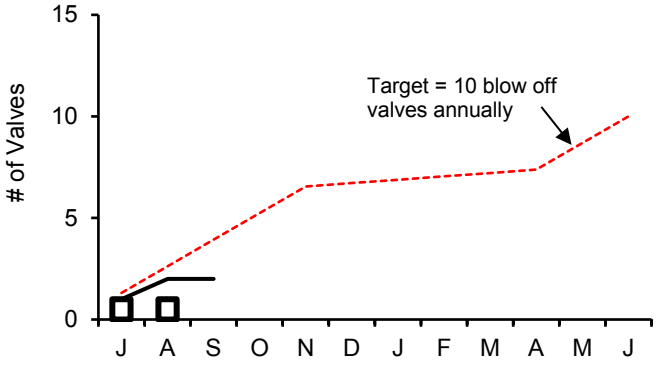
During the 1st Quarter of FY20, there were no main line valves replaced.

Blow-Off Valves Exercised



During the 1st Quarter of FY20, 51 blow off valves were exercised.

Blow-Off Valves Replaced



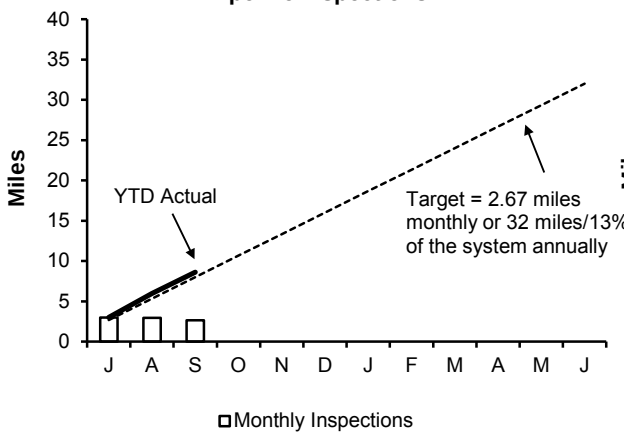
During the 1st Quarter of FY20, there were two blow off valves replaced.

Wastewater Pipeline and Structure Inspections and Maintenance

1st Quarter - FY20

Inspections

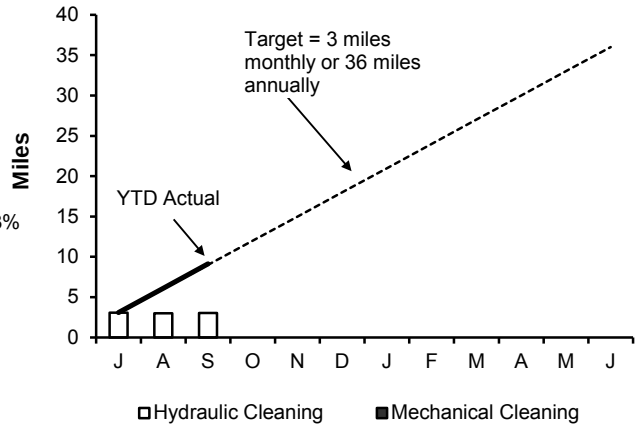
Pipeline Inspections



Staff internally inspected 8.61 miles of MWRA sewer pipeline during this quarter.The year to date total is 8.61 miles. No Community Assistance was provided month.

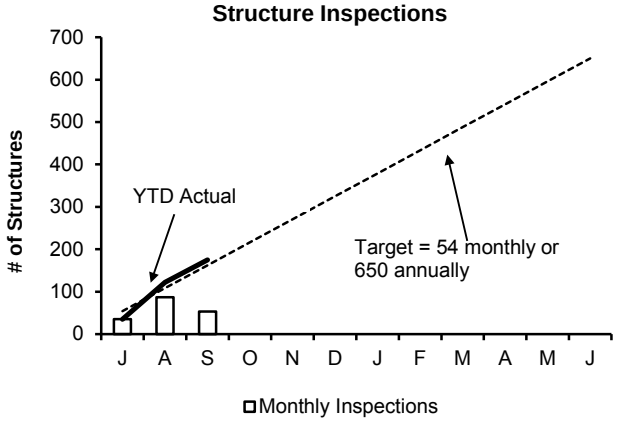
Maintenance

Pipeline Cleaning



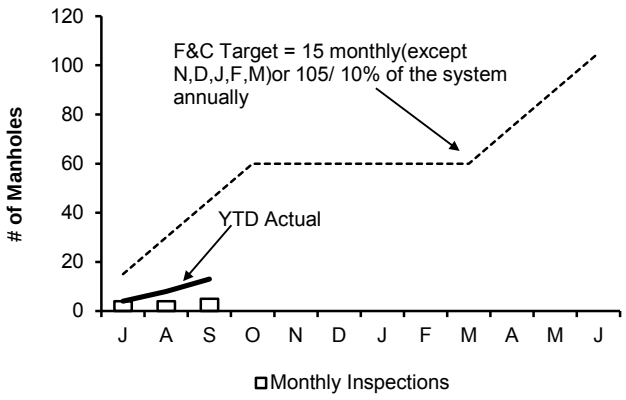
Staff cleaned 9.13 miles of MWRA's sewer system and removed 30 yards of grit and debris during this quarter.The year to date total is 9.13 miles. No

Structure Inspections



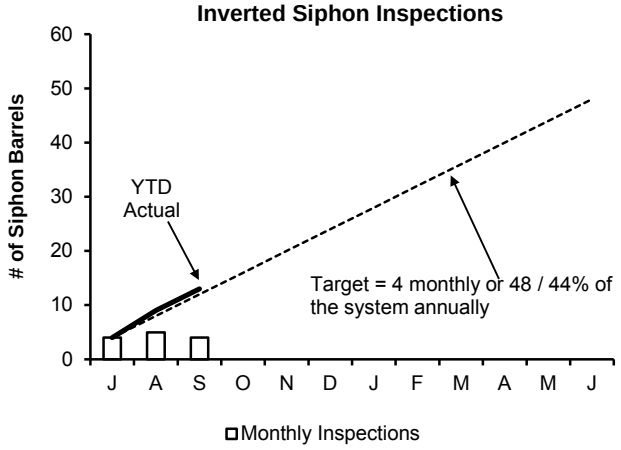
Staff inspected the 36 CSO structures and performed 139 dditional manhole/structure inspections during this quarter. The year to date total is 175 inspections.

Manhole Rehabilitation



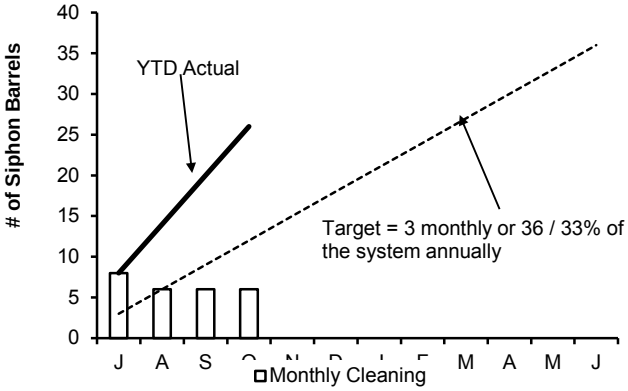
Staff replaced 13 frames & covers during this quarter.The year to date total is 13.

Inverted Siphon Inspections



13 siphon barrels were inspected this quarter. Year to date total is 13 inspections.

Inverted Siphon Cleaning

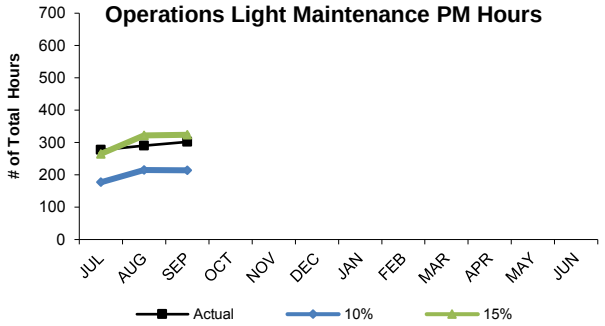


Staff cleaned 26 siphon barrels during this quarter. Year to date total is 26.

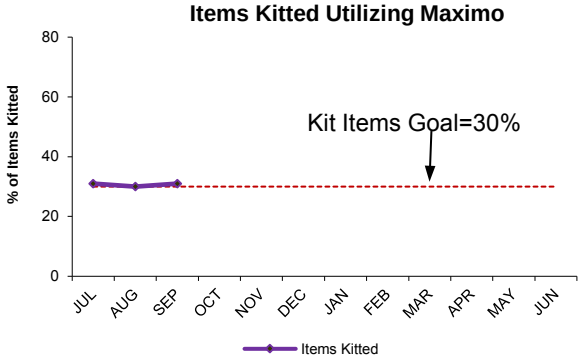
Field Operations' Metropolitan Equipment & Facility Maintenance

1st Quarter - FY20

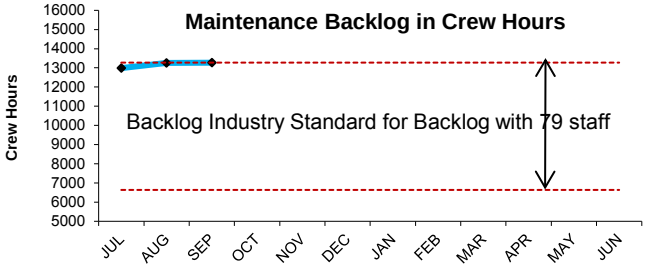
Several maintenance and productivity initiatives are in progress. The goal for the Overall PM completion and the Operator PM completion was raised to 100% for Fiscal Year 2010. The Operator PM and kitting initiatives frees up maintenance staff to perform corrective maintenance and project work, thus reducing maintenance spending. Backlog and overtime metrics monitor the success of these maintenance initiatives.



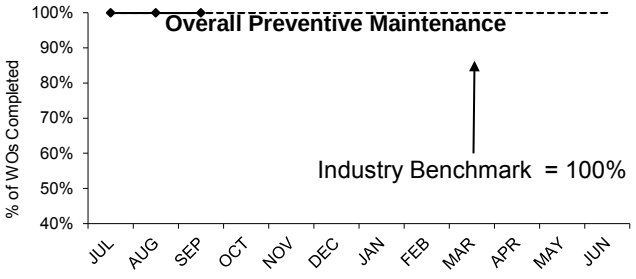
Operations staff averaged 290 hours of preventive maintenance during the 1st Quarter, an average of 14% of the total PM hours for the 1st Quarter, which is within the industry benchmark of 10% to 15%.



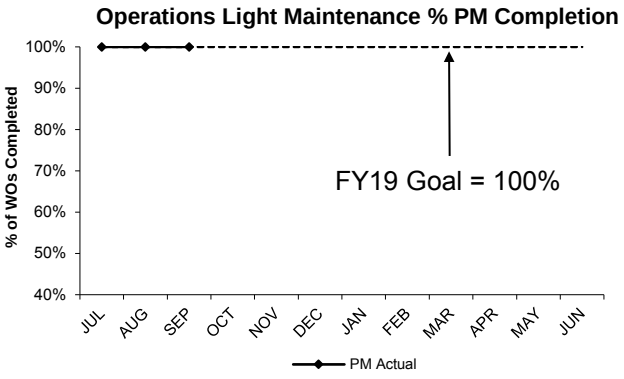
Operation's FY20 maintenance kitting goal has been set at 30% of all work orders to be kitted. Kitting is the staging of parts or material neccesary to complete maintenance work. In the 1st Quarter, 31% of all applicable work orders were kitted. This resulted in more wrench time and increased productivity.



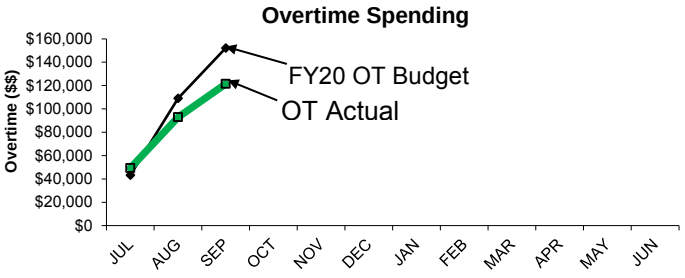
The 1st Quarter backlog average is 13174 hours. Management's goal is to continue to control overtime and still stay within the industry benchmark of 6636 to 13275 hours.



The Field Operations Department (FOD) preventive maintenance goal for FY20 is 100% of all PM work orders. Staff completed an average of 100% of all PM work orders in the 1st Quarter.



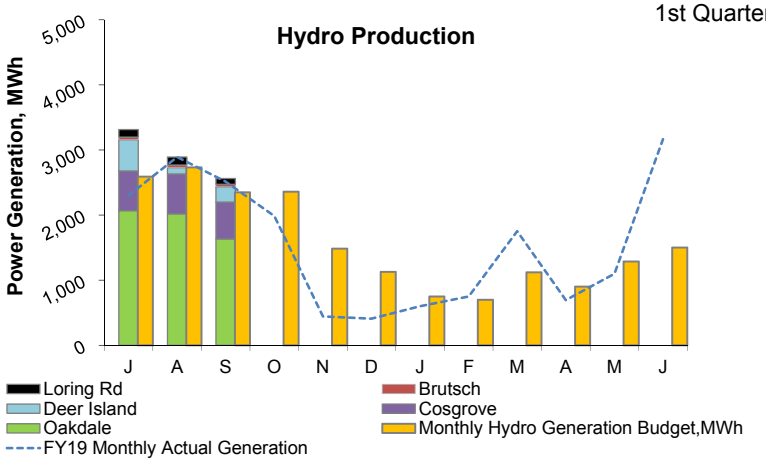
Wastewater Operators complete light maintenance PM's which frees up maintenance staff to perform corrective maintenance. Operations' FY20 PM goal is completion of 100% of all PM work orders assigned. Operations completed an average of 100% of PM work orders in the 1st Quarter.



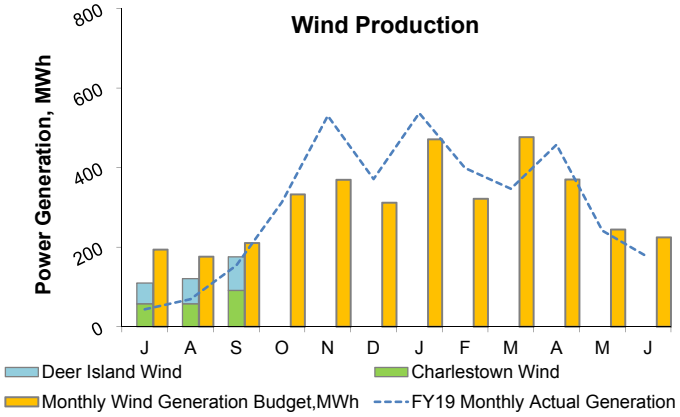
Maintenance overtime was $31k under budget for the 1st Quarter. Overtime was used for critical maintenance repairs and wet weather events.

Renewable Electricity Generation: Savings and Revenue

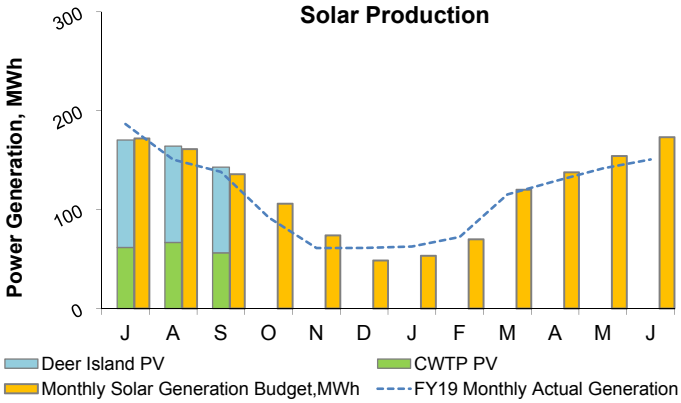
1st Quarter - FY20



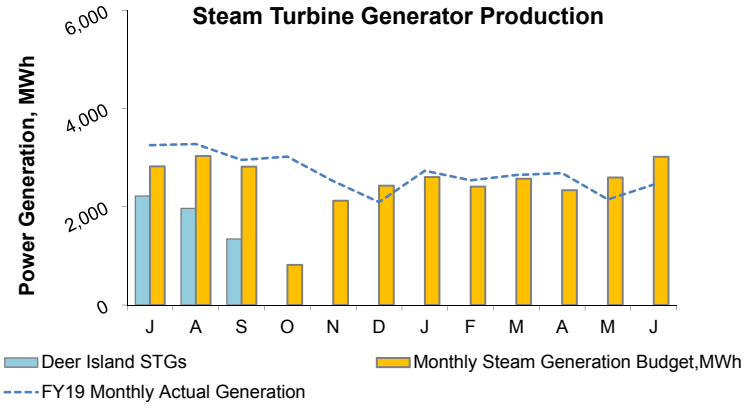
In the 1st Quarter of FY20, the renewable energy produced from all hydro turbines totaled 8,765 MWh; 14% above budget[3] .
Savings and revenue invoices for all the facilities have not yet been received for this FY20 reporting period.



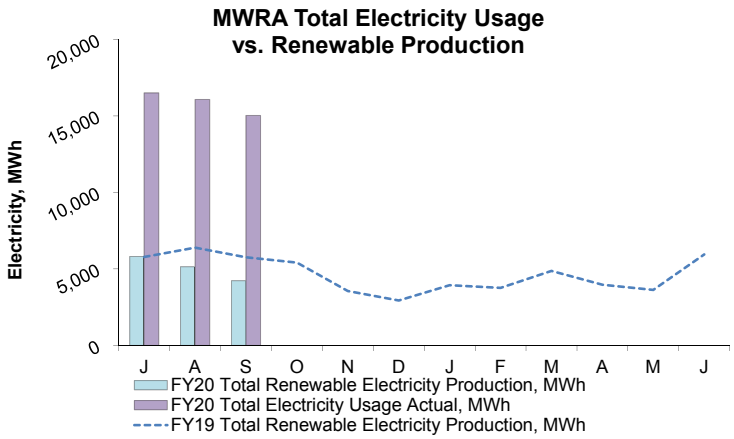
In the 1st Quarter of FY20, the renewable energy produced from all wind turbines totaled 406 MWh; 30% below budget[3] .
Savings and revenue invoices for all the facilities have not yet been received for this FY20 reporting period.

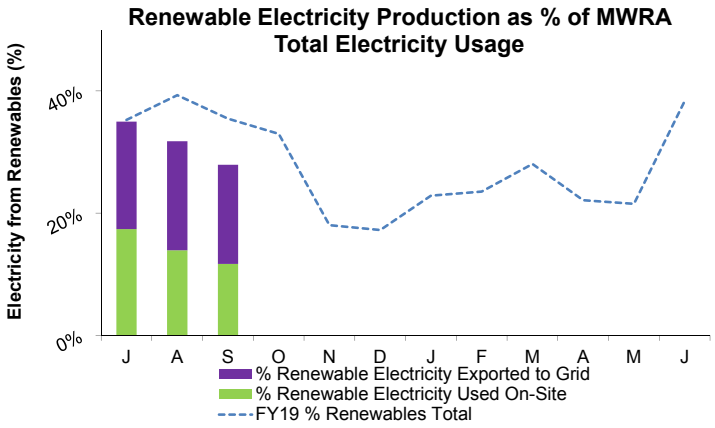


In the 1st Quarter of FY20, the renewable energy produced from all solar PV systems totaled 488 MWh; 4% above budget[3] .
Savings and revenue invoices for all the facilities have not yet been received for this FY20 reporting period.



In the 1st Quarter of FY20, the renewable energy produced from all steam turbine generators totaled 5,529 MWh; 36% below budget[3]. This was due to a vacuum system issue which prevented the STGs from operating in “summer mode” which would have resulted in additional generation. Generation was also low due to an annual Thermal Power Plant (TPP) shutdown for maintenance in September. Savings and revenue invoices for all the facilities have not yet been received for this FY20 reporting period.



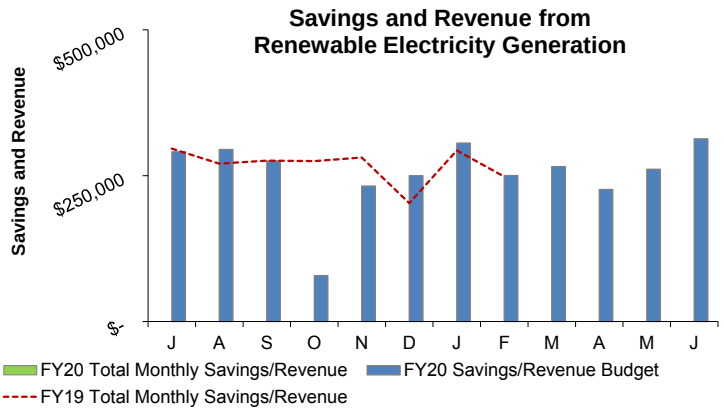


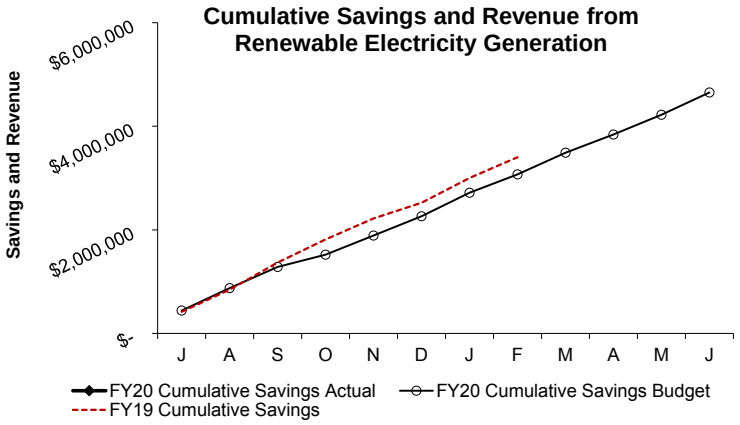
In the 1st Quarter of FY20, MWRA's electricity generation by renewable resources totaled 15,189 MWh. MWRA’s total electricity usage was approximately 47,597 MWh. The MWRA total electricity usage is the sum of all electricity purchased for Deer Island and FOD plus electricity produced and used on-site 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.
In the 1st Quarter, green power generation represented approximately 32% of total electricity usage. 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

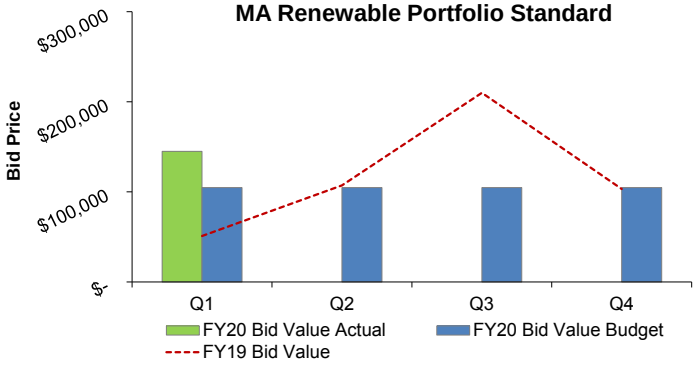
1st Quarter - FY20

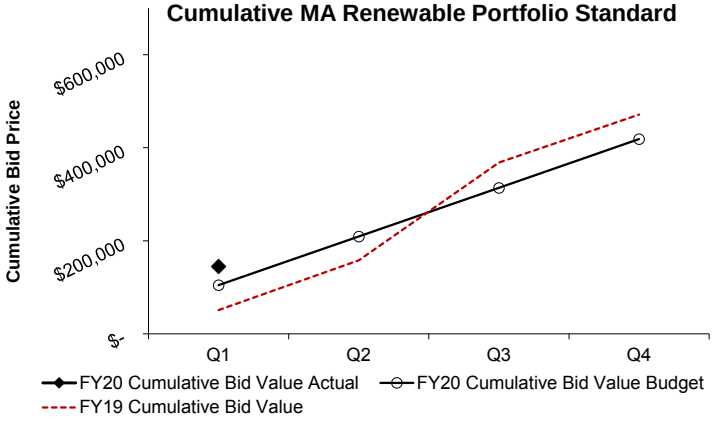




Savings and revenue invoices for MWRA renewable electricity generation have not yet been received for this reporting period[1].

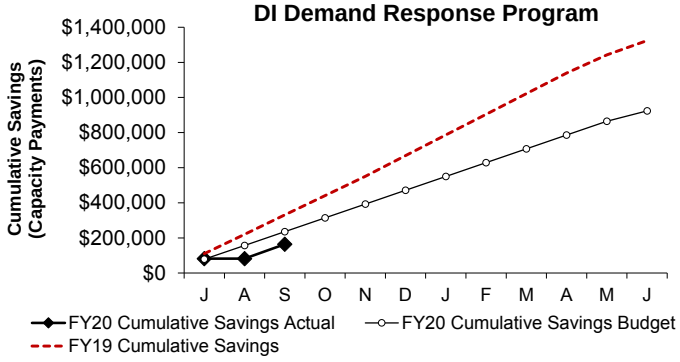
Savings and revenue[2] from all renewable energy sources include wind turbines, hydroelectric generators, solar panels, and steam turbines (DI). This includes savings and revenue due to electricity generation (does not include avoided fuel costs and RPS RECs).
The use of DITP digester gas as a fuel source 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).

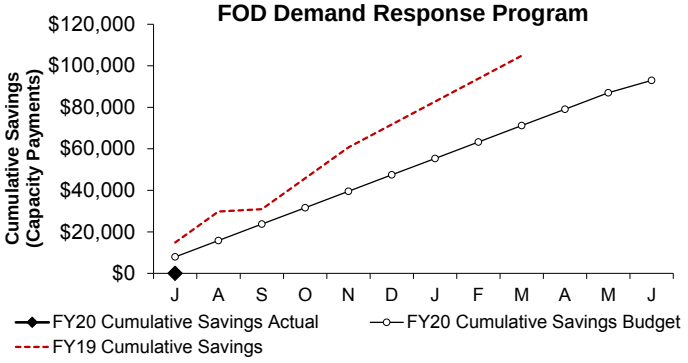




Bids were awarded during the 1st Quarter[1] from MWRA's renewable energy assets; 5,987 Q1 CY2019 Class I Renewable Energy Certificates (RECs) and 50 Q1 CY2019 Solar RECs were sold for a total value of $144,889 RPS revenue; which is 38% above budget[3] for the Quarter.
REC values reflect the bid value on the date that bids are accepted. Cumulative bid values reflects the total value of bids received to date.

*Only Class I and Solar RECs are being reported for Q1 CY2019 sales. Class II RECs have not been sold and are currently reserved for future sale.



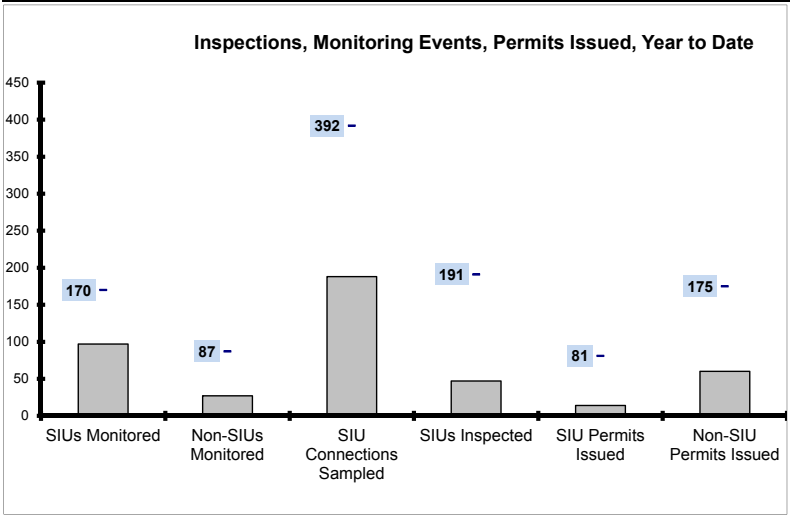


Currently Deer Island, JCWTP, and Loring Rd participate in the ISO-New England Demand Response Programs[4]. By agreeing to reduce demand and operate the facility generators to help reduce the ISO New England grid demand during periods of high energy demand, MWRA receives monthly Capacity Payments from ISO-NE. When MWRA operates the generators during an ISO-NE called event, MWRA also receives energy payments from ISO-NE. FY20 Cumulative savings (Capacity Payments only) in September[1] total $163,973 for DI and payments for FOD have not yet been received for this reporting period[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

1st Quarter - FY20



EPA Required SIU Monitoring Events
for FY20: 170
YTD : **97**

Required Non-SIU Monitoring Events
for FY20: 87
YTD : **27**

SIU Connections to be Sampled
For FY20: 392
YTD: **188**

EPA Required SIU Inspections
for FY20: 191
YTD: **47**

SIU Permits due to Expire
In FY20: 81
YTD: **14**

Non-SIU Permits due to Expire
for FY20: 175
YTD: **60**

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.

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, 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, increased inspections leading to permit category changes requiring additional monitoring events.

TRAC also monitors one-third of the non-SIUs each year.
SIU and Non-SIU permits are issued with durations of two to five years, depending on the category of industry, varying the number of permits that expire in a given year.

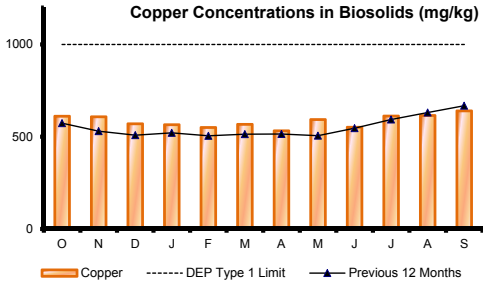
Number of Days to Issue a Permit

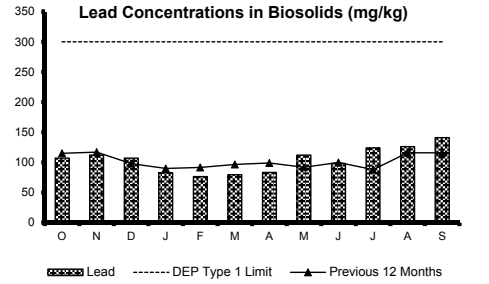
	0 to 120		121 to 180		181 or more		Permits Issued	
	SIU	Non-SIU	SIU	Non-SIU	SIU	Non-SIU	SIU	Non-SIU
Jul	2	19	0	0	0	0	2	19
Aug	4	21	0	4	1	0	5	25
Sep	7	16	0	0	0	0	7	16
Oct								
Nov								
Dec								
Jan								
Feb								
Mar								
Apr								
May								
Jun								
% YTD	93%	93%	0%	7%	7%	0%	14	60

EPA requires MWRA to issue or renew 90% 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% of SIU permits to be issued within 180 days.

In the 1st quarter of FY20, seventy-four permits were issued, fourteen of which were SIUs. All but one of the SIU permits were issued within the 120-day timeframe. Four of the non-SIU permits were issued after the 120-day timeframe. Timely availability of needed data for permit processing coupled with the late payment of the permit fees, led to those five permits being issued beyond the 120-day timeframe.

No SIU permits were issued in this quarter for the Clinton Sewer Service area.





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.

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
1st Quarter – FY20

Western Water Operations and Maintenance

Carroll Water Treatment: Staff supported the generator replacement project on Emergency Diesel generator #1. Staff recoated the fuel storage tanks for the emergency generators to prevent water infiltration into the interstitial space. Three of the emergency generators were tested under load bank conditions for EPA compliance purposes.

Metro Water Operations and Maintenance

Valve Program: Valve operations to support in-house work included an isolation of Section 70 along with Meters 185 and 198
to Saugus. This isolation supported the repair of a failed valve on Walnut Street, which was completed, and the valve returned to service. In addition, a portion of WASM 15 at the River Street Bridge in Cambridge was filled and leak tested. Support of CIP work included the Section 110 construction project, the Section 111 construction project, the Turkey Hill Tank repainting project and the isolation of WASM1 in Newton for the Commonwealth Avenue Pump Station project. Valve operations occurred to support an outside contractor working under an 8M permit. Section 55 at Ocean Avenue in Revere was flushed, disinfected and sampled in preparation of reactivation.

Water Pipeline Program: Staff constructed a seepage weir on Dam 8 at the Fells Open Reservoir in Stoneham. Work included building an access road to the toe of the dam, excavation, setting a dewatering well, pouring a footing for the weir, forming and pouring the weir wall and restoring the site. Work began on a drainage and road repair project on "10% Road" at the Wachusett Dam in Clinton. Work includes repairing the existing drains and catch basins, restoring and up grading the drainage swale and regarding the road. Seven leaks were repaired during the quarter including one on WASM 15 at the River Street Bridge in Cambridge. Leak detection was performed on over 36 miles of MWRA water main and assistance was provided to nine customer communities.

Wastewater Operations and Maintenance

Union Park Facility Generator Fuel Tank: The replacement for the leaking fuel oil tank for the emergency generator at the Union Park CSO was substantially completed by July 2019. Temporary fuel tank was removed in September 2019.
Wastewater OCC Improvements Project: Staff attended numerous meetings and toured several other operational control centers during the month of July for the Wastewater OCC Improvements project. Operations staff continued over the course of the quarter to work with Engineering & SCADA staff to complete this project.
Remote Headworks & Deer Island Shafts Study: Flow was stopped on two days at the Ward Street and Columbus Park Headworks, as part of this shaft inspection project. The shut down on 9/13/19 was a trial shutdown and the 9/26/19 shutdown was for the internal inspection of shaft "C" at Deer Island.

Metro Equipment and Facility Maintenance

Brattle Court Pump Station: The #3 Variable Frequency Drive failed. MWRA electricians troubleshot the equipment and found a faulty coil. A new coil was installed and the drive was returned to service.
Nut Island Headworks: MWRA plumbers replaced the water regulator and all associated piping to the #2 vortex.
Prison Point CSO: MWRA mechanics replaced the facility grinder.
DeLauri Pump Station: MWRA plumbers and electricians installed a new facility boiler.
Prison Point CSO: Plant water pump #1 failed from mis-alignment, due to the pump base crumbling. MWRA mechanics, machinists and welders rebuilt the pump base, installed a new pump, laser aligned the motor to the pump and returned the pump to operations.
Somerville CSO/Alewife Pump Station: MWRA electricians working with the SCADA group installed a new uninterruptable power supply for each facility.
DeLauri Pump Station: A new boiler was purchased and installed by MWRA plumbers, electricians and HVAC staff.
Framingham Pump Station: The #3 Variable Frequency Drive (VFD) failed. Due to the age of the equipment, no repair parts were available. Three new drives were purchased. MWRA electricians and machinist installed the first of the three new VFD's.
Cottage Farm CSO: #1 fine screen motor failed. MWRA electrician, mechanics and carpenters installed a new motor.

Metering

Community Assistance: Metering department staff continued to provide monthly water meter readings to billing and bi-monthly wastewater meter readings to both the finance department and community outreach for coordination with our MWRA communities. During Q1 FY20 metering staff continued community outreach programs including meetings with Malden, Dedham, and Lynn. In addition, alerts were sent on 8 occasions about higher than expected monthly

Verizon 4G Upgrade:, Metering staff has been preparing for Verizon to shut off their 3G data network permanently on January 1, 2020. In order to maintain communications after the shutoff a total of 316 3G modems and 182 Telog RU-33 wastewater meters required upgrade to new 4G modems and RU-35 dataloggers.
Verizon notified the Authority in September that the shutdown of the 3G network has been delayed one year from January 1, 2020 and will now occur on January 1, 2021. Despite this delay, staff continues tracking progress and is on schedule for completion of the changeover by the end of 2019. In addition to the modem rollouts, the meter data department worked with MIS to update the SQL database for communication with new modems and meters. New SQL server went online in August with no service interruption.

TRAC

Compliance issued 1 Administrative Settlement, 22 Notices of Noncompliance, 43 Notices of Violation, 2 Return to Permit Letters, 1 Ruling, and 1 Penalty Assessment Notice.
This first quarter TRAC issued a total of 65 MWRA 8(m) Permits allowing companies to work within an easement or other property interest held by the Authority. The total number includes 42 permits issued for work within water infrastructure easements and 23 permits issued for work within sewer infrastructure easements. Permits issued this quarter were issued in an average of 86 days from the date the application for 8(m) permit was received by the MWRA.
TRAC monitored the septage receiving sites a total of 31 times. Staff conducted 219 inspections of existing gasoline/oil separators, and 42 new construction gasoline/oil separators.

TRAC promulgated revisions to the following regulations on September 6, 2019: Adjudicatory Proceedings (360 CMR 1.00), Enforcement and Administrative Penalties (360 CMR 2.00), and the Sewer Use Regulations (360 CMR 10.000). In the revisions, a new group permit for eligible dental practices was created. In addition to creating a new group permit for

Dental Discharges, TRAC increased its permit and monitoring charges,and incorporated all of EPA's approved changes to the Clinton sewerage service area local limits.

Environmental Quality-Water

Algae: MWRA's algae monitoring season continued, with DCR and MWRA staff collecting algae samples routinely at Wachusett Reservoir. Enhanced monitoring of sample and buoy data occurred throughout the quarter due to elevated levels of *Chrysophorella* and chlorophyll-a.
Staff collected routine algal toxin and taste and odor compound samples at Cosgrove Intake Reservoir; Wachusett and Quabbin raw water inlet taps; and associated finished water taps. The monitoring program ends each September.

Weekly cyanobacteria visual monitoring continued at all standby reservoirs. Observations required follow-up sampling and investigation at Spot Pond, Sudbury Reservoir, and Chestnut Hill during the quarter. Staff provided final comments on a cyanobacteria inspection IPad application, that will provide the ability for managers to review reservoir inspection data.

Since early August, elevated levels of *Chrysosphaerella* were detected at the Quabbin Reservoir. The CVA communities received multiple metallic-taste complaints. As a result, DCR staff increased algae monitoring to three days a week and ENQUAL staff provided water quality updates throughout the month. Staff issued a press release on MWRA's web site.

In June, MADEP encouraged all public water systems to collect PFAS samples at finished water locations to better understand PFAS presence in drinking water across Massachusetts. In July and August, ENQUAL collected samples from MWRA reservoir sources, as well as raw and finished water taps. Reports were forwarded to MADEP. In September, ENQUAL staff collected finished water samples for three partial communities: Bedford, Needham, and Peabody.

Per a DEP request, staff collected samples on September 10-19 at the CWTP raw water inlet and finished water taps for pesticide testing, in response to the state aerial spraying program to minimize exposure to Eastern equine encephalitis (EEE).

Community tanks: On August 8 and September 18, sampling staff provided support to the city of Waltham for sampling and testing associated with each of their Prospect Hill Tanks. The tanks were reactivated following confirmation that all tests met drinking water standards. On September 25, staff provided support to the city of Wakefield for a water quality evaluation of their Sydney St. Tank.

MWRA and Malden staff met August 14 to discuss recent total coliform positives and recent chlorine residuals within their distribution system. In response, Malden conducted hydrant flushing in the area of concern and installed an outside sample station.

On August 27, sampling staff sampled and tested water quality samples following MWRA's Turkey Hill Storage Tank painting project. All samples met drinking water standards and staff successfully reactivated following MADEP approval.
In September, staff sampled and tested water quality samples associated with MWRA's Section 111 and Section 55 pipelines. All samples met drinking water standards and the pipelines were reactivated.

Buoy: Throughout the quarter, staff visited the reservoir buoys to perform routine replacement of water quality sondes as well as maintenance and troubleshooting to facilitate transfer of buoy data. All three buoys are currently collecting and recording water quality profiles from the Wachusett Reservoir.

Environmental/Chemical Contract Management

ENQUAL and Procurement staff discussed contract compliance issues and elevated chlorate levels associated with the bulk sodium hypochlorite supply to our drinking water treatment plants. ENQUAL staff will continue to randomly sample tank truck deliveries and arrange for chlorate testing by an independent laboratory.

Environmental Quality-Wastewater

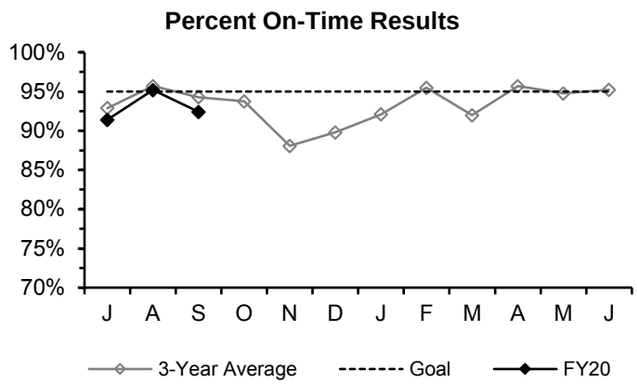
Harbor/CSO Receiving Water Monitoring: Submitted annual report on water quality in the Charles and Alewife/Mystic by July 15, as required by the water quality standards variances. CSO receiving water monitoring sampling in support of the water quality standards variance and the CSO assessment continued; due to the dry weather there were only a few storm sampling events in the Charles in the Alewife/Mystic. Biweekly harborwide monitoring continued throughout the summer. Responded to public reports of murky brown water in Boston Harbor, with assistance from DLS, Enqual-Water, and the Harbor & Outfall Monitoring consultant, identifying a bloom of the nuisance algal species *Karenia mikimotoi* which has been widely reported in nearshore waters of the Gulf of Maine in late summer 2019.

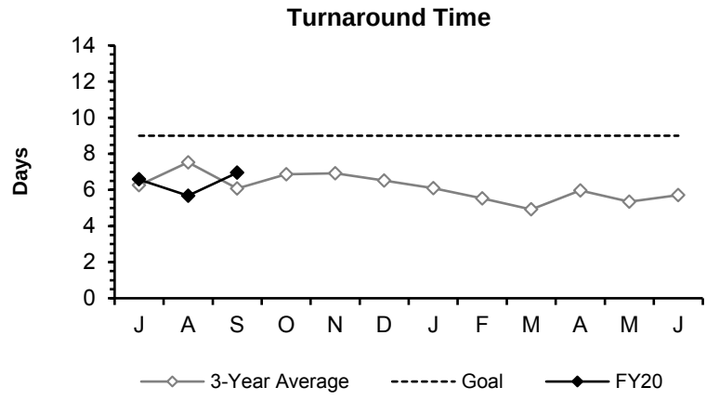
Coordination with other MWRA Departments: Presented information on receiving water quality monitoring and modeling at the MA DEP July 18 hearing on tentative determinations to extend water quality standards variances in the Charles River and Alewife Brook/Upper Mystic River. Worked with Environmental & Regulatory Affairs and with Engineering & Construction to provide comments on the draft variances; the new variances were issued by MassDEP and went into effect September 1. Attended Court oral arguments on July 19 and worked with Law Division regarding legal agreements and updates to the Receiving Water Model Work Plan. Worked with Engineering & Construction and the DCOO to address regulatory agency questions and concerns about the receiving water quality analysis portion of the CSO Post-Construction Monitoring & Performance Assessment project.

Completed a plan for CSO/storm water outfall sampling including storm drain sampling by TRAC and DLS in Medford and Arlington, and by Cambridge and Somerville in their storm drains. The final plan was submitted to DEP for inclusion with the variances. The outfall sampling program for untreated CSOs discharging to the Alewife Brook, conducted by TRAC, DLS, and ENQUAL, successfully captured discharges from a storm in late August. Provided DITP and Clinton influent and effluent quality information to TRAC for inclusion in the annual pretreatment report.
Provided daily summary of Boston Harbor beach closings some of which are affected by new MA Department of Public Health rule for when to post.

Cooperation with other agencies: Daily postings of harbor beach testing results continued until Labor Day. Met with DPH and DCR to discuss beach posting method change. Submitted comments to EPA and MADEP on draft permits issued for three POTWs discharging to the Merrimack River, on issues of interest to MWRA in potential future permits. Staff attended training on the science and regulation of PFAS, an emerging contaminant of great current concern.

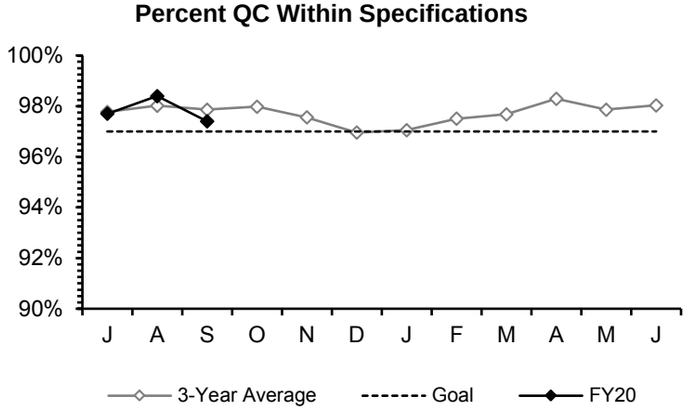
Laboratory Services
1st Quarter - FY20



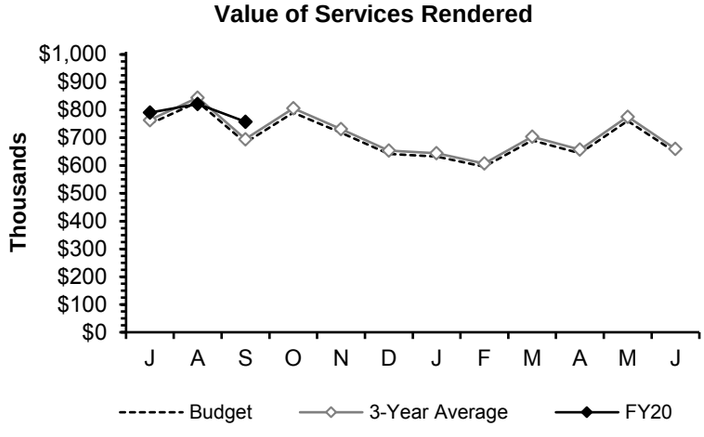


The Percent On-Time measurement was slightly below the 95% goal due to training of new staff.

Turnaround Time was faster than the 9-day



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



Value of Services Rendered met the annual budget projection.

Highlights:

HOM: Received and processed one unanticipated *Alexandrium* (red tide) survey during July. Elevated counts of the red tide phytoplankton in Massachusetts Bay triggered extensive response sampling and testing efforts.

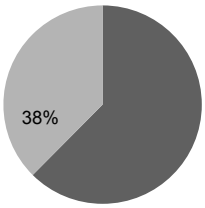
Residuals: Assisted NEFCO and NEBRA with understanding and clarifying MA DEPs new PFAS sampling requirements. Continued unanticipated extra fecal coliform testing of pellets to support NEFCOs application to market in Pennsylvania.

CONSTRUCTION PROGRAMS

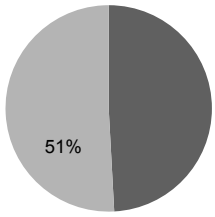
Projects In Construction

1st Quarter – FY20

Money



Time



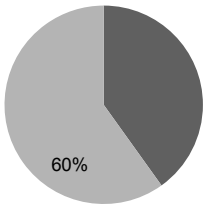
Southern Extra High Pipeline Section 111

Project Summary: This project consists of 6,800 linear feet of 36-inch water main in Dedham and Westwood and includes pipe jackings at the Dedham Corporate MBTA Station and at the MassDOT Route 95 East Street Rotary.

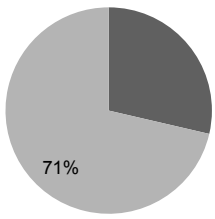
Notice to Proceed: 10-Aug-2018 *Contract Completion:* 7-Nov-2020

Status and Issues: As of September Crew 1 installed 1,011 ft. of 36" DICL water mainline from Sta. 33+27 to 43+38 and Crew 2 installed 185 ft. of 36" DICL pipe for water mainline from Sta. 45+88 to 44+03. The crews removed 165 CY of unsuitable material and placed 1311 SY of temporary trench pavement.

Money



Time



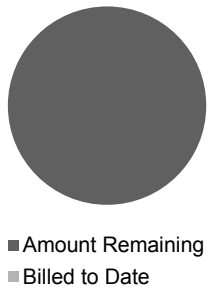
Chelsea Creek Headworks Upgrade

Project Summary: This project involves a major upgrade to the entire facility including: automation of screening collection & solids conveyance, replacement of the odor control, HVAC and electrical systems.

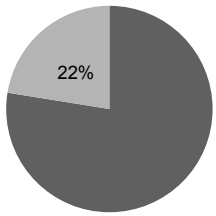
Notice to Proceed: 22-Nov-2016 *Contract Completion:* 21-Nov-2020

Status and Issues: As of September, the Contractor continued work on the installation of the odor control duct towards the exhaust stack and from the fan towards CAD 1. They installed the level switch and level transmitter probes for Channel 2 screen pod and installed the compressed air header for the grit pods. In addition, they continued installing the Channel 2 grit collection system.

Money



Time



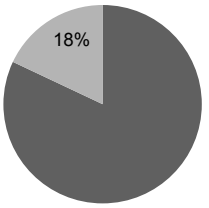
Cottage Farm & Gillis PS Roof Replacement

Project Summary: This project involves the replacement of the rubber roofing membrane system at the Cottage Farm CSO and the Gillis Pumping station.

Notice to Proceed: 10-Jul-2019 *Contract Completion:* 9-Jul-2020

Status and Issues: As of September, the Contractor has been providing submittals for review.

Money



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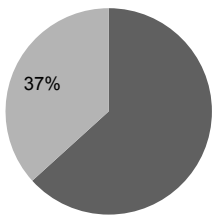


Commonwealth Ave Pump Station Improvements

Project Summary: This project will provide a new connection to the station from two low service pipelines in Commonwealth A venue and add low service pumps so that the City of Newton can be supplied in the event of a City Tunnel failure.

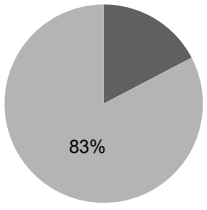
Notice to Proceed: 28-Feb-2019 *Contract Completion:* 30-Sep-2020

Status and Issues: As of September, the Contractor continued installation of exhaust ductwork and fan coils in both buildings; completed Valve Vault D concrete pour for walls and top. In addition, they held a pre tie-in meeting ahead of the WASM 1 work, and subsequently began WASM 1 work on September 16th.

Projects In Construction

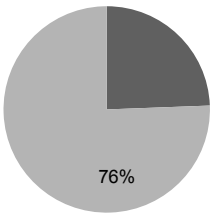
1st Quarter – FY20

Money



Amount Remaining
Billed to Date

Time



Days Remaining
Days Expended

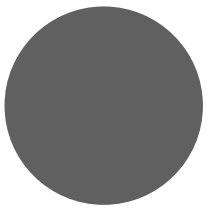
NIH Section 110 - Stoneham

Project Summary: This project consists of the replacement of 14,000 linear feet of 48-inch diameter transmission main in the Town of Stoneham.

Notice to Proceed: 5-Sep-2017 *Contract Completion:* 1-Jun-2020

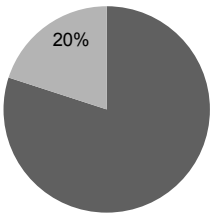
Status and Issues: As of September, the Contractor installed 519-LF of 48" DIP water main along Pond Street and Main Street. Total to date installed 13,033 LF, which includes the completion of the 48" DIP installation in DCR roads. They removed 183.83-CY of ledge along Pond Street and Main Street. Total to date removed 16,296.42 CY.

Money



Amount Remaining
Billed to Date

Time



Days Remaining
Days Expended

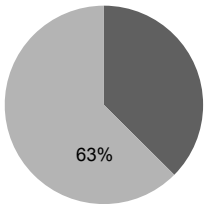
Capital Improvements at the Biosolids Facility

Project Summary: This project involves the replacement of nine mechanical conveyors and ancillary equipment, as well as three sludge processing rotary dryer drums.

Notice to Proceed: 9-Apr-19 *Contract Completion:* 21-Aug-20

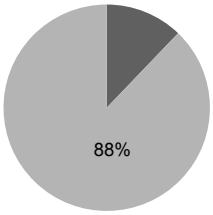
Status and Issues: As of September, the Contractor has mobilized on-site. They are in the process of removing duct work to remove Dryer Drum No. 4 and replacement of the air compressor and nitrogen generator.

Money



Amount Remaining
Billed to Date

Time



Days Remaining
Days Expended

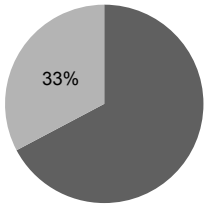
Winthrop Terminal VFD and Motor

Project Summary: This project involves the replacement of 6, 600-HP motors, VFDs and associated electrical components in the Winthrop Terminal Facility.

Notice to Proceed: 16-Jun-2016 *Contract Completion:* 12-Mar-2020

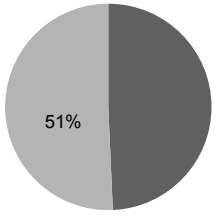
Status and Issues: VFD No. 5 commission test on-going.

Money



Amount Remaining
Billed to Date

Time



Days Remaining
Days Expended

Gravity Thickener Rehabilitation

Project Summary: This project involves the upgrade of all six gravity thickeners, including the complete replacement of each tank's sludge and scum thickening equipment and 5 of the 6 FRP dome covers.

Notice to Proceed: 11-May-2018 *Contract Completion:* 4-Feb-2021

Status and Issues: As of September, the Contractor completed the control panel testing, repaired the grout floor and the final adjustments to the mechanism to start the 14-day run test.

CSO CONTROL PROGRAM

1st Quarter – FY20

All 35 projects in the Long-Term CSO Control Plan were complete as of December 2015 in compliance schedule milestones in the Federal District Court Order. MWRA is conducting a multi-year CSO post-construction monitoring program and performance assessment that will culminate in a report to EPA and DEP in December 2021 that will verify whether the court-ordered long-term levels of CSO control are attained. Of the $911.1 million budget in the FY20 CIP for the CSO Control Program, approximately $7.0 million remain to be spent, as described below.

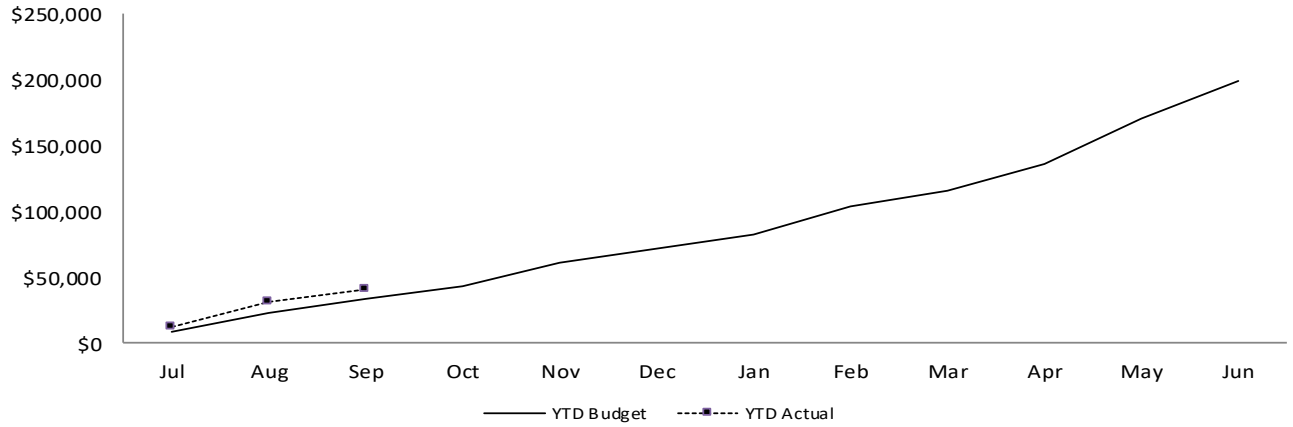
Project/Item	Status as of September 30, 2019
BWSC Dorchester Interceptor Inflow Removal	MWRA's CIP and the MOU/FAA with BWSC included $5.4 million for additional inflow removal from the BWSC Dorchester Interceptor system in the South Dorchester Bay Sewer Separation area, of which $1.7 million was transferred to the BWSC MOU/FAA CSO account and $1.6 million of that was withdrawn by BWSC to fund related design and construction work. On May 17, 2017, MWRA's Board of Directors authorized removing the remaining $3.8 million from the BWSC MOU/FAA (which ended on June 30, 2017) and including this funding amount in a separate, 4-year financial assistance agreement with BWSC effective July 1, 2017. The new agreement limits MWRA financial assistance to reimbursement of the eligible costs of BWSC construction work reviewed and approved by MWRA, up to $3.8 million. BWSC recently completed sewer system evaluations and is preparing a construction contract for inflow removal that it plans to submit to MWRA for eligibility approval this fall.
City of Cambridge Memorandum of Understanding and Financial Assistance Agreement	The City of Cambridge attained substantial completion of its last project, CAM004 Sewer Separation, in December 2015 in compliance with Schedule Seven, and attained substantial completion of related surface restoration work by the end of 2017. MWRA made a final transfer of funds to the Cambridge CSO account in December 2017, in the amount of $1,254,551, to cover eligible costs through June 30, 2018, when the 22 year-old, $100.2 million MOU/FAA ended. Cambridge continues to support ongoing MWRA review of the construction contracts Cambridge managed under the CSO MOU and Financial Assistance Agreement. Staff expect to complete the review and issue a final eligibility certification by **November 30, 2019**.
MWRA CSO Performance Assessment – Contract 7572	MWRA issued the Notice to Proceed with the contract for CSO Post-Construction Monitoring and Performance Assessment to AECOM Technical Services, Inc., in November 2017. The contract includes CSO inspections, overflow metering, hydraulic modeling, system performance assessments and water quality impact assessments, culminating in the submission of a report to EPA and DEP in December 2021 verifying whether the court-ordered levels of CSO control are attained. • MWRA will issue a third semiannual progress reports on the performance assessment by October 31, 2019, covering the data collection and CSO discharge quantification period of January 1 – June 30, 2019, and other work progress. • Temporary CSO meters continue to be employed at 36 of the original 57 metered locations, in accordance with Amendment 1 to the AECOM contract. • MWRA's CSO performance assessment consultant, AECOM, continues to upgrade and improve the calibration of MWRA's hydraulic model, and expects to complete and verify the model calibration this fall. The calibrated model will be used to perform comparisons of model predicted CSO discharges with the discharges measured from the CSO metering program that began in April 2018. Model calibration is intended to bring the meter results and model predictions closer together to gain assurance of the accuracy of the model in predicting CSO discharges for use in determining attainment of the Long Term Control Plan's Typical Year levels of control. • MWRA and AECOM continue to conduct, in close coordination with the CSO communities, investigations into the higher overflow activities measured at several outfalls to better understand the factors contributing to overflows and identify system adjustments that may help bring discharges into compliance with the long-term levels of control. • AECOM is making progress in developing the receiving water models, in accordance with Amendment 1. MWRA staff are performing CSO and stormwater sampling with the assistance of the cities of Cambridge and Somerville and Medford, to establish water quality inputs to the models. On August 30, 2019, DEP issued five-year CSO variances to water quality standards for the Lower Charles River/Charles Basin and the Alewife Brook/Upper Mystic River effective through August 31, 2024. The variance conditions include the water quality modeling and sampling noted above, the evaluation of additional CSO controls for these waters, and other requirements intended to minimize CSO discharges, their impacts and public health risk.

CIP Expenditures
1st Quarter – FY20

FY20 Capital Improvement Program Expenditure Variances through September by Program ($ in thousands)				
Program	FY20 Budget Through September	FY20 Actual Through September	Variance Amount	Variance Percent
Wastewater	17,308	26,426	9,118	53%
Waterworks	14,764	13,882	(881)	-6%
Business and Operations Support	1,785	713	(1,072)	-60%
Total	$33,857	$41,021	$7,165	21%

Project overspending within Wastewater was due to greater than anticipated community requests for grants and loans for the Infiltration/Inflow (I/I) Program, contractor progress for the Chelsea Creek Headworks Upgrades Construction, Residuals/Electrical/Mechanical/Drum Dryer Replacements, Chemical Tanks and Digester Pipe and Winthrop Terminal Facility VFD Replacements, earlier than anticipated equipment purchases for the Wastewater Meter Equipment project, and work anticipated in FY19 that was completed in FY20 for the Clinton Roofing Rehabilitation. This was partially offset by planned work expected in FY20 that was completed in FY19 for the Gravity Thickener Rehabilitation contract. Project underspending in Waterworks was due to delay in paving for the Southern Extra High Section 111 Construction 2, MBTA crossing issue with Construction 3, and less than anticipated community loan requests. This was partially offset by work anticipated in FY19 that was completed in FY20 for the Cosgrove Intake Roof Repair and Painting Bellevue 2 and Turkey Hill Tanks.

Budget vs. Actual CIP Expenditures
($ in thousands)
Total FY20 CIP Budget of $199,147



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 9/28/2019	$147.2 million
Unused capacity under the debt cap:	$1.58 billion
Estimated date for exhausting construction fund without new borrowing:	MAY-20
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	$128 million $350 million
Budgeted FY20 Cash Flow Expectancy*:	$183 million

* Cash based spending is discounted for construction retainage.

DRINKING WATER QUALITY AND SUPPLY

Source Water – Microbial Results and UV Absorbance

1st Quarter – FY20

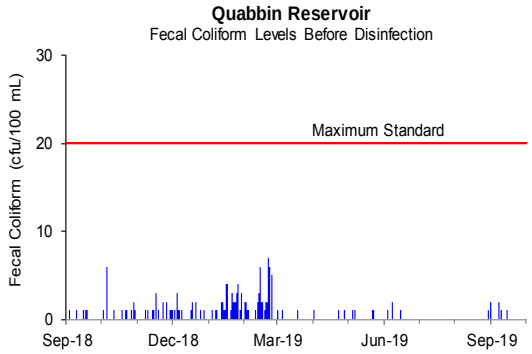
Source Water – Microbial Results

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

Sample Site: Quabbin Reservoir

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

All samples collected during the 1st 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.**

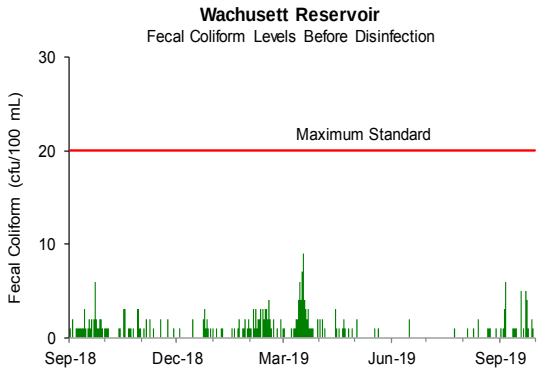


Sample Site: Wachusett Reservoir

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 1st Quarter were below 20 cfu/100ml. **For the current six-month period, 0.0% of the samples exceeded a count of 20 cfu/100mL.**

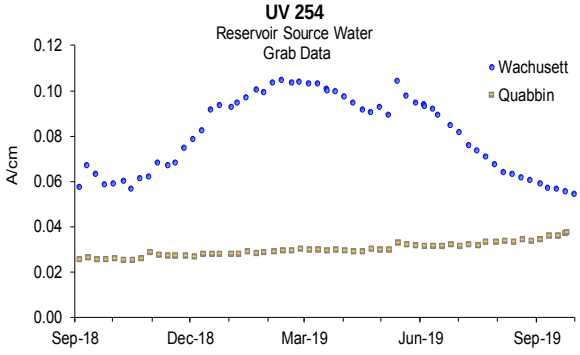


Source Water – UV Absorbance

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 are currently around 0.038 A/cm.

Wachusett Reservoir UV-254 levels are currently around 0.055 A/cm.



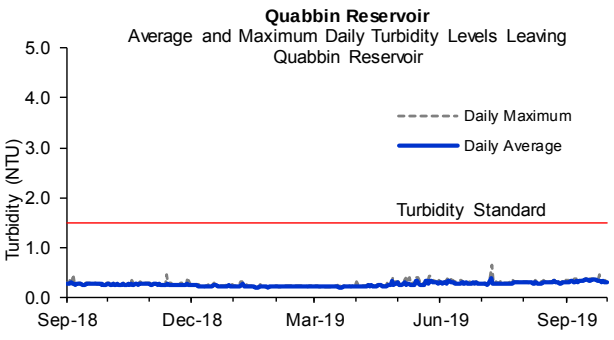
Source Water – Turbidity

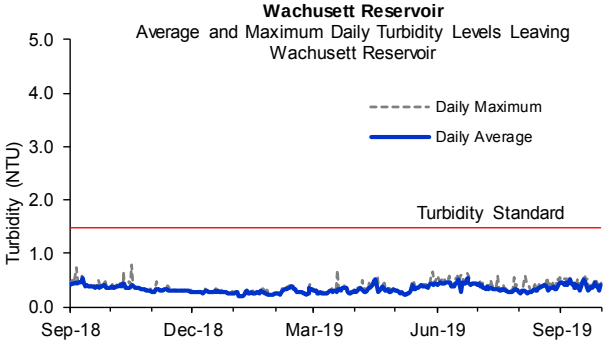
1st Quarter – FY20

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.



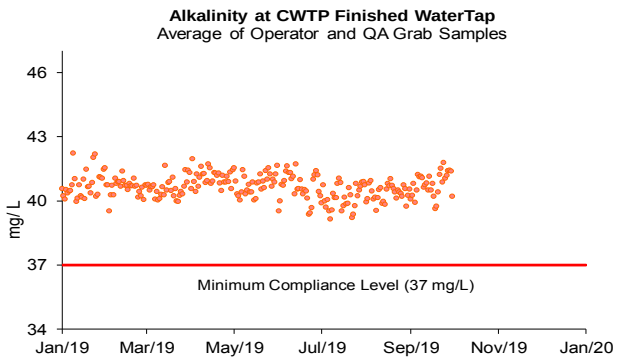


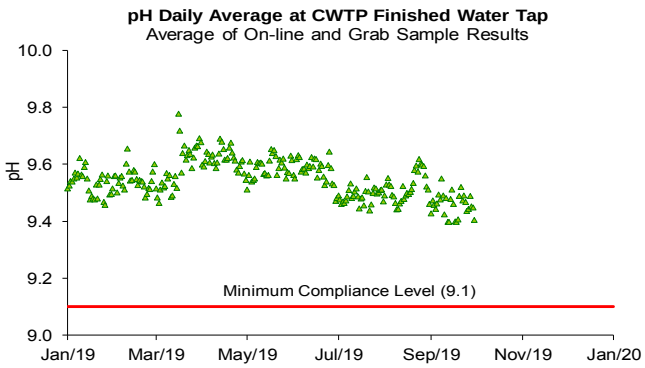
Treated Water – pH and Alkalinity Compliance

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.

Distribution system samples were collected on September 4 and 5, 2019. Distribution system sample pH ranged from 9.0 to 9.6 and alkalinity ranged from 38 to 41 mg/L. No sample results were below DEP limits for this quarter.





Treated Water – Disinfection Effectiveness

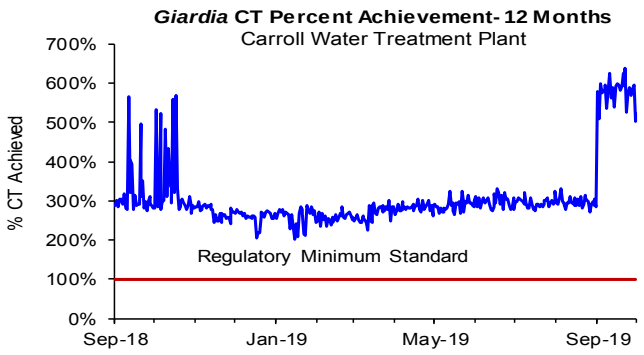
1st Quarter – FY20

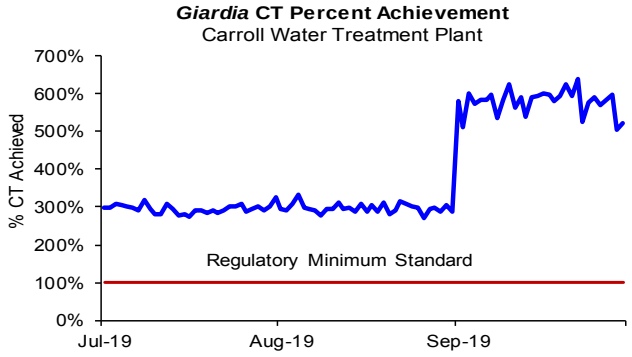
At the Carroll Water Treatment Plant (CWTP), MWRA meets the required 99.9% (3-log) inactivation of *Giardia* using ozone (reported as CT: concentration of disinfectant x contact time) and the required 99% (2-log) inactivation of *Cryptosporidium* using UV (reported as IT: intensity of UV x time). MWRA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

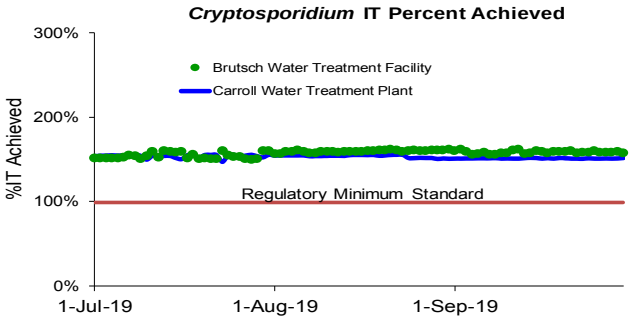
- Ozone dose at the CWTP varied between 2.2 to 2.8 mg/L for the quarter.
- *Giardia* CT was maintained above 100% at all times the plant was providing water into the distribution system this quarter, as well as every day for the last fiscal year.
- *Cryptosporidium* IT was maintained above 100% during the month. Off-spec water was less than 5%.
- The Wachusett Aqueduct Pump Station (WAPS) will improve redundancy in the MWRA water system. WAPS testing was initiated in June 2018 and continued through October 2018. Prior to and during WAPS testing, CWTP proactively increased the ozone dose and "CT achievement". This is visible in the top left graph.
- The ozone doses was proactively raised early September in response to an algae bloom in the reservoirs. This is visible in the top left graph.

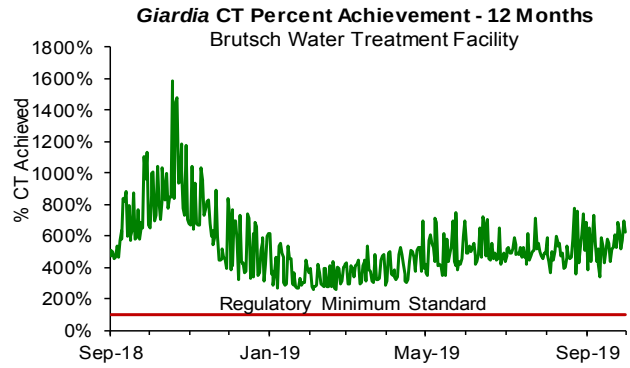


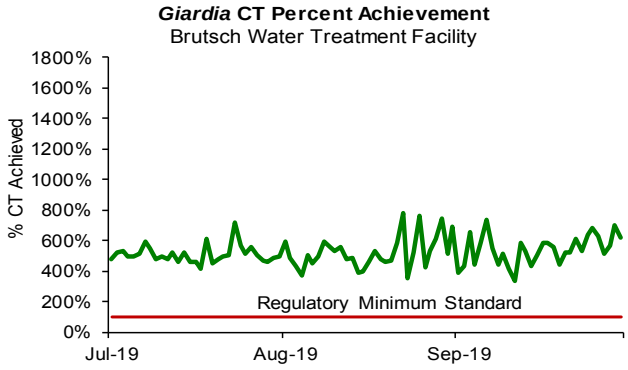


Quabbin Reservoir (CVA Supply) at: Brutsch Water Treatment Facility

- The chlorine dose at BWTF is adjusted in order to achieve MWRA's seasonal target of >0.75 mg/L (November 01 – May 31) and >1.0 mg/L (June 1– October 31) at Ludlow Monitoring Station.
- The chlorine dose at BWTF varied between 1.9 to 2.2 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% during the month. Off-spec water was less than 5%.







Source Water - Algae

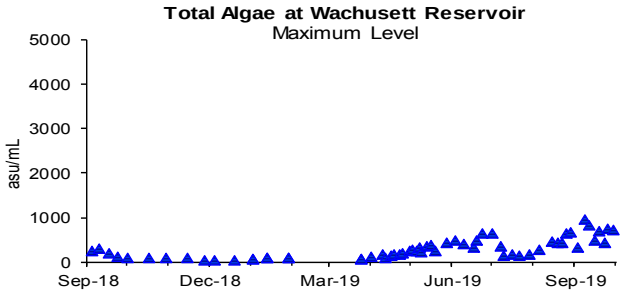
1st Quarter – FY20

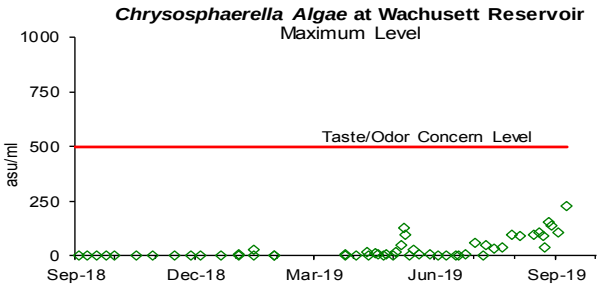
Algae levels in the Wachusett and Quabbin Reservoir are monitored by DCR and MWRA. These results, along with taste and odor complaints, are used to make decisions on source water treatment for algae control.

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 1st quarter, sixty-one complaints concerned taste and odor which may be related to algae were reported from the local water departments.

In August, *Chrysosphaerella*, a taste and odor causing algae species, bloom occurred the Quabbin and Wachusett Reservoir. See the MWRA Press Release: http://www.mwra.com/01news/2019/090419-specialnotice-wachusett.html.





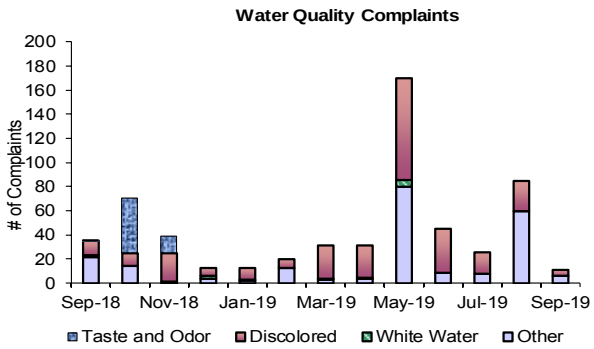
Drinking Water Quality Customer Complaints: Taste, Odor, or Appearance

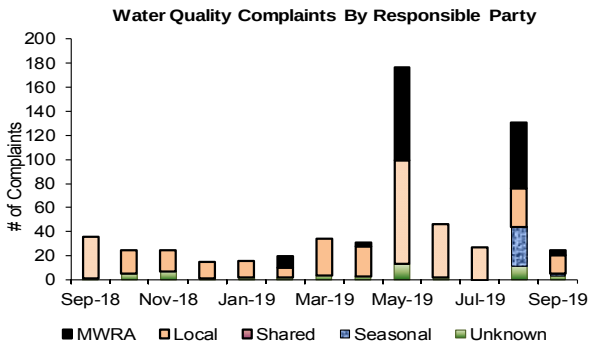
MWRA collects information on water quality complaints that typically fall into four categories: 1.) discoloration due to MWRA or local pipeline work; 2.) taste and odor due to algae blooms in reservoirs or chlorine in the water; 3.) white water caused by changes in pressure or temperature that traps 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 183 complaints during the quarter compared to 68 complaints from 1st Quarter of FY19. Of these complaints, 48 were for "discolored water", 61 were for "taste and odor", and 74 were for "other". Of these complaints, 75 were local community issues, 59 were MWRA related issues, 35 were seasonal in nature, and 14 were unknown in origin.

- In August, forty-four taste and odor complaints were reported from the CVA communities when *Chrysosphaerella* (a taste and odor causing algae species) bloom occurred the Quabbin Reservoir. The taste and odor complaints dropped to thirteen reported complaints early September when the *Chrysosphaerella* levels decreased in the reservoirs, see top right graph.
- On August 12, Medford reported fifty-five no water and low pressure complaints due to a leak on an MWRA water main line.





Bacteria & Chlorine Residual Results for Communities in MWRA Testing Program

1st Quarter – FY20

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 141 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* 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 1st Quarter, 80 of the 6,434 community samples (1.24% system-wide) submitted to MWRA labs for analysis tested positive for total coliform (Boston, Marblehead, Melrose - July; Boston, Deer Island, Malden, Newton, Quincy, Winthrop, Bedford, Needham - August; Boston, Lynnfield, Marblehead, Norwood, Bedford, Canton, Hanscom AFB, Wilmington, Woburn - September). Five of the 1,986 MWRA samples (0.25%) tested positive for total coliform. No samples tested positive for *E.coli*. In August, Malden had greater than 5.0% of their samples that were total coliform positive and, therefore, is required to conduct a Level 2 Assessment since this is the second occurrence within a rolling 12-month period. Winthrop (in August) and Marblehead (in September) had more than one positive total coliform sample and, therefore, are required to conduct a Level 1 Assessment. Bedford had more than one positive total coliform sample in August and again in September and, therefore, is required to conduct a Level 2 Assessment since this is the second occurrence within a rolling 12-month period. In September, Hanscom AFB had more than one positive total coliform sample and, therefore, is required to conduct a Level 2 Assessment since this is the second occurrence within a rolling 12-month period. Only 1.4% of the Fully Served community samples had chlorine residuals lower than 0.2 mg/L for the quarter. No community violated the TCR.

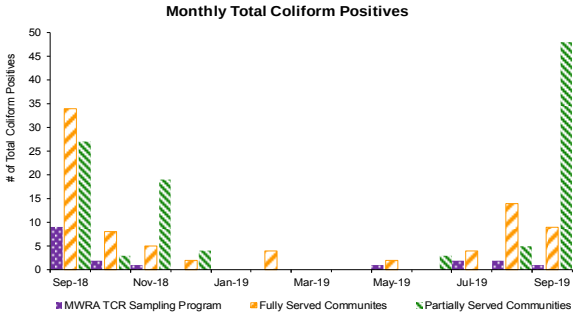
NOTES:

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	MWRA Locations	398	5 (1.26%)	0	
MWRA a	Shared Community/MWRA sites	1588	0 (0%)	0	
MWRA	*Total: MWRA*	1986	5 (0.25%)	0	No
Fully Served	ARLINGTON	155	0 (0%)	0	
Fully Served	BELMONT	112	0 (0%)	0	
Fully Served	BOSTON	817	8 (0.98%)	0	No
Fully Served	BROOKLINE	224	0 (0%)	0	
Fully Served	CHELSEA	169	0 (0%)	0	
Fully Served	DEER ISLAND	45	1 (2.22%)	0	No
Fully Served	EVERETT	182	0 (0%)	0	
Fully Served	FRAMINGHAM	237	0 (0%)	0	
Fully Served	LEXINGTON	116	0 (0%)	0	
Fully Served	LYNNFIELD	21	1 (4.76%)	0	No
Fully Served	MALDEN	251	7 (2.79%)	0	Yes
Fully Served	MARBLEHEAD	81	3 (3.70%)	0	Yes
Fully Served	MARLBOROUGH	126	0 (0%)		
Fully Served	MEDFORD	221	0 (0%)	0	
Fully Served	MELROSE	129	1 (0.78%)	0	No
Fully Served	MILTON	116	0 (0%)	0	
Fully Served	NAHANT	30	0 (0%)	0	
Fully Served	NEWTON	279	1 (0.36%)	0	No
Fully Served	NORTHBOROUGH	48	0 (0%)	0	
Fully Served	NORWOOD	106	2 (1.89%)	0	No
Fully Served	QUINCY	341	1 (0.29%)	0	No
Fully Served	READING	130	0 (0%)	0	
Fully Served	REVERE	195	0 (0%)	0	
Fully Served	SAUGUS	104	0 (0%)	0	
Fully Served	SOMERVILLE	273	0 (0%)	0	
Fully Served	SOUTHBOROUGH	30	0 (0%)	0	
Fully Served	STONEHAM	91	0 (0%)	0	
Fully Served	SWAMPSCOTT	54	0 (0%)	0	
Fully Served	WALTHAM	216	0 (0%)	0	
Fully Served	WATERTOWN	130	0 (0%)	0	
Fully Served	WESTON	45	0 (0%)	0	
Fully Served	WINTHROP	78	2 (2.56%)	0	Yes
Fully Served	*Total: Fully Served*	*5152*	*27 (0.52%)*		
Partially Served c	BEDFORD	94	38 (40.43%)	0	Yes
Partially Served c	CANTON	93	1 (1.08%)	0	No
Partially Served c	HANSCOM AFB	45	10 (22.22%)	0	Yes
Partially Served c	NEEDHAM	129	2 (1.55%)	0	No
Partially Served c	PEABODY	208	0 (0%)	0	
Partially Served c	WAKEFIELD	147	0 (0%)	0	
Partially Served c	WELLESLEY	112	0 (0%)	0	
Partially Served c	WILMINGTON	90	1 (1.44%)	0	No
Partially Served c	WINCHESTER	91	0 (0%)	0	
Partially Served c	WOBURN	213	1 (0.47%)	0	No
CVA d	SOUTH HADLEY FD1	60	0 (0%)	0	
	Total: CVA & Partially Served	*1282*	*53 (4.13%)*		
	Total: Community Samples	*6434*	*80 (1.24%)*		

Chlorine Residuals in Fully Served Communities

	2018				2019								
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
% <0.1	0.5	0.7	0.7	0.2	0.3	0.2	0.1	0.0	0.0	0.0	0.2	0.3	0.7
% <0.2	1.5	1.9	1.6	1.0	0.3	0.2	0.1	0.1	0.1	0.1	0.7	1.3	2.3
% <0.5	4.6	5.8	3.8	2.3	1.1	0.6	0.4	0.3	0.3	0.9	2.5	4.5	7.2
% <1.0	11.9	11.2	8.3	5.2	2.8	1.8	1.7	1.4	1.9	3.2	7.0	11.0	14.9
% ≥1.0	88.2	88.8	91.7	94.8	97.2	98.2	98.4	98.7	98.1	96.8	93.0	89.0	85.1

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

1st Quarter – FY20

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.

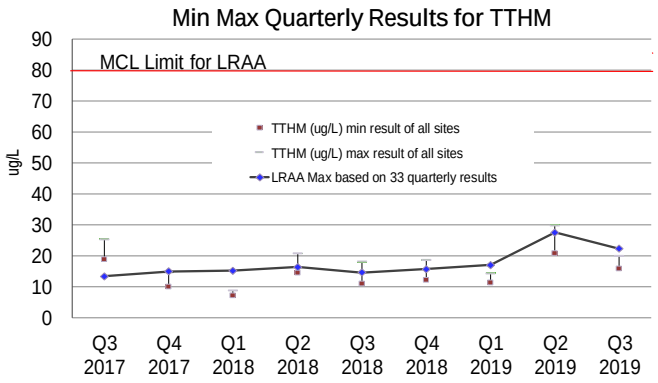
The locational running annual average calculated quarterly at each individual sampling location must be below the Total HAA5 or Total TTHM MCL standard. The charts below show the highest and lowest single values for all sites, and the LRAA of the highest location each quarter.

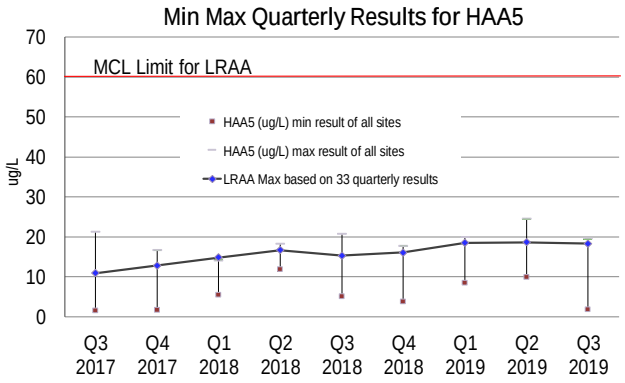
Partially served and CVA communities are responsible for their own compliance monitoring and reporting, and must be contacted directly for their individual results. The chart below combines data for all three CVA communities data (Chicopee, Wilbraham and South Hadley FD1). Although, they are separately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

Bromate is tested monthly per DEP requirements 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.

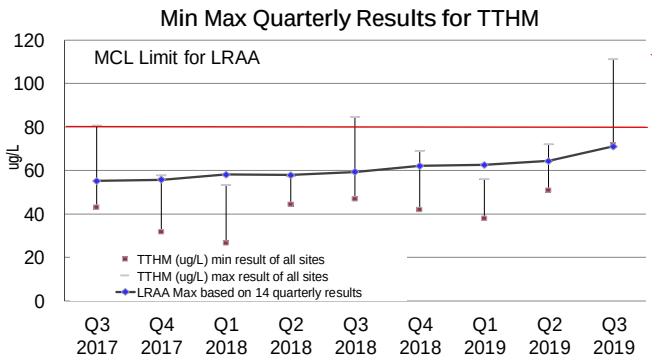
The LRAA for TTHMs and HAA5s for MWRA's Compliance Program (represented as the line in the top two graphs below) remain below current MCL standards. The Max LRAA in the quarter for TTHMs = 22.3 ug/L; HAA5s = 18.3 ug/L. The current RAA for Bromate = 0.0 ug/L. During Q3, 2019 sampling two CVA communities exceeded Operational Evaluation Levels for HAA5 or Total Trihalomethanes. While this does not result in a violation this will require an analysis and review of their water system and a report to MADEP. No LRAA exceedances or violations occurred this quarter for the MWRA compliance program or for any of the CVA communities.

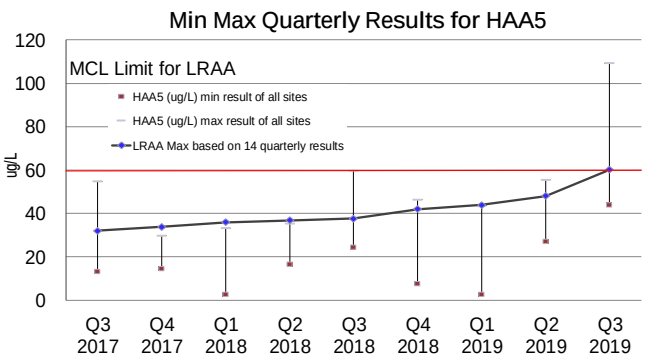
MetroBoston Disinfection By-Products





CVA Disinfection By-Products (Combined Results)





Water Supply and Source Water Management

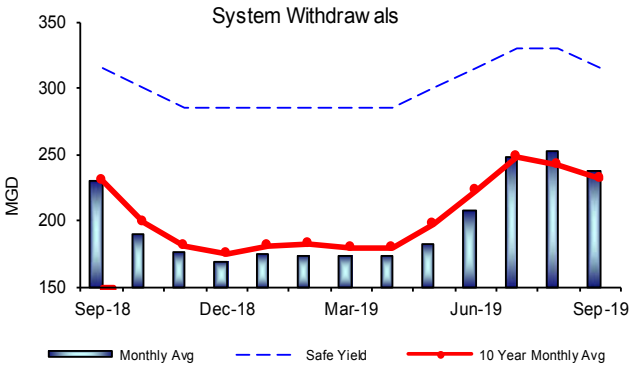
1st Quarter – FY20

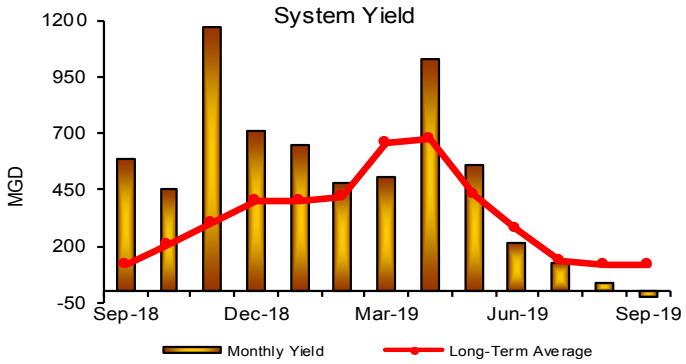
Background

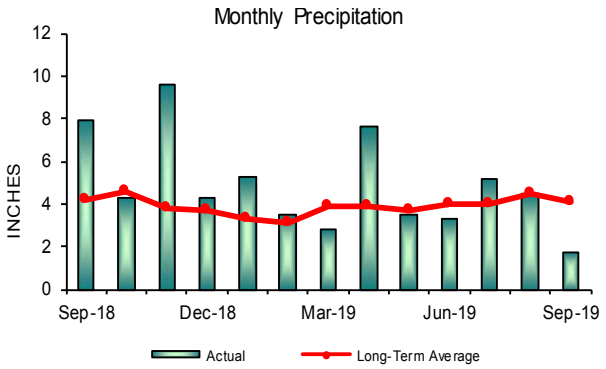
A reliable supply of water in MWRA's reservoirs depends on adequate precipitation during the year and seasonal hydrologic inputs from watersheds that surround the reservoirs. Demand for water typically increases with higher summer temperatures and then decreases as temperatures decline. Quabbin Reservoir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

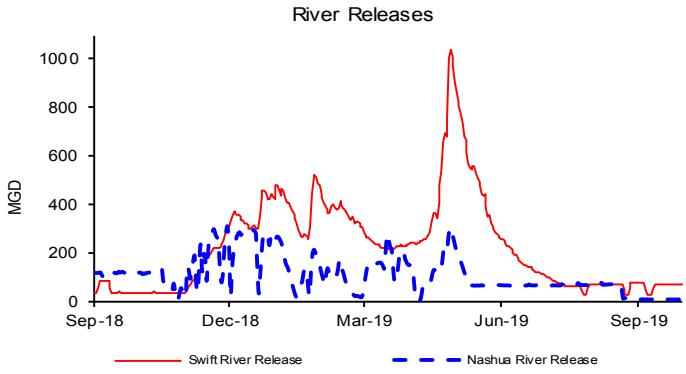
Outcome

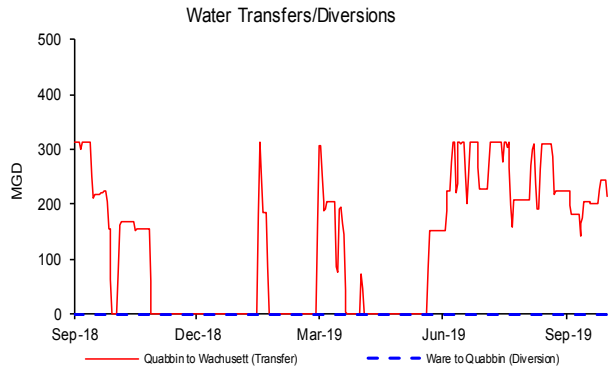
The volume of the Quabbin Reservoir was at 90.8% as of September 30, 2019; a 6.8% decrease for the quarter, which represents a reduction of more than 28 billion gallons of storage and a decrease in elevation of 3.71' for the quarter. System withdrawal for the quarter was above the 10 year monthly average. Precipitation and Yield for the quarter were below their respective long term quarterly average. The system remains in normal operating level.

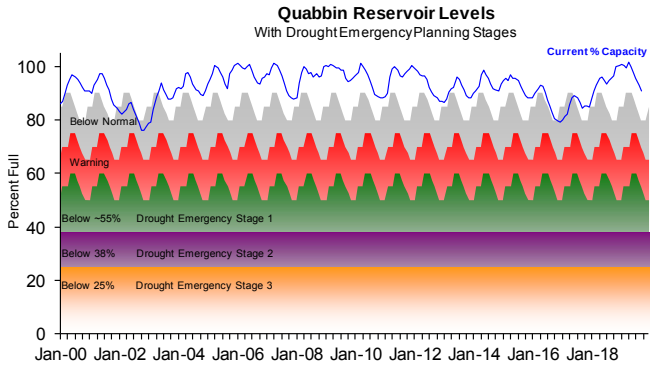












WASTEWATER QUALITY

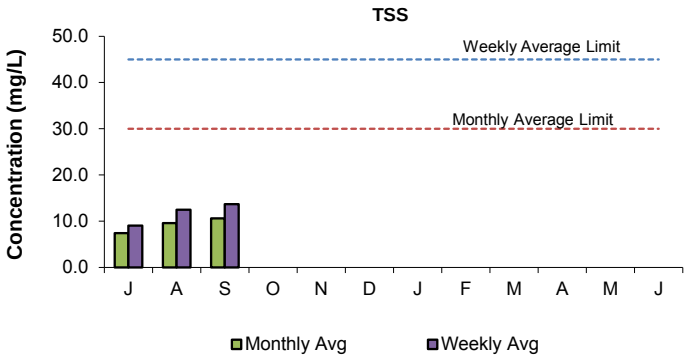
NPDES Permit Compliance: Deer Island Treatment Plant

1st Quarter - FY20

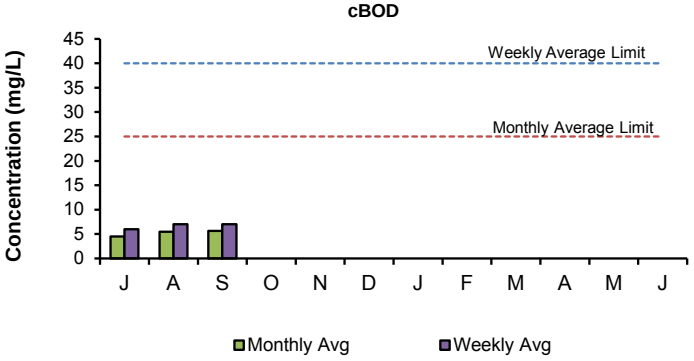
NPDES Permit Limits

Effluent Characteristics		*Units*	*Limits*	*July*	*August*	*September*	*1st Quarter Violations*	*FY20 YTD Violations*
Dry Day Flow (365 Day Average):		mgd	436	319.6	318.8	315.0	0	0
cBOD:	Monthly Average	mg/L	25	4.5	5.5	5.7	0	0
	Weekly Average	mg/L	40	6.0	7.0	7.0	0	0
TSS:	Monthly Average	mg/L	30	7.4	9.6	10.6	0	0
	Weekly Average	mg/L	45	9.0	12.5	13.7	0	0
TCR:	Monthly Average	ug/L	456	0	0.54	0	0	0
	Daily Maximum	ug/L	631	0	16.67	0	0	0
Fecal Coliform:	Daily Geometric Mean	col/100mL	14000	25	12	10	0	0
	Weekly Geometric Mean	col/100mL	14000	8	7	6	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	6.5-7.0	6.5-7.1	0	0
PCB, Aroclors:	Monthly Average	ug/L	0.000045	UNDETECTED			0	0
Acute Toxicity:	Mysid Shrimp	%	≥50	>100	85.4	92.6	0	0
	Inland Silverside	%	≥50	>100	>100	>101	0	0
Chronic Toxicity:	Sea Urchin	%	≥1.5	100	100	100.0	0	0
	Inland Silverside	%	≥1.5	100	100	100.0	0	0

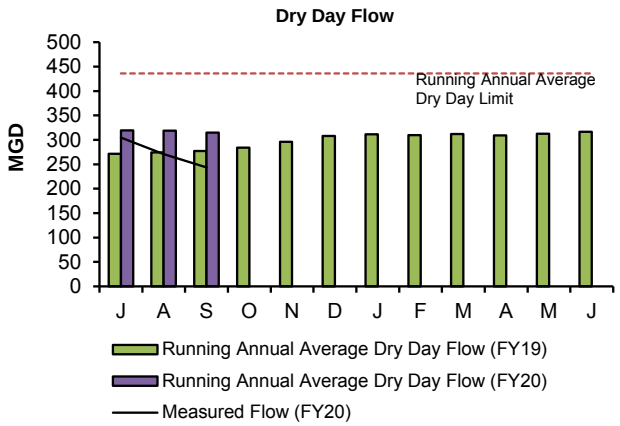
There have been no permit violations in FY20 to date at the Deer Island Treatment Plant (DITP).



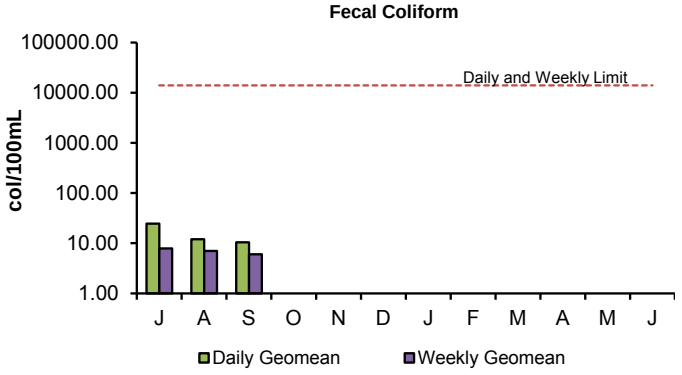
Total Suspended Solids (TSS) in the effluent is a measure of the amount of solids that remain suspended after treatment. All TSS measurements for the 1st Quarter were within permit limits.



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 1st 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 1st 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 1st Quarter, all permit conditions for fecal coliform were met.

NPDES Permit Compliance: Clinton Wastewater Treatment Plant

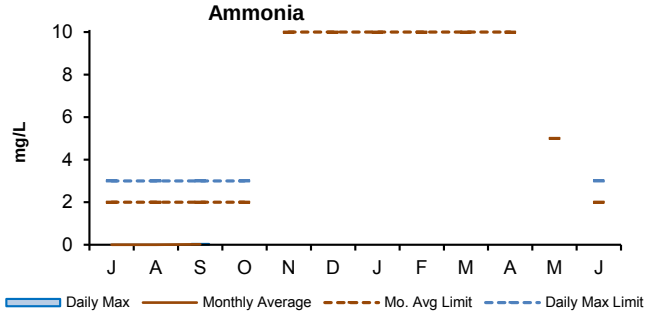
1st Quarter - FY20

NPDES Permit Limits

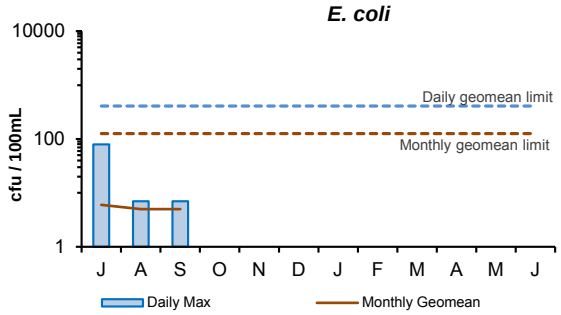
Effluent Characteristics		*Units*	*Limits*	*July*	*August*	*September*	*1st Quarter Violations*	*FY20 YTD Violations*
Flow:	12-month Rolling Average:	mgd	3.01	3.25	3.16	3.05	3	3
BOD:	Monthly Average:	mg/L	20	1.70	1.50	1.60	0	0
	Weekly Average:	mg/L	20	1.90	1.70	1.90	0	0
TSS:	Monthly Average:	mg/L	20	0.80	0.70	0.70	0	0
	Weekly Average:	mg/L	20	2.20	1.00	1.50	0	0
pH:		SU	6.5-8.3	7.2-7.5	7.4-7.6	7.3-7.6	0	0
Dissolved Oxygen:	Daily Average Minimum:	mg/L	6	7.70	7.80	8.10	0	0
E. Coli:	Monthly Geometric Mean:	cfu/100mL	126	6	5	5	0	0
	Daily Geometric Mean:	cfu/100mL	409	79	7	7	0	0
TCR:	Monthly Average:	ug/L	17.6	0.00	0.13	0.53	0	0
	Daily Maximum:	ug/L	30.4	0.00	4.00	4.00	0	0
Copper:	Monthly Average:	ug/L	11.6	5.87	7.58	9.20	0	0
	Daily Maximum:	ug/L	14.0	5.87	7.58	9.62	0	0
Total Ammonia Nitrogen: June 1st - October 31st	Monthly Average:	mg/L	2.0	0.00	0.00	0.02	0	0
	Daily Maximum:	mg/L	3.0	0.00	0.00	0.04	0	0
Total Phosphorus: April 1st - October 31st	Monthly Average:	mg/L	0.15	0.07	0.06	0.07	0	0
	Daily Maximum:	mg/L	RPT	0.14	0.12	0.17	0	0
Acute Toxicity+:	Daily Minimum:	%	≥100	N/A	N/A	>100	0	0
Chronic Toxicity+:	Daily Minimum:	%	≥62.5	N/A	N/A	62.5	0	0

There have been three permit violations in FY20 at the Clinton Treatment Plant.
1st Quarter: There were three permit violations in the first quarter. The 12-month rolling average flow exceeded the limit of 3.01 MGD due to excessive rains in the region in late 2018.

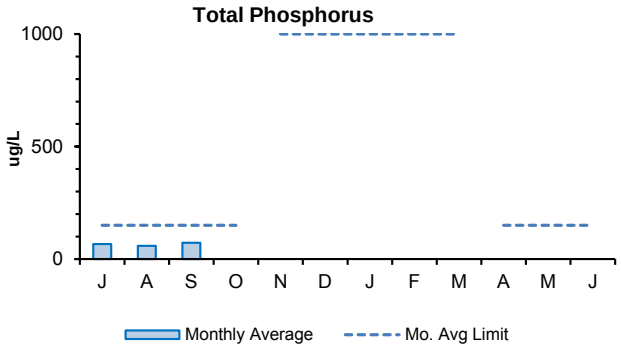
+ Toxicity testing at the Clinton Treatment Plant is conducted on a quarterly basis.



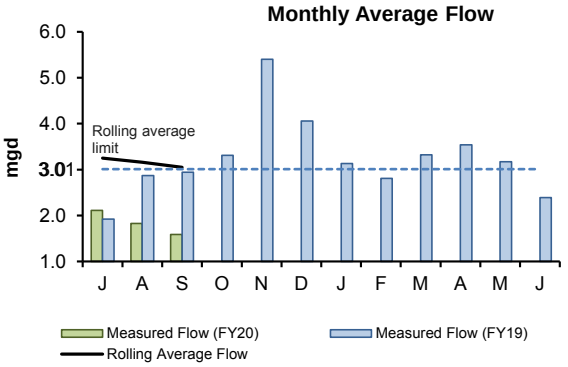
The 1st Quarter's monthly average and daily maximum concentrations of ammonia were below the permit limits. The monthly average and daily maximum limits for the 1st Quarter are variable, ranging from 10 and 35.2 mg/L to 2 and 3 mg/L respectively. The permit limits are most stringent from June to October 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 1st Quarter.The monthly and daily limits are 126 cfu/100 mL and 409 cfu/100 mL respectively.



The 1st Quarter's monthly average concentrations for total phosphorus were below permit limits. The new permit limit of 0.15 mg/L from April through October went into effect April 1st, 2019. The new permit limit of 1.0 mg/L from November through March goes into effect November 1st, 2019.

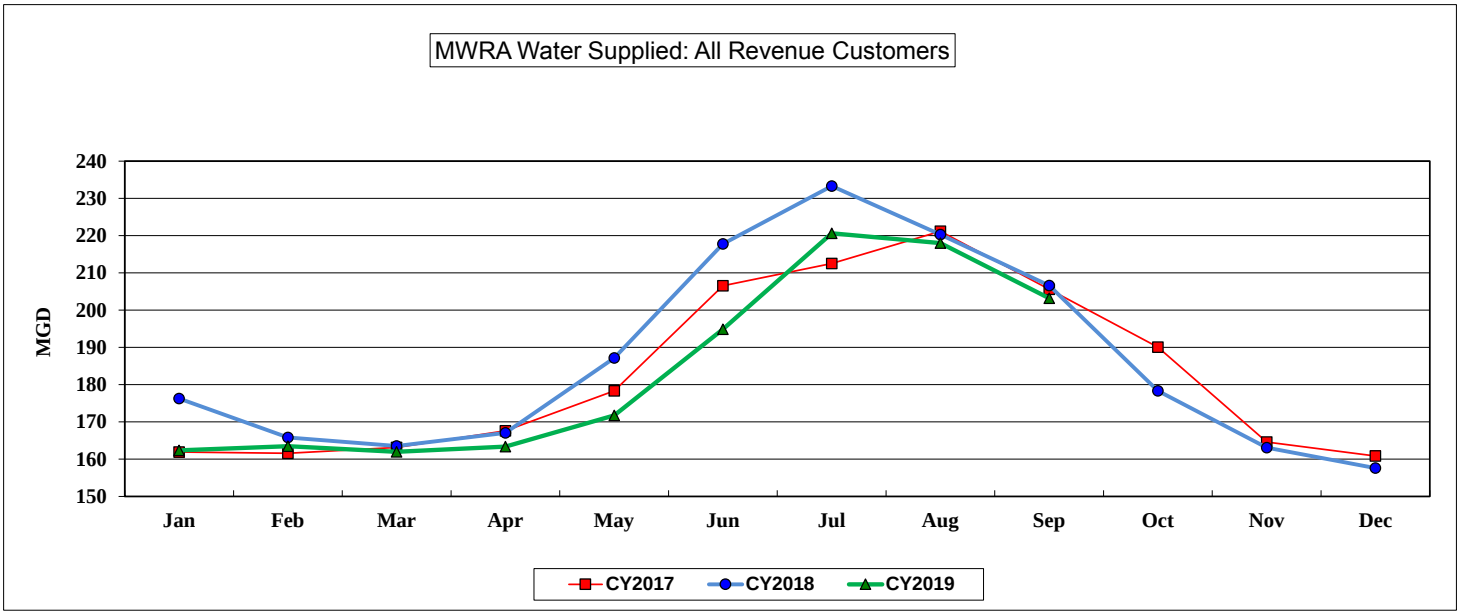


The graph depicts the rolling annual average monthly flow, measured in million gallons per day, exiting the plant. The 12-month rolling average flows during the 1st quarter exceeded the limit of 3.01 due to excessive rains in the region during November and December 2018.

COMMUNITY FLOWS AND PROGRAMS

Customer Water Use

1st Quarter - FY20



MGD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Average
CY2017	161.941	161.609	163.129	167.613	178.331	206.541	212.533	221.175	205.579	190.053	164.610	160.853	182.969	182.969
CY2018	176.294	165.841	163.539	167.056	187.145	217.776	233.321	220.268	206.586	178.340	163.125	157.612	193.347	186.553
CY2019	162.367	163.492	161.984	163.350	171.782	194.905	220.633	218.028	203.211	0.000	0.000	0.000	184.617	184.617

MG	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD Total	Total
CY2017	5,020.179	4,525.063	5,056.997	5,028.390	5,528.255	6,196.217	6,588.510	6,856.435	6,167.355	5,891.640	4,938.301	4,986.434	66,783.777	66,783.777
CY2018	5,465.125	4,643.548	5,069.719	5,011.695	5,801.508	6,533.267	7,232.949	6,828.310	6,197.590	5,528.550	4,893.739	4,885.979	52,783.711	68,091.978
CY2019	5,033.382	4,577.768	5,021.509	4,900.488	5,325.247	5,847.153	6,839.629	6,758.882	6,096.328	0.000	0.000	0.000	50,400.387	50,400.387

The September 2019 Community Water Use Report was recently distributed to communities served by the MWRA 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 2019 water use will be used to allocate the FY21 water utility rate revenue requirement.

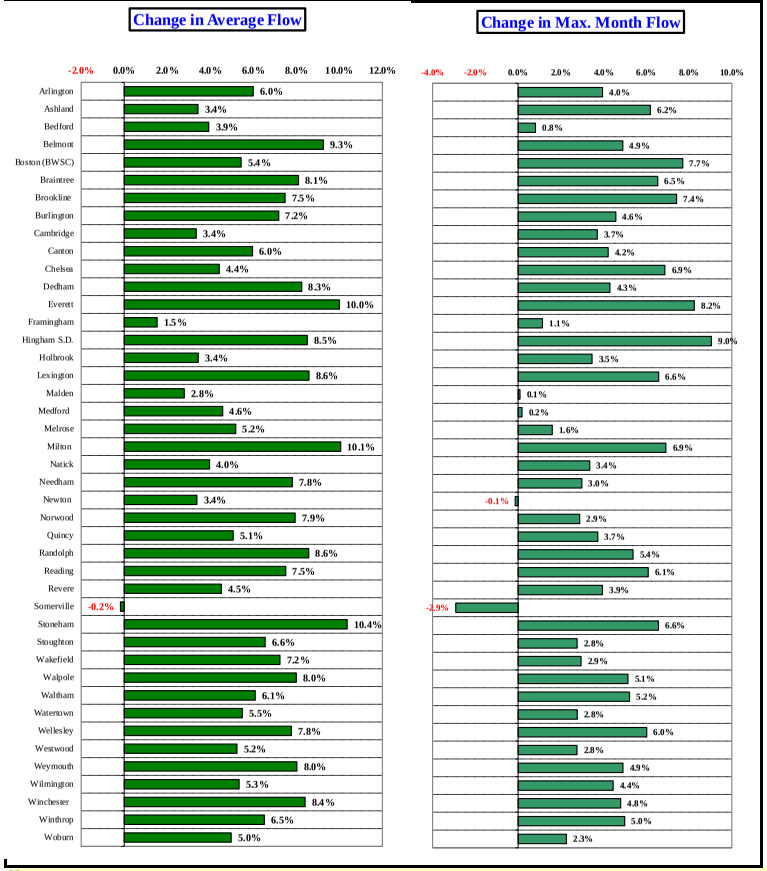
September 2019 water supplied of 203.2 mgd (for revenue generating users) is down 3.4 mgd or 1.6% compared to September 2018. System-wide year to date consumption for CY19 is lower than CY18 with 184.6 mgd being supplied to MWRA customers through September. This is 8.7 mgd lower than CY18, and is a decrease of 4.5%.

Community Wastewater Flows

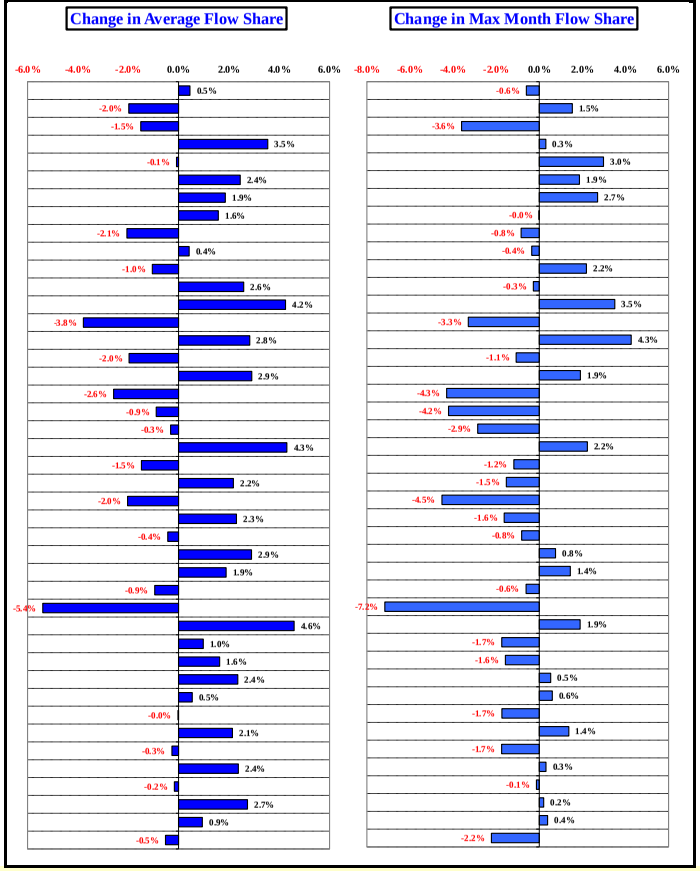
1st Quarter - FY20

How Projected CY2019 Community Wastewater Flows (through August 2019) Could Effect FY2021 Sewer Assessments [1,2,3]

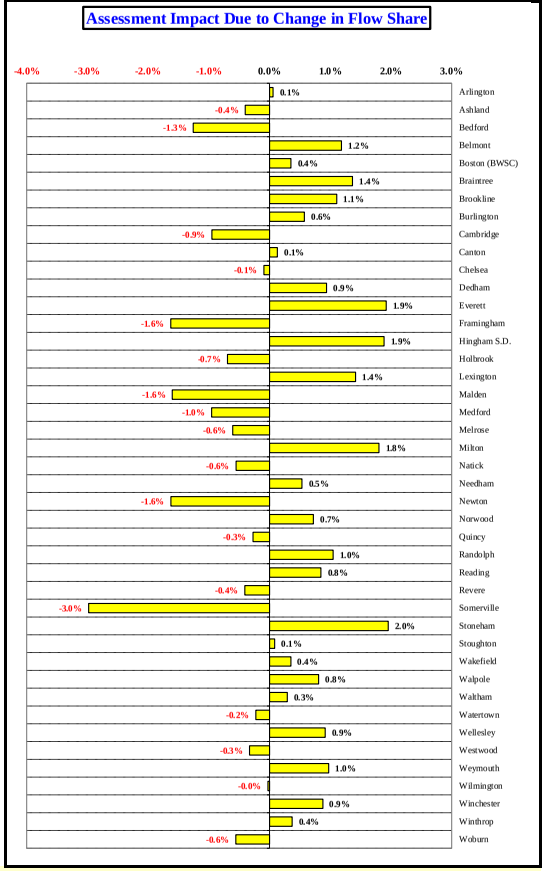
The flow components of FY2021 sewer assessments will be calculated using a 3-year average of CY2017 to CY2019 wastewater flows compared to FY2020 assessments that used a 3-year average of CY2016 to CY2018 wastewater flows.



But as MWRA's sewer assessments are a ZERO-SUM calculation, a community's assessment is strongly influenced by the RELATIVE change in CY2017 to CY2019 flow share compared to CY2016 to CY2018 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]



Notes:

[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 CY2016 to CY2019 average wastewater flows as of 10/17/19. Flow data is preliminary and subject to change pending additional MWRA and community review.**

[3] **CY2016 to CY2018 wastewater flows based on actual meter data. CY2019 flows based on actual meter data for January to August, and projected flows for September to December.**

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

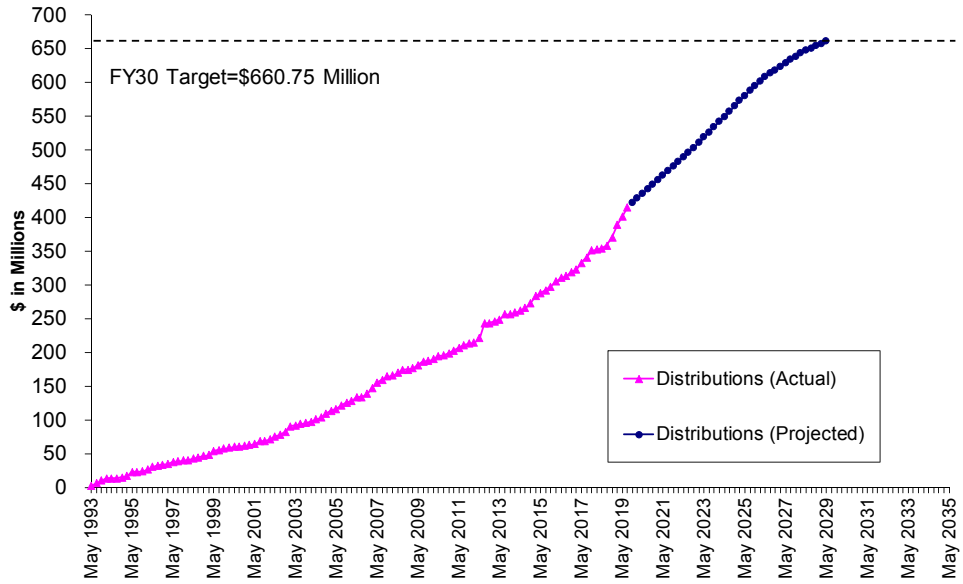
30

Community Support Programs
1st Quarter – FY20

Infiltration/Inflow Local Financial Assistance Program

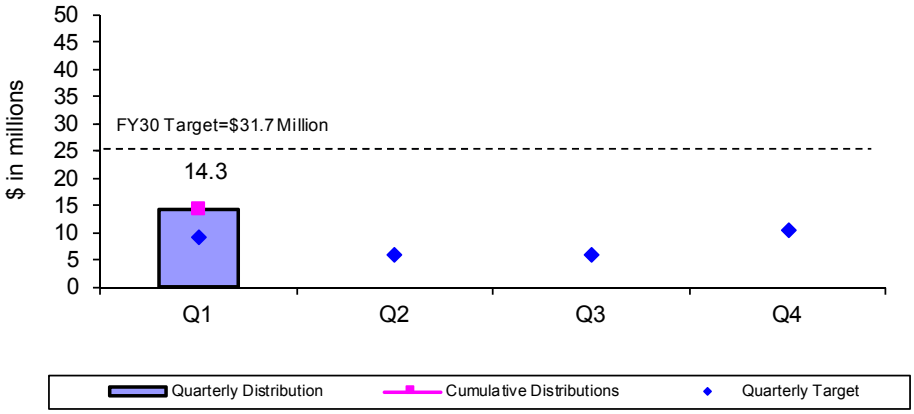
MWRA's Infiltration/Inflow (I/I) Local Financial Assistance Program provides $760.75 million in grants and interest-free loans (average of about $20 million per year from FY93 through FY30) to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned collection systems. Eligible project costs include: sewer rehabilitation construction, pipeline replacement, removal of public and private inflow sources, I/I reduction planning, engineering design, engineering services during construction, etc. I/I Local Financial Assistance Program funds are allocated to member sewer communities based on their percent share of MWRA's wholesale sewer charge. Phase 1-8 funds (total $300.75 million) were distributed as 45% grants and 55% loans with interest-free loans repaid to MWRA over a five-year period. Phase 9 through 12 funds (total $360 million) are distributed as 75% grants and 25% loans with interest-free loans repaid to MWRA over a ten-year period. Phase 13 provides an additional $100 million in loan-only funds (not yet included in the graph of distributions below).

I/I Local Financial Assistance Program Distribution FY93-FY30



During the 1st Quarter of FY20, $14.3 million in financial assistance (grants and interest-free loans) was distributed to fund local sewer rehabilitation projects in Belmont, Boston, Framingham, Hingham, Milton, Newton, Weymouth and Winchester. Total grant/loan distribution for FY20 is $14.3 million. From FY93 through the 1st Quarter of FY20, all 43 member sewer communities have participated in the program and $415 million has been distributed to fund 583 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.

FY20 Quarterly Distributions of Sewer Grant/Loans



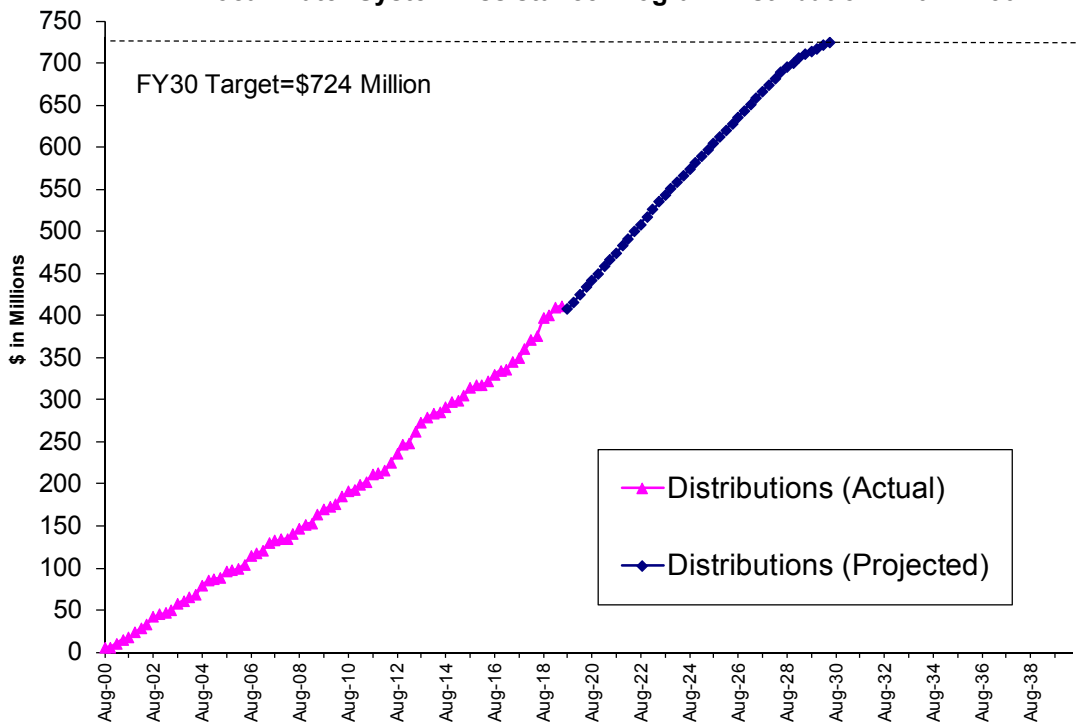
Community Support Programs

1st Quarter – FY20

Local Water System Assistance Program

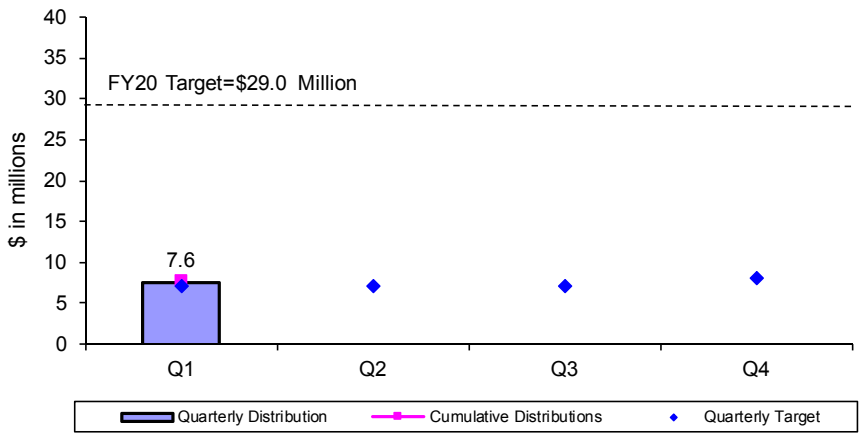
MWRA's Local Water System Assistance Programs (LWSAP) provides $724 million in interest-free loans (an average of about $24 million per year from FY01 through FY30) to member water communities to perform water main rehabilitation projects within their locally-owned water distribution systems. There have been 3 phases: Phase 1 at $222 Million, Phase 2 at $210 Million, and Phase 3 at $292 Million. Eligible project costs include: water main cleaning/lining, replacement of unlined water mains, lead service replacements, valve, hydrant, water meter, tank work, engineering design, engineering services during construction, etc. MWRA partially-supplied communities receive pro-rated funding allocations based on their percentage use of MWRA water. Interest-free loans are repaid to MWRA over a ten-year period beginning one year after distribution of the funds. The Phase 1 water loan program concluded in FY13 with $222 million in loan distributions. The Phase 2 - LWSAP continues distributions through FY23. The Phase 3 Water Loan Program is authorized for distributions FY18 through FY30.

Local Water System Assistance Program Distribution FY01-FY30



During the 1st Quarter of FY20, $7.6 million in interest-free loans was distributed to fund local water projects in Arlington, Belmont, Framingham, Malden, Norwood and Quincy. Total loan distribution for FY20 is $7.6 million. From FY01 through the 1st Quarter of FY20, $419 million has been distributed to fund 454 local water system rehabilitation projects in 42 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.

FY20 Quarterly Distributions of Water Loans



Community Support Programs

1st Quarter – FY20

Lead Service Line Replacement Loan Program

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

FY17 was the first year of the Lead Service Line Replacement Loan Program. During FY17, MWRA made three Lead Loan Program distributions as noted in the Table below.

FY18 was the second year of the Lead Loan Program. During FY18, MWRA made five Lead Loan Program distributions as noted in the table below.

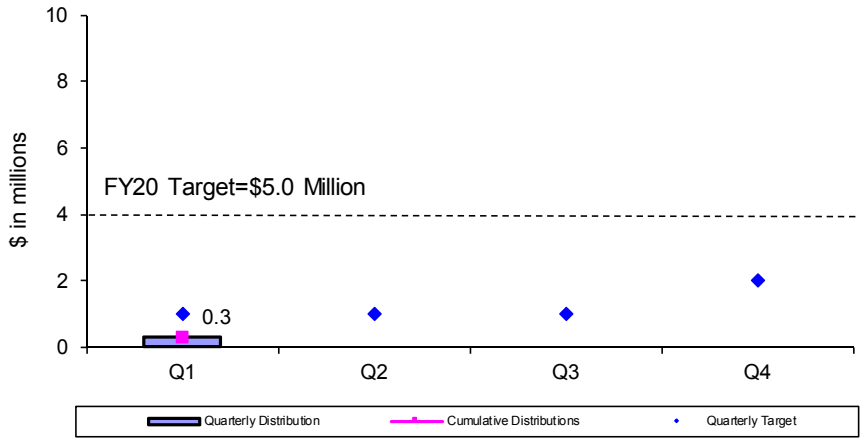
FY19 was the third year of the Lead Loan Program. During FY19, MWRA made four Lead Loan Program distributions as noted in the table below.

FY20 is the fourth year of the Lead Loan Program. One Lead Loan was made during the 1st quarter of FY20: $300,000 to Chelsea.

Summary of Lead Loans:

Chelsea in FY20	$0.3 Million
Marlborough in FY19	$1.0 Million
Winthrop in FY19	$0.5 Million
Chelsea in FY19	$0.1 Million
Everett in FY19	$1.0 Million
Needham in FY18	$1.0 Million
Winchester in FY18	$0.5 Million
Revere in FY18	$0.2 Million
Winthrop in FY18	$0.3 Million
Marlborough in FY18	$1.0 Million
Newton in FY17	$4.0 Million
Quincy in FY17	$1.5 Million
Winchester in FY17	$0.5 Million
TOTAL	$11.9 Million

FY20 Quarterly Distributions of Lead Service Line Replacement Loans

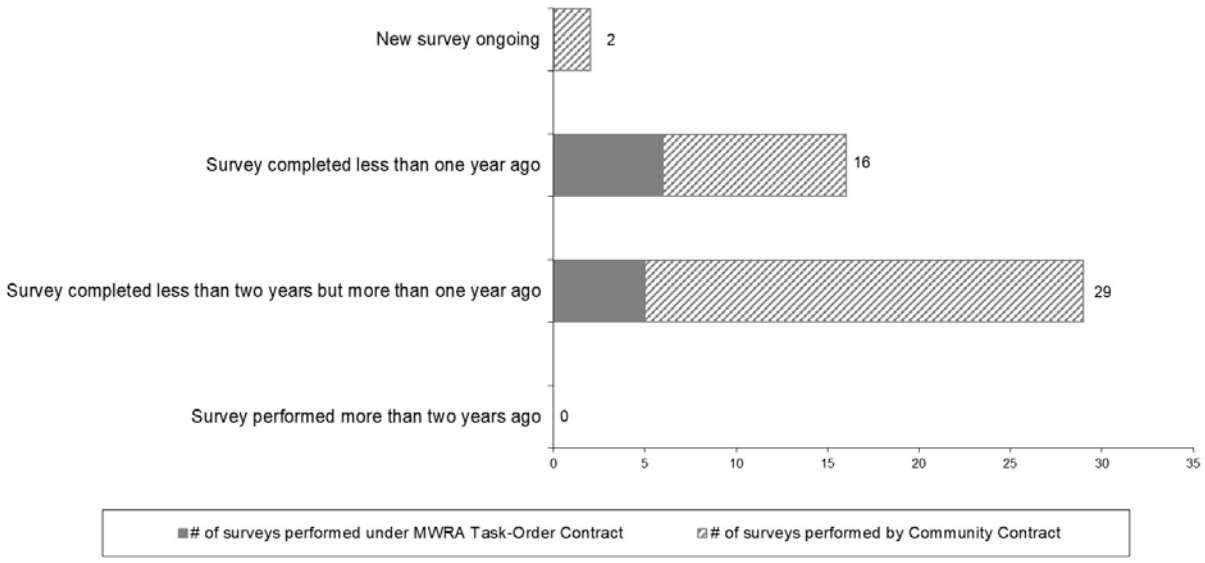


Community Support Programs

1st Quarter – FY20

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 1st Quarter of FY20, 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 205 mgd. The local Water Conservation Program includes distribution of water conservation education brochures (indoor and outdoor bill-stuffers) and low-flow water fixtures and related materials (shower heads, faucet aerators, toilet leak detection dye tabs, and instructions), all at no cost to member communities or individual customers. The Program's annual budget is $25,000 for printing and purchase of materials. Annual distribution targets and totals are provided in the table below. Distributions of water conservation materials are made based on requests from member communities and individual customers.

	Annual Target	Q1	Q2	Q3	Q4	Annual Total
Educational Brochures	100,000	640				640
Low-Flow Fixtures (showerheads and faucet aerators)	10,000	791				791
Toilet Leak Detection Dye Tablets	_____	419				419

BUSINESS SERVICES

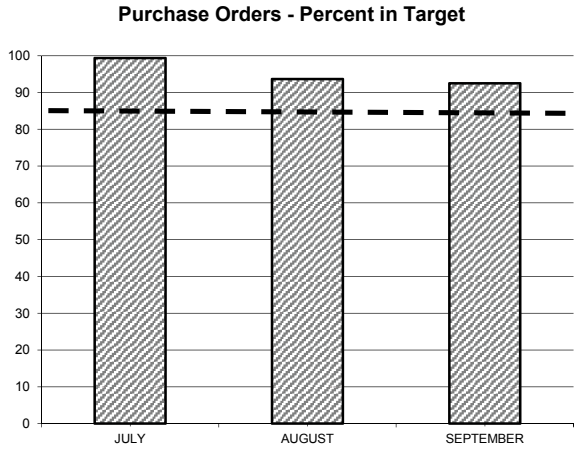
Procurement: Purchasing and Contracts

1st Quarter - FY20

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 4.59 days vs. 5.35 days in Qtr 1 of FY19. Processed 53% (8 of 15) of contracts within target timeframes; Average Processing Time was 182 days vs. 173 days in Qtr 1 of FY19.

Purchasing



	No.	TARGET	PERCENT IN TARGET
$0 - $500	592	3 DAYS	88.6%
$500 - $2K	636	7 DAYS	97.3%
$2K - $5K	473	10 DAYS	95.8%
$5K - $10K	37	25 DAYS	81.0%
$10K - $25K	52	30 DAYS	92.3%
$25K - $50K	5	60 DAYS	80.0%
Over $50K	24	90 DAYS	83.3%

The Purchasing Unit processed 1819 purchase orders, 53 more than the 1766 processed in Qtr 1 of FY20 for a total value of $11,891,739 versus a dollar value of $9,797,360 in Qtr 1 of FY19.

The purchase order processing target was not met for the $5K-$10K category due to sourcing requirements and end user evaluations; the $25K-$50K category due to staff summary and sole source requirements; and the over $50K category due to specification revisions.

Contracts, Change Orders and Amendments

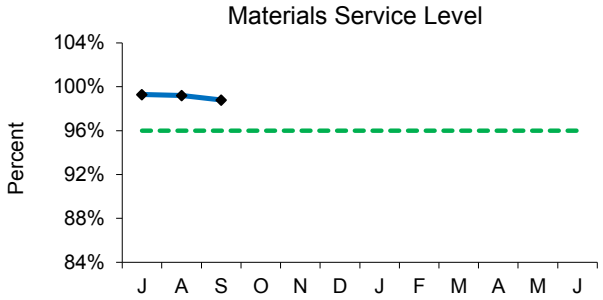
Seven contracts were not processed within the target timeframes. The notice to proceed for one contract, a resident engineering and inspection services contract was delayed in order to allow time for the constuction contractor to go through the submittal process, order the specialized equipment, and have such equipment delivered to the site for installation. Two contracts were delayed due to additional insurance requirements necessary for insurance services and another was delayed due to the addition of a second site visit during the bid process. Also, prior to execution, an issue was raised that called for additional internal vetting. A fifth contract was delayed due to the need for additional review and approval by MWRA engineering staff. Another contract was delayed because the work could not be initiated until the winter timeframe. The final contract was delayed due to the postponement of the Board award to allow for additional review of costs, and upon award, the need to obtain final E-tables from the consultant.

Procurement processed fifteen contracts with a value of $20,927,828 and seven amendments with a value of $1,276,363. Nineteen change orders were executed during the period. The dollar value of all non-credit change orders during Q1 FY20 was $1,306,598 and the value of credit change orders was ($1,068,435).

Staff reviewed 48 proposed change orders and 24 draft change orders.

Materials Management

1st Quarter - FY20



The service level is the percentage of stock requests filled. The goal is to maintain a service level of 96%. Staff issued 7,205 (99.1%) of the 7,271 items requested in Q1 from the inventory locations for a total dollar value of $1,187,328.

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 FY20 goal is to reduce consumable inventory from the July '19 base level ($8.4 million) by 2.0% (approximately $169,249), to $8.2 million by June 30, 2020 (see chart below).

Items added to inventory this quarter include:

- Deer Island – actuator, control head, gas detector, transducer adapter and gas monitor pump for I&C; insulators, heat shrink, transmitter, hole saw and pilot drill for Electrical; expansion valve, solenoid valve, sight glass, cage nuts, current limiter and brass sleeves for HVAC; pipe clamps, pump deflector, Victaulic bends, and rotork actuator for Liquid Train.
- Chelsea – plate clamps, cable assembly, encoder, lenses, lamps, o-rings, connectors, lenses, cables cameras and floats (cues vehicle) for Metro Maintenance; adapters, receptacles, motors, pumps, couplings, shaft drives and wedge assemblies for Work Coordination; trailer connectors, O2 sensors, filters and truck-lites for Fleet Services; shoe covers and hazardous waste labels for Environmental Affairs.
- Southboro – ells, tees, unions, valves and couplings for plumbing.

Property Pass Program:

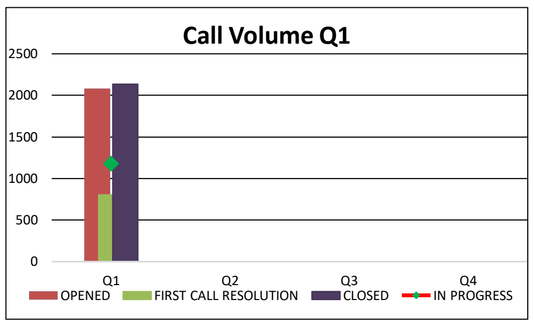
- Three audits were conducted during Q1.
- Scrap revenue received for Q1 amounted to $6,342. Year to date revenue received amounted to $6,342.
- Revenue received from online auctions held during Q1 amounted to $114,719. Year to date revenue received amounted to $114,719.

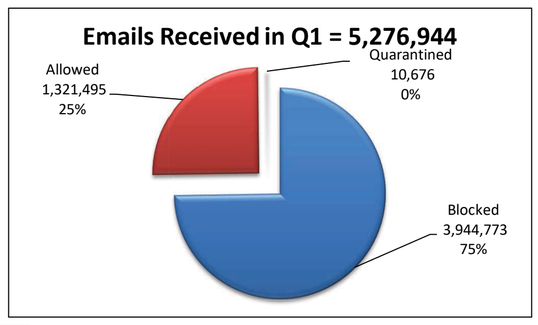
Items	Base Value July-19	Current Value w/o Cumulative New Adds	Reduction / Increase To Base
Consumable Inventory Value	8,462,463	8,422,113	-58,685
Spare Parts Inventory Value	9,183,923	8,958,767	-106,957
Total Inventory Value	17,646,386	17,380,880	-265,506

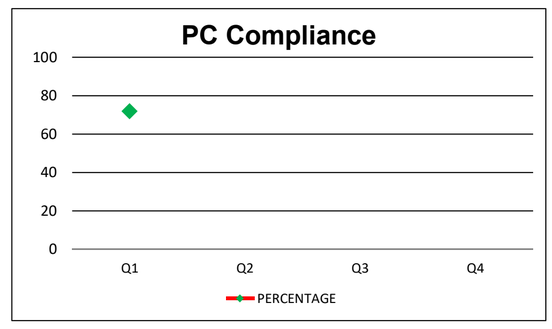
Note: New adds are items added at an inventory location for the first time for the purpose of servicing a group/department to meet their business needs/objectives.

MIS Program

1st Quarter - FY20







Performance & Backlog for Q1

- 2135 calls were completed this quarter.
- Call closure averaged 7.6 days.
- Priority 1& 2 Service Level Agreements (SLA) were not met. One priority 1 call was mis-prioritized and a priority 2 call associated with a chronic application issue resulted in missing the SLA.

Cyber Security Q1

- In Q1, pushed 546 security fixes/updates to desktops/servers. 72% ofall PCs/Laptops are compliant with approved patches.
- McAfee quarantined 33 distinct viruses from 8 PCs. PCs are current with antivirus signatures for known malware.
- 75% of all email is block upon initial receipt and evaluation.

Audio/Visual Upgrades: Procurement event closed October 1st. Bids under review and vendor selection.

Exchange Upgrade: This will be a two phased migration. Bid for Professional Services closed in September and is undergoing review and vendor selection.

AWIA Risk and Resiliency Assessment: This is a two phased assessment. Procurement event has been posted to Supplier Portal. Expect to award by end of October.

Chelsea Environmental Controls Monitoring System: Development of a bid specification for hardware, software upgrades, and a 3 year maintenance contract is scheduled to be posted in October.

PBX (Telephone System) Upgrade: Generating an RFQP to replace the current Phone System. This is planned to be submitted to procurement in January 2020.

Infrastructure Upgrades: CWTP and Southborough servers migrated to new infrastructure hardware. Clinton wi be migrated after the Verizon circuit upgrade. Server hardware and server operating system software for Chelsea being procured and is awaiting staff summary approval

DI Ops Hardware Segmentation: File Servers and Print Servers Migrated. Application Server migration scheduled for October.

Enterprise Content Management (ECM)/e-Construction: Completed documenting all use cases (48) and associated workflows (91) describing current E&C and Records Management work process for document management. Worked with users on prioritizing use cases for implementation. Completed first draft of SOW. Began refining the SOW with Procurement staff and developing the RFQP.

Dental Certifications ApplicationUpdated: Functional Requirements with new enhancements to the MWRA Portal to reduce administrative costs and distribute account management activities between MWRA staff and the businesses that we regulate. Worked with EPA contractor (CGI Federal) to design new configuration settings to Accommodate Dental Offices. Provided EPA Contractor updated lab and facility data including dental offices. Developed Test plan and identified 15 different User Acceptance Tests for development.

Contracts Management: User requirements documentation completed and signed off. User Acceptance Testing completed and signed 0ff. Production system ready for go-live and awaiting a selected contract for the first implementation.

Custom development: Deployed a revised Rain Data web application, adding a new rain gauge (for Somerville) and a clickable gauge map rebuilt with codes on the revised map. A new Overdue Lab Time-entry/approval report was implemented.

Lawson: Deployed revised bid tab configuration to Production as part of Professional Services roll out in Lawson Strategic Sourcing. MWRA procurement practice requires that a bidder's proposed pricing be confidential until an award decision is made. A security class/condition addresses this viewing requirement in the Sourcing application for internal viewers of the Professional Services event category, so a configuration change was needed to restrict the display of proposal pricing in the bid tabulation to all viewers, internal (MWRA) or external (Supplier Portal).

Telog Application System: Upgraded Telog application to the latest available version that supports 4g modems. Telog application host server OS was upgraded to Windows 2016(from Windows 2012)

Library & Records Center: The Library supported 22 research requests, supplied 34 books for circulation, provided 26 articles and 57 standards. The MWRA Library Portal supported 8641 end-user searches. The Record Center (RC) added 185 new boxes, handled 265 total boxes, executed 12 rush requests, electronically distributed 164 pages of technical information, performed 30 database/physical box searches saving 14 deliveries and shredded nine (9) bins of confidential documentation. The RC manager attended 3 State Records Conservation Board meetings.

IT Training: For the quarter, 15 staff attended 9 classes. 1% of the workforce has attended at least one class year-to-date. Five (5) job aids were developed/updated and posted on the Intranet (Pipeline).

Legal Matters

1st Quarter FY 2020

PROJECT ASSISTANCE

Real Estate, Contract, Environmental and Other Support:

- **8(m) Permits**: Reviewed eighty-two (82) 8(m) permits.

- **Real Property**: Reviewed Wachusett Watershed Fee Acquisition, W-001213, related to Kush property located at 249 Redemption Rock Trail in Sterling, MA and Wachusett Watershed Fee Acquisition, W-001201, related to Jefferson Meadows, LLC property on Quinapoxet Street in Holden. Reviewed easement plans related to the release of easement rights burdening MWRA's Spot Pond Covered Storage parcel of land located on Woodland Road in Stoneham. Revised proposed lease for procurement of space for MWRA's records center. Recorded extension permit at the Norfolk Registry of Deeds for DEP order of conditions 338-0629 in Westwood, MA relating to Southern Extra High Water Main project (MWRA Contract No. 6453). Reviewed temporary and permanent property rights needed for construction of MWRA Contract 7540 – water sections 50/57 and sewer sections 19/20/21 in Medford. Drafted one (1) one-day license for workshop at DITP. Reviewed MWRA's, BWSC's, and the Commonwealth's real property interests at and adjacent to the MWRA's Commercial Point facility in Boston. Reviewed Land Court document related to case seeking release of easement in Framingham in close proximity to MWRA's shaft L property. Reviewed MWRA's property rights in the approximate vicinity of 188 Clark Road in Brookline.

- **Environmental**: Assisted the Toxic Reduction and Control (TRAC) Division with the necessary documents to finalize the changes to TRAC's implementing regulations 360 CMR 1.00, 2.00, and 10.00. Final regulation and necessary forms were filed with the Massachusetts Secretary of State Regulations Division, for final publication in the *Massachusetts Register*. Reviewed Emergency Planning and Community Right-To-Know Act (EPCRA) regulations relating to Tier II Reporting Requirements. Reviewed NPDES letter notifying EPA and DEP of MWRA's plan for operating DITP during the period of time when Harbor Electric Energy Company disconnects its existing electric power cable from DITP and connects its new electric power cable to DITP.

- **Public Records Requests**: During the First Quarter, MWRA received one hundred and forty (140) public records requests and responded to one hundred and thirty-three (133) public records requests.

LABOR, EMPLOYMENT AND ADMINISTRATIVE

New Matters

Two demands for arbitration were filed.

A Charge was filed at the Massachusetts Commission Against Discrimination alleging that the MWRA discriminated against an employee on the basis of age, disability, race/color and retaliation.

A charge was filed at the Massachusetts Commission Against Discrimination alleging that the MWRA discriminated against an employee on the basis of his religion when he was not promoted.

Matters Concluded

Received a dismissal from the MCAD for lack of probable cause of a charge of discrimination on the basis of age.

LITIGATION/CLAIMS

SUMMARY OF PENDING LITIGATION MATTERS

TYPE OF CASE/MATTER	As of Sept 2019	As of June 2019	As of March 2019
Construction/Contract/Bid Protest (other than BHP)	2	3	3
Tort/Labor/Employment	4	5	5
Environmental/Regulatory/Other	2	2	2
Eminent Domain/Real Estate	0	0	0
Total	**8**	**10**	**10**
Other Litigation matters (restraining orders, etc.)	1	1	1
Total – all pending lawsuits	**9**	**11**	**11**
Claims not in suit:	0	1	1
Bankruptcy	0	0	0
Wage Garnishment	4	4	4
TRAC/Adjudicatory Appeals	0	1	1
Subpoenas	0	0	1
TOTAL – ALL LITIGATION MATTERS	**13**	**17**	**18**

New lawsuits / claims:

Janice Bennett v. MWRA, Suffolk Superior Court, C.A. No. 1984-CV-02670: Plaintiff filed suit against MWRA alleging that temporary fencing owned by MWRA fell on her causing her injury and damages. MWRA filed its Answer to the Complaint.

Significant Developments

Shea v. MWRA, Suffolk Superior Court, C.A. No. 1984-CV-1847C: On July 22, 2019, MWRA filed and served its Answer to Plaintiff's Complaint.

J. D'Amico v. MWRA, et al., Suffolk Superior Court, C.A. No. 1784-CV-04097 BLS2: Mediation is scheduled for October 25, 2019.

(Current employee) v. MWRA: MWRA served Plaintiff with a motion for summary judgment on August 12, 2019. Plaintiff's opposition papers were

served on September 6, 2019. Plaintiff served an opposition to MWRA's motion for summary judgment on September 17, 2019.

Closed Cases: BHD/BEC JV2015 v. MWRA, Suffolk Superior Court, C.A. No. 1884-CV-03477D: Plaintiff contractor brought claims arising out of MWRA Contract No. 7157, Wachusett Aqueduct Pumping Station. The claims were settled. A Stipulation of Dismissal was filed with the Court on July 31, 2019. This matter is now closed.

DaPrato v. MWRA, Suffolk Superior Court, C.A. No. 2015-CV-3687D; SJC No. 12651: The Satisfaction of Judgment has been filed with the Court and this matter is now closed.

Quinn, Isabelle v. MWRA, Suffolk Superior Court, C.A. No. 1884-CV-03544E: At its July 17 meeting, MWRA's Board of Directors approved a settlement of this case. The parties then executed a Settlement Agreement, which was approved by the Court. This matter is now closed.

Closed Claims: Helmsworth Mgt Co. (Quinn, Isabelle)**:** This claim by the worker's compensation carrier for Isabelle Quinn was resolved by the above litigation. This matter is now closed.

Subpoenas During the First Quarter of FY 2020, one subpoena was received, one subpoena was closed, and no subpoenas were pending at the end of the First Quarter FY 2020.

Wage Garnishments There are currently 14 Trustee Process matters, four of which are considered active and are monitored by Law Division.

TRAC/MISC.

New Appeals: There are no new appeals in 1st Quarter FY 2020.

Settlement by Agreement of Parties The Midtown Hotel; MWRA Docket No. 19-02

Stipulation of Dismissal No Joint Stipulation of Dismissals filed.

Notice of Dismissal Fine paid in full No Notices of Dismissal, Fine Paid in Full.

Tentative Decision There are no Tentative Decisions issued in the 1st Quarter FY 2020.

Final Decisions There are no Final Decisions issued in the 1st Quarter FY 2020.

INTERNAL AUDIT AND CONTRACT AUDIT ACTIVITIES
1st Quarter - FY20

Highlights
During 1st quarter FY20, Internal Audit (IA) completed a review of Asset Tracking – Fleet Data Verification. This review was to determine the accuracy of the Maximo fleet database by conducting a physical inventory of all MWRA plated vehicles and plated equipment. Sixteen recommendations were made with three of them closed at the completion of the review. Some recommendations include updating the Vehicle Management and Maintenance Policy, strengthening internal controls and updating the inventory in the Maximo system.

In addition, one consultant audit, one consultant preliminary review and three construction preliminary labor burden reviews were completed. IA also performed a review of the Chelsea lease for FY19, completed a prevailing wage review of the cleaning contract at Clinton and computed the MWRA overhead rate for FY20.

Status of Recommendations
During FY20, 21 recommendations were closed of which 18 are from prior fiscal years' audits.

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

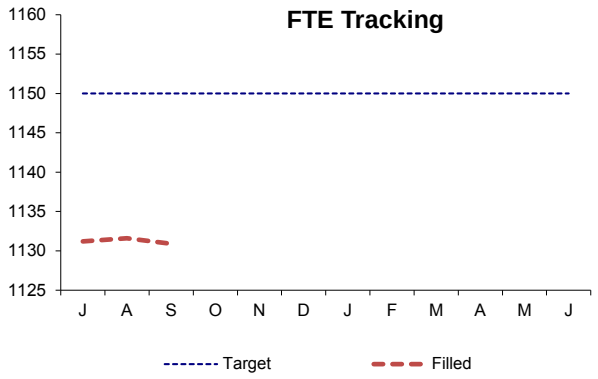
Report Title (issue date)	Audit Recommendations		
	Open	Closed	Total
Purchase Card Activity on Deer Island (3/31/17)	1	14	15
Review of Uniform Debit Card Program (3/30/18)	1	5	6
Fleet Services Process Review (6/30/18)	2	3	5
Fuel Use & Mileage Tracking (12/31/18)	4	4	8
Review of Purchase Card Activity (5/23/19)	1	10	11
Asset Tracking – Fleet Data Verification (8/21/19)	13	3	16
Total Recommendations	22	39	61

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	FY16	FY17	FY18	FY19	FY20 Q1	TOTALS
Consultants	$88,312	$272,431	$118,782	$262,384	$591,089	$1,332,998
Contractors & Vendors	$1,772,422	$3,037,712	$1,323,156	$3,156,524	$336,873	$9,626,687
Internal Audits	$220,929	$224,178	$204,202	$210,063	$53,692	$913,064
Total	**$2,081,663**	**$3,534,321**	**$1,646,140**	**$3,628,971**	**$981,654**	**$11,872,749**

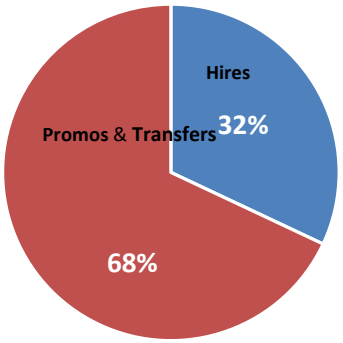
OTHER MANAGEMENT

Workforce Management
1st Quarter - FY20



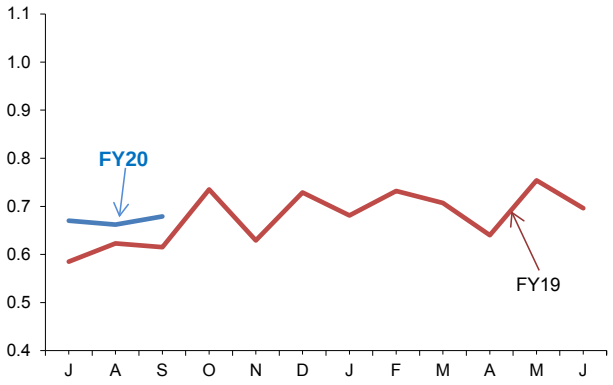
FY20 Target for FTE's = 1150
FTE's as of September 2019 = 1130.9
Tunnel Redunancy as of Sept 2019 = 7.0

Position Filled by Hires/Promos & Transfer for YTD



	Pr/Trns	Hires	Total
FY18	118 (61%)	74 (39%)	192
FY19	112 (60%)	76 (40%)	188
FY20	28 (60%)	13 (40%)	189

Average Monthly Sick Leave Usage
Per Employee

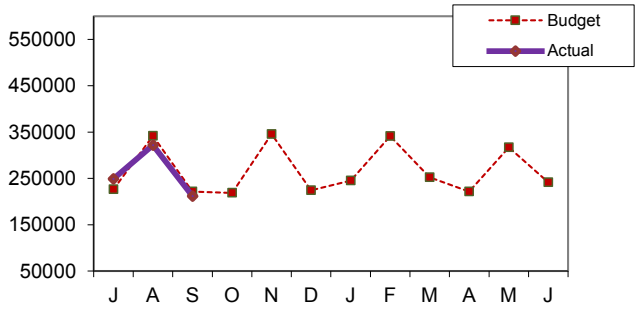


Average monthly sick leave for the 1st Quarter of FY20 increased as compared to the 1st Quarter of FY19 (8.04 to 7.29)

	Number of Employees	YTD	Annualized Total	Annual FMLA %	FY19
Admin	137	1.78	7.14	24.4%	7.78
Aff. Action	5	3.45	13.80	0.0%	6.28
Executive	4	0.05	0.20	0.0%	7.05
Finance	32	1.32	5.28	0.0%	2.28
Int. Audit	6	2.00	8.02	13.0%	4.06
Law	13	1.67	6.69	10.9%	7.80
OEP	4	1.00	4.00	0.0%	5.97
Operations	932	2.09	8.36	18.7%	8.35
Tunnel Red	7	1.19	4.75	48.9%	8.11
Pub. Affs.	10	1.08	4.30	10.1%	4.45
MWRA Avg	**1150**	**2.68**	**8.04**	**18.8%**	**8.13**

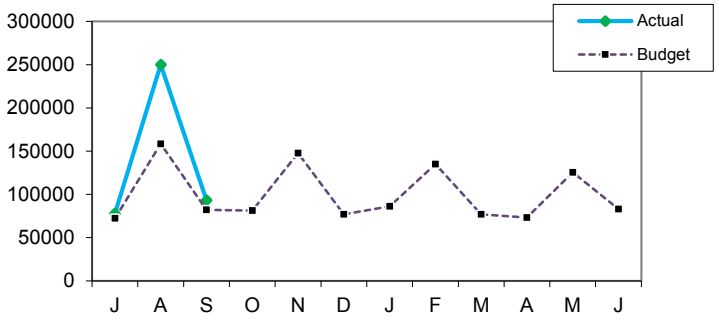
Percent of sick leave usage for FY20, attributable to Family and Medical Leave Act (FMLA) is 18.8% .

Field Operations
Current Month Overtime $



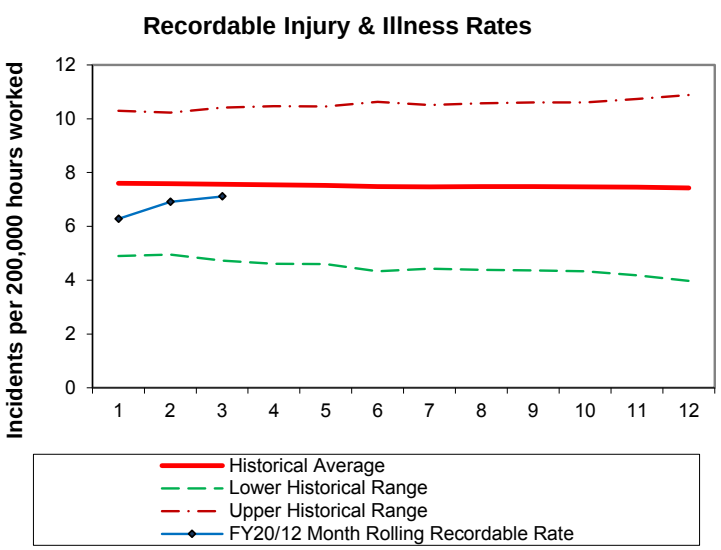
Total Overtime for Field Operations for the first quarter of FY20 was $782,265 which is ($7k) under budget. Emergency overtime was $378k, which was ($20k) under budget. Rain events totaled $287k, CSO activation was $36k, emergency maintenance was $41k. Coverage overtime was $187k, which was $4k over budget, reflecting the month's shift coverage requirements.
Planned overtime was $217k or $9k over budget, mainly for maintenance off-hours work at $104k, community assistance (mainly quench buggy) at $37k, and maintenance work completion at $21k.
Year-to-date, FOD has spent $782,265 on overtime, which is ($7k) under budget.

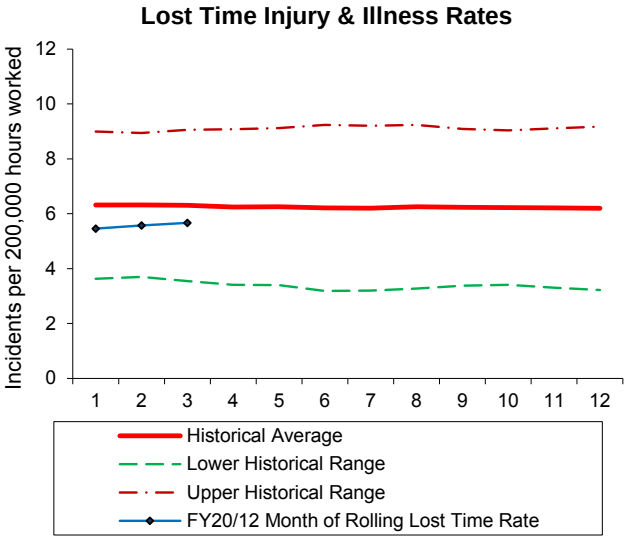
Deer Island Treatment Plant
Current Month Overtime $



Deer Island's total overtime expenditure through the first quarter of FY20 was $421k, which was $108K or 35% over budget. In the first quarter Deer Island experienced higher than anticipated planned overtime related to the Eversource cross harbor HEEC cable outage of $110k and shift coverage requirements of $39k.
This is offset by less storm coverage of ($21k) andplanned / unplanned overtime (non-HEEC related) of ($20k). The FY20 CEB included $30k for HEEC overtime vs. $140k spent. The outage lasted 18 days as opposed to the 5 days anticipated.

Workplace Safety
1st Quarter - FY20





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 FY18. 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

	1st Quarter Information		
	New	Closed	Open Claims
Lost Time	5	18	52
Medical Only	20	21	19
Report Only	19	21	
	QYTD		FYTD
Regular Duty Returns	7		7
Light Duty Returns	0		0

COMMENTS:

Regular Duty Returns

July	2	Employees returned to full duty/no restrictions
August	1	Employees returned to full duty/no restrictions
September	4	Employees returned to full duty/no restrictions

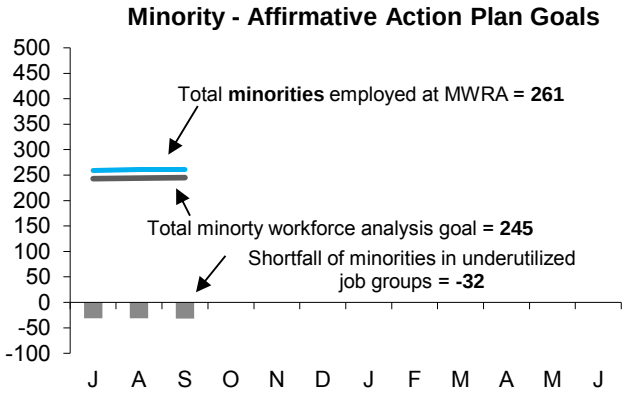
Light Duty Returns

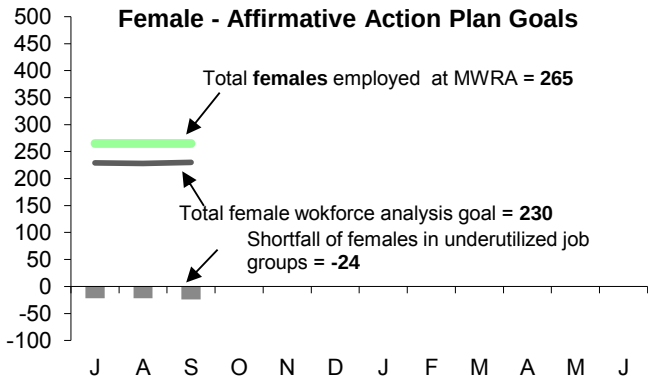
JUL N/A
AUG N/A
SEPT N/A

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

1st Quarter - FY20





Highlights:

At the end of Q1 FY20, 6 job groups or a total of 32 positions are underutilized by minorities as compared to 8 job groups fo r a total of 71 positions at the end of Q1 FY19; for females 7 job groups or a total of 24 positions are underutilized females as compared to 10 job groups or a total of 53 positions at the end of Q1 FY19. During Q1, 5 minorities and 4 females were hired. During this same period 3 minorities and 4 females were terminated.

Underutilized Job Groups - Workforce Representation

Job Group	Employees as of 9/30/2019	Minorities as of 9/30/2019	Achievement Level	Minority Over or Under Underutilized	Females As of 9/30/2019	Achievement Level	Female Over or Under Underutilized
Administrator A	23	3	3	0	11	7	4
Administrator B	23	0	4	-4	6	5	1
Clerical A	28	10	6	4	25	18	7
Clerical B	23	9	5	4	5	9	-4
Engineer A	81	29	17	12	17	19	-2
Engineer B	60	19	14	5	14	12	2
Craft A	115	17	22	-5	0	3	-3
Craft B	148	21	28	-7	3	7	-4
Laborer	68	18	15	3	4	3	1
Management A	102	22	25	-3	34	40	-6
Management B	43	9	9	0	9	5	4
Operator A	67	4	13	-9	2	1	1
Operator B	66	18	10	8	3	1	2
Professional A	30	3	7	-4	19	14	5
Professional B	163	46	43	3	80	60	20
Para Professional	52	15	11	4	26	14	12
Technical A	52	15	12	3	7	11	-4
Technical B	6	3	1	2	0	1	-1
Total	**1150**	**261**	**245**	**48/-32**	**265**	**230**	**59/-24**

AACU Candidate Referrals for Underutilized Positions

Job Group	Title	# of Vac	Requisition Int. / Ext.	Promotion s/Transfers	AACU Ref. External	Position Status
Craft B	Inventory Control Speciaist	2	Int	2	0	2 Promo =(WM) (HM)
Engineering A	Program Manager, PC&PS	1	Int	1	0	Promo = WF
Craft A	M&O Specialist	2	Int.	2	0	2 Promo = (2WM)
Craft A	M&O Specialist	1	Int/Ext.	0	0	NH = WM
Craft B	Electrian	2	Ext	0	0	NH = (WM) (AM)
Craft B	Plumber/Pipefitter	2	Ext.	0	0	NH = (2WM)
Management A	Program Mgr., Security, Arch & Engin.	1	Ext	0	0	NH = AM
Management A	Program Manager, Wastewater Ops.	1	Int.	1	0	Promo = WM
Management B	Program Manager, Public Health	1	Ext.	0	0	NH = WF
Operator A	Area Supervisor	4	Int/Ext	4	0	Promo = (4WM)
Operator A	Area Supervisor	1	Int.	1	0	Promo = WF
Professional A	Sr.Staff Counsel	1	Ext.	0	0	NH = WM
Professional A	Asst. Manager Workers Comp & LR	1	Int/Ext.	0	0	NH = WF
Technical A	Sr. Instrument Tech	1	Int.	1	0	LT = WM

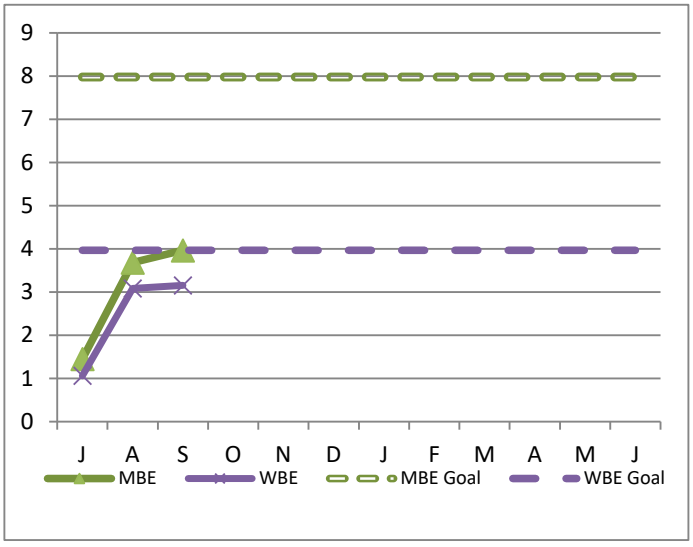
MBE/WBE Expenditures

1st Quarter - FY20

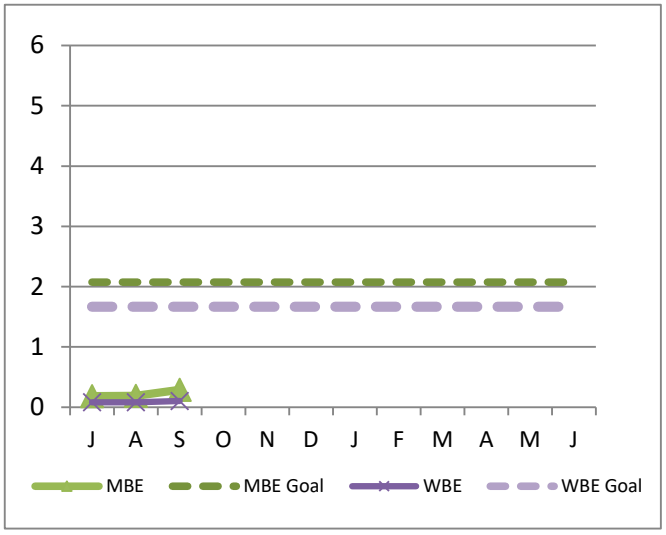
MBE/WBE targets are determined based on annual MWRA expenditure forecasts in the procurement categories noted below. The goals for FY20 are based on 85% of the total construction and 75% of the total professional projected spending for the year. Certain projects have been excluded from the goals as they 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 September.

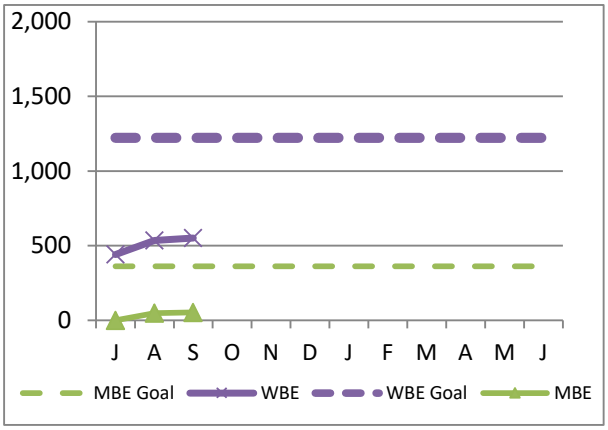
Construction



Professional Services



Goods/Services



FY20 spending and percentage of goals achieved, as well as FY19 performance are as follows:

MBE					WBE			
FY20 YTD		FY19			FY20 YTD		FY19	
Amount	Percent	Amount	Percent		Amount	Percent	Amount	Percent
3,967,506	49.7%	11,699,641	150.6%	Construction	3,155,244	79.5%	20,152,509	521.8%
288,965	13.9%	2,285,171	134.1%	Prof Svcs	104,040	6.2%	1,551,120	113.2%
53,166	14.7%	213,198	40.3%	Goods/Svcs	551,145	45.1%	780,760	46.7%
4,309,637	41.4%	14,198,010	142.0%	**Totals**	3,810,429	55.6%	22,484,389	325.6%

FY20 MBE/WBE dollar totals do not include MBE and WBE payments to prime contractors and consultants.

MWRA FY20 CEB Expenses
1st Quarter – FY20

As of September 2019, total expenses are $185.3 million, $5.3 million or 2.8% lower than budget, and total revenue is $199.4 million, $2.0 million or 1.0% over budget, for a net variance of $7.3 million.

Expenses –

Direct Expenses are $59.5 million, $140k or 0.2% under budget.

- **Ongoing Maintenance** expense $2.5 million over budget or 36.3%, reflecting the timing of projects.
- **Wages & Salaries** are under budget by $993k or 3.9%. Regular pay is $1.0 million under budget, due to lower head count, and timing of backfilling positions. YTD through September, the average Full Time Equivalent (FTE) positions was 1,138, twenty fewer than the 1,158 FTE's budgeted.
- **Utilities** are $586k under budget or 9.5%, reflecting electricity and diesel under spending at Deer Island totaling $497k. Electricity underspending reflects CTG usage during HEEC cable electrification testing partially accounting for $199k of that variance. Diesel underspending of $278k at Deer Island is due to timing differences.
- **Professional Services** expenses are $581k under budget or 21.6%, primarily due to under spending for Computer System Consultants of $493k, partially offset by overspending of $109k for Lab & Testing & Analysis.

Indirect Expenses are $12.8 million, $3.4 million or 20.7% under budget driven by lower than expected Watershed Reimbursement of $3.0 million.

Debt Service Expenses totaled $113.0 million, $1.8 million under budget due to lower than budgeted variable interest rates.

Revenue and Income –

Total Revenue and Income is $199.4 million, $2.0 million higher than budget, primarily due to greater than budgeted other user charges, $1.0 million, reflecting Stoughton's prepayment of its remaining Entrance Fee, disposal of equipment of $189k, higher investment income $225k, higher energy revenue of $134k, and receipt of an unbudgeted operating grant for $107k.

	Sep 2019 Year-to-Date			
	Period 3 YTD Budget	Period 3 YTD Actual	Period 3 YTD Variance	%
EXPENSES				
WAGES AND SALARIES	$ 25,657,901	$ 24,664,624	$ (993,277)	-3.9%
OVERTIME	1,229,344	1,350,999	121,655	9.9%
FRINGE BENEFITS	5,321,347	5,064,476	(256,871)	-4.8%
WORKERS' COMPENSATION	588,564	463,638	(124,926)	-21.2%
CHEMICALS	3,589,825	3,317,881	(271,944)	-7.6%
ENERGY AND UTILITIES	6,169,967	5,584,258	(585,709)	-9.5%
MAINTENANCE	6,773,463	9,235,466	2,462,003	36.3%
TRAINING AND MEETINGS	103,547	91,133	(12,414)	-12.0%
PROFESSIONAL SERVICES	2,694,082	2,113,094	(580,988)	-21.6%
OTHER MATERIALS	987,381	1,117,234	129,853	13.2%
OTHER SERVICES	6,491,022	6,463,512	(27,510)	-0.4%
TOTAL DIRECT EXPENSES	**$ 59,606,443**	**$ 59,466,315**	**$ (140,127)**	**-0.2%**
INSURANCE	$ 652,806	$ 545,294	$ (107,512)	-16.5%
WATERSHED/PILOT	6,708,400	3,659,245	(3,049,155)	-45.5%
HEEC PAYMENT	577,815	384,570	(193,245)	-33.4%
MITIGATION	413,655	412,767	(888)	-0.2%
ADDITIONS TO RESERVES	523,571	523,571	-	0.0%
RETIREMENT FUND	7,315,000	7,315,000	-	0.0%
POST EMPLOYEE BENEFITS	-	-	-	---
TOTAL INDIRECT EXPENSES	**$ 16,191,247**	**$ 12,840,447**	**$ (3,350,799)**	**-20.7%**
STATE REVOLVING FUND	$ 21,505,342	$ 21,505,342	$ -	0.0%
SENIOR DEBT	49,298,444	49,298,444	-	0.0%
DEBT SERVICE ASSISTANCE	(890,235)	(890,235)	-	0.0%
CURRENT REVENUE/CAPITAL	-	-	-	---
SUBORDINATE MWRA DEBT	44,083,850	44,083,850	-	0.0%
LOCAL WATER PIPELINE CP	-	-	-	---
CAPITAL LEASE	804,265	804,265	-	0.0%
DEBT PREPAYMENT	-	-	-	---
VARIABLE DEBT	-	(1,818,288)	(1,818,288)	---
DEFEASANCE ACCOUNT	-	-	-	---
TOTAL DEBT SERVICE	**$ 114,801,666**	**$ 112,983,378**	**$ (1,818,288)**	**-1.6%**
TOTAL EXPENSES	**$ 190,599,356**	**$ 185,290,140**	**$ (5,309,214)**	**-2.8%**
REVENUE & INCOME				
RATE REVENUE	$ 190,441,750	$ 190,441,750	$ -	0.0%
OTHER USER CHARGES	2,338,288	3,373,152	1,034,864	44.3%
OTHER REVENUE	771,965	1,496,720	724,755	93.9%
RATE STABILIZATION	-	-	-	---
INVESTMENT INCOME	3,866,642	4,091,239	224,597	5.8%
TOTAL REVENUE & INCOME	**$ 197,418,645**	**$ 199,402,861**	**$ 1,984,216**	**1.0%**

Cost of Debt

1st Quarter – FY20

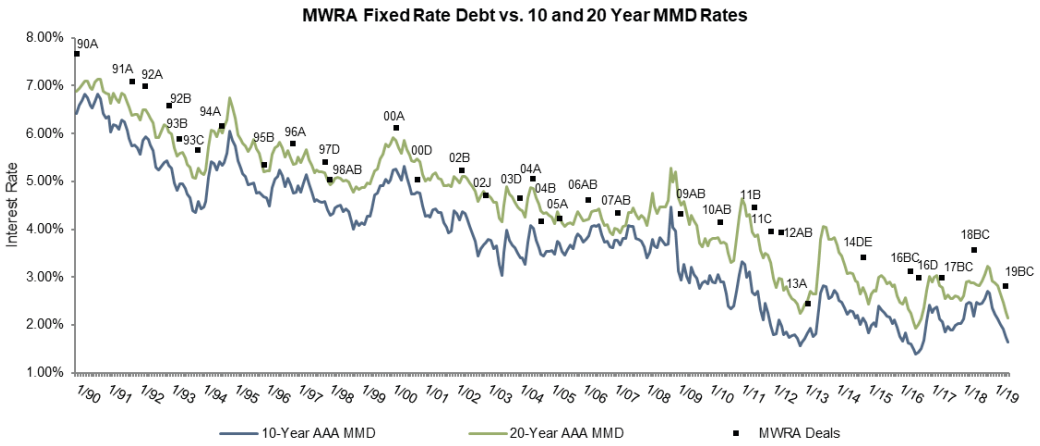
MWRA borrowing costs are a function of the fixed and variable tax exempt interest rate environment, the level of MWRA's variable interest rate exposure and the perceived creditworthiness of MWRA. Each of these factors has contributed to decreased MWRA borrowing costs since 1990.

Average Cost of MWRA Debt FYTD

Fixed Debt ($3.39 billion)	3.70%
Variable Debt ($389.9 million)	1.93%
SRF Debt ($921.4 million)	1.55%
Weighted Average Debt Cost ($4.70 billion)	3.13%

Most Recent Senior Fixed Debt Issue
May 2019

2019 Series B &C ($144.2 million)	2.82 %

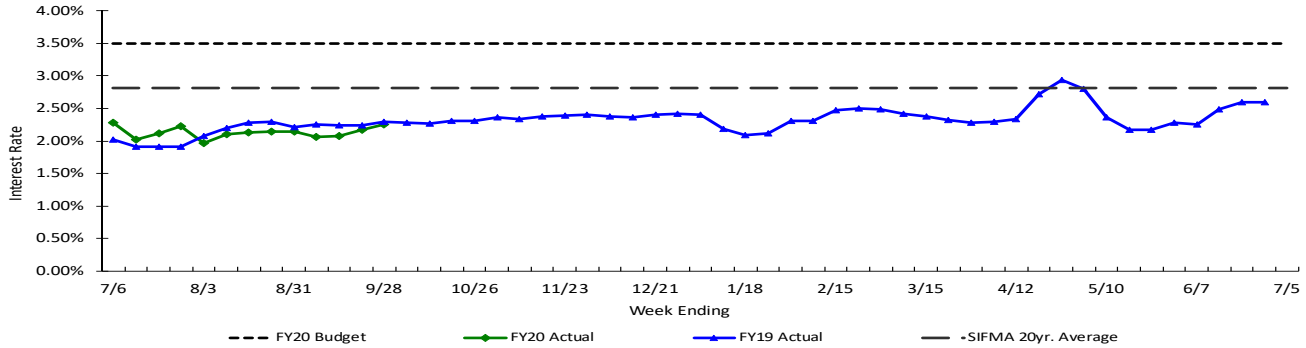


Bond Deal	1993C	1994A	1995B	1996A	1997D	1998AB	2000A	2000D	2002B	2002J	2003D	2004A	2004B	2005A
Rate	5.66%	6.15%	5.34%	5.78%	5.40%	5.04%	6.11%	5.03%	5.23%	4.71%	4.64%	5.05%	4.17%	4.22%
Avg Life	19.1 yrs	19.5 yrs	20.5 yrs	19.5 yrs	21.6 yrs	24.4 yrs	26.3 yrs	9.8 yrs	19.9 yrs	19.6 yrs	18.4 yrs	19.6 yrs	13.5 yrs	18.4 yrs

Bond Deal	2006AB	2007AB	2009AB	2010AB	2011B	2011C	2012AB	2013A	2014D-F	2016BC	2016D	2017BC	2018BC	2019BC
Rate	4.61%	4.34%	4.32%	4.14%	4.45%	3.95%	3.93%	2.45%	3.41%	3.12%	2.99%	2.98%	3.56%	2.82%
Avg Life	25.9 yrs	24.4 yrs	15.4 yrs	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

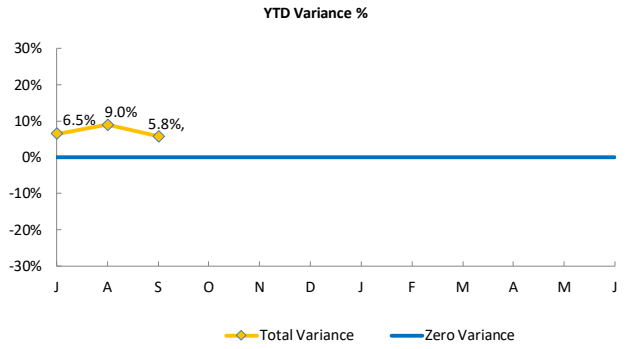
Weekly Average Variable Interest Rates vs. Budget

MWRA currently has eleven variable rate debt issues with $782.2 million outstanding, excluding commercial paper. Of the eleven outstanding series, four have portions which have been swapped to fixed rate. Variable rate debt has been less expensive than fixed rate debt in recent years as short-term rates have remained lower than long-term rates on MWRA debt issues. In September, SIFMA rates ranged from a high of 1.58% to a low of 1.28% 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.

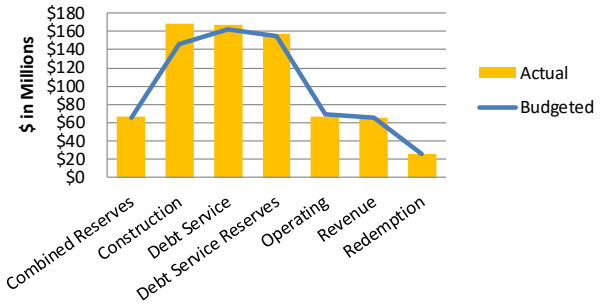


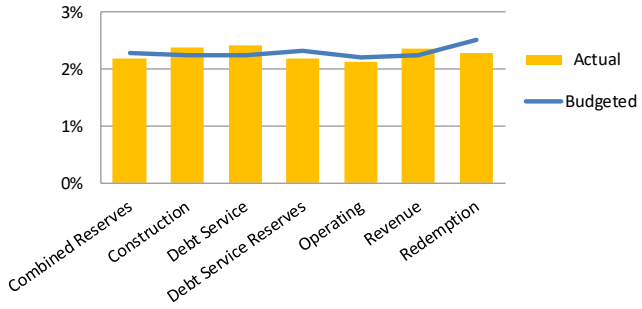
Investment Income
1st Quarter – FY20

Year To Date

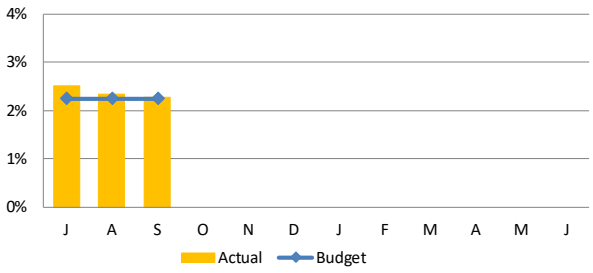


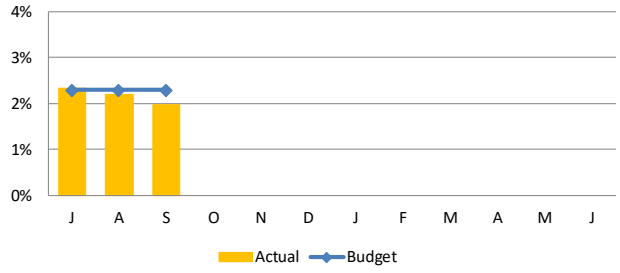
	YTD BUDGET VARIANCE ($000)			
	BALANCES IMPACT	RATES IMPACT	TOTAL	%
Combined Reserves	$8	($17)	(9)	-2.4%
Construction	$124	$56	180	22.2%
Debt Service	$26	$72	98	10.9%
Debt Service Reserves	$13	($50)	(37)	-4.2%
Operating	($18)	$6	(12)	-3.2%
Revenue	$1	$18	19	5.3%
Redemption	$1	($15)	(14)	-8.5%
Total Variance	$155	$70	$225	5.8%

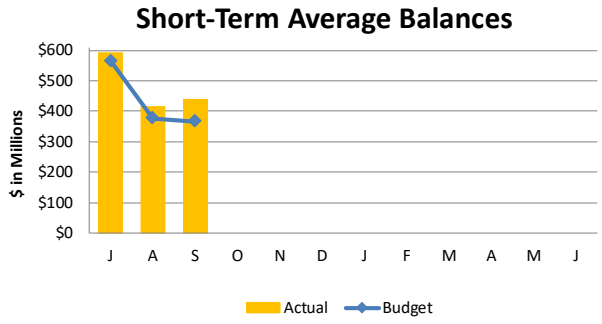


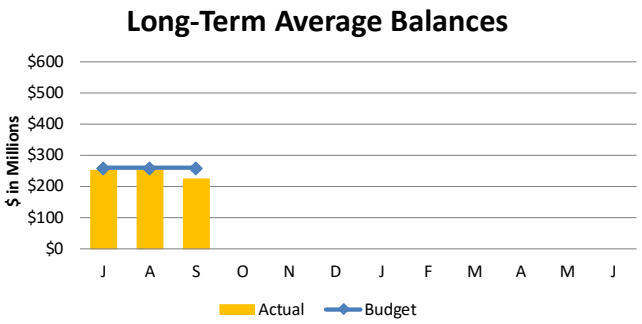


Monthly









1st Quarter - FY20

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